

A Thesis Submitted for the Degree of PhD at the University of Warwick

Permanent WRAP URL:

<http://wrap.warwick.ac.uk/185395>

Copyright and reuse:

This thesis is made available online and is protected by original copyright.

Please scroll down to view the document itself.

Please refer to the repository record for this item for information to help you to cite it.

Our policy information is available from the repository home page.

For more information, please contact the WRAP Team at: wrap@warwick.ac.uk

**A Comparative study of Menarche and
Menstruation Knowledge and Experiences of
Girls aged 16-19 years old in low-resource
settings of the Philippines and the United
Kingdom**

By Rebecca Ruth Lane Evans

**A thesis submitted in partial fulfilment of the
requirements for the degree of Doctor of
Philosophy in Health Sciences**

University of Warwick, Warwick Medical School

February 2023



Contents

<i>Description</i>	<i>Page number</i>
Title page	1
Contents	2
List of Illustrations	5
Acknowledgements	7
Declaration	8
Summary	9
Chapter 1 Introduction 1.0 Background to the research 1.1 Justification of the research 1.2 Review of the pertinent literature 1.3 Gaps in the literature 1.4 Development of the Research Aims and Objectives 1.5 Thesis Structure	11
Chapter 2 Methodology 2.0 The Research Topic and Motivation 2.1 The Research Process 2.2 Ontology and Epistemology 2.3 Branches of Epistemology and Theoretical Frameworks 2.4 Methodology 2.5 Formulating the Research Questions 2.6 Methods 2.7 Data Sources 2.8 Summary of Methodology Chapter	30
Chapter 3 Research Methods 3.0 Research Aims, Objectives and Questions 3.1 Study Design 3.2 Participants 3.3 Preparation of Materials 3.4 Data collection, transfer and Storage 3.5 Analysis Plan 3.5.1 Quantitative data 3.5.2 Qualitative data 3.5.3 Systematic Literature Review	54



<i>Description</i>	<i>Page number</i>
<p>Chapter 4 Systematic Review</p> <p>4.0 Introduction 4.1 Scoping Review 4.2 Structuring the Review 4.3 Objectives of the Review 4.4 Review Methods 4.5 Data Extraction 4.6 Analysis and Synthesis 4.7 Results 4.8 Analysis 4.9 Discussion 4.10 Conclusion</p>	82
<p>Chapter 5 Results</p> <p>5.0 Research questions revisited 5.1 Data retrieval 5.2 Background variables 5.3 Sources of Menstrual Knowledge 5.4 Menstrual Knowledge Attitude and Perception (KAP) and Experience Scores 5.5 Regression Analysis 5.6 Summary of quantitative data 5.7 Using the qualitative data to interpret the quantitative data</p>	107
<p>Chapter 6 Thematic Analysis</p> <p>6.0 Factors affecting Menstruators 6.1 Socio-ecological model 6.2 Biological Factors 6.3 Personal Factors 6.4 Interpersonal Factors 6.5 Environmental Factors 6.6 Societal Factors 6.7 Photovoice</p>	136
<p>Chapter 7 Thematic Synthesis and Discussion</p> <p>7.0 A brief summary of results and analysis 7.1 Synthesis 7.2 Discussion 7.3 What girls want 7.4 What does the thesis add to existing knowledge? 7.5 Recommendations for further research 7.6 Specific Recommendations for the Philippines and the UK 7.7 General recommendations for policy and practice 7.8 Strengths and Weaknesses 7.9 Conclusion</p>	163



<i>Description</i>	<i>Page number</i>
Bibliography	192
Appendices	218
Appendix 1 Abbreviations	218
Appendix 2 Facebook recruitment advertisements	220
Appendix 3 Published Systematic Review	221
Appendix 4 Demographic data graphed	258
Appendix 5 Sources of Knowledge data	279
Appendix 6 Menstrual Knowledge data	283
Appendix 7 Attitudes and Perceptions data	294
Appendix 8 Menstrual Experience data	297
Appendix 9 pre-Covid Methods	324
Appendix 10 pre-Covid Call for Participants	341
Appendix 11 Flow diagram of Qualtrics Survey	342
Appendix 12 Flow diagram of Focus Group Discussion (FGD)	343
Appendix 13 FGD Consent Form	344
Appendix 14 FGD Participant Information Leaflet	346
Appendix 15 Impacts of PhD	351



List of Illustrations

<i>Description</i>	<i>Page number</i>
Figure 1.1 Thesis Structure	29
Figure 3.1 Components of the Synthesis	56
Table 3.1 Quantitative Survey questions	62
Table 3.2 The questions asked to the Focus Group Participants	72
Table 3.3 Bucketing of demographic variables The Philippines	76
Table 3.4 Bucketing of demographic variables The UK	76
Table 3.5 Logical framework to answer the research question 1a: 'What is the knowledge, attitude and perceptions (KAP) of Menarche and Menstruation?	79
Table 3.6 Logical framework to answer the research question 1b: 'What is the Experience and Practice of Menarche and Menstruation?	80
Figure 4.1 Proximal, Intermediate and Distal Outcomes	87
Figure 4.2 Inputs and Outputs	89
Table 5.1 Demographic factor of sample	110
Table 5.2 Demographic features of sample compared to national data in the Philippines and in the UK.	111
Table 5.3 Sources of Menstrual Knowledge of sample	115
Table 5.4 Descriptive Statistics of Knowledge, Attitudes and Practices, and KAP and Experience Score Quartiles	116
Table 5.5. Comparison of The Philippines and the UK mean scores	117
Table 5.6 Multiple Linear Regression between background variables, Knowledge, Attitude and Perceptions, KAP and Experience in The Philippines	119
Table 5.7 Multiple Linear Regression between background variables, Knowledge, Attitude and Perceptions, KAP and Experience The UK	124
Figure 6.1 The Socio-Ecological Model and factors affecting menstruators	136



Figure 6.2 photographs from Participant 2 in the Philippines 'menstrual experience'	159
Figure 6.3 the emergent themes mapped to the socio-ecological model	162
Figure 7.1 Inputs and outputs for menstrual KAP, Positive Feedback Loop	166
Figure 7.2 The Logic Model: Proximal, intermediate and distal outcomes and indicators of a menstrual health intervention, with inputs and outputs.	169



Acknowledgements

I would like to thank my supervisors Professor Frances Griffiths and Associate Professor Bronwyn Harris of the University of Warwick for competently steering me through this thesis.

I would like to thank Nancy Caluga Nicholas and Flora Tatoy of Kapitiran-Kaunlaran Foundation in the Philippines for arranging and assisting with fieldwork. I would like to thank Dr. Gerald Uy Sim for his assistance with the Tagalog translation.

I would like to thank Dr Ram Bajpal of the University of Keele for his assistance with statistical analysis.

Lastly I'm thankful for the support I have received from my parents, sisters and daughters and my husband Jeffrey.



Declaration

This thesis is submitted to the University of Warwick in support of my application for the degree of Doctor of Philosophy. It has been composed by myself and has not been submitted in any previous application for any degree.

Parts of this thesis have been published by the author.

Evans RL, Harris B, Onuegbu C, et al. Systematic review of educational interventions to improve the menstrual health of young adolescent girls. *BMJ Open* 2022;12:e057204. doi:10.1136/bmjopen-2021-057204



Summary of thesis

It is known that menstruation is a challenge to schoolgirls that can affect both attendance and participation. This research seeks to understand the factors that affect the quality of the menstrual experience of schoolgirls so that more supportive policies can be designed.

This was a mixed-methods study which recruited menstruators between the ages of 16 and 19 in the Philippines (a Low-and-Middle Income Country (LMIC)) and in the United Kingdom (UK) (a High-Income Country (HIC)) using Facebook Advertising. Respondents completed an on-line survey in Qualtrics. 11 Likert-style questions were used to produce a Menstrual Knowledge score and 14 Likert-style questions were used to produce a Menstrual Experiences score. Regression analysis looked for associations between the menstrual experience and demography. A small group of respondents from each country took part in an asynchronous epistolary Focus Group Discussion via social media. Qualitative data were imported into Nvivo for Thematic Analysis.

706 menstruators were recruited (Philippines $n = 308$ and UK $n = 398$). For the focus groups, $n = 12$ and $n = 8$ respectively. Using $P < 0.5$, predictors of knowledge in the Philippines were perceived income, improved sanitation, a waste-collection service and state-schooling. Predictors of experience were absolute income (food security) and improved sanitation. Predictors of knowledge in the UK were perceived income, urban setting and state-schooling. Predictors of experience were perceived income, urban setting and age. There was a significant difference between the Philippines and the UK in knowledge score but no difference between experience score ($P < 0.001$). There was a significant difference between the two countries in how girls feel when they are menstruating ($P < 0.01$). Girls in the UK felt more negative about menstruation than those in the Philippines. Girls in both countries frequently described suffering from dysmenorrhea which affected their participation. They also reported anxiety about leaking which affected their concentration.

This study confirmed that access to menstrual products and adequate Water, Sanitation and Hygiene (WASH) facilities is a fundamental requirement for girls to manage their menstruation at school. Limited access to resources in the Philippines affected girls' menstrual experiences, and a few were forced to go home from school to deal with the bleeding. This study also revealed that despite UK schools providing products and a good standard of facilities, this alone did not improve girls' experience of menstruation; girls in the UK did not rate their menstrual experience any better than those in the Philippines.

Debilitating dysmenorrhea was very commonly experienced. In the Philippines, girls got support from their peers and their teachers and could leave the classroom temporarily to change or rest if necessary. In the UK, girls complained about school policies that did not let them out of the classroom. They routinely took painkillers, and some took the contraceptive pill, in order to be able to cope. The menstrual stigma requiring them to 'put up and shut up' led to anxiety and negative feelings around menstruation. These findings concur with what has been called 'the Menstrual Mandate' in HICs in which girls are expected to conceal their menstruation from others (Bobel, 2019).

This research found that girls in LMIC need access to painkillers as well as pads and infrastructure to enable them to participate in school activities, but in both LMIC and HIC,



policies that remove the menstrual stigma, educate about dysmenorrhea and menstrual disorders, and promote Menstrual Health more widely need to be developed. The results of the literature review into menstrual education interventions suggested that interactive interventions that promote discussion are the most effective for improving menstrual literacy.



Chapter 1 Introduction

...in which the topic of menstrual health and girls' education is introduced, a justification for the research is made, a review of the literature is undertaken to establish the current state of knowledge, gaps in the literature are identified and the research aim is developed.

1.0 Background to the research

'...there is no tool for development more effective than the education of girls and the empowerment of women...' Kofi Annan (United Nations Press Release 16 January, 2004)

Kofi Annan (secretary-general of the UN 1996-2006) made an inspiring and oft-quoted speech to the Women's Health Commission, in which he outlined the profound effect that educating girls could have in breaking the cycle of poverty. He recognised that through education, girls would be better able to look after their own health, and the health and education of their future families. They would improve their work prospects and the economic development of their communities. He even suggested that girls were peace-makers and that their education would stop wars and protect the planet! (United Nations Press Release 16 January, 2004)

Since then, evidence linking girls' education to better health outcomes has been gathering. Educating girls has been shown to have a positive impact on health by delaying marriage and pregnancy, reducing infant and maternal mortality, reducing incidence of disease such as Human Immunodeficiency Virus (HIV) and malaria, and reducing Female Genital Mutilation (FGM) and Gender-Based Violence (GBV) (Sperling, Winthrop and Kwauk, 2016) and in the long-term educated girls gain social capital and have access to wider opportunities (Sommer *et al.*, 2016). This makes a compelling case for ensuring that girls do not drop out of education prematurely.

The education of girls has been on the global agenda since the 1990s. In 1995, 189 countries signed the Beijing Declaration and Platform for Action (BPfA) pledging to advance the education of girls (cited in UNESCO, 2020). This was a precursor to the Millennium Development Goals (MDGs) which set a target of ensuring that all children were able to complete a full course of primary schooling by 2015 (UN Organisation, 1998). Since 1995,



180 million more girls have enrolled in education, allowing 65 % of countries to achieve gender parity in primary education. The gains are more modest in upper secondary, where there is gender parity in 24% of countries, and in poor, rural areas still only 2% of girls actually finish secondary education (UNESCO, 2020).

There are many dimensions to girls' school attendance, some of which are external, such as poverty, culture (which may dictate that girls are doing gender-specific tasks in the home rather than schooling) and preference given to boys' education (Sommer, 2011; Lahme, Stern and Cooper, 2018), but others are internal, stemming from the girls themselves. It is well known that a lot of adolescent girls drop out of school when they begin menstruating because they find it difficult to manage their menstruation in the school environment (Jewitt and Ryley, 2014; Montgomery *et al.*, 2016).

The Sustainable Development Goals (SDGs) which came into effect in 2015 have provided a renewed opportunity to focus on gender parity in education and specifically the barriers faced by girls (Sommer *et al.*, 2017). SDG Goal 4 is pertinent in calling for Quality Education and SDG Goal 5 calls for Gender Equality. Menstruation is not mentioned *per se*, however SDG goal 6 on Water and Sanitation alludes to it, saying that 'special attention (*should be given*) to the needs of women and girls and those in vulnerable situations' (Sommer *et al.*, 2021).

Menstruation was first recognised as a significant barrier to girls' education in a seminal paper by Jackie Kirk and Marnie Sommer in 2006, 'Menstrual and body awareness: linking girls' health with girls' education' (Kirk and Sommer, 2006). They found that a lack of products and poor sanitary facilities contributed to adolescent girls' school absenteeism. This article spawned a body of work that went on to link poverty to the difficulties of managing menstruation, largely in LMIC (Boosey and Wilson-Smith, 2013; Montgomery *et al.*, 2016). The term Menstrual Hygiene Management (MHM) was coined by WaterAid as it issued practical guidance to WASH Non-government Organisations (NGOs) tackling the problem (House, Mahon and Cavill, 2013).

In 2013, 'adequate' MHM was defined as, 'Women and adolescent girls are using a clean menstrual management material to absorb or collect menstrual blood, that can be changed as often as necessary for the duration of a menstrual period, using soap and water for washing the body as required, and having access to facilities to dispose of used menstrual management materials' (Sommer and Sahin, 2013).



Anecdotally, NGOs on the ground had been observing inadequate MHM for years (Birdthistle *et al.*, 2011) but it was not until quantitative studies used the definition that the extent of the prevalence was revealed. In one study in Uganda 90.5% of girls failed to meet the criteria for adequate MHM (Hennegan *et al.*, 2016) which illustrates the scale of the problem.

UNICEF encouraged governments to develop WASH in Schools (WinS) policies to provide hygiene education and sufficient latrines, water and soap (Loughnan *et al.*, 2016) to improve the health of *all* school children, and improve school attendance. With the issue of MHM being raised, some schools went further to address the of ‘special’ concerns of girls, segregating boys’ and girls’ facilities, and including menstrual hygiene education in their programming. Most evaluations of these WinS policies and programmes have found that they have been good at delivering the infrastructure but have been mixed in terms of behaviour change (Chard and Freeman, 2018). The results regarding school absenteeism have been mixed (McMichael, 2019) and it has proven difficult to disaggregate the data to look at the impact on menstruating girls specifically.

A few NGOs started to include menstrual product distribution in their programming which did seem to show an impact on school attendance. A large meta-analysis in India found that school absence was inversely associated with (disposable) pad use (Van Eijk *et al.*, 2016).

Very recently, it has become evident that ‘period poverty’ is not restricted to LMIC, but is to be found in HIC such as the USA (Sebert Kuhlmann *et al.*, 2019) and the UK (Elsworthy, 2018). A survey commissioned by Plan International found that 1 in 10 girls in the UK suffered from period poverty that prevented them from attending school (Milne, 2019).

Although products and toilets go some way to meeting the needs of menstruating girls (Sommer, Kjellén and Pensulo, 2013), qualitative work on the lived experiences of girls has uncovered many more social and emotional consequences to menstruation which are linked to school absenteeism and suggestive of the need for more supportive programming. A lack of knowledge about menarche exposed girls to psychological stress (Hennegan *et al.*, 2019) and anxiety about revealing one’s menstrual status, shame about leaks and fear of teasing led to low-self esteem (Shah *et al.*, 2019). The anxiety surrounding menstruation at school has been associated with reduced concentration and participation



(Jewitt and Ryley, 2014; Sommer, Ackatia-Armah, *et al.*, 2015). For many girls, menstruation has had a negative impact on their mental health (Cardoso *et al.*, 2021).

The more holistic term 'Menstrual Health' is now preferred to MHM because it encompasses not only the hygienic management of menstruation but psychological components such as confidence, dignity and self-esteem as well. It has been defined as 'a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity, in relation to the menstrual cycle' (Hennegan, Winkler, *et al.*, 2021).

Menstrual research has continued to grow rapidly and has expanded the concept of menstrual health to that of menstrual justice. Menstrual justice recognises that women's lives are inexorably linked to the menstrual cycle, beyond fertility, and that their menstrual health needs are holistic and cannot be separated from other needs. A menstrual justice lens sheds light on many gendered cultural practices and society norms that are violations of human rights, and draws attention to the need for policy changes at national level to bring about menstrual equity (Manorama and Desai, 2020).

In the timeframe of this thesis there has been a seismic increase in interest globally in menstrual issues, much of it led by activists and on the side of menstrual justice, including within that climate justice. The direction of this study has evolved alongside the conceptualisation of the menstrual problem and the outcomes fit within a menstrual justice framework.

1.1 Justification of the Research

Women and girls are core to the SDGs. The aim of the SDGs is to 'eradicate poverty' by 2030, and we are now in the 'Decade of Action' with a renewed focus on accelerating progress after it stalled during the global pandemic. The UN recognise that women are disproportionately represented in what is known as 'the last mile' and the call to 'leave no-one behind' requires a strengthening of efforts to remove the barriers preventing gender-equity (United Nations Sustainable Development Group UNSDG, 2020). A UNDP report emphasizes that 'Policies and programmes to reach the last mile could have greater impact if they are specifically oriented to empower women and girls and to support gender equality' (Pedrajas and Choritz, 2016).



Sommer *et al* 2021 claim that Menstrual Health plays a key role in all 17 of the goals but particularly identified Education, Gender, Health (Sexual and Reproductive Health; Psychosocial Wellbeing), and Water, Sanitation and Hygiene (WASH) as important research priorities (Sommer *et al.*, 2021). However, there is a need for a greater understanding of the linkages between the goals in order to plan effective and sustainable interventions (Hennegan *et al.*, 2016).

Against the background of the SDGs and within a human rights' framework this research was conceived to explore the links between menstruation, health, education, and poverty. Coming from an education background, my hypothesis was that a greater menstrual literacy mitigated against some of the detrimental effects of poverty and improved menstrual health and experience. I hoped to be able to produce recommendations to improve menstrual experience through menstrual literacy and go some way to addressing gender equity through enabling girls to get an education.

1.2 Review of the pertinent literature

A review was undertaken in order to reveal the current status of knowledge on this subject and uncover gaps in the literature. Search terms used in combination were Menarche, Puberty, Menstruation, Menses, Menstrual Health, Knowledge, Sources of knowledge, Attitude, Perception, Cultural myth, taboo, belief, Menstrual Hygiene Management, Practice and Experience. In order to get the fullest picture possible, papers were not excluded on quality or provenance at this stage.

The literature contained five systematic reviews of relevance. All of them address menstrual challenges in LMIC. Two of them focused on Menstrual Hygiene Management of women of all ages (Sumpter and Torondel, 2013; Hennegan and Montgomery, 2016). Three of them focused on adolescents; A study of Menstrual Hygiene Management in Indian girls (Van Eijk *et al.*, 2016), a study to map Menstrual Knowledge (Chandra-Mouli and Patel, 2017) and a study about Menstrual Knowledge that included younger girls (Coast, Lattof and Strong, 2019). All the reviews reported that girls were unprepared for the events of menarche and menstruation and predominantly experienced negative feelings of dismay, fear and shame.



There was a step-change in the terminology circa 2016 (Hennegan, 2017). The global menstrual movement preferred the term 'Menstrual Health' to Menstrual Hygiene Management, as it linked hygiene and resources with access to health, well-being, education, equity, empowerment and rights (Okomoto, 2019). 'Good health' is a goal of all peoples, and the aim of many interventions. One of the main prerequisites for achieving good health generally is health literacy. Having knowledge or awareness of health enables people to prepare for life events, to engage in behaviours that promote good health, and to recognise when something is wrong and needs remedying. By extension, 'good menstrual health' may depend upon 'good menstrual literacy' and require knowledge of the menstrual cycle for planning and gathering materials, behaviours that promote hygiene such as using menstrual absorbents and washing the genitals and seeking medical help for menstrual disorders such as heavy bleeding.

1.2.1 Preparedness

Menarche is the most significant event in the life of a girl as she transitions to adulthood (Blum *et al.*, 2014; Kågesten *et al.*, 2017). It is a single event that has many physical and psycho-social consequences (Sumpter and Torondel, 2013). Successfully navigating menarche and menstruation requires knowledge and information. Several studies, however, reported that girls lacked knowledge of menarche and many were unaware of it until it happened to them (Gupta *et al.*, 2018; Tiwari, Ekka and Thakur, 2018). A study in Mexico found that 20 % of girls did not know anything about it at all, prior to the event, and 39% said they felt unprepared (Marván and Molina-Abolnik, 2012). Another study described girls as 'appalled and horrified' on attaining menarche (Skandhan *et al.*, 1988). Girls who were prepared for menarche were significantly more able to cope with menstruation than those who were not (Chandra-Mouli and Patel, 2017). Negative experiences of menarche have been associated with negative experiences of menstruation, such as debilitating pain (Marván and Alcalá-Herrera, 2014; Coast, Lattof and Strong, 2019). Knowledge about what to expect, and mental as well as physical preparedness seems important for on-going menstrual health.

1.2.2 Menarche knowledge

Menarche is the visible expression of the developmental phase of puberty caused by hormones changing growth patterns over a period of a couple of years. As girls enter adolescence, gonadotropin hormones are secreted from the anterior pituitary gland of the



hypothalamus in the brain. Follicle Stimulating Hormone (FSH) travels in the blood to the ovary and activates the development of the egg-containing follicle, causing it to release oestrogen. As the follicle develops, oestrogen prepares the endometrium for implantation by increasing vascularisation. Without the egg being fertilised, the endometrial lining is shed through the vagina leading to a loss of 30-80 mls of blood over a period of 3-5 days (Jain *et al.*, 2022). This is menstruation, which is a normal physiological process. Menarche is the first menstruation a girl experiences.

Other physical and emotional changes are significant during early adolescence (Afsari, 2017). Physically, menarche is usually preceded by the swelling of the breasts and hips, although these changes take place gradually, unlike the onset of bleeding which starts unexpectedly. Emotionally, moods and body dysmorphia are common (*ibid*). The rate of depression in adolescent girls was found to be twice that of boys (Al Omari, Razeq and Fooladi, 2016). Girls were found to have a strong reaction to menarche itself, particularly if they were unprepared; girls that were better prepared had less negative emotional responses (*ibid*). Blum *et al* (2014) argues that the period of early adolescence is extremely important in the developing young girl, whereby positive experiences allow for the development of a 'healthy brain with decision-making capacity', essential for empowerment and agency (Blum *et al.*, 2014).

Information on young adolescents' knowledge about menarche is scanty but it appears to be worryingly lacking, particularly as it has been shown that the experience of menarche itself that can define the future attitude girls take to managing the challenges of menstruation.

1.2.3 Menstruation knowledge

Studies have found that a lack of information about Menarche and Menstruation leaves girls unsure what is normal (Gumanga, 2012). Van Eijk *et al* (2016) looked at 138 studies, which included 100 000 subjects, and found that half considered menstruation 'normal', which means that half did not (Van Eijk *et al.*, 2016). Some girls reportedly associate blood with trauma, and on reaching menarche, they were scared and thought they were dying (Sommer, Kjellén and Pensulo, 2013).

Without guidance, girls were at risk of not dealing with menstruation hygienically (Bennett and Harden, 2014; Chandra-Mouli and Patel, 2017). They have been found to use a range



of absorbent materials from dirty rags to leaves or bits of mattresses to absorb the blood. Such non-sterile materials could potentially lead to reproductive tract infections, although Sumpter and Torondel (2016) have reviewed the evidence and say that 'whilst it is plausible', the evidence is weak (Sumpter and Torondel, 2013). Notwithstanding, unhygienic practices have led to a range of negative physical and social outcomes. These include the use of rough material that chafes, and the use of damp material that causes irritation. If not changed regularly, the material has emitted a smell. Girls have reported being uncomfortable and embarrassed and withdrawing from social circles (Shah *et al.*, 2019). It is clear that girls need information and guidance to help them to deal with their menstruation confidently but it not clear where that should come from.

1.2.4 Sources of knowledge

What children should be taught about puberty, when and by whom, can be controversial. For some, puberty is regarded as a private matter to be addressed within family settings only; for others, puberty education is left up to the state. The outcome is that many young girls are ill-prepared for menarche and menstruation (Mason *et al.*, 2013; Marván and Alcalá-Herrera, 2014; Chandra-Mouli and Patel, 2017; Setyowati, Rizkia and Ungsianik, 2019).

Menarche and menstruation are such taboo subjects that they are not routinely discussed (Ali and Rizvi, 2010). In Jordan, girls only found out about menstruation through eaves-dropping (Al Omari, Razeq and Fooladi, 2016). As mentioned above, several studies report girls being ignorant of menstruation until it they start bleeding (Gupta *et al.*, 2018; Tiwari, Ekka and Thakur, 2018) and for many, it remains a phenomenon about which they know very little. In a study in Pakistan, up to 50% of girls did not know the origin of menstrual blood. Some referred to it as 'dirt', others as a 'disease' (Ali and Rizvi, 2010).

Family members, teachers, religious or community leaders, and mass media are all potentially sources of knowledge. Several studies have found Mothers to be the main source of menstrual knowledge (a study in Turkey put it as high as 84% (İşgüven, Yörük and Çizmeciğlu, 2015), but their own knowledge may be incomplete (Chandra-Mouli and Patel, 2017; Coast, Lattof and Strong, 2019). This means that they may perpetuate cultural myths and misinformation (Sooki *et al.*, 2016; Valizadeh *et al.*, 2017). A menstrual knowledge intervention that involved educating mothers showed a significant difference in girls' knowledge scores pre- and post-test intervention (Valizadeh *et al.*, 2017). This



demonstrates Raskova and Stolinska's (2017) assertion that 'mothers can't be relied upon' (Raskova and Stolinska, 2017).

In HIC, it is often assumed that teachers will relieve mothers of the responsibility of informing their daughters about menarche. In the UK, although puberty is taught as part of the science curriculum in secondary school, menarche or menstruation *per se* are not mentioned (United Kingdom Department for Education, 2014). According to Freidenfelds (2009) as quoted by Ghanoui (2022) it has been the advertising efforts of sanitary product manufacturers that have primarily educated girls in High-income countries about menstruation for last century or so (Ghanoui, 2022).

The UK Government has recently consulted on Relationship and Sex Education (RSE), and for the first time acknowledged that menstrual well-being should be included in primary and secondary school curricula (United Kingdom Department for Education, 2019). However, because sex education is controversial, parents can still choose to withdraw their children from classes. The new curriculum was implemented in schools from September 2020. Teachers have already raised their concerns that they are not trained for this and are unable or unwilling to teach it (Brown *et al.*, 2022). The impact on Menstrual Literacy and Menstrual Health is yet to be fully evaluated, but it cannot be assumed that all girls will get access to the information in a useful or timely way.

1.2.5 Age at menarche

Age at menarche has been reported globally to be falling (Gultie, Hailu and Workineh, 2014). Menarche is triggered when girls attain a certain body mass and in higher income countries this has been increasingly earlier in a girl's life as nutritional quality has improved. Marván and Alcalá-Herrera (2014) found that 8% of the girls in their study had attained menarche before they were 11 years old (Marván and Alcalá-Herrera, 2014). Some girls may be just 8 or 9 years old. Girls are now experiencing menarche whilst they are still in elementary or primary school, and they are even less likely to have been prepared for the event.

Older girls have been found to have more menstrual knowledge than younger girls (Chandra-Mouli and Patel, 2017) and post-menarche girls have more knowledge than pre-menarche girls (Coast, Lattof and Strong, 2019)), suggesting that experience has been the catalyst for them to seek information. Gupta *et al* (2018) found that mass-media was a



new source of information for students in India (Gupta *et al.*, 2018). There is some evidence that girls have sought information from other non-traditional sources, such as the internet and social media (Sommer, 2009) but many concerns have been raised as to the veracity of information found on line (Suarez-Lledo and Alvarez-Galvez, 2021).

1.2.6 Silence

It is still taboo to talk about menstruation openly in many places across the globe. A study conducted in the Czech Republic and in China found that girls are told to keep their menstrual status secret (Raskova and Stolinska, 2017). 33% of participants in an Ethiopian study said that they never discussed it with anyone (Gultie, Hailu and Workineh, 2014). In Jordan, a phenomenological analysis reported that girls believed talking about it was 'rude' (Al Omari, Razeq and Fooladi, 2016). Mothers in Mexico said it was 'natural and normal' but ironically thought because of that 'it should not be remarked upon' (Marván and Alcalá-Herrera, 2014).

The language used for menstruation at society level often hid the topic in plain sight, referred to as an 'elision' (Coast, Lattof and Strong, 2019). In the UK, the use of the term 'Feminine Hygiene' as a medicalizing euphemism for menstrual products has been adopted widely (Agnew and Sandretto, 2016). Official documentation covered it in other agendas such as sexual and reproductive health, family planning and HIV prevention, and may not even directly refer to menstruation *per se*. for example, Pakistan has a ten-point plan to improve women's health as part of the National Vision 2016-2025 (Pakistan Ministry of Education and National Training MOENT, 2019) but does not refer once to menstrual health.

1.2.7 Culture rites and taboos

Culture and religion have been found to have a role in the attitudes and perceptions of societies towards menarche and menstruation. In some cultures, menarche was celebrated as a rite of passage, signalling fitness for marriage and child-bearing (Behera, Sivakami and Behera, 2015; Shah *et al.*, 2019). In Southern India, menarche was celebrated with gifts of jewellery and feastings (Al Omari *et al.*, 2016). Whilst there are societies that are positive about child marriage, early marriage is rarely associated with good outcomes for girls' health and it is a target for eradication within the SDG framework (Raj *et al.*, 2015; Lee *et al.*, 2016).



In the majority of societies, menarche has more negative connotations. Lee and Sasser-Cohen found that the bleeding can signal witchcraft or a curse (Bennett and Harden, 2014). Menstrual blood can be seen as dirty or polluting, so in some societies girls may not be allowed to do the cooking or carry water (Sommer, Kjellén and Pensulo, 2013). In Nepal, girls had to leave the comfort of their homes to go to a remote hut for the duration of their menstruation (Morrison *et al.*, 2018; Mukherjee *et al.*, 2020). In Cambodia girls were no longer allowed to play but must act as adults (Sommer, Ackatia-Armah, *et al.*, 2015). In some religions, girls were restricted from attending the holy places, as found in India (Tuli *et al.*, 2019) and in Nepal (Baumann, Lhaki and Burke, 2019). In Islam girls were said to become accountable for themselves as adult women, being respectful and covering their heads with the hijab, praying daily and fasting during Ramadan (Al Omari *et al.*, 2016). It has been reported in Sub-Saharan Africa that parents assume menarche is the result of sexual relations, so that girls are scared to tell the family (Sommer, 2009). In Tanzania, girls are not allowed to sit with the men-folk, possibly because they fear this (Sommer, Ackatia-Armah, *et al.*, 2015). In the UK, Bennett and Harden (2014) noted the words that mothers on an internet discussion thread used about their daughter's menarche; 'bittersweet' and a 'complete absence of joy' were some of the sentiments (Bennett and Harden, 2014). Negative attitudes of older women have been found to contribute to the fear and stress of young girls regarding menarche and menstruation (Marván and Molina-Abolnik, 2012; Behera, Sivakami and Behera, 2015).

Culture, its rites of passage and taboos clearly affect how menstruation is experienced by girls and the many nuances need to be more fully understood.

1.2.8 Restrictions

Many girls have menarche and menstruation restrictions put upon them, such as not being able to do the cooking for fear of contaminating the food, and some girls will impose restrictions upon themselves, believing, for example, that avoiding certain foods, like green mangos, will reduce the intensity and length of the menstrual flow (Sommer, Ackatia-Armah, *et al.*, 2015; Evans, 2018). Sometimes girls restrict bathing for the same reason (Ali and Rizvi, 2010). In the Philippines, superstitions such as jumping down three steps was believed to limit menstruation to just three days (Evans, 2018). According to Tiwari, Ekka, and Thakur (2018), these restrictions and superstitions are generally due to 'ignorance' (Tiwari, Ekka and Thakur, 2018).



Restrictions, whether self-imposed or imposed, may curtail a girl's normal activities (Jewitt and Ryley, 2014). Girls in the UK worried about whether they would be able to go swimming or play sports and they experienced 'sorrow' that menarche had come upon them (Bennett and Harden, 2014). A girl in the Philippines 'wished she was a boy' so that she could continue to run around with her friends instead of experiencing menstruation (Evans, 2018). Sometimes the society dictates that girls stop going out. In India, where arranged marriages are common, girls may get married once they attain menarche and become housewives and mothers and drop out of school. 720 million women worldwide are believed to be married before the age of 18 (Raj *et al.*, 2015). In Ethiopia it was reported that once girls reached menarche they were not allowed to leave the house for fear of abduction or rape (Sommer, Ackatia-Armah, *et al.*, 2015).

Once girls started menstruating, they encountered restrictions to their liberty.

1.2.9 School attendance

One of the main reasons girls miss school in all countries is the difficulty they have in managing their menstruation with dignity and ease. There have been a number of studies that have tried to quantify menstruation-related absence: a study in Pune in India reported it at 78.6% (Srivastava and Chandra, 2017). Van Eijk *et al.* 2016 carried out a meta-analysis of 64 Indian studies on school absenteeism and one in four girls said they were absent due to menstruation (Van Eijk *et al.*, 2016). Gultie, Hailu, and Workineh (2014) found that girls stayed at home because they were in pain, or because they had no facilities to change privately, or because they feared staining their clothes (Gultie, Hailu and Workineh, 2014). Lack of 'hardware', such as female friendly sanitation systems, and 'lack of software', the knowledge about how to manage menstruation, impacted upon their ability to attend school and participate fully.

Those who did stay in school could not concentrate fully as they worried about leaking or whether boys would smell the menstrual blood and know they were menstruating (Sommer, Kjellén and Pensulo, 2013). In the Philippines, girls experienced 'stress, shame, embarrassment, confusion and fear due to lack of knowledge, an inability to manage menstrual flow or from being teased by peers' (Haver *et al.*, 2013). Sometimes girls were distracted by worrying that menstruation is due (Ndlovu and Bhala, 2016).



Adolescent girls often suffered from Pre-Menstrual Syndrome, which caused several symptoms, such as headaches, nausea, bloating, and diarrhoea, and some suffered from Dysmenorrhea, or painful cramps, which were debilitating. Due to the stigma associated with menstruation, they were embarrassed to tell their teachers that they were in pain (Chandra-Mouli and Patel, 2017). It was observed that adolescent girls were reluctant to seek medical help for menstruation-related problems and wouldn't see a male doctor (Behera, Sivakami and Behera, 2015). Some girls preferred to self-medicate and stay at home (Jewitt and Ryley, 2014).

There were many challenges experienced when menstruating that meant girls stayed at home rather than went to school.

1.2.10 Education

Poor families may prioritise the education of boys and be complicit in girls staying at home. Once girls started missing school, they began to fall behind with their studies. In Kenya, it has been reported that these girls are then likely to fall further behind and may actively seek out older men to marry, so that they can be 'looked after'. This has been associated with a raft of negative consequences, such as Female Genital Mutilation, Gender Based Violence, early marriage and pregnancy, sexually transmitted diseases and reproductive health issues. Although practices such as FGM have been banned by the government, traditional communities in the provinces are still likely to carry it out (Kidney, Galvin and Syombua Nthusi, 2018).

Even in the UK, where education is compulsory until the age of 18, girls who regularly miss school fall behind their peers. Missing 3 days of school each month over 9 months of the school year can add up to 189 days of secondary education; in the UK that is a 'whole school year' that girls could be behind boys. The consequence of this is to make it more difficult for girls to achieve their qualifications, and this perpetuates gender inequalities in society (Jewitt and Ryley, 2014).

The benefits of education are difficult to quantify but anecdotally well known in terms of improved life chances and social mobility. A number of studies have found that education empowers girls. They have better access to health care information, and are able to access comprehensive health care, including family planning. They invest in the health and



education of their own families and there is long-lasting, intergenerational impact in reducing poverty (Kirk and Sommer, 2006; Sperling, Winthrop and Kwauk, 2016).

1.2.11 Summary

As girls reach puberty, they are faced with the challenges of menstruation. For those who live in low-resource settings (LRSs), a lack of access to hardware (such as pads) or software (such as knowledge) can make negotiating menarche and menstruation difficult. Cultural restrictions and taboos can exacerbate the problems girls face; they may become anxious and they may limit their physical activities in order to cope. Some girls miss school, and fall behind, and some drop out of school altogether. In order to support girls to reach their full potential, there needs to be a greater understanding of the factors that affect their experience and ultimately their long-term Menstrual Health and Well-being. The empowerment of girls through addressing their menstruation needs will contribute to the realisation of several Sustainable Development Goals; Health SDG 3, Education SDG 4, Equality SDG 5, Water and Sanitation SDG 6, and Economic Growth SDG 8.

1.3 Gaps in the literature

It was important to consider the body of research and the gaps in the literature in order to clarify what would usefully add to it without repetition or purpose.

A small number of systematic reviews have been conducted on this nascent topic of menstruation and they have identified a few problems with the extant literature: a) the terms 'Good MHM' and 'Bad MHM' were used in studies without clear definition (Sumpter and Torondel, 2013) b) there was little hard evidence about factors that affect the menstrual experience (Hennegan and Montgomery, 2016); c) there were inconsistencies in measuring knowledge (Chandra-Mouli and Patel, 2017) and inconsistencies in measuring outputs (Hennegan and Montgomery, 2016) and d) there was a lack of the 'voice' of girls in studies (Coast, Lattof and Strong, 2019).

Other authors have mentioned specific gaps in the literature and proposed future directions for research:

- i) 'there is no comparative work on menarche experiences' (Sommer, Kjellén and Pensulo, 2013)



- ii) There is a ‘need for more detailed empirical work on how girls’ experiences of menstruation and puberty vary in different geographical (including rural versus urban) and cultural contexts’ (Jewitt and Ryley, 2014)
- iii) there is ‘an urgent need for rigorous research to reveal the prevalence, causes and consequences of MHM across contexts’ (Hennegan, 2017)
- iv) ‘more research on the topic of menstrual-related educational attainment...particularly context’ is required (Sommer, 2010)
- v) A ‘standardised and reproducible metric’ is required (Penelope A. Phillips-Howard *et al.*, 2016)
- vi) ‘more predictors may need to be considered. Hygiene management is not the only menstruation-related challenge facing girls’ (Hennegan *et al.*, 2016)
- vii) ‘Other issues that future studies should explore include the impact of menstruation on concentration, test scores, and self-esteem’ (Benshaul-tolonen *et al.*, 2020)
- viii) ‘There has also been insufficient research examining the impact of inadequate MHM guidance or environments on schoolgirls’ levels of self-esteem, their self-efficacy to manage their menstruation in school, and their ability to concentrate in class when menstruating in schools that lack adequate WASH facilities or sensitized teachers and peers’ (Sommer *et al.*, 2016)
- ix) ‘interventions should be based on a clear theory of change which includes the various individual and contextual factors which contribute to women and girls MHM’ (Benshaul-tolonen *et al.*, 2020)
- x) ‘translating the evidence base into practical guidance by evaluating MHH interventions and disseminating best practices for implementers’ is required (Amaya, Marcatili and Bhavaraju, 2020)

Taking these observations and opinions into account allowed the research topic to be narrowed and the questions to crystallize. It was felt that was a need to extend the research to girls young adolescents; to menarche; to girls’ voiced experiences; to low-resource settings, to different cultures and high-income countries as well as LMIC to get a fuller picture of the determinants of Menstrual Health.



1.4 Development of the Research Aims and Objectives

The aim became to understand the factors that determine Menstrual Health.

The type of study that would be suitable for understanding more about Menstrual Health was a Knowledge, Attitudes and Practices Study, commonly known as KAP. KAP studies aim to elicit what is known, believed and done in respect to a particular problem. KAP studies originated in the 1950s, initially in the field of family planning, to understand behaviour, and have been much used since in public health. They often provide baseline information for tracking behaviour change, especially before, during and after an intervention (Cleland, 1973). KAP studies are popular with researchers because they are relatively easy to administer to a large target population. Structured questions with pre-defined answers allow the data to be collected quantitatively using a composite score and thus a KAP survey is also relatively easy to analyse (Launiala, 1970).

Traditional KAP surveys do not separate out Knowledge, Attitude and Practices as some statements may be said to combine aspects of more than one. Knowledge influences attitudes which inform practices around the problem. In this study it was decided to separate Knowledge from Attitudes, and to use alternative meaning of P: Perceptions. The topic of menstruation is particularly subject to myths and misinformation due to the stigma associated with it, and perceptions were expected to be important. Grouping Knowledge and Attitude with Perceptions also allowed them to be conceptually separated from Practices and Experiences, ie what is thought, internally (KAP), to what is done, externally, or corporeally, practices and experiences. This allowed a hypothesis to be formulated that there is a relationship between KAP and Experience. If a relationship was found, it might be possible to design an intervention to address KAP which would have an effect on Experience.

This would allow the design of more appropriate policies and interventions to support girls (Hennegan and Montgomery, 2016). It seemed a feasible aim, as interventions that improve the knowledge and experience of girls about menarche are fairly easily implemented, at low cost and with significant long-term gains (Sommer, Hirsch, *et al.*, 2015; Shah *et al.*, 2019) and it seemed a justifiable aim, as girls who can manage their menstruation with ease and dignity are more likely to stay in school.



The funders (The National Institute for Health Research (NIHR) Slum Health Group) were interested in Low-Resource Settings. In order to gain access to participants from such settings for the research, it was decided to draw on a Community-Based Organisation (CBO) in the Philippines with whom the author had previously collaborated for a Master's thesis. This organisation, Kapitiran-Kaunlaran, was working with the poorest people in Manila who lived in informal settlements. Participants for a HIC could be recruited through the author's collaborators in the UK.

1.4.1 Title

A Comparative study of Menarche and Menstruation Knowledge and Experiences of girls aged 16-19 years old in low resource settings of the Philippines and the United Kingdom.

1.4.2 Aim

To describe the knowledge and experiences of menarche and menstruation in school girls aged 16-19 years in low resource settings of the Philippines and the UK and to explore the factors that affect the quality of the experience.

1.4.3 Research objectives

1. in low resource settings of the Philippines and the UK
 - a) to describe the knowledge, attitude and perceptions (KAP) of adolescents aged 16-19 years old with regard to menstruation
 - b) to explore the menstrual experiences and practices of menstruators aged 16-19 years old
2. to investigate the relationships between menstrual knowledge, attitude and perceptions; social demographics; and menstrual experiences and practice.
3. Through literature review, to evaluate the impact of policies and programmes designed to inform about puberty, and Menstrual Health in particular, and to make recommendations for supporting girls based upon the research results.

1.4.4 Research questions

- 1a. What is the knowledge, attitude and perceptions (KAP) of 16-19 year olds about menstruation?
- 1b. What is the experience of adolescents aged 16-19 with regard to menstruation?



2. What are the factors that influence menstrual experience?
3. What is the impact of education and hygiene promotion on Menstrual Health?

1.4.5 Substantial amendments

A thesis is a journey. This one was interrupted by the global Covid-19 pandemic which began in 2020. Substantial changes had to be made to data collection which could not be done in person, but had to be done on-line. This necessitated changing the target population of this research to girls aged 16-19 years old so that they could give their own consent (originally the age group was 10-14 years old).

In the timeframe of this thesis there has been a seismic increase in interest globally in menstrual health (not necessarily related to the pandemic although possibly for some as discussed later). This has led to a new consciousness in menstrual justice, which the participants of this study reflect, that wasn't anticipated when it started and was not mentioned in the literature.

The former has led to there being a pre-covid methods chapter which can now be found in the appendices. The latter has led to the adoption of a more feminist approach to the analysis.

1.5 Thesis structure

The first chapter introduces the research topic, providing the inspiration and the context for the research. It summarises the results of a review to identify gaps in the literature, and this leads to the development of the research aims, questions and objectives. Chapter two explains the ontological and epistemological standpoints of the researcher, and how this influences the choice of methodology. Chapter three describes the study design and research methods which were substantially amended following the global pandemic in 2020 which put a stop to fieldwork (the original methods is to be found as an appendix). The fourth chapter is a Systematic Review of the literature on menstrual education interventions. Chapter Five presents the quantitative data; the descriptive statistics and the logistic regression. Chapter Six presents the thematic analysis of the qualitative data. The Seventh chapter draws the qualitative and quantitative data together in the thematic synthesis and discussion.



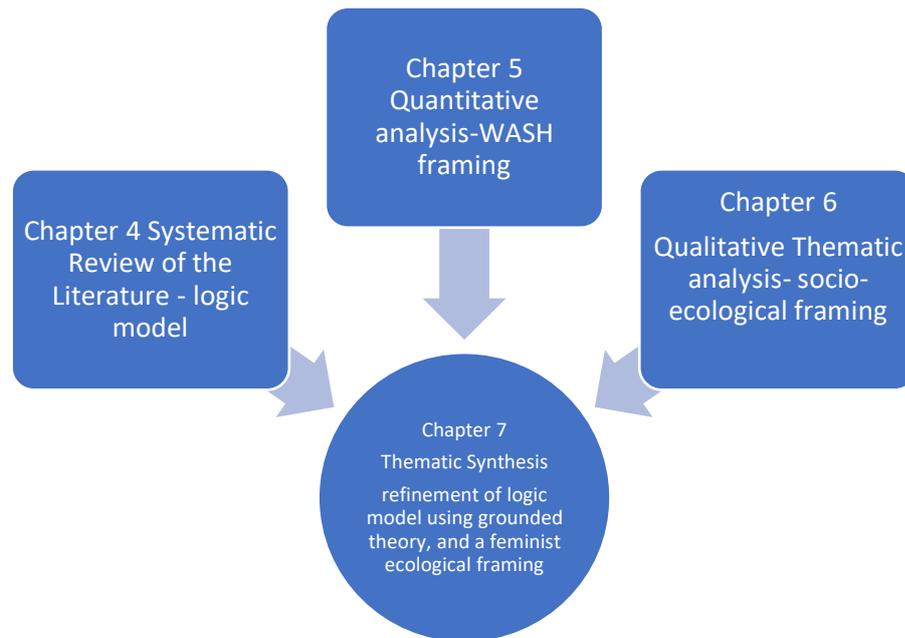


Figure 1.1 Thesis Structure: A flow chart to show how the different parts of the analysis and their framings contribute to the thematic synthesis



Chapter 2 Methodology

...in which the research process is described as a linear progression through Ontology, Epistemology, Methodology, Methods and Sources; for each the possible options are discussed in light of the study aims, the researcher's position is considered and then the chosen options are justified.

2.0 Research Topic and motivation

'My realisation that managing menstruation in low-resource settings was a challenge was born out of personal experience during a gap year spent working with a charity based in Manila slums. There were no toilets and no privacy. Managing menstruation is never easy but I was curious to understand whether my experience was different to that of the local girls and if so, why? Did factors like education, income and culture affect the experience?'

2.1 The Research Process

Grix 2002 suggests that there is an order to the building blocks of research: Ontology, Epistemology, Methodology, Methods and finally Sources. A methodology cannot be chosen without first considering the ontological and epistemological standpoint of the researcher (Grix, 2002). The background of the researcher ultimately affects their worldview. It draws them to favour one branch of philosophy over another, and the constructs they make to interpret their world. It influences the language used, the questions asked, the answers chosen to include or exclude, the meaning given to them and it shapes the conclusions made (Berger, 2015). For the researcher, it is important to be reflexive in all stages of the research process and to 'recognize and take responsibility for one's own situatedness within the research' (ibid).

2.2 Ontology and Epistemology

Ontology is concerned with the nature and structure of the world, and how this can be expressed. At two ends of the ontological spectrum lie Objectivism and Constructivism.



Objectivism focuses on the tangible nature of an object or a social phenomena and that it can be known. Its exists independently of the researcher and other actors. Constructivism, on the other hand, holds that all knowledge is a product of human thought or construction (Dawson, 2013). It is concerned with the meanings given to social phenomena. These are constantly changed by social interactions.

Epistemology stems from ontology. Epistemology is about the human acquisition of knowledge; what we know, how we know and the nature of belief. It is concerned with the development of theory. At two ends of the epistemological spectrum lie Positivism and Interpretivism. A positivist standpoint embraces the scientific method, which looks for fundamental laws. It reduces phenomena to the simplest forms and formulates and tests hypotheses about the nature of being. Empirical data can be collected about them, objectively and independently of the researcher, and analysed statistically without bias. Interpretivism rejects fundamental laws and suggest that it is all about perception which varies in space and time (Grix, 2002; Dawson, 2013).

It is usual to describe objective physical measures in quantitative terms, and subjective ideas in qualitative terms. Adherents to positivist or constructivist schools of thought strongly proclaim their respective benefits (unbiased, statistically valid hypothesis testing for positivism, rich meaningful contextual realities for constructivism) and argue for their incompatibility (Johnson and Onwuegbuzie, 2004). On their own, positivism is reductionist and constructivism does not exist outside the constructs of a society. Neither allows the phenomenon to be understood at any more than face-value.

Pragmatism situates itself between the purist divisions of ontology and epistemology. It emphasises the reality of human existence. It views knowledge as being both a reality and constructed. It is an explicitly value-oriented approach. It endorses eclecticism and pluralism. It recognises that quantitative and qualitative approaches have much to offer (Johnson and Onwuegbuzie, 2004).

Here it is useful to consider the benefits and weaknesses of pragmatism. It's not just a way of avoiding philosophical debates. If the goal of research is to provide practical help or guidance, then it can be the best fit. Insights might be provided from both stances that together have synergy and produce a 'superior product'. It promotes shared values, such as equality. Some argue that it is not pure and therefore not valid. Some argue that the



answers are imprecise and it may not be clear who will find it useful (Johnson and Onwuegbuzie, 2004).

2.2.1 What is this study about?

It is necessary to consider what this study is about in order to choose which ontological and epistemological standpoint is relevant.

Menstrual Health

This study is a study of menstruation or more specifically, Menstrual Health. Menstrual Health has grown out of the field of Public Health which in the last half century has shifted its perspective away from 'disease' and towards 'health' (Baum, 1995). The way to understand public health has necessarily shifted, from the individual and biological or medical to the community and holistic well-being (ibid).

Health is a complex construct that derives from the interactions of many components upon the individual; genetic, biological, environmental, social, economic and political (Baum, 1995). Health status occupies a position at the intersection between the corporeal and the psychological. That which seeks to describe Menstrual Health is positivist and that which seeks to develop theory about the reality and perspectives of the participants is constructivist. Menstrual Health is a concept that has only recently been defined as 'a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity, in relation to the menstrual cycle' (Hennegan, Winkler, *et al.*, 2021).

Low-Resource settings

This work was conducted within the NIHR Slum Health Group. 'Slum' can be a problematic term. Lilford et al 2019 in an article which discusses the 'neighbourhood effects' of living in slums suggest that one would work back from the outcome of health and well-being (in this case, menstrual health and well-being) to the determinant (slum vs non-slum). The problem, they say, is defining what a slum is; 'If slums could be identified by means of a specific reference standard based on underlying axioms or established scientific principles, then the ontological problem would have been solved and the empirical question would concern the consequences of living in a slum'. They conclude that the basic dichotomy of slum versus non-slum is unhelpful as there is no agreement about its definition and that there is 'no entity 'slum' that has an underlying reality which is reflected in the various



factors by which we measure it' (Lilford *et al.*, 2019). In this study, the term low-resource setting (LRS) was adopted as it is used in Health Care.

Neighbourhoods, be they slums or LRSs, are social constructs. When research uses participants, the researcher becomes part of the construct (Grix, 2002). This shifts the ontological position towards constructivism. Similarly, perceived realities are a consequence of context and are constantly changing due to interactions with different actors including the researcher (Grix, 2002; Dawson, 2013). This shifts the epistemological position towards interpretivism.

2.2.2 Position of the researcher on ontology and epistemology

Pertinent to this research is my background as a biologist and science teacher, and my current research role in the Improving Health in Slums Unit of the National Institute for Health Research.

As a scientist, I am trained in the scientific method, which operationalises concepts so that they can be measured and carries out experimental research, testing hypotheses in a systematic way to produce conclusions.

My training led me towards an objectivist standpoint, but my work as a volunteer in slums helped me to understand the value of social constructs and drew me towards a more constructivist ontology. Similarly, I theoretically embrace a positivist understanding of the world but my experience of travel and meeting people from many different cultures has made me realise there are many different interpretations of phenomena, leading me towards the interpretivist standpoint regarding epistemology.

2.2.3 Choice of ontology and epistemology

Menstrual Health, like Mental Health, has emerged as a contemporary issue that requires insights from these two potentially opposing paradigms in order to develop interventions that work in real-world settings (Robins *et al.*, 2008).

The goal of the slum health unit is to improve health in slums, by identifying threats to health and well-being and intervening to prevent them from arising (Lilford *et al.*, 2019).

The researcher finds that a pragmatist stance suits the purpose well.



2.3 Branches of epistemology and theoretical frameworks

There are a few different branches of epistemology which take different standpoints on the acquisition of knowledge and have developed different theoretical frameworks for describing this.

Social epistemology is concerned with the way that knowledge and beliefs are derived from the social relationships (Dawson, 2013) and what others tell you is true. This is called testimony (Fricker and Cooper, 2018). Feminist epistemology is concerned with the role of gender on what is believed to be true. It is often used to critically analyse knowledge that has been constructed by the patriarchy (Rocheleau and Nirmal, 2014) and reconstruct it in a gender-sensitive way. Pragmatic epistemology diminishes the emphasis placed on theory and looks to what works in practice (Rycroft-Malone *et al.*, 2012). Naturalistic epistemology only considers knowledge gained from nature and the empirical sciences to be true (Baum, 1995). Evolutionary epistemology regards knowledge as an adaptation to the environment that enhances survival (Gontier, 2006) and is concerned with it as a strategy rather than a truth.

2.3.1 Position of the researcher on branches of epistemology

Pertinent to this research is the fact that I am a female, of white British background, a biologist, and a science teacher.

Menstrual health is, de facto, a feminist research topic. As a member of the female sex, I have experienced menstrual injustice (for example, the tampon tax or inadequate public toilets) and therefore am invested in feminist political ecologies that 'focus on men's and women's differentiated access to and control of environmental resources and socio-political processes' (Elmhirst, 2011). This led me to adopt feminist epistemology and I intended to use a feminist lens to analyse inequalities apparent within the school setting especially.

As a researcher from the global north working with research subjects from the global south, I need to be cognizant of the privilege of my white British background. However uncomfortable it makes me feel, it brings with it notions of power and dominance from the colonial era. Decolonisation means challenging the dominance of the global north in the production of knowledge. It is incumbent upon me to interrogate what my position means to myself, to the research subjects and the research process, and take steps at every stage



to mitigate its effect. 'Research should aim to decolonise and reframe... and researchers question whether they should even be working in this space' (Russell-Mundine, 2012). This led me to adopt a social epistemology, in which knowledge is local and contextual. I decided to employ local fieldworkers who were embedded within the communities to carry out the data collection and translation.

As a person who chose to study biology at degree level, I embrace Darwinian notions of adaptation and niche. Niche refers to the 'combination of multidimensional environmental conditions' permitting a species to survive in it (Soberon and Arroyo-Pena, 2017). It is possible to distinguish between fundamental niche (where it could live if there were no other competitors) and realised niche (where it actually lives). The ecological world in which we live is very influential to our human experience. Differing neighbourhoods have different realised niches or realities. This is an evolutionary epistemology that I think is relevant to the research (Dawson, 2013). I wanted to investigate the effect of the environment on girl's menstrual experiences and the coping strategies they adopted.

This led me to consider the socio-ecological model as a theoretical framework for this study.

2.3.2 Choice of theoretical frameworks

The socio-ecological model places the individual at the centre of their world and describes the different actors that the individual interacts with and is influenced by. The model arranges these different levels of interaction in order of proximity to the individual through family, environment and society and suggests that these interactions define the individual's world view.

The Socio-ecological was first proposed by Bronfenbrenner in 1977 as a conceptual model for understanding human development. Bronfenbrenner argued that research into human development by scientists employing the observation methods of ethologists or animal behaviourists was limited in that the only environment that could be observed was the immediate environment. Yet human behaviour is influenced by many things unseen, such as the rules and regulations of a school or workplace, or the policies of a government. Human behaviour is not only influenced by wider forces in terms of space, but also in time, such as ancestral knowledge and belief, or that which is inherited as culture. Bronfenbrenner proposed a systems approach that examined the elements that



contributed to each sphere of influence, and analysed the effect of manipulating them on human development (Bronfenbrenner, 1977).

Bronfenbrenner's model was adopted enthusiastically by those researching human development, and by defining the determinants of human development, it developed into a theory of behaviour change that could be used to promote health. The Centre for Disease Control and Prevention has used it specifically to inform their colo-rectal cancer program (Nuss *et al.*, 2012); it has been used for health promotion in schools, for example, a healthy-eating program (Townsend and Foster, 2013); for understanding the difficult to reach, for example, sex workers (Ma, Chan and Loke, 2017) and even very recently it has been used to shed light on vaccine-avoidance during the global Covid-19 pandemic (Al-Jayyousi *et al.*, 2021).

The Socio-ecological model or theory as it has become, has been much modified over the years. Kilanowski describes the nested circles in a modern form of the SEM as the microsystem (immediate interactions); the mesosystem (direct contacts eg school); the exosystem (community); the macrosystem (society and culture) and lastly the chronosystem which takes account of the historical context (Kilanowski, 2017). Different names have been given to the five levels, depending on the emphasis of the study. Townsend and Foster 2013 reported on a schools' programme, and called the levels Student Intrapersonal, Student Interpersonal, School Organisation, School Community, Macro-level organisation (Townsend and Foster, 2013). A WASH informed study in the Philippines called them Biological, Personal, Interpersonal, Environmental and Societal levels (Haver *et al.*, 2013)

The Socio-ecological model has been particularly useful to identify targets for multi-level interventions (Willows, Hanley and Delormier, 2012) and has therefore been of much use at the policy level (Townsend and Foster, 2013).

The Millenium Development Goals set targets for achieving access to water and sanitation which were largely missed. This was in part because the engineers did not have a good understanding of the human psychology required for the adoption of new technologies. As the Sustainable Development Goals have been articulated, the WASH world has made use of the SEM in order to analyse the barriers and make the interventions more effective. This has often required a multi-pronged approach, as shown in a study in Ethiopia about sustainable latrine adoption (Alemu *et al.*, 2017). The nuances of peer pressure and (un)



exemplary leaders were explored through an SEM lens in a study about the uptake of WASH interventions in the slums of Kampala (Ssemugabo *et al.*, 2020). Research into hand-washing in Sierra Leone used the SEM to explain the intersectionality of behaviours and social identities (such as age and gender) (Luetke Lanfer and Reifegerste, 2021).

A few researchers have started to use the SEM as a framework for understanding menstrual health. Much of the work is at the descriptive stage, and a study in Uttar Pradesh in India has used the SEM to investigate menstrual health due to the cross-cutting nature of the stigma that affects all menstruators in time and in space (McCammon *et al.*, 2020). The SEM was also used as the framework for a systematic review into menstrual health and hygiene in Nepal. The findings were categorized using the SEM levels and the conclusion was that there was a lack of high quality evidence at all levels with recommendations that future research is required across the levels (Sharma, McCall-Hosenfeld and Cuffee, 2022).

As this study seeks to describe the determinants of menstrual health, the SEM seems a useful way of conceptualising it, and especially because the study wishes to get at the differences between two populations in order to uncover how nuanced menstrual health is. The model takes into account the chronosystem, from which culture stems. The SEM was the theoretical framework chosen for this study.

The socio-ecological framework was chosen as the most appropriate theoretical framework for this study.

2.4 Methodology

It was necessary that the methodology chosen reflected both major paradigms and this pointed to mixed methods research. Mixed methods has been called the third major paradigm and is essentially a pragmatist approach (Johnson and Onwuegbuzie, 2004). It is characterised by being both quantitative and qualitative and is particularly well suited to public health research (Baum, 1995). The strength of mixed methods research is that it allows integration of findings to elevate the interpretation and to develop new theory (Fetters, Curry and Creswell, 2013). It uses tools from different disciplines and draws on their combined strength. For example, 'Research questions (may) concern concepts that are multi-faceted and not directly visible or measurable' (Tobi and Kampen, 2018). Different disciplines may have tools to operationalise concepts and transform them into



observable indicators. Some concepts may be composites of different dimensions (ibid). Mixed methods research encourages the use of several methodologies and methods that together provide the best chance to discover the answer to the problem. It promotes creativity in seeking solutions and eclecticism in their choice. This has been termed Eclectic Methodological Pluralism (Chambers, 2017).

2.4.1 Positivist methodologies

Within the positivist standpoint, there were two main methodologies; experimental research and survey research (Dawson, 2013).

Experimental research is often what is known as the scientific method. Researchers identify an independent variable which they manipulate, and measure the change in a dependent variable, whilst controlling other variables. It can be refined for accuracy, and repeated for reliability, and the data generated should be completely independent of the researcher.

Survey research is used to collect data from human subjects. It can be used to collect objective data about the subjects, such as height and weight, but it is dependent upon them to answer the question correctly and the data cannot be verified independently. It is more usually used to collect data about thoughts and attitudes. It is therefore inherently subjective, but it can be used to explore or explain phenomenon. It is often used to look at correlations between variables. Its validity is very much related to how well the sample represents the larger population (Dawson, 2013).

Choice of positivist methodology

Researching the experiences of menstruators lent itself to survey research as it would be possible to collect both objective and subjective data which would allow for correlations to be investigated.

2.4.2 Constructivist methodologies

Within the constructivist standpoint, there were several methodologies which were considered: feminist, ethnography, grounded theory, phenomenology, heuristic, participatory action research and discourse analysis. Three in particular are well suited to Health research: phenomenology, discourse analysis and grounded theory (Starks and Trinidad, 2007). Participatory is well-suited to vulnerable populations who do not usually have a voice (Chambers, 2017).



Phenomenological

Phenomenology seeks to describe the 'phenomenon of interest' by asking those who experience it. Their 'Truth' is known through embodiment and the researcher asks questions to clarify the meaning they give it, and translates that into a 'core' experience to be understood by others such as health workers and educators (Starks and Trinidad, 2007).

Discourse analysis

Discourse analysis is about how people talk about phenomena and the meaning that is given to their words. Greater understanding of this may be used by policy makers, health workers and educationalists to make their messaging effective (Starks and Trinidad, 2007)

Grounded theory

The procedure involves close examination of concepts that are ground into the data, from which a theory that explains a basic social process is allowed to emerge (Glaser, 1978). The "six Cs" of social processes that are examined are causes, contexts, contingencies, consequences, covariances, and conditions (Strauss, A and Corbin, 1994). They are analysed for 'structures, implied or explicit codes of conduct and procedures that circumscribe how interactions unfold and shape the meaning that comes from them' (Starks and Trinidad, 2007). Grounded theory is used to observe the phenomenon under different conditions, to generate an explanatory theory, so that interventions can be tailored to the context (Starks and Trinidad, 2007).

Participatory

'Participatory Action Research (PAR) seeks to understand and improve the world by changing it' (Baum, MacDougall and Smith, 2006). Often researchers specifically 'seek to address inequity, health disparities, or a social injustice through empowering marginalized or underrepresented populations' (Fetters, Curry and Creswell, 2013). PAR requires the researched and the researcher to be involved together in reflective enquiry that seeks to understand the local context and embedded culture, which gives the researched more power of their lives and encourages them to action for social change (ibid).



2.4.2.1 Choice of constructivist methodology

The specific set of methodologies adopted for this study were phenomenological, feminist and participatory.

Phenomenological

A phenomenological approach was chosen as the most appropriate for this study, because the study researched how girls experienced the phenomenon, menstruation. The commonalities could be collected in a thematic analysis and used to give girls, often the most overlooked individuals in society, a voice.

Grounded theory

Phenomenology and grounded theory share a number of similarities, particularly in respect of trying to get at the truth. Grounded theory tends to go a step further; it looks for commonalities between different cultures and attempts to build a unifying theory, which can be used to design interventions. This was also a goal of the study.

Feminist

Of all the different nuances that needed to be explored in relation to girls and menstruation, foremost is gender. Gender intersects with imposed limitations, both spatial and metaphoric, that curb access to social capital and promote gender inequalities (Jewitt and Ryley, 2014). It was essential that a feminist lens was used to uncover meanings that have for so long been part of 'accepted culture' that both men and women forget their origin in a patriarchal society and institutions. Feminist research seeks to amplify the views of women and to improve their lot in life. 'In contradiction to traditional research, the objectives of feminist research include both the development of new knowledge and the production of social change' (Kaur and Nagaich, 2019). Feminist research is also characterised by being interdisciplinary and participatory.

Menstruation is a sensitive subject matter, and for that reason participatory methods needed to be utilised as far as possible (Chambers, 2017). When topics are sensitive, participants may be culturally conditioned to maintain a front or party-line, and in the case of taboo subjects, avoid saying certain words altogether. Participatory research requires the researcher to establish trust with participants to persuade them to reveal deep truths. This often requires building a relationship between researcher and participant, and trust grows when the researcher shows their own vulnerabilities, perhaps revealing something about themselves, that puts them on an equal footing with the participant. Both become



mutual 'keepers' of each other's secrets. In scientific circles, such behaviour would be frowned upon, both because it leads to bias and because it might be seen as manipulative. In social research, such bias is inherent in getting anywhere near the truth, and as such needs to be recognised for what it is. Rigour comes from the reflexivity of the researcher (ibid).

2.4.6 Summary of methodology

A mixed methods methodology was adopted, which would embrace a positivist quantitative survey and constructivist phenomenological qualitative data collection through participatory activities that would seek out the views of girls.

2.5 Formulating the research questions

According to Crotty 1998 as quoted by Grix (2002), research questions can only be formulated properly once the ontology, epistemology and methodologies have been considered. Setting the research questions then allows the selection of the most appropriate methods and sources of data (Grix, 2002).

Questions about menstruation and setting could be formulated from the positivist stance *i.e.* cause and effect, such as 'How does setting affect menstruation?' or with an interpretivist viewpoint such as 'What meaning is given to menstruation in different settings?' As mixed methods was the methodology chosen, the research question needed to encompass elements of both.

Young adolescent girls were identified as the population based on the gaps identified in the literature review. The different settings were to include HIC and LMIC countries.

The question was set as

'How do the experiences of menstruation differ between young adolescent girls in different settings and what influences them?'

This question has a quantitative aspect (that which can be measured objectively and can be compared) and a qualitative aspect (the subjective influences).



2.6 Methods

The selection of specific methods is detailed in the next chapter. Here consideration is given to the strengths and weaknesses of the different methods and how a robust combination was selected.

2.6.1 Strengths and weaknesses of quantitative and qualitative data collection

Some of the advantages of quantitative data collection are that it is quick, the data is precise, and the analysis is straightforward. It is reasonably independent of the researcher and repeatable, at other times and with other populations. It may be preferred by programme administrators and funders. Advantages of qualitative data collection are that it provides rich data, very context specific and useful for describing complex phenomena (Johnson and Onwuegbuzie, 2004).

Weaknesses that might come about from quantitative research are that researcher's theories may not reflect the situation on the ground; the categories used might not be meaningful to the participants and closed questions lead to confirmation bias, which means the researcher gets the data they asked for and possibly misses out on other factors because they are not asked about. Weaknesses of qualitative research are that it might be very subjective and not broadly applicable; it might be influenced by the researcher's biases, and it may have low credibility (Johnson and Onwuegbuzie, 2004)

2.6.2 The advantages of mixed methods research

With mixed methods, quantitative instruments yield numerical data from a large number of participants, but need interpretation to give them meaning, and qualitative data instruments yield detailed meaningful transcripts from a small number of participants, that without analysis show no pattern at all. Qualitative data can be used to illuminate the meaning of the quantitative data, and quantitative data can be used to give rigour to qualitative data.

The benefits of mixed methods for this study are the integration of qualitative and quantitative data to generate synergy of both together (Guetterman et al., 2019) and to overcome the weaknesses of both individually.

Mixed methods was an appropriate study design for research into Health, and in this case Menstrual Health, because although physiology could be described quantitatively, experience is modified by a number of other qualitative factors, such as socio-economic



status, education, and culture. A range of methods, called Eclectic Methodological Pluralism (EMP) by (Chambers, 2017) needed to be used to understand and evaluate this complexity (O’Cathain, Murphy and Nicholl, 2007).

2.6.3 The selection of robust research methods

‘Research is robust if it considers validity and accuracy, bias and error, rigour, credibility and trustworthiness among other elements’ (Bhakta, 2019). These were all important considerations when the methods were selected.

Validity

The validity of the research refers to how well the results measure what they are supposed to measure, tested against theory and measures of similar concepts. This is the internal validity. External validity is also important and refers to how well it covers the concept and how useful it is in the real world under real world conditions.

Validity needs to be considered with the choice of instruments used (which should measure what you want them to measure) and by using appropriate sampling techniques to ensure that they are powered and representative of the population.

With qualitative methods, validity often refers to truth. Truth comes from applying research methods with integrity, diligence, and attention to detail so that accuracy is preserved. It is important to check with the participants the accuracy of the transcripts and whether the final themes reflect their views.

Reliability

Reliability refers to the reproducibility of the results. In quantitative research, this is easily achieved by creating a protocol that precisely specifies all stages of the research. In qualitative research, it is not so easy. Protocols should be standardised as far as is possible, such as having a prepared list of questions for interviewees, but it is difficult to then predict what will emerge. Data collection methods need to be flexible enough to capture data that has not been anticipated.

Bias

The use of randomisation in quantitative data collection eliminates bias, but again, it is more difficult in qualitative data collection. It is impossible to eliminate researcher bias,



but being reflective about one's positioning helps one to understand and mitigate some forms of bias. Checking with other researchers can help reflexivity.

Of interest in research that is with the underprivileged and the often over-looked is the biases that exist because of security, health, compliance, notions of class and diplomacy. A researcher may not go to certain areas or talk with certain people because they may be excluded from mainstream society. Chambers (2017) reminds researchers to ask, 'who is being met and seen and heard'?

Biases need to be acknowledged and ongoing reflection and adjustment of methods of data collection is required to capture sufficient and relevant data.

Rigour

Rigour is provided by selecting the right tools to do the job; the right methods to complement the methodologies. Where possible, best practice protocols should be used. Where not, it requires clarity of thought and record-keeping, to ensure that the rationale behind the decisions is justifiable and consistent. Rigour requires that sufficient data is collected, that it is free from error and verified by the participants.

Trustworthiness

Trustworthiness relates to the findings of the research. It is measured against credibility, transferability, dependability, and confirmability. Credibility asks, 'what supporting evidence has been presented to make the results believable?' Transferability is about how applicable the results are to other contexts. Dependability requires the study to be described in such detail that it could be replicated, and confirmability is a measure of how much the results reflect the participants and not the researcher (Johnson, Adkins and Chauvin, 2020). Data collection should ensure that 'rich and thick verbatim' descriptions of participants accounts are sought and recorded (Abraham *et al.*, 2018).

Triangulation

Triangulation is a way of confirming the findings by using multiple data sources and identifying their points of convergence. It highlights similarities and differences and allows gaps to be plugged. In so doing, it minimises errors and promotes accuracy and rigour.

Green et al (1989) specifically referred to triangulation increasing validity; clarification increasing interpretability; development increasing validity, initiation seeking paradox and



contradiction as increasing breadth and depth, and expansion increasing scope as purposes for which one might choose mixed methods (Greene, Caracelli and Graham, 1989).

Eclectic Methodological Pluralism was chosen to bring together a number of participatory methods. Because the subject matter, menstruation, is sensitive, the researcher needed to use methods that would establish trust in order to persuade participants to reveal deep truths (Chambers, 2017). Although this could compromise rigour, that would be mitigated by the intentional reflexivity of the researcher, ground-truthing (Glaser, 1978) and the triangulation (Banning, 2009) that is possible using EMP.

2.7 Data Sources

2.7.1 Selection of countries

The Philippines and the United Kingdom were chosen in order to provide contrast in the determinants of health literacy; schooling, income and religion or culture (Hawkey *et al.*, 2017; Lahme, Stern and Cooper, 2018; Schillinger, 2021) They also provided contrast in access to Water, Sanitation and Hygiene (WASH) which are important factors in Menstrual Health (Ellis *et al.*, 2016).

The population of the Philippines is 105 million with a growth rate of 1.55%. 95% of the population are Christian and 80 % of the population are Roman Catholic. 22% of urban dwellers do not have access to improved sanitation. There is a growing middle class and schools in urban areas have made good progress to achieve gender parity (Central Intelligence Agency, 2021a). However, school is not free. Some out-of-school-youth participate in the Alternative Learning System (ALS) that NGOs run in parallel with schools and may alternate between systems as finances dictate. Menarche and menstruation are the subject of cultural myths and pseudo-science (Ellis *et al.*, 2016; Evans, 2018). Girls who lack resources such as pads stay close to home to manage their menstruation (ibid).

The UK is a high income country with a welfare state. It has a population of about 65 million. The population growth rate is 0.51% (Central Intelligence Agency, 2021b). In the UK, there are pockets of deprivation. The population, particularly in the cities, is ethnically diverse and there is a mix of religions, although it is increasingly a secular society (ibid). There is a statutory requirement for children to be in education from the age of 5 – 18 years). Although the UK regards itself as having gender-parity, menstruation is still a taboo topic and the effects of menstruation on girls' life-chances are largely ignored.



2.7.2 Low Resource settings

There are several terms that seek to contrast the 'haves' with the 'have-nots' of this world: developed vs developing countries; low-and-middle-income countries v high-income countries; the global south v the global north. 'Low-resource' was chosen here to mean 'resource-constrained', as this research had its origins in the Slum Health Group, where health inequalities were associated with access to resources, specifically built environment and services such as water, sanitation and power (Lilford *et al.*, 2019)

2.7.3 Social media use in data collection

The global COVID-19 pandemic in 2020 necessitated data collection being on-line and the use of social media in recruitment and in data collection was investigated.

It has been widely acknowledged that the Millennial Generation (those born between 1982 and 1993) and those that have been born since, engage with the world differently to those that have gone before. This is primarily due to the advancement of digital technologies (Dalessandro, 2018). Digital technologies include PCs and laptops that give access to the internet, email communication, and Smart phones and social media apps. Indeed, a distinguishing feature of Generation Z (those who were born after the year 2000) is that they have grown up in a world of 24-hour internet connection and fast broadband and much of their lives are lived through their Smart phones. This means that they not only use the technology to access information and services, but also for conducting their social lives, making friends, and having experiences 'online'. A Guardian report from 2016 in the UK claimed that 5–16-year-olds spend 3 hours a day on social media, have an average of 150 connections and the most popular apps are Snapchat and Instagram (Ifould, 2016).

As Generation Z engage with digital technologies for almost every aspect of their lives, reaching them through non-digital technologies is very difficult. They do not read newspapers, stop by community message boards in libraries and shops, or take a flyer. When Dalessandro (2018) conducted a study in the US in 2014-2015 she found 'No one responded to the numerous physical advertisements placed around town despite the US\$30 incentive' and concluded that using digital technologies was of 'crucial importance' (Dalessandro, 2018). She also found that young people prefer to respond via text or email at a time convenient to them, rather than in person in real time, either face-to-face or by phone (*ibid*).



Digital technologies are attractive to recruiters because their broad reach and high usage enables many ‘impressions’ (views) of a recruitment advertisement. They also offer a relatively inexpensive and time-efficient way of collecting data for studies. Some researchers have noted that they are good for collecting data for health research, particularly on sensitive topics, due to the anonymity that the internet provides (Ford *et al.*, 2019). There is also little difference in response rates between sub-groups of a population, due to the universal coverage of the internet (at least in high income countries). In addition, the possibility of ‘audience-tailoring’ means that they are good at targeting the otherwise ‘hard-to-reach’ populations (Guillory *et al.*, 2018).

However, even digital technologies have surpassed one another as time has gone on. First Millennials stopped reading emails and turned to MySpace and Facebook. MySpace was very popular in the Noughties but after that declined. Then Facebook became the most visited website in the world (after Google). Ramo and Prochaska investigated its usage as a fast and affordable method for recruiting survey participants for research into tobacco usage (Ramo and Prochaska, 2012). A 20 Advertisement Facebook campaign was run for thirteen months using Tobacco key words, and that was found to reach 2.8% of Facebook accounts held by 18–25-year-olds in the United States. The cost per completed survey was about a tenth of the cost of employing an internet marketing company to place web adverts and about a fifth of the cost of employing a survey company to email potential participants. They concluded that Facebook was a viable method for recruitment of this age group. The limitations that they noted were that Facebook had to approve the ads and there was no way to determine how representative the sample was (*ibid*).

Since then, Facebook has been used extensively to carry out research as it reaches such a large part of the population. Elmahy (2018) carried out a study called ‘Reaching Egyptian Gays using Social Media’ in which he manually distributed a questionnaire to a long list of Facebook pages and groups he had collected that discuss sexual minority issues in Egypt (Elmahy, 2018). To do this, he carried out a Facebook Search using key words suggested by a small pilot group of 20 gay men. The words were in English and Arabic and other dialects and used in combination with the names of Egyptian Cities. This led him to local interest groups. The contacts of each group were examined, and snowball sampling was used to find related groups and individuals. Messages were posted regularly on these Facebook Group pages, which contained a link to the questionnaire. Elmahy concluded that Facebook was a very efficient way of reaching Egyptian Gays. Many of the participants were



married and not 'out' as gay due to the stigma attached to homosexuality in Egypt and would not have been recruited through traditional methods. He obtained 461 participants via this method in 8 months (ibid). He compared this to a previous study using conventional methods to reach Egyptian Gays that only recruited 73 participants (El-Sayyed, Kabbash and El-Gueniedy, 2008).

The Social Media preferences of young people have continued to evolve. Facebook is still the largest platform, but the age demographic of users has steadily increased, and now people under 30 have moved on to other Social Media Platforms, most notably Instagram and Snapchat. Ford et al (2019) decided to compare the recruitment metrics of Facebook, Instagram and Snapchat in their study into knowledge and attitude towards retail marijuana. They measured Impressions (views), Clicks (clicked on survey), and Completions (completed survey), and they were able to calculate Conversion rate (*ie* how many impressions were converted into clicks). Snapchat had the most impressions, 114200, but the least conversions at 1600. The conversion rate was 1.40%. Instagram had 2222 impressions and 803 clicks. The conversion rate was 36.13%. The conversion rate for Facebook was 2%. As 71% of young people in the US use more than one social media platform, the authors concluded that the use of the most 'popular' social media platforms was an important tool to 'augment' recruitment to surveys (ibid).

This study about marijuana involved the use of paid advertisements. The ads were created using a template within the Ad Manager feature of each Social Media Platform. They contained carousel images, headings, caption text, and hyperlinks to the Web-based survey. The ads were reviewed by each of the social media platforms and were developed in an iterative process that took between 3 and 5 days. The survey itself was in Qualtrics (Ford *et al.*, 2019).

Ad Sets were used to define Ad Placement. This allowed the parameters of the campaign to be set, the target group, the duration, the budget. On Facebook they appeared in the News Feed, on Instagram they appeared in the personal feed and on Snapchat they appeared as Stories.

There was a total budget (\$1000) and a daily budget for the ad campaigns (which was adjusted as the campaign progressed). The final cost per completed survey was \$4.76 excluding the incentives (Ford *et al.*, 2019).



Targeted Social Media Ads as a method for recruiting the 'hard-to-reach' were investigated in a study of the LGBT community by Guillory *et al* 2018; they reasoned that Social Media Platforms possess such large quantities of personal data, that ads could be highly-specific and therefore very efficient at reaching groups that often go underground due to stigma. They were able to drill down to their participants not just on age and gender but on interests and preferences, which is information that may not be held by official databanks (Guillory *et al.*, 2018). They compared social media recruitment with intercept recruitment (where they intercepted individuals in places where they might congregate, such as gay bars). Not surprisingly, they concluded that social media is a very effective way of recruiting the hard-to-reach, particularly the sub-groups (in this case, for example, women who prefer women, but may not actualise that). They found that recruitment via social media was not only easier and more cost-effective, but the sample was younger and more diverse (*ibid*).

The paper contains a detailed methodology (Guillory *et al.*, 2018). The authors created Instagram and Facebook pages which then shared a set of ads. Ads were designed to appeal to the demographic. They had a brief text description and an incentive (e.g., "Breakfast on us! Take a survey of LGBT young adults and get \$20 if you qualify!"), a reference to the Facebook page or Instagram account associated with the ads, and an image. Those that clicked were sent to a screening page, then directly on to give consent and take the survey. When they completed the survey, they got the \$20 digital gift card (*ibid*).

Guillory *et al* (2018) found that the costs of recruitment due to social media were just 2.2% of the total (therefore 97.8% due to intercept recruitment), as the only real cost was the cost of placing the ad, compared to the labour costs and other associated costs of intercept recruitment. Social media recruitment was also 3.31 times faster than intercept recruitment.

A limitation of using Social Media Recruitment that they did note was lower quality of data (Guillory *et al.*, 2018). They suggested that offering an incentive attracted some people to try the survey multiple times, which lead to more responses being rejected. They also suggested that social media puts more distance between the researcher and the participant, potentially leading to lower levels of accountability and therefore lower quality data. However, they were not able to quantify this at all (*ibid*).



Utilizing new technologies for conducting research brings with it new methodological and ethical issues, and in 2018 Arigo et al published a paper entitled 'Using social media for health research: methodological and ethical considerations for recruitment and intervention delivery' (Arigo *et al.*, 2018). They concur that social media platforms offer a 'unique and cost-effective' opportunity for health research recruitment and say that 'social media-enabled research is particularly well suited for studying health topics that are highly stigmatized (e.g., sexual health) as well as connecting with populations that are hard to reach (e.g., rare diseases). They go on to acknowledge, however, the many pitfalls that have been encountered as researchers grapple with these emerging technologies, and they provide some helpful suggestions and workarounds (ibid).

Firstly they had lower than expected recruitment or truncated recruitment periods (Arigo *et al.*, 2018). Their answer to this is to fully understand the target group and their use of the social media. It has already been noted that young audiences have moved away from Facebook. They are more likely to use Instagram or Twitter. Secondly, they noted that the recruitment ad was not always relatable to the audience. They suggest that the presentation needs to be considered, such as colour or images or text, and Key Words need to be carefully chosen. Key words that represent the interests of the audience were shown to enhance recruitment. Facebook and Twitter mostly use text, but Instagram mostly uses images. They suggested taking this into consideration when designing ads (ibid).

They also said that recruitment was maximised by adjusting the campaign as it progresses (Arigo *et al.*, 2018). They used Facebook Analytics to monitor the performance of ads, and they learnt what days and what time were best for reaching this age group (Monday and Tuesday evening). They were able to find out what images were appealing and deleted those that performed poorly to improve the campaign (ibid).

Another challenge they discuss is that social media may attract non-targeted users to respond, particularly if there is an incentive offered (Arigo *et al.*, 2018). They suggest being selective in material presented in the ad, perhaps getting interest through a key word but not revealing the true nature of the study so that the eligibility criteria are not given away before screening. Obviously multiple entries would need to be removed but survey tools can be set to only allow one attempt from an IP address (ibid).

They have some very specific advice regarding the use of X, formerly known as Twitter, for recruitment (Arigo *et al.*, 2018). X feeds are public, and they do have the potential for



enormous reach, but only if targeted. One strategy to increase recruitment is to include the name(s) of an Influencer. This is somebody known to be sympathetic to the cause but who primarily has many followers of the right demographic. Another strategy is to use relevant hashtags. It is important again to find hashtags that have a large following. They suggest a number of sites to help find good hashtags: 'hashtags.org, twubs.com, and twaz-zup.com, and healthcare-related hashtags can be found in the Healthcare Hashtag Project at symplur.com' (Arigo *et al.*, 2018).

Some cautions are issued regarding using hashtags (Arigo *et al.*, 2018). The nature of the group following the hashtag needs to be understood and the norms of that group adopted. For example, it might be considered poor form to post too often. However, tweets are in essence very ephemeral, and it is necessary to repost regularly for them to be seen by the target audience. One suggestion is that some early findings of the study are shared to encourage further participants to take part. The downside of that is that it may alter the integrity of the research by changing participant expectations.

Finally, Arigo *et al.* 2018 helpfully produce a table of pros and cons of different Social Media Platforms to enable researchers to find the one most suitable for their study. The advantage of Facebook is that it is the largest platform, but a disadvantage is sampling bias. The advantage of Instagram is that it can reach a younger demographic, but it too has sampling bias. The advantage of twitter is that it can loosely target a lot of people with some interest. A disadvantage is that there is no control over the message once it has gone (ibid).

Ethical considerations are extremely important when considering using social media platforms for research (Arigo *et al.*, 2018). 'Attention must be paid to the foundational ethical principles of autonomy, beneficence, and justice. These principles are demonstrated when determining how to: (1) obtain informed consent within a social/ digital domain; (2) assess and mitigate the probability and magnitude of potential harms; and (3) ensure those who stand to benefit from the research are included as participants.' (Arigo *et al.*, 2018). It is very important that potential participants receive the participant information in a way that is accessible to them and that they can give their informed consent, and consideration needs to be given to the study design to ensure this. The authors point out that young people have a different understanding of privacy and might seem happy to share all of their personal details online, but researchers have a duty to ensure that their data is protected.



A further consideration are the rights of 'bystanders'; those who are caught up in the study by being linked on social media, such as a follower. Researchers should consider any risks to bystanders and alter study designs to mitigate these risks. Because privacy policies on Social Media Platforms change so frequently, researchers are encouraged to monitor them or engage somebody with this expertise to do so (ibid).

If the budget allowed, professionals could be engaged to run an ad campaign. The Glad Study (Davies *et al.*, 2019) is an on-going study of The Genetic Links to Anxiety and Depression, which is aiming to recruit 40000 participants into the NIHR Mental Health BioResource. It is making use of traditional recruitment methods and social media. Professional web developers set up a website for the study, and a PR company created a Social Media Campaign utilising Facebook, Twitter and Instagram. The paper by Davies *et al* reported on some of the initial findings regarding the methodology. One finding is that the Social Media Platforms have performed very well at recruiting younger adults (aged 16-30) to the study compared to traditional methods (ibid).

The Ad campaign was aimed at a younger audience and encouraged participation galvanising volunteers to be part of a 'community', a call for action asked people to 'help out' in the 'largest study' of its kind (Davies *et al.*, 2019) The wording gave people a reason for taking part and possibly normalised participation by claiming to be the largest study. The ads were very simple in colour palette, text and animation, and emphasized the simplicity and ease of taking part. You Tube videos described the consent process in a relatable way and provided more information about the study. The ad campaign was run initially for six weeks. Within 24 hours, over 8000 participants had signed up (ibid).

Setting up an on-line community is another way to engage with potential participants. It is not necessary to have the vast resources that were behind the Glad Study. Another study that has effectively recruited through a free Facebook page is the Clare Project. The Clare Project is a research project about what matters most to young adults with advanced cancer. As a community it offered the participants something in return for their data; an opportunity to connect with others.

In conclusion, social media is an important tool for reaching young people. The most popular Social Media sites are Instagram and Snapchat, but young people often have multiple accounts and a strategy involving different sites could increase recruitment. Facebook has the largest reach. Instagram has the most conversions to survey completion.



The Search features of Social Media sites can be used to target special interest groups and place messages with them for free. However, the different sites have their own Ad creation and marketing tools that can be employed for relatively little financial outlay. In order to be effective, it is very important to get to know the Social Media platform and its users well, before creating an ad campaign. Ads need to be placed regularly over a minimum of a six-week period. Professional PR companies can be employed at greater expense to produce professional ad campaigns.

2.8 Summary of Methodology Chapter

After consideration of the philosophical standpoint of the researcher, the subject matter of the study and the aim of the study, a pragmatist paradigm was selected, utilising a socio-ecological framework, and mixed methods methodology. This would consist of an explanatory study design, with quantitative and qualitative data collection using eclectic pluralism to optimise the sensitivity and rigour of the results. Social media was the instrument selected to collect data online from the Philippines and the UK.



Chapter 3 Methods

...in which the methods are described in detail in the format: Study design, Participants, Materials, Data Collection, and Analysis Plan.

3.0 Title, Research Aims, Objectives and Questions

3.0.1 Title

A Comparative study of Menarche and Menstruation Knowledge and Experiences of girls aged 16-19 years old in low resource settings of the Philippines and the United Kingdom.

3.0.2 Aim

To describe the knowledge and experiences of menarche and menstruation in school girls aged 16-19 years in low resource settings of the Philippines and the UK and to explore the factors that affect the quality of the experience.

3.0.3 Research objectives

The research objectives were:

1. in low resource settings of the Philippines and the UK
 - a) to describe the knowledge, attitude and perceptions (kap) of adolescents aged 16-19 years old with regard to menstruation
 - b) to explore the menstrual experiences and practices of menstruators aged 16-19 years old
2. to investigate the relationships between menstrual knowledge, attitude and perceptions; social demographics; and menstrual experiences and practice.
3. Through literature review, to evaluate the impact of policies and programmes designed to inform about puberty, and Menstrual Health in particular, and to make recommendations for supporting girls based upon the research results.



3.0.4 Research questions

- 1a. What is the knowledge, attitude and perceptions (KAP) of 16-19 year olds about menstruation?
- 1b. What is the experience of adolescents aged 16-19 with regard to menstruation?
2. What are the factors that influence menstrual experience?
3. What is the impact of education and hygiene promotion on Menstrual Health?

3.1 Study design

This was an explanatory study that set out to investigate, measure and explain the relationship between Demographics, Menstrual Literacy (KAP) and Menstrual Experience of adolescents in low-resource settings of the Philippines and the UK. This required the study to be mixed methods, and because of the constraints of the Covid-19 pandemic, it was designed to be carried out online. It consisted of a quantitative cross-sectional survey, a qualitative epistolary (asynchronous) focus group discussion (Ferguson, 2009) with a photovoice activity (Bhakta, 2019; Graber, 2020) and a literature review.

3.1.1 Quantitative survey to answer RQ 1a, 1b and 2

The quantitative survey collected demographic data; data on knowledge, attitudes and perceptions (KAP) and data on experiences and practices. The KAP data was used to produce a score for Menstrual Literacy to answer question 1a and the experience and practice data was used to produce a Menstrual Experience score to answer question 1b. The relationships between the demographic factors and the scores were analysed statistically using regression analysis to answer question 2.

3.1.2 Qualitative FGD and Photovoice activity to augment RQ 1a, 1b and 2

The qualitative data was collected through epistolary focus group discussions and a modified photovoice activity. These were participatory methods that were compatible with being carried out online. The focus groups were set up as private online groups. The other participatory method of photovoice was included as an option for those that found it difficult to put their thoughts into words. Participants were encouraged to take a photo of something that expressed how they felt about menstruation (Bhakta, 2019).



This would also provide triangulation.

3.1.3 Literature Review in order to answer RQ 3

A systematic review of the literature on menstrual education interventions was a desk-top study carried out independently of the survey and focus group discussion. This is to be found in Chapter 4.

3.1.4 Synthesis

The different components of the study were analysed separately and then brought together in an over-arching synthesis to meet the aim of the study.

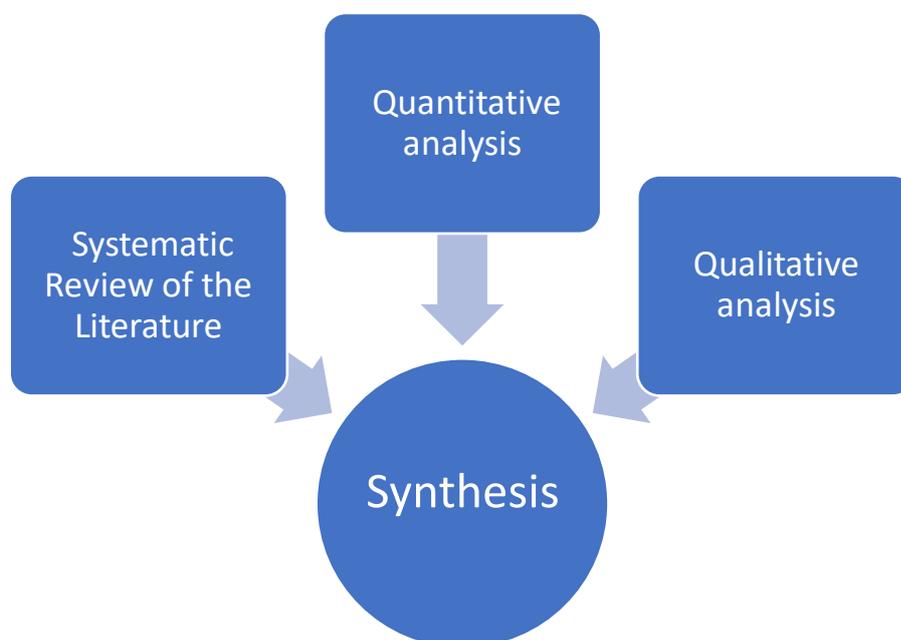


Figure 3.1 How the different components of the study contribute to the synthesis

3.1.5 Ethics

The study obtained ethical approval from BSREC in the UK (BSREC 43, 19-20).



3.2 Participants

3.2.1 The quantitative survey

Participants were recruited through a Facebook advertisement campaign that ran between February and March 2020. The ads were generated iteratively and used Facebook algorithms to target 16–19-year-olds from low-resource settings of the National Capital Region (the Manila Conurbation) of the Philippines and of the United Kingdom. A Community Based Organization in Manila was used to provide mobile-phone data to low-income clients to enable them to have internet access. Respondents who clicked on a link were directed to a survey in Qualtrics. Before entering the survey, the participants had to read the Participant Information Leaflet (PIL) and sign the consent form.

Sample size Calculation

The survey was designed to produce a score for Menstrual Literacy (KAP) and a score for Menstrual Experience. It was intended to analyse the difference in mean score by subgroup to discover whether there is a difference in KAP between the Philippines and the UK, between menstruators and non-menstruators and between publicly funded and non-publicly funded education. A sample size calculator was used (Calculator.net, 2022). For the standard 5% margin of error (or confidence interval) and 95% confidence level, the suggested sample size in each locality is 384. This concurred with two similar studies which had sample sizes of 361 (Shah *et al.*, 2019) and 364 (Afsari, 2017).

If the recruitment rate is 90% and the response rate is 30%, as is usually found with unsolicited surveys (Krosnick, 2018), this means that the survey needed to reach 2844 adolescents.

Sampling method: 'Opt-in' criterion sampling

Participants to the study were recruited through 'opt-in' criterion sampling. Criterion sampling is a type of 'typical case' sampling (Sandelowski, 2000) and is more flexible than purposive sampling which may only lead to the contacts of the researcher.

The criteria were established as a) potential participants were part of the target population by age-group, b) they had lived in the country for the past two years (in order for them to have experienced the school system) and c) they were from a low-income background.

Participants to the study were recruited through a Facebook advertising campaign that provided a link to the quantitative questionnaire.

The settings of a Facebook campaign allowed geographical regions and age-groups to be targeted. In the Philippines the conurbation of the North Central Region (Metro Manila)



was selected. In the UK, the Greater London and the Midlands conurbation were selected. The age-group was set at 16- 19. The advertising campaign ran for 6 weeks between February and March 2021.

To increase recruitment the link was also shared via the webpages and social media of identified partners and educational organisations. In the Philippines, this was the Mary Johnson hospital (part of the Philippine Christian University where the partners are based), and high schools in the vicinity (Tondo) with whom the partner has engagement. The online pages of the community-based organisation, Kapatiran-Kaunlaran Foundation Inc., were also used to contact out-of-school youth, with whom the CBO engages. In the UK, the advert with link was posted on the online pages of the Times Educational Supplement, the Further Education Supplement and the Guardian Education pages, as these are frequented by education professionals who may have been able to repost the advert on their school and college websites. Direct contact was made with colleagues known to the researcher working in FE institutions in low-resource settings including London, Medway, Leicester, Nottingham, Derby, Chesterfield, and Manchester. The home-schooled community was contacted through admission to a Facebook page and the link was shared, and Twitter was used to spread the link more widely.

Facebook Advertising campaign

The Facebook advertising campaign required the generation of appealing adverts, which was named THE MENLIT study. These were created in CANVA which produces professional-looking ads using a template. 10 sets of 3 adverts were created, with a neutral palette colour. Some featured menstrual products, some featured girls, and some featured lifestyle aspirations of this demographic, like flowers and coffee. They drew attention by making statements, such as 'Painful periods affect 9 out of 10 girls', or asking questions, such as 'Could you help us understand more about menstrual experiences?' Some mentioned incentives, some did not. Using Facebook analytics, it was possible to manipulate the different sets and the parameters, such as day and time of advert going out, in order to see what worked best. In the Philippines, a photo of a young woman clutching her stomach elicited the greatest response. In the UK, it was the simple words 'The Menlit Study'. The best day and time appeared to be Sunday evening. The tools of Facebook were set to employ algorithms to target potential participants. This involved showing the ad to people who had already responded to similar ads before and showing the ad again to them if they had not followed through with a click. The analytics tool



reports on Reach (the number of people the ad has been shown to) and Impressions (the number of times the ad has appeared on their screen, ie more than once per person).

Incentives/Compensation

The study required participants to have a mobile phone and data. In the Philippines, mobile data is purchased as pay-as-you-go. Participants were told that they would be able to claim P100 as compensation for taking part in the survey. Those who completed the questionnaire were taken to a second survey page where they could enter their contact details (to ensure that the survey data itself remained anonymous). Once this was verified, the local partner was able to transfer P100 via GCash to them, up to a maximum of 400 participants.

In the UK it was assumed that participants would be using their own data as part of an unlimited data plan, and that data itself would not be an incentive, so it was decided to offer an alternative in the form of entry into a draw for a combined, larger prize.

Participants who wished to claim their compensation were also required to click on a second survey where they could leave their contact details. Three participants were drawn randomly from the list (using an online randomiser) and were sent a £100 Amazon Gift Card.

Limitations of sampling method

The problem with 'opt-in' criterion sampling is that the participant must self-identify as meeting the inclusion criteria. It is very difficult to verify this. However, that is a limitation of all on-line data collection and not just this study. It does affect the validity of the results and is something to be aware of when drawing conclusions.

A limitation of this study was that some of the criteria are subjective, for example, identification of low resource. The participants identify as low resource, but this is their perception. To get a more absolute indication of poverty, a more objective question was included in the demographic section of the questionnaire. In the Philippines, the question asked was about food security (which was taken from the census) and in the UK the question was about pupil premium (which is a means tested payment for school children from low-income households).

Another limitation of this study is that money is offered which can introduce selection bias. However, it was recognised that people expect to get something out of giving up their time and after consultation with the partners in the Philippines and students at the



University of Warwick a level of compensation that also worked as an incentive was agreed upon.

3.2.2 The Qualitative Focus Group Discussion

Recruitment

Purposive sampling was used for recruitment to an asynchronous epistolary focus group discussion. The participants were contacts of the CBO in the Philippines and of ex-teacher-colleagues of the researcher in the UK. The participants were given the PIL and signed a consent form. The focus group was conducted between February and May 2021 on Facebook Messenger in the Philippines and WhatsApp in the UK.

Type of Focus Group Discussion

As menstruation is a sensitive subject matter and can be embarrassing, it was important to provide a safe, if virtual, space for participants to feel confident enough to speak their truth (Chambers, 2017). It was run asynchronously and was epistolary. A group of participants, and particularly young girls who have not yet developed their confidence, are likely to refine their own opinions when they hear the opinions of others, whether they be confirmatory or contradictory. It can be important for a discussion to take place to help them to formulate their ideas as if they answer straight away it might be with a stock answer. Being asynchronous allowed the participants time to think and reflect, and respond to others, and come to a shared knowledge (Ferguson, 2009). It also helped to avoid confirmation bias; in question-and-answer sessions, participants can think that there is a 'right' answer and try to give that, and researchers can assume that they know the answer, and that is what they hear.

Purposive sampling

Purposive sampling was selected as the best method to use to achieve a homogeneous sample of participants who share the same characteristic, in this case, were from a low-resource setting. Purposive sampling is often used to recruit to a small focus group and requires an in-depth knowledge of the participants to ensure that they meet the inclusion criteria. It is entirely non-random, and completely biased, so it is not suitable for statistical analysis, and this must be considered during the analysis. However, it does mean that the participants may be selected for their 'soft skills', for example, they may be able to articulate themselves well, and because they might be team players and work well together. Importantly, the selector can try to ensure a balance of views; in this case it was



desirable that they represented different educational backgrounds. Finally, when purposive sampling is carried out by somebody who knows the participants well, those that are vulnerable, or a safe-guarding risk can be protected.

In the Philippines, a field assistant from the community-based organisation invited girls aged 16-19 to take part in an online Facebook Messenger group. This was the preferred social media in the Philippines as all of the girls had Facebook accounts. The fieldworker knew the girls and their families well as they were engaged in livelihood and educational programmes run by the CBO, and by definition, all came from very low-resource settings (Manila North Cemetery or Tondo Eskinita). The families lived below the poverty line, in make-shift houses, without piped water or sanitation, and living hand-to-mouth to feed themselves. Some of the girls were out-of-school-youth (OOSY), some were part of the Alternative Learning System provided by the CBO, and some were 'scholars' who were sponsored to attend public school by the CBO.

Most of the girls had mobile phones (or at least a family member did). Pre-paid SIM cards were provided to them. The field assistant was able to take their consent and then enrolled them into the Facebook messenger group. Twelve were enrolled in total. The researcher and field assistant acted as administrators. The field assistant was an established trusted adult already in their lives, and this helped to give the girls confidence. On a practical level, the discussion was carried out in English and Tagalog, with the field assistant providing the necessary translation. The girls were provided with data and P300 each was promised for answering the questions and completing the tasks.

In the UK, safe-guarding leads from the colleges recruited above identified girls who met the inclusion criteria and gave them the information about the study. The safe-guarding leads had access to files about the girls and their families, which included their background. They usually have contact with those from low-resource settings to ensure that they are able to claim any allowances for fees, travel or food. Their main role is to have an overview of the vulnerabilities of the students in their care, and act to safe guard them. The safe-guarding leads are the best placed people in a school or college to select those that come from a low-resource background whilst avoiding those that have vulnerabilities. They were able to approach the girls, and if the girls wanted to take part, it was the girl who sent an email to the researcher so that they were not put under pressure. Those who responded were enrolled onto a WhatsApp group. WhatsApp is the preferred social media in the UK. One advantage is the high level of encryption it provides. Eight



participants were enrolled, who had different educational backgrounds, including one who had been home-schooled, one who had been to a faith school and one who had been to a girls' school. They all had access to data but were promised £30 in Amazon vouchers for their contribution to the group.

3.3 Preparation of Materials

3.3.1 Survey Development

The survey consisted of a 70 item Likert-style questionnaire with three sections on Demography, Menstrual Literacy (KAP) and Menstrual Experiences. The questions were based on those from previous studies (Crofts and Fisher, 2012a; Wilson *et al.*, 2015; Shah *et al.*, 2019). The demographic questions and sources of knowledge were closed questions with several expected answers, based on previous work by the researcher and in consultation with the CBO in the Philippines (Evans, 2018). The KAP and Experience questions were Likert-style statements.

Table 3.1 Quantitative survey questions

<i>Section</i>	<i>Content</i>
1.0 1.1	PIL Consent
2.0	<i>Demographic Questions – the Philippines only</i>
2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9 2.10 2.11 2.12 2.13	What is your age? Are you currently a school or college student? Do you live in an urban or rural area? Would you describe your circumstances as low income or low resource? What is your religion? Have you ever not had enough food to eat? (food security question) How many people live in your house? How many females over the age of 12 live in your house? What is the main source of water used by your household for handwashing? What kind of C.R. do members of your household usually use? Do you share this C.R. with other households? Do you have a waste collection service? What sort of school did you attend for the last two years?



3.0	<i>Sources of Information PH and UK</i>
3.1 3.2 3.3 3.4	Who first told you about menstruation? How old were you when you first learned about menstruation? Have you ever been taught about menstruation in a school lesson? Have you ever sought information about menstruation from any of these sources? (Tick all that apply: family member, friend or acquaintance, nurse or health care professional, teacher, religious leader, books, the internet, online discussion groups)
	<i>Knowledge PH and UK</i>
3.5 3.6 3.7 3.8 3.9 3.10 3.11 3.12 3.13 3.14 3.15	Menstruation begins at puberty The colour of the first menstruation is white Menstruation is blood loss Girls don't menstruate until their body produces eggs Menstrual blood exits the body through the same opening as urine Menstrual blood comes from the stomach where food is digested Menstrual blood comes from the womb where babies grow A menstrual period lasts an average of 10 days Menstruation happens only twice a year Pregnant women don't menstruate Menstruation stops in old age
	<i>Attitude and Perceptions PH and UK</i>
3.16 3.17 3.18 3.19 3.20 3.21 3.22 3.23 3.24 3.25 3.26 3.27	When a girl starts her periods, it's a cause for celebration When girls start their periods, they should stop behaving like children and start behaving responsibly When girls start their periods, they are ready to start a family Girls should not do vigorous physical activity if they are menstruating Girls who are menstruating look different Girls who are menstruating are more emotional than usual Girls should keep their menstrual status a secret Men and boys should not see menstrual blood Girls should carry on as normal during their menstruation Menstrual pain or discomfort is largely in the mind Boys should be taught about menstruation Girls who are menstruating are unclean and cannot take part in religious ceremonies
4.0	<i>Experiences and Practices PH and UK</i>
4.1 4.2 4.3 4.4 4.5 4.6	Would you describe your periods as normal? How old were you when you started your periods? How many days does the bleeding last? What type of menstrual products do you normally use? What are the most important factors in your choice of menstrual product? Have there been times when you have not had sufficient menstrual product?



4.7	In a 24 hour period, how often do you change your menstrual product
4.8	when your flow is heaviest?
4.9	During the school or college day, where do you go to change your used menstrual product?
4.10	During the school or college day, what do you do with the menstrual waste?
4.11	During the school or college day, are you able to take part in all of your usual activities whilst menstruating?
4.12	In a normal month, how many days of your schooling do you miss due to menstruation?
4.13	Do you miss school or college for other reasons?
4.14	At school or college I always carry menstrual products with me, just in case
4.15	At school or college I can leave the classroom to manage my menstruation at any time
4.16	I sometimes ask a friend to lend me some menstrual products if I am in need
4.17	If I start bleeding whilst I am at school or college, I go home straightaway
4.18	
4.19	I have been teased or bullied about menstruation
4.20	When I am menstruating, I find it difficult to concentrate
4.21	Menstruation doesn't affect me
4.22	If I am menstruating, I avoid running around or playing sports
4.23	Sometimes I have not got enough money for menstrual products
4.24	I'm able to wash and maintain my personal hygiene whilst menstruating
4.25	I'm able to use clean menstrual products throughout the duration of my period
4.26	I prefer to be alone and not socialise during my menstruation
4.27	I feel energetic and positive during my menstruation
	I feel shame and embarrassment when I am menstruating
	I sometimes suffer from discomfort during my menstruation, such as cramps or bloating
5.0	<i>Demographics – UK only</i>
5.1	What is your age?
5.2	Are you currently a school or college student?
5.3	Do you live in an urban or rural area?
5.4	Would you describe your circumstances as low income or low resource?
5.5	What is your religion?
5.6	Within the last 5 years, have you received free school meals or pupil premium?
5.7	How many people live in your house?
5.8	How many females over the age of 12 live in your house?
5.9	What sort of school did you attend up to the age of 16?



The questionnaire was uploaded into Qualtrics. The questionnaire could be completed in English or Tagalog. It was in four parts. The first part provided the participant information and required respondents to give their consent to the study. They could not enter the rest of the questionnaire if they did not check the consent box. The questionnaire used skip logic and display logic so that each respondent only had to complete the relevant sections to them, to avoid wasting time. The second part collected socio-demographic data. These questions were similar but not the same for the Filipino respondents and the UK respondents. The third part consisted of questions on their knowledge, attitude and perceptions (KAP) of menstruation and the fourth part (for menstruators only) was to collect information about their experiences of menstruation.

Qualtrics was selected as it was simple and efficient for the user and allowed anonymity. This was important for the study as it would promote completion rates, ensuring sufficiency of data, enhancing rigour and reducing bias. For the researcher, Qualtrics provided the opportunity to carry out statistical analysis within the program.

3.3.2 Pilot

Volunteers were sought in the two countries to pilot the questionnaire. The CBO in the Philippines asked some of their scholars and Gateway College in Leicester provided some students. Two in each country piloted the whole questionnaire, and fourteen from the Philippines piloted the demographic section to ensure that the full range of options for the multiple-choice had been covered.

Logic and length of time

The pilot provided an opportunity to check how smoothly the logic of the questionnaire ran and how long it would take someone to answer the questionnaire.

One UK respondent said that it took her 10 minutes to complete, and she had not experienced any difficulties with the logic. The other said it had taken her 15 minutes. The girls in the Philippines did not state how long it took them.

Acceptability

The questionnaire was on a sensitive subject and because it is possible that the questions could cause offence, embarrassment or alarm, it was important to know whether there would be any issues with it and whether it would be acceptable to adolescents from diverse cultural and religious backgrounds (Testa and Coleman, 2006). The volunteers did not find anything problematic with it.



Comprehensibility

The students from the Philippines found the language of the participant information difficult to understand, even in translation, and it was re-written in a plainer style. They also preferred the English word 'sanitary napkin' to menstrual products or absorbents which translated as 'blood-suckers'.

One participant from the UK said that they did not recognise which type of school they had attended, as they knew it as a Comprehensive. As 'Comprehensive' or 'Comp' is common parlance for a state-controlled school in the UK, it was added in brackets to the question.

Content Validity

The questionnaire was put together using questionnaires that were validated in Africa (Crofts and Fisher, 2012b; Wilson *et al.*, 2015; Shah *et al.*, 2019) and the previous experience of the researcher in the Philippines. It is important to check that the participant understands the questions in the way that is intended, and that the questions are valid for that context (Krosnick, 2018).

The section on demographics was completed by 14 volunteers. This was to check the assumptions that had been made, whether the questions were useful and to refine the categories for analysis. It was intended to turn the responses from Likert Style questions into scores, which would require bucketing of the answers, but before the categories were decided, it was important to understand what the norms were.

Pilot study results summarised

The median age was 18 years old (the median gives the best indicator of the middle of the data in a small sample). All the respondents were students and all of them were Christian. This is probably because they were purposively sampled as scholars of a Christian CBO. However, in terms of the analysis, these factors may not be very useful (factors accounting for over 95% of the sample are not meaningful as predictors).

Eight of them (57%) were in public school, 3 (21%) in the alternative learning system and 3 (21%) out-of-school youth. Half (7) had completed school as far as grade 9/10 (Junior High).

Half (7) identified as coming from low-resource settings, but another 6 checked the 'maybe low-resource' box. They probably are from a low-resource setting (because they were selected by the CBO) which indicates that participants may be reluctant to identify as



low-resource, possibly due to the attached stigma. Over half (8) of them identified with at least one of the seven statements about food security, which was used as a proxy for absolute poverty, and confirmed the sample as being representative of a low-resource population. For this reason, it was decided to combine the 'yes' and the 'maybe' low resource into one category.

Half (7) of the households were greater than 7 members, and just under half (6) had more than five females. As far as bucketing the responses goes, this had implications for the size of household category. It was decided to divide size of household into small (1-6) and big (7+) to reflect the norms as opposed to small 1-4) and big 5+ in the UK. Similarly, the number of females was divided into two categories; small (1-4) and big (5+) as opposed to small (1-3) and big (4+) in the UK.

Half (7) had piped water but 6 checked the 'other' box. They were offered the possibilities of artesian well, electric pump (ground water), and hand pump, which are all known water sources in Manila, so if they checked other, it meant that they had no reliable water source and were probably purchasing water from a 'water shop' (according to the CBO). Only 5 of them had access to a flush toilet. 9 out of the 14 used a bucket. Half of them did not have a private comfort room but had to share with another family. Ten of them claimed to have a waste-collection service.

The results did justify having different questions for the Philippines and the UK on Water, Sanitation and Waste-collection. They were not included in the UK as it is assumed there is universal coverage, but the results of this pilot suggest they might be significant in the Philippines.

Reliability

It was also important to establish whether the respondents knew what was required of them when it came to answering the questions, and whether the results were repeatable. One of the ways in which to assess this is the 'test-retest method' or 'percentage agreement' (Berchtold, 2016). The same respondent takes the test at two different time intervals, and the items are compared for complete agreement. The percentage agreement of this test was 82.92% on raw scores and 95.73% on collapsed scores which show directional agreement. (Collapsed scores are when 'Strongly agree' and 'somewhat agree' are both treated as positive, and 'Strongly Disagree' and 'somewhat disagree' are both treated as negative). It is important that agreement is conducted on the same person, and the time interval should neither be too short so that they can recall what they said last



time, or too long so that learning or other changes have occurred to alter their opinion. Two students took this test twice. One had an interval of 13 days between the first test and the second. Their raw scores agreement was 85.36% and their collapsed scores agreement was 97.5%. The second student had an interval of 19 days. Their raw scores agreement was 80.48% and their collapsed scores agreement was 93.9%. It would be better to have a larger sample size to avoid bias, even for a pilot, but it does give an indication that this questionnaire is performing reasonably well. It is generally accepted that agreement needs to be over 70%.

Internal consistency

Cronbach's alpha was used to establish whether there was internal consistency between the items (Litwin, 1995). Multiple items were used to construct the scale and it was important to ensure that they measured the same concept, for example, period positivity in the experience scale. Item Analysis was conducted to find out the correlation of each item to the overall score, which led to those that did not correlate well being dropped (eg 'I feel different when menstruating'). SPSS was used to calculate the Cronbach's alpha on the remainder, which should be above 0.7 and this one was 0.8326, showing good internal consistency.

Incentives

To encourage adolescents to participate in the study, some of the budget was reserved for incentives.

Advice was taken from the CBO who administered the questionnaire in the Philippines, and they devised a system to allow all participants (up to a maximum of 400) to claim P100.

In the UK, it was decided to run a draw. The volunteers were asked which incentive they thought was more appealing; a) an iPad, b) 3 x £100 shopping vouchers or c) 6 x £50 vouchers. One of the participants said she personally thought 6 x £50 vouchers would be better as the chance of getting one was quite high. The other two preferred 3 x £100 because that could buy them a large item that they couldn't otherwise afford, like trainers.

This was then used in the Facebook advertisements to recruit participants. On completion of the survey, participants were directed to another page which asked them to email the researcher if they wanted to go in a draw for vouchers. This avoided their details being linked to the data in the survey.



3.3.2 Qualitative Focus Group preparation and administration

Consent

Participant Information Leaflets were issued, and written consent was obtained from potential participants before enrolling them onto on-line focus groups.

Enrolment

The focus group discussion for the Philippines was set up as a private group in Facebook Messenger called 'Experiences of Menstruation' and one of the admins was the researcher and another was the partner in the Philippines. The participants were fully briefed about the risks prior to this, as Facebook isn't encrypted, and their written consent was obtained. They were advised to use pseudonyms, and they were instructed not to post anything that personally identified themselves or others (Association of Internet Researchers, 2012). The Filipina administrator was asked to keep the ID of the participants separately and assign the participants numbers for all data transfer. They were additionally asked to monitor the activity of the group very carefully and to close the account down and alert the Facebook authorities if there were any suspicious activities.

In the UK, a WhatsApp group was set up with the researcher as the admin. Although WhatsApp has end-to-end encryption, and there were less risks from outsiders, the members of the group were asked to agree to good practice rules regarding respect for each other and confidentiality.

Pre-prepared questions

The focus groups were designed to be epistolary and asynchronous. The set of pre-prepared questions were uploaded at the beginning to stimulate the discussion.

Photovoice

Participants were allowed to upload photos of what menstruation meant to them if they found it easier to express themselves in that way. They were instructed to make sure there were no personal identifiers in the photos, and if the photos had faces, they had to blur them to ensure that individual people were not identifiable.

Reliability

Reliability was ensured by preparing the questions in advance so that they were asked in the same way to all participants. But the nature of the discussion allowed for flexibility in its direction.



Bias

To mitigate some researcher bias, a fieldworker was employed in the Philippines who had access through her charity work to the poorest people who were excluded from mainstream society. This introduced a different type of bias, but ensured the voices of the intended participants were heard.

Rigour

The qualitative data likewise was collected online through social media sites. It was easy to verify the UK WhatsApp focus group data, but not so easy in the Philippines, as there was a third-party intermediary doing the collection and translation (the fieldworker). Clarification was sought on some matters.

Trustworthiness

The credibility was checked by asking participants to complete a photovoice activity in which they sent in a photograph of their experiences of menstruation. The results from the two countries were compared to ascertain how transferable they are. The study was described in detail to the ethics committee and is repeatable, and the confirmability is high due to having used the participants' own words in the analysis.

Triangulation

It was planned to have several activities to provide triangulation (see pre-covid methods) but due to the Covid-19 pandemic, when data collection transferred to on-line, this limited the options. To compensate for this, additional questions were added to the questionnaire and focus-group that asked the same thing from a different angle, to check that the responses were not changing. The photovoice activity was modified so that the participants could submit any photograph or image that represented their experience of menstruation as another point of triangulation.



3.4 Data collection, transfer and storage

3.4.1 Data collection

Quantitative data

The data was collected electronically through Qualtrics.

Qualitative data

The Focus Groups were conducted separately and asynchronously in each country. There was a set of ten questions that were prepared in advance and uploaded to a private Facebook Messenger group in the Philippines, and a private WhatsApp group in the UK. These were the opening gambits to stimulate discussion. Follow-up questions were then asked, and these were dependent upon the course the discussion took, so were unique to each group.

The epistolary and asynchronous nature of the focus group operated slightly differently in each country. In the Philippines, due to time-zone differences and the need for some translation through a Tagalog speaking fieldworker, the discussion didn't flow spontaneously. So, the Philippine admin also uploaded the questions one at a time to encourage a targeted response. Some of the respondents replied online to the group. Others submitted their response separately to the admin. The first responses were forwarded to the researcher, and the researcher sent back further questions for clarification. Another round of question-and-answer was conducted. This took place over one month.

In the UK, the pre-prepared questions were also uploaded at the beginning, and then the questions were uploaded one at a time, usually once a day. The discussion was more spontaneous, with some questions provoking many comments and the discussion occasionally going off on a tangent. The girls sometimes asked each other questions and ended up sharing tips and advice. The researcher asked them to return to a couple of questions that had not initially generated many comments or where the comments needed clarification.



Table 3.2. The questions asked to the Focus Group Participants

Questions to Focus Group Participants in both the Philippines and the UK.	
<ol style="list-style-type: none"> 1. What terms are used to describe menstruation in this community? 2. Are there any traditions associated with menarche or menstruation? 3. If you wanted to get more information about menstruation, where would you go? 4. Did you know about menstruation before you started your periods? What did you know? 5. Where did you learn about menstruation? Have you had lessons on menstruation at school? 6. If you start menstruating whilst you are at school/college, what would you do? 7. Have you personally, or someone you know, ever had a 'menstrual accident' and leaked through your clothes? 8. Have you ever been teased or bullied about menstruation? 9. What are your preferred menstrual products and why? 10. Does the school provide you with menstrual products or do you carry them with you? 11. Are you able to go the toilets/C.R. as necessary? 12. What is the condition of the toilets/C.R.? Do you have enough space and privacy to change? 13. Is there sufficient water and soap? 14. Is a receptacle for disposal of menstrual waste provided? 15. Are you able to fully participate in activities when you are menstruating? 16. Have you got any tips for younger girls on how best to cope at school? 17. Does menstruation affect your sense of well-being? 	
Follow-up questions to the Philippines FGD	Follow-up questions to the UK FGD
<ol style="list-style-type: none"> 1a. Is menstruation discussed openly or is it kept a secret? 2a. 'women should not study because they will eventually get pregnant'. Does this mean that they should not study ever again after menarche because they will 	<ol style="list-style-type: none"> 18. What factors do you think have influenced your personal experience of menstruation? 19. More generally, what issues surrounding adolescent menstruation would you like to see addressed?



<p>become moms, or does it mean just during menarche?</p> <p>3a. Would you personally openly say you were menstruating, to family? To friends? To teachers? To strangers?</p> <p>5a Did you learn anything useful about menstruation from school?</p> <p>8a. How did you feel when you leaked through your clothes?</p> <p>9a Are boys empathetic about menstruation?</p> <p>10a. How would you feel if you did not have a commercial napkin and had to improvise with cloth?</p> <p>11a Could you still get menstrual products at school if you had no money?</p> <p>12a Do you have to tell the teacher the reason you need to leave the class to go to the CR?</p> <p>13a What do you consider to be necessary for you to be comfortable using the CR?</p> <p>14a How often is there not enough water or soap?</p> <p>15a Do people dispose of menstrual waste hygienically?</p> <p>16a What activities would you not take part in if you were menstruating?</p>	<p>20. Has anybody tried menstrual pants or cups?</p> <p>21. Dysmenorrhea, cramps, period pains and endometriosis are coming up a lot. Anybody got any experiences or opinions?</p> <p>22. What is normal about periods and when to seek help. Is that something that should be taught?</p> <p>23 Are cramps something to be 'put up with' or should you be able to say that you are suffering and perhaps not able to participate fully in something? Particularly in schools or work situations.</p> <p>24. Do you use medication eg the pill to control the bleeding?</p> <p>25. How did you feel when you started your period and had to ask somebody to buy products?</p> <p>26. Who told you about menstruation and when you started, did you feel adequately prepared?</p> <p>27. Are friends and important sources of such knowledge?</p> <p>28. Has the covid pandemic affected your menstrual practices in any way?</p>
---	---

Some of the data from the Philippines was written in Tagalog, so that was translated by a fieldworker into English. Then the data from the Philippines and from the UK were transcribed into Nvivo 12 Pro to be coded for thematic analysis.

3.4.2 Data transfer



Qualitative data

The link to the Qualtrics survey was embedded in the University of Warwick website.

Qualitative data

In the Philippines, the admin collated the responses, translated them and sent them to the researcher in an Excel Spreadsheet with personal identifiers removed. The excel sheets were transcribed onto a password-protected University of Warwick laptop.

In the UK, the WhatsApp group was set up from a University of Warwick laptop. WhatsApp is secure as it provides end-to-end encryption. This means that there was no data transfer outside of the University of Warwick server.

3.4.3 Data storage

The files were uploaded onto secure University of Warwick servers which comply with strict information protection standards. The data will be stored according to university of Warwick protocols for a period of ten years.

3.5 Analysis Plan

3.5.1 Quantitative data analysis plan

Descriptive Statistics

In order to answer the first research question, descriptive statistics were conducted within Qualtrics and inferential statistics within SPSS.

Research question 1

1a. What is the knowledge, attitude and perceptions (KAP) of adolescents aged 16-19 years old with regard to menstruation?

1b. what is the experience of adolescents aged 16-19 with regard to menstruation?

Demographic variables and Sources of Menstrual Knowledge were described with percentages and crosstabs were used to compare the two countries. The significance level was set at P0.05.

Scores were generated for a) Knowledge, b) Attitude and Perceptions, c) KAP and d) Experience by transforming the Likert scale responses into numbers 1-5 and totalling them.



This was to allow the means and the quartiles to be found, in order to get a 'feel' for the data.

Scores

A Knowledge score was generated from 11 questions in the survey (max 55). Correct statements were scored as follows: Strongly disagree = 5, disagree =4, neutral =3, agree =2, and strongly agree =1. Those that were incorrect were scored in reverse.

The process was repeated with 12 questions for Attitude and Perceptions (max 60).

The Knowledge Score and the Attitude and Perceptions Score were combined to give a total KAP score (max 115).

An Experience Score was generated from 12 further questions (max 60).

Descriptive statistics reported on were the mean and standard deviation, the minimum to maximum range and the quartiles for each Score in each country separately.

Inferential statistics

The data was then exported to SPSS to carry out inferential statistics. The t-test was used to compare the means of the four scores between the two countries. The Pearson Correlation test was used to look for an association between KAP and Experience.

Regression analysis

SPSS was then used for regression analysis in order to answer the second research question.

2. *What are the factors that influence menstrual experience?*

It was intended to use the General Linear Model (Afsari, 2017) to see which demographic variables were predictors of KAP and Experience Scores. The data were imported into SPSS for this purpose and the demographic data were bucketed into two categories: category 1 was the reference category. See table 3.3 and 3.4.



Table 3.3 Bucketing of demographic variables The Philippines

Demographic variable	Category 1 (reference)	Category 2
Age	16-17 years	18-19 years
Scholar (currently studying)	No	Yes
Setting	Rural	Urban and mixed
Income (perceived)	Low and maybe	High
Food Security	Food insecurity	Food security
Size of Household	Small (1-6)	Large (7+)
Number of females in HH	Small (1-4)	Large (5+)
Water source	Not piped	Piped (on tap)
Sanitation system	Not flush/pour-flush	Flush/pour-flush
C.R. shared with another HH	Yes	No
Waste-collection service	No	Yes
Schooling	Non-public	Public

Table 3.4 Bucketing of demographic variables The UK

Demographic variable	Category 1 (reference)	Category 2
Age	16-17 years	18-19 years
Scholar (currently studying)	No	Yes
Setting	Rural	Urban and mixed
Income (perceived)	Low and maybe	High
Pupil premium	Yes	No
Size of Household	Small (1-4)	Large (5+)
Number of females in HH	Small (1-2)	Large (3+)
Schooling	Non-state	State

However, although the data was checked to comply with the assumptions of the GLM before proceeding, an error message was observed in the output. It said that ‘the maximum number of step-halvings was reached but the log-likelihood value cannot be



further improved and that subsequent results are based on the last iteration. The validity of the model fit is therefore uncertain.'

The Linear Regression model was investigated as an alternative. The data was found to fit the assumptions 1) that the independent variables are not highly correlated, by checking the collinearity in SPSS, 2) that the dependent variable is continuous, 3) that there is a linear relationship between the variables, by plotting a scatterplot, 4) that there are no significant outliers, by scrutinising the scatterplot, 5) that there is independence of observation, by using the Durbin-Watson test (selected for in SPSS).

The β coefficient, Confidence Interval and P value were extracted from the output and reported. The β coefficient is how much change there is in the outcome variable compared to the reference for every unit of change in the predictor value. This allowed a regression model to be fitted and the R^2 coefficient was also extracted which determined the significance.

3.5.2. Qualitative data analysis plan

Building theory

Grounded theory was used to work from the bottom up; from what is already known to that which can be created from the data. The transcripts of the focus groups were imported into Nvivo software for analysis. Content analysis was carried out by line-by-line coding, using codes generated deductively (based on a literature view of possible themes and previous work in the Philippines) and mapping them to an Integrated Behaviour Management (IBM) - WASH framing. This explanatory framework was proposed by Dreibelbis et al 2013 and brought together the components of several different theoretical models in one unified one that focussed on the contextual dimension, the psychosocial dimension and the technical dimension of WASH (Dreibelbis *et al.*, 2013). Using this, logical frameworks were created specifically in order to answer the two research questions: 1a 'What is the knowledge, attitude and perceptions (KAP) of Menarche and Menstruation?' And 1b 'What is the Experience and Practice of Menarche and Menstruation?' Finally, in order to generate new knowledge, higher order coding was conducted by drawing on the emergent cross-cutting themes to investigate the influences on menstruation framed by the socio-ecological model in a thematic analysis. New codes were generated inductively using the socio-ecological model.



Literature Review of possible themes

A literature review was undertaken to identify possible themes for coding the transcripts.

The themes used by Behera et al 2015 were '*menarche – a new experience, sources of information, physical and psycho-social changes after menarche, socio-cultural taboos related to menarche and menstruation, menstrual hygiene practices and menstrual morbidities and coping practices*' (Behera, Sivakami and Behera, 2015). Sivakami et al 2019 used '*awareness, taboo, items, effect on school experience, facilitation of school menstrual hygiene management, disposal facilities, pain relief, education on menstrual hygiene management and factors associated with missing school*' (Sivakami *et al.*, 2019).

Previous work by Evans in the Philippines had additionally generated overarching themes of '*Livelihoods and Income, Knowledge and Education, Culture Beliefs and Global Influences, and Environment and Sustainability*' unpublished (Evans, 2018).

Generation of codes

The tools of Nvivo such as word-clouds, which displayed the frequency of words used in the transcripts, were used to get a feel for the data. In the Philippines the most frequently used words were tangible, such as '*napkins*', '*wash*', and '*pain*', in contrast to those used in the UK which were more abstract, such as '*affected*', '*normal*', and '*uncomfortable*'. The word frequency analysis was used to suggest first-order codes and these were grouped according to the IBM -WASH model (Dreibelbis *et al.*, 2013).

By comparing the initial codes to those suggested by the literature review and past experience, second-order coding was carried out in order to group them into a bespoke logical framework that would answer the research questions. See table 3.5 and 3.6



Table 3.5 Logical framework to answer the research question 1a: 'What is the knowledge, attitude and perceptions (KAP) of Menarche and Menstruation?'

Menarche	Awareness		
	Traditions		
Menstruation	Sources of information	Family	Mum
			Sibling
		Community	School
			Friends
			Acquaintances
		Stranger	Medical professionals
	The Internet		
	Types of information	Physiological	
		Practical	
		Cultural	



Table 3.6 Logical framework to answer the research question 1b: 'What is the Experience and Practice of Menarche and Menstruation?'

Menarche Experience	Positive		
	Negative		
Menstruation Experience	Internal factors (menstrual experiences that relate to one's health and well-being)	Physical effects	Dysmenorrhea
			Other menstrual disorders
			Smell
		Emotional Effects	PMS
	Embarrassment		
	Anxiety		
	Shame		
	External factors (menstrual experiences that relate to one's environment)	Resource availability	Menstrual Products
			Water
			Soap
Waste bin/Trash can			
Expectations of others		Cubicle and lock	
		Hygiene	
Menstrual Practice	Participation	Restrictions	Leaking
			Physical Weakness
			Restrictions
		Adaptations	Coping mechanisms
			The Pandemic



3.5.3 Systematic review of the literature

Research question for literature review

3. *What is the impact of education and hygiene promotion on Menstrual Health?*

A systematic review was conducted of the academic literature following the PRISMA checklist and reporting guidelines. The MMAT was selected as the quality appraisal tool. The protocol is to be found with the rest of the review in Chapter 5, to avoid duplication, because it has already been published in the British Medical Journal Open.

3.5.4 Synthesis

The results of the quantitative and qualitative analyses, along with the outcomes of the systematic review, were entered into the Nvivo software. Tools such as the matrix function were used to explore the linkages and generate themes that brought the different strands together (Barnett-Page and Thomas, 2009). A thematic synthesis, based upon grounded theory (Strauss, A and Corbin, 1994) was used to develop lines of argument that describe and explain the factors that facilitators and barriers to Menstrual Health.



Chapter 4 Systematic Review

...in which a systematic review of the literature was conducted of Educational Interventions to improve the menstrual health of young adolescent girls. A peer-reviewed version was published by the British Medical Journal Open and can be found in full in the appendix. The tables have not been reproduced in this chapter to avoid duplication.

4.0 Introduction

A scoping review was conducted to assess the extent of the research that had been carried out into menstrual health, to organise it into categories and to clarify the gaps in the literature that would be usefully answered by conducting a systematic review.

4.1 Scoping Review

Young adolescents are ill-prepared for menarche and menstruation (Mason *et al.*, 2013; Marván and Alcalá-Herrera, 2014; Chandra-Mouli and Patel, 2017; Setyowati, Rizkia and Ungsianik, 2019). In many cultures, Menstruation is a taboo subject (Shah *et al.*, 2019) and many girls are ignorant of it until they start bleeding (Sharma *et al.*, 2015). A study by Skandhan (Skandhan *et al.*, 1988) describes girls as 'appalled and horrified' on attaining menarche. Negative experiences of menarche and early menstruation can cause poor Menstrual Health (Marván and Alcalá-Herrera, 2014; Coast, Lattof and Strong, 2019).

'Menstrual Health' is a broad term which encompasses the hygienic management of menstruation with psychological components of well-being such as confidence, dignity and self-esteem (Ramaiya *et al.*, 2019; Nalugya *et al.*, 2020). It is an expansion of the concept of Menstrual Hygiene Management (MHM), mostly used in Low and Middle Income contexts to describe the challenges of managing menstruation with a lack of resources, especially pads, water and soap (House, Mahon and Cavill, 2013),(Ellis *et al.*, 2016; Hennegan, 2017). In these situations, Girls have been reported as using improvised absorbent materials, such as dirty rags, leaves or bits of mattresses (Jewitt and Ryley, 2014; Shah *et al.*, 2019). They may not have disposal facilities for used materials and they may have insufficient water to cleanse their genitals or hands (Sommer, Kjellén and Pensulo, 2013), making good hygiene very difficult to attain. Inadequate menstrual hygiene has been proposed as a factor in



debilitating dysmenorrhea and other morbidities such as RTIs and cervical cancer (Sumpter and Torondel, 2013; Rani, Sharma and Singh, 2016; Tiwari, Ekka and Thakur, 2018).

Unhygienic practices not only have physical consequences but psycho-social consequences too (Shah *et al.*, 2019). The use of improvised material, possibly synthetic or of a rough texture, or used when damp, can cause irritation and chafing (Mason *et al.*, 2013). Material that is used for menstrual blood absorption for long periods of time without being changed regularly may smell (*ibid.*). This can lead girls to feeling uncomfortable and anxious (Hennegan, 2019) and becoming withdrawn. Studies in LMIC have shown an association between Menstruation and a reduced participation in activities and/or an increase in school absenteeism (Sumpter and Torondel, 2013; Hennegan *et al.*, 2017; Kansiiime *et al.*, 2020). In High Income Countries (HIC), 'period poverty' has been recognised as an issue for certain groups such as homeless women (Sebert Kuhlmann *et al.*, 2019). Nascent work by Irise International suggests Period Poverty is more wide-reaching, particularly amongst school girls, and contributes to Menstrual Anxiety and School Absenteeism.

Despite menstruation being experienced by about 50% of the population, Menstrual Stigma is still rife in society and Menstruation is rarely talked about in public. Mothers are complicit in instructing their daughters to keep their menstrual status 'secret' (Raskova and Stolinska, 2017). In Jordan, a phenomenological analysis reported that girls believed talking about menstruation was 'rude' (Al Omari, Razeq and Fooladi, 2016). But a lack of discussion leaves girls unsure what is normal (Gumanga, 2012). Only half of all girls in a meta-synthesis which included 100 000 subjects considered menstruation to be 'normal' (Van Eijk *et al.*, 2016). A study by Gultie *et al.* found 33% of participants never discussed it with anyone (Gultie, Hailu and Workineh, 2014). Girls without guidance may not be 'competent' to deal with menstruation hygienically (Bennett and Harden, 2014; Chandra-Mouli and Patel, 2017) and girls who do not have their anxieties allayed may become withdrawn.

There is an expectation that Menstrual Knowledge is passed from mothers to daughters, generation after generation. But a number of studies have shown that the knowledge of mothers themselves maybe incomplete (Bennett and Harden, 2014; Afsari, 2017; Coast, Lattof and Strong, 2019) and they may actually perpetuate cultural myths and misinformation (Sooki *et al.*, 2016; Valizadeh *et al.*, 2017). There are many other potential sources of knowledge within a community; including other family members, Teachers,



Religious or Community Leaders, Doctors, Nurses and Mass Media Bosses, and they all have a role to play in menstrual education (Shaikh, Mubeen and Furqan, 2017; Coast, Lattof and Strong, 2019). It is upon everybody to become more literate in Menstrual Health to support menstruating girls and women.

In recognising that girls need knowledge to understand what is happening to them and not be scared; to manage their menstruation in a hygienic way; to practise self-care and feel good about themselves; to identify what is normal and when to seek help; the question becomes: how should that knowledge be communicated? What should be communicated, when, and by whom? In other words, there is a need to know what works in Menstrual Education. This review is not limited to interventions that seek to improve knowledge of menstruation *per se* but also those that seek to improve skills or competencies in the management of menstruation. This includes training on the use of different menstrual products, and self-care techniques for managing menstrual symptoms. It also extends to improving knowledge of families or communities and activities that seek to promote discussion and knowledge-seeking behaviour.

Previous reviews have focussed on the more narrow 'Menstrual Hygiene' in LMIC. A review by Sumpter and Torondel (Sumpter and Torondel, 2013) focussed on the health outcomes of MHM interventions, some of which were educational. Hennegan and Montgomery investigated whether MHM interventions improved Educational outcomes (Hennegan and Montgomery, 2016). A small review by Tamiztousi (Tamiztousi *et al.*, 2019) investigated the efficacy of Menstrual Hygiene Education on young girls' knowledge, attitude and practice in Iran by performing a meta-analysis of four RCTs.

In order to move the field forward, it was decided to focus this systematic review on the qualitative and quantitative results of educational interventions that are designed to improve Menstrual Health more generally and include studies conducted in both LMIC and HIC.

4.2 Structuring the review.

A fundamental difficulty in carrying out a systematic review of interventions is that they are heterogeneous which introduces a degree of complexity, *ipso facto*. Logic models have been proposed as a way of dealing with the complexity and of providing additional insights



compared to more conventional review methods. A logic model summarises in diagrammatic form the inputs of an intervention and the anticipated outputs and tries to link these theoretically in what is known as a 'Theory of Change' (Baxter *et al.*, 2014). They are sometimes represented as a ladder in which the rungs are stages on a journey to the desired outcome at the top.

A relevant framing using the ladder analogy is the Sanitation Ladder (Morella, Foster and Banerjee, 2008; Crofts and Fisher, 2012).

When the sanitation ladder was first proposed, progress towards the top was conceptualised as increased separation of faeces from the environment; the first rung of the ladder was no sanitation, the second a hole in the ground, the third a pit with a slab, the fourth, a flush toilet. The WHO/JMP described the bottom rungs as 'basic sanitation' and the upper rungs as 'improved sanitation' and this artificial divide was used as an indicator in monitoring progress towards the Millenium Development Goals (MDGs) (Morella, Foster and Banerjee, 2008).

Critics have described the Sanitation ladder as a reductive way of thinking about sanitation. Achievement of the first stage does not ensure automatic promotion to the second stage. Dasgupta et al 2021 argued that it is not enough to construct toilets and sewerage systems. Several different strands need to optimise and synchronise together to facilitate moving on up. They called for local and national policies to support the implementation and performance of systems and infrastructure at each step of the sanitation service chain (Dasgupta, Agarwal and Mukherjee, 2021).

Others have criticised the Sanitation Ladder for not capturing the complexity of issues such as privacy, which disproportionately affect women and girls and girls (Exley *et al.*, 2015). The Sustainable Development Goals include the needs of women in their indicators, without saying exactly what these are, just that there should be 'access to adequate and equitable sanitation and hygiene for all... *paying special attention to the needs of women and girls*' (United Nations Sustainable Development Group UNSDG, no date). There is a need to make this more explicit.

In this work, the journey towards menstrual health has adapted the ladder model into a pyramid, in order to better represent the multiple factors, both internal (such as access to



resources, space, privacy, washing facilities, etc) and external (such as policy to make these resources available) that are required to optimise at the lower levels in order to move up.

4.2.1 The development of the Logic Model

Logic Models are usually developed in reverse, by identifying the desired outcome of an intervention and suggesting the necessary preceding events that will bring it about. These are determined in two ways, both from published evidence and from discussion with experts (Baxter *et al.*, 2014). The opinions of several experts were informally collected through on-line discussion forums and community of practice, such as LinkedIn.

Using existing logic models from the literature (Harris *et al.*, 2019), the author worked backwards from the higher order aim to propose a chain of causal events that would lead to the overall outcome of improved Menstrual Health. The aim of Good Menstrual Health and Well-being is envisioned at the pinnacle of a pyramid, the distal outcome to the intervention. Girls who have good menstrual health and well-being have Menstrual Literacy, can manage their menstrual cycle confidently and feel empowered to make choices about their own bodies and lives. They can fully participate in school and achieve their potential (Nalugya *et al.*, 2020). The distal outcome requires an improvement in the preceding intermediate outcome. The intermediate outcome here is Participation (not restricted by menstruation): mobility, participation in normal activities (eating/drinking with the family), school attendance (Jewitt and Ryley, 2014). Below that is the proximal outcome; hygienic and comfortable menstruation management, which requires access to menstrual products, WASH facilities, painkillers, and the use of self-care practices to manage the symptoms (House, Mahon and Cavill, 2013).

In Figure 4.1 the pyramid of proximal, intermediate, and distal outcomes is shown (with macro-level distal outcomes above that). On the right-hand side, there are suggested indicators of such outcomes.



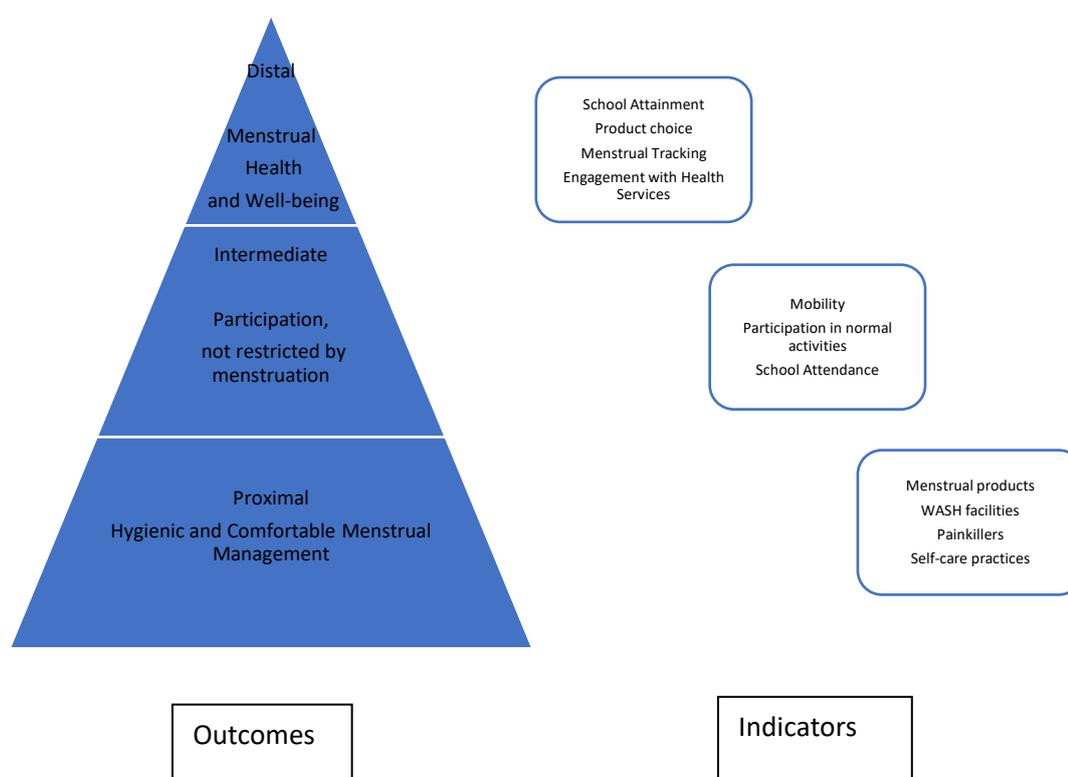


Figure 4.1. Proximal, intermediate and distal outcomes and indicators of a menstrual health intervention

Although most interventions considered are aimed at improving the lives of girls, either as individuals or as groups, some interventions are at the macro-level, involving communities of all ages and sexes, not just girls *per se*.



4.2.2 Theory of Change

A logic model allows the steps required to achieve the outcomes to be articulated, in what is known as the theory of change. Hypotheses about causality and factors that mediate or moderate the outcome are formulated and tested and can be linked to the evidence-base.

Logic models have been adopted as useful tools for programming in the Health Sphere.

NHS Health Scotland says that 'logic models typically help us to understand two problems: What are our health priorities? And how should we intervene?'. They go on to say that 'We see logic models as a useful tool in developing accountability for health improvement outcomes' (NHS Health Scotland, 2014). A highly developed and pertinent logic model is a Cochrane review about the self-management of asthma in schools (Harris *et al.*, 2019). The authors found that there was good evidence for the effectiveness of interventions on the proximal and intermediate outcomes but that the distal outcomes were less tangible and not easy to directly link with the intervention. However, they were able to capture much of the complexity in their diagrammatic logic models and they provided a good way of thinking about the problem and highlighting the potential impacts that was very useful for communicating to all stakeholders (Baxter *et al.*, 2014; Harris *et al.*, 2019).

Project SHINE (Sanitation and Hygiene Innovation in Education) utilised a logic model to explore a participatory science education programme amongst pastoralists in rural Tanzania, that involved the whole community. It helped them to understand the importance of water, sanitation and hygiene (WASH) and to develop their own projects that were culturally relevant to improve it. Project SHINE also found that the interventions were effective at the proximal level, but it became more difficult to measure the outputs at a distal level, or to ascertain whether they were sustainable. The authors did conclude that it showed much promise (Hetherington *et al.*, 2017).

In this case, in order to achieve the Proximal Outcome of Hygienic and Comfortable Menstrual Management, it is hypothesized that girls need Menstrual Knowledge and Skills. They may require knowledge of the menstrual cycle to prepare products for menstruation; they may need skills to use those products correctly to avoid the risk of contracting reproductive tract infections, or of leaks; they may need to be aware of techniques for managing dysmenorrhea, or they may need to know when things aren't normal, and they ought to seek help. These elements of Knowledge and Skills underpin the achievement of



the proximal outcome and therefore are core elements in the achievement of Menstrual Health, and thus the target for many interventions.

4.2.3 Inputs and Outputs

The inputs and outputs are specific to the intervention. Inputs, such as teachers/trainers and materials, and external factors such as the setting, the local policies, and the local funding arrangements are factors that modify the design characteristics of the intervention. Design characteristics include individual or group delivery, pedagogical techniques, integration with the curriculum, Assessment, Delivery to all girls and boys or just girls, teacher or instructor, family involvement, health professional involvement.

Different interventions also record different outputs, however, overall, for an educational intervention, there will be measures of menstrual knowledge, attitude and practice of the recipients. See figure 4.2



Fig. 4.2 Inputs and Outputs of a Menstrual Education Intervention

4.3 Objectives of Literature Review

The objectives of this literature review are twofold.

1. to describe the range of menstrual educational interventions and
2. to evaluate the impact of menstrual education interventions intended to equip young adolescent girls with the knowledge and skills to promote Menstrual Health



4.4 Methods

4.4.1 Publication date and language

Menstrual Hygiene Management was a term coined in 2005 by Wateraid to describe the problems faced by women in Low- and Middle-Income Countries with limited WASH infrastructure. Analysis of Web of Science publications shows that until 2014, there were a relatively small number of papers being published every year on this topic (less than 10). In 2015 there was an explosion of interest in this topic and a move away from management to the broader Menstrual Health, or Menstrual Health and Hygiene (MHH) as it is sometimes known. It was deemed prudent to start the search for the present review from the time of the paradigm shift. This review draws upon papers published from January 2014 until May 2020 to bring the field up to date. Only reviews published in the English language have been included.

4.4.2 Participants

Studies aimed at young and inexperienced menstruators were sought for the review. The target age-group were 10 -14 years of age. WHO defines them as young adolescents. As the age at menarche (AAM) varies considerably, this was expected to capture pre-menarche girls that are pubescent and would start menstruating within two years, and girls that had already started menstruating, but their periods had not settled down and they were still learning how to cope. Studies that included adolescents up to the age of 19 were not excluded if the aim was to instruct inexperienced menstruators. Some studies included older girls because they were intellectually disabled and were part of the intervention based more on intellectual age rather than chronological age. Some studies included older girls because they were members of classes assigned by grade rather than age. Studies about interventions aimed at adult women were excluded.

4.4.3 Types of Interventions/ Inclusion criteria

Interventions which had a component of menstrual information transfer were eligible for the review. Their aim was to improve Menstrual Health by achieving one or more of the following:

- Increasing knowledge of menstruation to reduce anxiety and shame, and normalise the experience



- Increasing skills and competencies to manage menstruation comfortably and hygienically
- Increasing awareness of strategies for self-care of menstrual symptoms

Interventions that were straightforward ‘Menstrual Education’ in which lessons about puberty, anatomy, and hygiene were delivered by teachers or other educators were eligible. Interventions focussed on skills training, such as correct menstrual cup insertions, and delivered by nurses or other key workers were also eligible. Programmes that facilitated peer or self-guided learning through the provision of resources or spaces (both physical and remote) for learning to occur were also eligible for inclusion.

Studies were not eligible if the improvements were in hardware such as toilets or pads without any accompanying education or training; nor if they were about Sanitation and Hygiene education without reference to MHM specifically. Studies were not eligible if they were about abnormal menstruation; nor menstruation associations with medical conditions (genetic or acquired); nor if their aim was research into endocrinology/ non-human models. Studies that described existing Knowledge, Attitude and Practice without any intervention were also excluded.

4.4.4 Protocol for identification of academic literature

The field of Menstrual Health Education cuts across many disciplines, Medicine, Nursing, Health, Science, Social Science, Environmental Science, Education, Pedagogy, Psychology, Feminism, Water and Sanitation Engineering, Ethnography, Humanitarian Response and Development. The most pertinent databases for a search of the literature are ASSIA Applied Social Science Index and Abstracts; CINAHL Cumulative Index to Nursing and Allied Health Literature; EMBASE Excerpta Medica database; MEDLINE Medical Literature Analysis and Retrieval System Online; Sociological Abstracts; Web of Science; IBBS International Bibliography of the Social Sciences; TRoPHI Trials Register of Promoting Health Interventions.

The search parameters combined the target population, menstruation, education and programme (see table 1 in appendix 3).

These were decided on following the work of Hennegan and Coast in this topic (Hennegan and Montgomery, 2016; Coast, Lattof and Strong, 2019) and then refined through trial and error on the major scientific database ‘Web of Science’. These search terms were limited to



appearing in the title and abstract, and in papers published between the dates 01/01/2014 and 19/05/2020. The Search Terms were then used in the different databases. Some modification of the search was required to fit the fields of each different database.

4.4.5 Types of Outcomes

The logic model was used to identify what components of an intervention might be influential in achieving Menstrual Health, and therefore what data would be extracted.

The outputs of Menstrual Education are changes to the menstrual knowledge, attitude and practices of girls. Therefore, quantitative data such as Menstrual Knowledge, Attitude and Practices scores were extracted. Data to support the validity of the scores, such as sample frame, number of participants, age, age at menarche (AAM) and menstrual status (pre/post menarche) were also collected.

The outputs vary by design characteristics such as individual or group; all girls and boys or just girls; stand alone or embedded within Curriculum. They are modifiable by the inputs: teacher or health professional; theoretical framework; pedagogical techniques; materials; intensity, duration. Where given, this data was extracted.

Finally, external factors may influence the design characteristics and the inputs. The country, the setting (rural or urban), school type, and the socio-demographic profile of the participants was also extracted.

Some of the menstrual education studies were part of bigger trials and may have reported indicators relevant to the proximal, intermediate or distal outcomes, and even macro-level outcomes.

The indicators of proximal outcomes (that girls can manage their menstruation hygienically and comfortably) are access to Menstrual products, WASH facilities and painkillers, and the use of self-care practices to manage their symptoms. Girls need to have access to sufficient suitable clean products, private facilities to change, wash and dispose of used products, painkillers to manage dysmenorrhea and the means to practice self-care, such as yoga or taking a rest.

The indicators of intermediate outcomes (quality of life) are unrestricted mobility, participation in normal activities and school attendance. Not only do girls need the means to manage their menstruation hygienically, they need to have self-confidence in their



ability to manage outside of the confines of the house, and assurance to partake in activities from which they may be traditionally excluded.

The indicators of distal outcomes (menstrual health and well-being) are school attainment, product choice, menstrual tracking and engagement with Health services. School attainment is an indicator of unimpaired participation, not just attendance at school. This means that girls are able to concentrate on their schooling and not on their worries surrounding menstruation. Girls that have agency are able to control their menstruation and not the other way around. They can choose a suitable menstrual product to meet their individual needs. They track their menstrual cycle to be well-prepared so that they are not caught out and have to go home, and they engage as necessary with reproductive health services, without shame or stigma.

The indicators of macro-level distal outcomes, which is an increase in the menstrual literacy of the society, are gender-equal educational indicators and improved reproductive health indicators such as reduced RTIs and reduced pregnancy rates.

4.5 Data Extraction

The data was extracted using an Excel Spreadsheet and it was categorized by year of data collection, country, aims, setting, study population, study type, eligible sample frame, no of participants, inclusion criteria, exclusion criteria, AAM, menarche status, description of intervention, instructor, intensity, theoretical framework, follow-up period, measures, analysis tools, outcomes.

4.5.1 Quality Assessment

The Mixed Methods Appraisal Tool (MMAT) was used for quality assessment. It was chosen as it provides a range of checklists suitable for a variety of study designs, which is useful given the breadth of study types included here. The MMAT components focus on the clarity of the research questions and the appropriateness of the data collection methods. Our intention was to consider the MMAT assessment in the interpretation of study findings.

A judgement was made on overall quality by weighting the components and creating a score on an arbitrary scale. All studies were interrogated with two questions 'Are there



clear research questions?’ and ‘Do the collected data allow the research questions to be addressed?’ which were considered fundamental to the quality and were scored on a scale of ‘Yes’ = 2, ‘not clear’ = 1 and ‘No’ = 0. Five further supplementary questions were considered that addressed quality issues such as sample size. The sets of questions were different depending upon the study design, and are not directly comparable, so less weight was given to these; Yes = 1 and No = 0. The Best Fit principle was used. The maximum score when added together was $2 + 2 + 5 = 9$. Studies scored 0-5 were categorised as low quality; those that scored 6 or 7 were scored as moderate quality and those that scored 8 or 9 were scored as high quality.

4.6 Analysis and Synthesis

4.6.1 Quantitative Analysis

The results of quantitative studies were tabulated for comparison. Not all data could be converted but for studies that reported quantitative results with a pre- and post- test score of Menstrual Knowledge, I found the effect size by calculating the Standard Mean Difference using Cohen’s *d*. Effect sizes can lie between 0 and infinity. Cohen suggested that a small effect size is a value of 0.2, a medium one is 0.5 and a large one is 0.8. Some social science disciplines report much larger sizes and the statistical guidance was revised to suggest that a medium effect is the average of those in the relevant literature (Hemphill, 2003; Gignac and Szodorai, 2016). However, Cohen’s *d* has not previously been calculated for this discipline. I found the average of those in this review and ranked the results accordingly (Bakker *et al.*, 2019).

4.6.2 Qualitative Analysis and synthesis

A Qualitative Comparative Analysis (QCA) (Thomas and Harden, 2008) was made of all studies by scrutinising the data extracted for common themes and reporting them in a narrative summary.

4.6.3 Synthesis: Building A Logic Model

Logic models enable the key findings of the analysis to be synthesized into a theory of change. A logic model was constructed to frame the effect of Menstrual Education Interventions on Menstrual Health.



4.7 Results

A total of 1240 papers were recovered using the search terms (table 5.2). 900 remained after the removal of duplicates and 48 were saved to Excel for full text screening. 852 did not meet the inclusion criteria. This was largely because they were not interventions but studies of menstruation (Figure 2 in the appendix)

4.7.1 Study Characteristics

Twenty-four papers met the inclusion criteria: They were grouped into the following categories of study design according to the MMAT Quality Appraisal tool: 12 Randomised Controlled Trials (RCTs); 5 quantitative descriptive studies; 1 quantitative non-random study; 5 mixed-methods studies and 1 qualitative study. See table 3 in appendix.

The study dates ranged from 2012 to 2017, with dates of publication ranging from 2014 to 2019. Studies were undertaken in Iran (six), Turkey, Indonesia (two), Ethiopia, India (four), Bangladesh, Uganda (four), USA, Nepal, Kenya (two) and China.

Of the studies, two included boys (Hurwitz *et al.*, 2018; Kansime *et al.*, 2020; Nalugya *et al.*, 2020); one included mothers (Afsari, 2017; Valizadeh *et al.*, 2017) and two focussed on intellectually-disabled adolescent girls (Altundağ and Çalbayram, 2016; Ariyanti and Royanto, 2018). The number of study participants varied from 1 to 2564. The total number of participants in the 20 different intervention studies was 10362.

4.7.2 Aims of the Studies

The common aim of the studies was to evaluate the impact of a Menstrual Education Intervention on Menstrual Health for adolescent girls. A number of studies were more broadly about puberty education (Afsari *et al.*, 2015; Mokari, Khaleghparast and Samani, 2016; Valizadeh *et al.*, 2017; Blake *et al.*, 2018; Hurwitz *et al.*, 2018; Morrison *et al.*, 2018). Several studies measured Menstrual Knowledge, Attitudes and Practices (KAP) (Haque *et al.*, 2014; Sharma *et al.*, 2015; Su and Lindell, 2016; Valizadeh *et al.*, 2017; Chadalawada, Devi and Rani, 2017; Kheirollahi *et al.*, 2017; Blake *et al.*, 2018; Hurwitz *et al.*, 2018; Arasteh *et al.*, 2019; Setyowati, Rizkia and Ungsianik, 2019; Jarrahi, Golmakani and Mazlom, 2020). Nearly all of the studies used a pre-test, post-test model but one study used a post-test only model (Hurwitz *et al.*, 2018). A small number specifically focussed on Menstrual Hygiene Management and evaluated training on pad replacement or cup insertion



(Altundağ and Çalbayram, 2016; Hennegan and Montgomery, 2016; Montgomery *et al.*, 2016; Penelope A Phillips-Howard *et al.*, 2016; Van Eijk *et al.*, 2016; Ariyanti and Royanto, 2018; Jarrahi, Golmakani and Mazlom, 2020; Kansime *et al.*, 2020; Nalugya *et al.*, 2020)

The amount of time after the completion of the intervention to the assessment varied from the same day to up to 5 years, with 13 of the studies in the range of 1 – 9 months, and the mode being 1 month. A common theme was allowing one menstrual cycle to pass before re-testing.

4.7.3 Interventions

There was a range of intervention types. Eight of the interventions employed traditional education in the form of didactic teaching, sometimes supplemented with posters, flip-charts, and question-and-answer sessions (Mokari, Khaleghparast and Samani, 2016; Montgomery *et al.*, 2016; Su and Lindell, 2016; Chadalawada, Devi and Rani, 2017; Hennegan *et al.*, 2017; Kheirollahi *et al.*, 2017; Morrison *et al.*, 2018; Sivakami *et al.*, 2019). Two interventions employed a more formal lecture presentation and gave out some supporting literature (Afsari *et al.*, 2015; Valizadeh *et al.*, 2017). Two interventions used stories and video presentations (Ariyanti and Royanto, 2018; Hurwitz *et al.*, 2018) and two interventions distributed puberty books (Blake *et al.*, 2018; Setyowati, Rizkia and Ungsianik, 2019) without further teacher input. Three interventions facilitated learning through peer-education (Arasteh *et al.*, 2019; Ramaiya *et al.*, 2019; Jarrahi, Golmakani and Mazlom, 2020) and seven different interventions focussed on Menstrual Hygiene Management training: some demonstrated pad usage with a menstrual kit (Haque *et al.*, 2014; Ariyanti and Royanto, 2018; Kansime *et al.*, 2020; Nalugya *et al.*, 2020) or using a doll (Altundağ and Çalbayram, 2016) and two instructed participants on the use of menstrual cups (Penelope A Phillips-Howard *et al.*, 2016; Van Eijk *et al.*, 2018). See table in appendix.

4.7.4 Delivery

Eight of the interventions used health professionals as instructors (Sharma *et al.*, 2015; Altundağ and Çalbayram, 2016; Montgomery *et al.*, 2016; Chadalawada, Devi and Rani, 2017; Valizadeh *et al.*, 2017; Van Eijk *et al.*, 2018; Ramaiya *et al.*, 2019; Jarrahi, Golmakani and Mazlom, 2020; Nalugya *et al.*, 2020). Five were researcher-led (Afsari *et al.*, 2015; Mokari, Khaleghparast and Samani, 2016; Su and Lindell, 2016; Valizadeh *et al.*, 2017; Ariyanti and Royanto, 2018); five were led by teachers (Haque *et al.*, 2014; Blake *et al.*,



2018; Morrison *et al.*, 2018; Sivakami *et al.*, 2019; Kansime *et al.*, 2020); two used peer-educators (Ramaiya *et al.*, 2019; Jarrahi, Golmakani and Mazlom, 2020) and the others did not make it clear. A wide range of intensity and duration models were used, ranging from three 5-minute videos in the space of one afternoon (Hurwitz *et al.*, 2018) to 1 hour per day for four months (Chadalawada, Devi and Rani, 2017). Only two embedded menstrual education into the school curriculum (Morrison *et al.*, 2018; Sivakami *et al.*, 2019).

4.7.5 Quality Assessment

The methodological quality of study designs was mixed: Eleven were rated as high quality and thirteen as moderate to low. Those considered to be of the highest quality were randomized controlled trials which included comparison groups. Some of the studies (nine) did this at the whole-school level which is recommended in educational interventions to prevent contamination of the intervention group with the control (Hutchison and Styles, 2010). The research questions were clear and the data collection methods appropriate. Of the other studies, several methodological limitations were noted; commonly, neither the delivery team nor the participants were blinded (nine); adequate randomization of the participants was lacking (ten) and /or relevant confounds were not identified or controlled (four). The quality of data analysis also varied considerably, with the weakest having small sample sizes and no measure of statistical significance (two). See table 5 in appendix.

4.8 Analysis

The quantitative and qualitative results are reported under four main themes: Menstrual Knowledge, Menstrual Attitudes, Menstrual Practices and Multi-component interventions.

4.8.1 Quantitative results

Menstrual Knowledge.

A meta-analysis was conducted on 11 studies which measured a change in menstrual knowledge following an intervention. A visual inspection of forest plots showed that all studies found a significant improvement in menstrual knowledge. Where studies reported the mean and standard deviation of a menstrual knowledge questionnaire, I calculated the effect size using Cohen's *d* (see table 5.6).



The average effect size of studies in this review was 3.44. Taking this as a medium effect size, I ranked them lowest – highest and suggest that <2 is low and >5 is high. Where I could not calculate an effect size, I have calculated % change in score. Due to the limited and heterogeneous nature of the data, I interpret the results only relative to the other studies in this review.

The effect size of those that distributed pamphlets and books was lowest at 0.33 (Valizadeh *et al.*, 2017), followed by those that showed videos 1.40 (Hurwitz *et al.*, 2018) and then lectures with question and answer sessions 2.13 (Su and Lindell, 2016) and 4.81 (Kheirollahi *et al.*, 2017). Small group or peer-teaching was high at 5.337 and 10.044 respectively. Large effect sizes may occur due to small sample sizes.

The effect size of Story-telling and simulating pad changing on a doll, although targeted at intellectually disabled girls, were shown to be very engaging.

It was reported that girls enthusiastically embraced the knowledge books which had pages for them to personalise and record observations about themselves and their cycles, to make them more interactive than a pamphlet (Blake *et al.*, 2018). The advantage of the books is two-fold; they can have a much greater reach than other interventions (already nearly 2 million copies have been distributed of this book around the world) and they have the potential to sustain the change in knowledge as they can be referred to time and time again.

Menstrual Attitudes

Five studies measured Menstrual Attitudes (Haque *et al.*, 2014; Afsari *et al.*, 2015; Su and Lindell, 2016; Hurwitz *et al.*, 2018; Setyowati, Rizkia and Ungsianik, 2019).

Four interventions reported significantly different ($p < 0.05$) attitude scores, and three of those provided pamphlets that addressed cultural restrictions (Haque *et al.*, 2014; Afsari *et al.*, 2015; Setyowati, Rizkia and Ungsianik, 2019). The other was an intervention on dysmenorrhea and self-care and included pamphlets with video and peer-sharing. Girls who had taken part had a significant increase in confidence and decrease ($p < 0.001$) in 'bothersome' menstrual attitude (Su and Lindell, 2016). The only intervention which did not find a significant difference in attitude pre- and post-test involved puberty education videos shown to early adolescent boys and girls (Hurwitz *et al.*, 2018).



Menstrual Practice

An intervention that trained intellectually-disabled adolescents in an 18-item pad replacement skill set found that pre-training and post-training differences were statistically significant ($p < 0.001$) (Altundağ and Çalbayram, 2016). A feasibility trial into the use of the menstrual cup by school girls in Kenya (Van Eijk *et al.*, 2018) found that usage increased as time went on and culminated in 96% usage after nine months. There was also an increase in hygiene, with the menstrual cup reported as reducing the prevalence of STIs from 19.2% to 12.9% ($p = 0.018$) (Penelope A Phillips-Howard *et al.*, 2016).

Multi-component interventions

An education intervention in India was part of a bigger project that involved pad provision and improved sanitation in schools. After four years, compared to unimproved schools, school attrition had fallen from 11% to 6% ($P < 0.003$) (Sivakami *et al.*, 2019). The effect of menstrual education alone cannot be separated out.

4.8.2 Qualitative results

Menstrual Knowledge

All studies reported an increase in Menstrual Knowledge. Interventions that used peer education and group counselling (Ramaiya *et al.*, 2019; Jarrahi, Golmakani and Mazlom, 2020) were as effective as those delivered by medical professionals (Haque *et al.*, 2014).

Those interventions that had a degree of interactivity were more effective than those that only gave out information. Those that encouraged discussions found that they led to an increased willingness to talk about menstruation and a greater awareness of what is normal (Mokari, Khaleghparast and Samani, 2016; Ramaiya *et al.*, 2019).

Only two interventions embedded menstrual education into the school curriculum (Morrison *et al.*, 2018; Sivakami *et al.*, 2019). In Nepal, some schools had received the WASH in Schools programme (WinS) (United Nations Children's Fund (UNICEF) and World Health Organization, 2018). However, the girls were highly critical of their teachers, especially male teachers. They complained that 'Teachers often got embarrassed, referred students to their textbook, and did not answer questions' (Morrison *et al.*, 2018).

Menstrual Attitudes



Most studies commented on an improved menstrual attitude and one noted a reduction in anxiety (Mokari, Khaleghparast and Samani, 2016). More than one study noted an improvement in confidence in performing menstrual health care behaviour, such as requesting pain relief for dysmenorrhea (Su and Lindell, 2016). Some studies observed an increased confidence of girls to push back against cultural restrictions, or harmful practices (Haque *et al.*, 2014; Mokari, Khaleghparast and Samani, 2016; Hennegan *et al.*, 2017; Ramaiya *et al.*, 2019; Bhagwat and Jijina, 2020).

Menstrual Practices

Skills are required to use pads and cups so that they are positioned correctly, are comfortable and don't leak. The cup feasibility trial in Kenya found that on-going training and support may be required to master the technique over a period of six months to one year (Penelope A Phillips-Howard *et al.*, 2016; Van Eijk *et al.*, 2018). Education was also found to be an important component of skill acquisition in Uganda, where pad-provision accompanied by education was shown to be more effective than pad-provision alone (Hennegan *et al.*, 2017).

Multi-component interventions

The MENISCUS intervention in Uganda attributed its success to the synergy of five combined elements; teacher training on puberty education, a drama skit, pad provision, pain relief provision, and Water, Sanitation and Hygiene (WASH) facility improvements (Nalugya *et al.*, 2020).

4.8.3 The Logic Model

The results of the review provide evidence that menstrual education improves the menstrual knowledge, attitude and practices (KAP) of young adolescent girls. It is suggested that increasing the menstrual KAP of girls increases their confidence to seek further knowledge and skills in a positive feedback loop (see fig 2). Menstrual Education is viewed as underpinning the logic model and is the first step to achieving Menstrual Health.

Inputs and Outputs to the Logic Model

Menstrual Education and training are the inputs. The output is improved menstrual knowledge, attitude and practices (KAP). The outputs are linked to the outcomes.

The results of the review enabled the outputs to be further refined.



Menstrual Health is the distal outcome to the intervention. It is characterized by girls feeling empowered and having agency to make choices about their own bodies and lives. They can choose a suitable menstrual product to meet their individual needs. They track their menstrual cycle to be well-prepared so that they are not caught out at school and have to go home, and they engage as necessary with reproductive health services, without shame or stigma. Girls that have agency are able to control their menstruation and not the other way around. They can focus on their school work and reach their potential.

Preceding the distal outcome is the intermediate outcome; unrestricted mobility and participation. Girls should be able to carry out normal activities such as eating/drinking with the family, attending school and playing sport when they are menstruating. This requires confidence in their own ability to manage outside of the confines of the house, and determination to enter spaces from which they are traditionally excluded.

Below that is the proximal outcome; hygienic and comfortable menstruation management. Girls should be able to use suitable menstrual products. They should be able to use water and soap to clean away menstrual blood, and they should be able to practise self-care to relieve the symptoms of dysmenorrhea, such as yoga. If they need painkillers or a rest, they should be able to request them of parents and teachers without embarrassment.

Menstrual KAP underpins these outcomes. In a theory of change, girls require knowledge of the menstrual cycle to prepare products. They may need skills to use the products correctly to avoid the risk of discomfort, leaks or of contracting reproductive tract infections. They may need confidence to ask for products and services. They may need awareness of self-care practices. They should know what is normal and when to seek help. Menstrual knowledge and its associated attitude and perceptions are the building blocks required for achieving successful outcomes.

4.9 Discussion

All twenty-four included studies that evaluated some form of menstrual education intervention reported that there was a measurable improvement in the Menstrual Knowledge, Attitude or Practices of young adolescent girls. Menstrual experience and need may be the motivators, as there was little improvement in the knowledge or attitude of very early adolescent girls or boys.



Most of the interventions were delivered in the school setting where it is relatively easy to reach the target group, although only two embedded the education into the school curriculum. In theory, schools should have good coverage and objectivity for delivery of this sensitive information at an appropriate time. However, teachers themselves may be ill-equipped to teach about menstruation without proper training (United Kingdom Department for Education, 2019).

A larger effect was gained with the more interactive interventions that included question and answer sessions. I suggest that this relates to the higher degree of participation, and concurs with current educational philosophy about the importance of active learning (Freeman *et al.*, 2014), based on constructivist theory (Dewey, 1938; Vygotsky, 1978). Gardner added to Dewey's early work on active learning when he described 'transformative' teaching. This involves using a range of methods that encourage the learner to find their own entry point and engage with the subject, often utilising space and creativity, and linking with their own experience (Achkovska Leshkovska and Miovska Spaseva, 2016). Discussing menstruation gives the girls agency to determine what it is that they need to know for themselves.

Those interventions that demonstrated skills and allowed for physical touch were also very effective. Other hygiene interventions that have been evaluated have pointed to the positive impact of a physical interaction with the tools of behaviour change (Yilmaz, Bohara and Chowdhury, 2020).

Nurses were particularly effective in delivering menstrual education, which is comprehensible when dealing with the practical side of menstruation management. Further than that, attempts to 'medicalise' the education by involving gynaecologists in course-writing, was no more effective than using peer educators to facilitate a discussion. There is some evidence that it is the talking about menstruation rather than the identity of the instructor that improves outcomes.

An improved menstrual attitude was reported by four studies and a reduction in anxiety by one. Menstrual stigma reinforces menstrual fear, and it is hypothesized that an increase in menstrual knowledge can lead to a more positive menstrual attitude, giving girls confidence to ask further questions about menstruation and learn more about their bodies. Girls with increased confidence have been able to demand access to menstrual products, WASH facilities and pain management.



Alongside menstrual knowledge is the acquisition of skills to manage menstruation hygienically. Various measures of menstrual practices were reported. The provision of clean pads or cups alone does not necessarily improve the experience of menstruation, unless one can learn to use them competently. Used in the right way they can prevent leaks and smells and allow the user to partake in daily activities with greater comfort and for longer time periods. Used in the wrong way, they could not only be uncomfortable, but they could be unhygienic. The opportunity to observe hands on demonstrations, and practice probably contributed to the success of these interventions. The study into the feasibility of the menstrual cup continued for 9 months in order for girls to become competent.

A logic model has been constructed to frame the effect of menstrual education interventions on Menstrual Health. Menstrual Education is seen as underpinning all desirable outcomes and programmes can be optimised by including an education aspect. There was evidence that interventions were successful in normalising menstruation and improving menstruation management, which is the proximal outcome of the logic model. However, there is less evidence for the intermediate and distal outcomes of the logic model. Whilst these studies did confirm that menstrual knowledge could be improved by education, and that menstrual competencies could be improved by training, one of them also shows that menstrual competencies alone, without education, have no significant effect on school attendance (Hennegan and Montgomery, 2016). It was also presumed that girls who have a more positive attitude are more likely to reject menstrual restrictions. However, these studies showed that restrictions such as not preparing food and not attending religious ceremonies whilst menstruating were still adhered to. It seems likely that these restrictions are upheld by the elders of the communities, and therefore will not be lifted until the attitude of the community changes (a macro-level distal outcome).

Multi-component interventions may be more successful than single components in achieving the distal outcome of Menstrual Health and Well-being. Girls need an enabling environment as well as knowledge. From a constructivist perspective which places learning within a social context (Vygotsky, 1978; Lock and Strong, 2010) interventions that seek to improve the menstrual literacy of the whole community and reduce menstrual stigma may be more effective in achieving the macro-distal outcomes of girl empowerment and gender equality.



4.10 Conclusion

The outcomes of this review provide evidence of the importance of knowledge in achieving the proximal outcomes of menstrual health; hygienic menstruation management, the use of self-care practices to manage the symptoms, and confidence to gain access to products and facilities. There is limited evidence for the intermediate outcomes of school attendance, mobility, and refusal to accept restrictions.

4.10.1 Strengths of this Review

This review adds to the literature regarding Menstrual Hygiene Management (MHM) by showing that all interventions that seek to educate girls about menstruation have a positive effect on girls' Menstrual management and subsequent Menstrual Health.

The review also provides evidence that training girls in various aspects of menstruation management, such as cup insertion, pad replacement, and self-care for menstrual symptoms, can improve their competency to manage their menstruation more durably, hygienically, and comfortably.

To our knowledge it is the first review of menstrual interventions to include both Higher Income Countries and Low- and Middle-Income Countries.

A strength of this review is that it proposes a logic model which provides a framework for thinking about Menstrual Health as a multi-component outcome and highlights the roles of different actors in achieving this. Menstrual Education is seen as underpinning all efforts and programmes can be optimised by including an education aspect. Another strength of this review is that it is mixed methods, and a qualitative lens has shown that facilitating peer discussion is as important as formal instruction.

4.10.2 Limitations of this Review

The review was carried out in the English language, which may have missed some publications. Because menstrual health is an emerging topic with evolving terminology, search terms may not have adequately captured all currently used descriptors. Searches were not conducted for publications prior to 2014.

As a mixed methods review, there are several systemic limitations derived from comparing heterogeneous data sets. In particular, the studies did not measure the same outputs and



the methodological quality of the studies was mixed. The methodological quality of the studies was moderate overall, which made it difficult to determine the programme elements that are prerequisite for success. It is possible that the level of knowledge in some LMIC was so low at base-line that any educational intervention is an improvement.

Although all interventions reported positive outcomes, this may be due to publication bias, where only significant results are shared. The meta-analysis on Effect Size has required transformation of differently reported statistics, undoubtedly confounding errors and reducing validity. Cohen's *d* has not previously been calculated for this discipline and therefore the magnitude of the effect size can only be considered relative to others in this review. However, it is suggested that due to the large effect sizes attained, they produce good indicators of travel.

The number of studies was small, and only one study was from a High Income Country, so it is difficult to say how applicable the conclusions are to a HIC. More research needs to be done in this area, particularly as period poverty has been increasingly reported since the start of the pandemic in HIC.

4.10.3 Implications for Policy and Practice

This review provides evidence that menstrual education has a positive effect on the menstrual knowledge, attitudes and practices of adolescent girls and needs to be delivered by trained personnel who are confident to lead discussion. Especially but not exclusively in LMIC, where resources are limited, it would be prudent to ensure that menstrual education is embedded into the school curriculum and that teachers receive specialist training.

Progress towards Menstrual Health is limited without an enabling environment. In order to achieve the more distal outcomes of the logic model, programme and policy makers need to address the menstrual literacy of the wider population. Multi-component interventions that speak to different actors and include hardware and software provision alongside menstrual education may make Menstrual Health more attainable.

4.10.4 Covid-19

This review was carried out on studies conducted before the Global Pandemic began in March 2020. The subsequent lockdown has had a profound effect on education, and many programmes have had to go on-line. I would encourage menstrual educators to be mindful



of the benefits of interaction and make use of on-line teaching platforms that facilitate discussion in break-out rooms.

4.10.5 Future work

There is an urgent need to have agreed and validated tools with which to measure Menstrual Health. Robust evidence needs to be generated from Randomized Controlled Trials.

It is hypothesized that Knowledge may be part of a positive feedback loop, in which improved knowledge of menstruation might allow girls to stay in school longer, which increases knowledge. More evidence needs to be generated to support this.

One recent multi-component study attributed its success to the synergy of five combined elements; teacher training on puberty education, a drama skit, pads, pain relief, WASH facility improvements (Nalugya *et al.*, 2020). However, this was just a pilot study and more work needs to be done in this area.

Little work has been done on the sustainability of the different interventions, although one study showed that menstrual knowledge declined again after a couple of months. This is an area that requires further research.



Chapter 5 Results

...in which quantitative results are presented using descriptive statistics, they are used to make comparisons in demographics between the Philippines and the UK; Menstrual KAP scores and Experience Scores are calculated, correlations tests are performed, and regression analysis is used to understand the relationships between the variables. Finally, the results are subjected to interpretation using the qualitative data.

5.0 Research questions revisited

- 1a. What is the knowledge, attitude and perceptions (KAP) of 16-19 year olds about menstruation?
- 1b. What is the experience of adolescents aged 16-19 with regard to menstruation?
2. What are the factors that influence menstrual experience?
3. What is the impact of education and hygiene promotion on Menstrual Health?

5.1 Data retrieval and cleaning

In the UK, the Facebook campaign generated a Reach of 62643, Impressions of 90599 and 653 unique clicks. The campaign cost £120.66 and worked out at £1.45 per person. In the Philippines, the Reach was 145956, the Impressions 263857 and the unique clicks 1806. This cost £109.58 and worked out at £1.81 per person.

The number who completed the survey before the cut-off date of the 31st March 2021 was 372 in the Philippines and 457 in the UK.

The survey flow was checked after two days, and it was realised that not all were complete. At that stage it was decided to change the settings to force all responses. The incomplete ones from that test period were filtered out using this command: Qualtrics/Data and Analysis/ Filter / Survey Metadata/ Finished/ Is/ False = 18. These were removed from the data set; 5 were from the Philippines and 13 from the UK.



This left a total of 829 respondents who had completed the survey: 367 from the Philippines and 444 from the UK. All the respondents had completed the relevant section on demographics and section on Knowledge, Attitudes and Perceptions. Only menstruators completed section 4 on menstrual experiences and practices. These were 308 (84%) in the Philippines and 398 (90%) in the UK.

5.2 Background variables: Demographic differences between the Philippines and the United Kingdom.

5.2.1 Sample characteristics

The Philippines

The sample of 367 respondents in the Philippines was 85% female, with a median age of 18 +/- 1.1 years. 81.2% identified as current students, with 52.9% having been in state education in the last two years. Nearly all identified themselves as religious (96.5%). Less than 1% were Muslim, and the rest were various Christian denominations. The largest of these was Roman Catholic at 74.1%.

The respondents came from predominantly urban (59.4%) and low-resource (80.7%) backgrounds. 41.3% checked the census question about food security: 'Was there a time in the last 12 months when you were worried that you would not have enough to eat?'

Most lived in large households of over 5 people (69.2%) with some living in households of over 10 people (4.9%). 42.8% of the households had 3 or more adult women. 43.3% of households did not have a flush toilet and 55.6% of households had to share their toilet with another household. 1.9% did not have access to a toilet at all. 23.4% had no waste-collection service and 36.4% had no piped water supply.

The United Kingdom

The sample of 444 respondents were 91.2% female with a median age of 17 +/- 0.9 years. 92.6% identified as current students and 58.4% have been in state-education in the last two years. 64.4% of respondents professed no religion; 2.7% were Muslim and 23.9% were Christian and then there were very small numbers of Jews, Hindus and Sikhs.



The respondents were split between urban (27.5%), rural (22.5%) and mixed (36.9%) settings. 49.5% self-identified as being from a low-resource background. 22.4% had been in receipt of free school meals.

66.6% of respondents lived in small households of 1 – 4 people. In larger households, there were more bathrooms and only 20.5% had to share a toilet with 4 or more people. 37.7% of the households had 3 or more adult women.

5.2.2 Comparison

Direct comparison

Using the crosstab function in Qualtrics set at P0.05, these items were found to be significantly different between the respondents of the two countries: Age, Religion, Setting, Perceived Income, Size of household. These items were not significantly different, Gender, Status, Schooling, Number of females in the household. See table 5.1.

Indirect comparison

Twice as many respondents from the Philippines checked an indicator of absolute poverty (Food security) as from the UK (in receipt of means tested pupil premium); (41.3% to 22.4% respectively).

Another indicator of poverty is lack of access to Water, Sanitation and Hygiene Facilities. It was assumed that all households in the UK have a flush-toilet, waste-collection service and piped water. In the Philippines it was 56.7%, 76.6% and 66.6% respectively.



Table 5.1 Demographic factor of sample

Demographic factor	The Philippines (n=367) /%	The UK (n=444) /%
Female	85	91
Student	81	93
16-17 years old	50	84*
State-controlled school	53	58
Completed Junior High Ph/Secondary School UK	60	92*
Religion	97*	36
Urban	60*	28
Low resource	81*	50
You were worried you wouldn't have enough food to eat? PH only	41	n/a
Received pupil premium last 5 years? UK only	n/a	22
Large household (5+)	69*	33
Adult females in HH (3+)	43	38
Piped water	64	n/a
Flush or pour-flush	57	n/a
Share CR with other households	56	n/a
Waste-collection service	77	n/a

*significantly different at P0.05 level

5.2.3 Comparison of national data

The population of the Philippines is 111 M and the UK 67 M. Their median age is 24.3 years and 40.6 years respectively. Key development indicators are life expectancy, GDP, literacy rate, school life expectancy and internet usage. Life expectancy at birth is 70.32 years and 81.3 years; GDP per capita is \$8000 and \$41600; Literacy rate is 97% and 99%; School life expectancy is 13 years and 17 years and Internet usage is 60% and 95% respectively (Central Intelligence Agency, 2021b, 2021a).



Table 5.2 Demographic features of sample compared to national data in the Philippines and in the UK.

Demographic factor	Category	Sample PH/%	National PH/% ¹	Sample UK/%	National UK/% ²
Age	16 -19 years	100	9	100	7
Gender	Female	85	49	91	49
	male	12	51	7	51
	Prefer not to say	3	No data	2	No data
Setting	Urban	60	47	28	84
	Rural	14	53	23	17
	Other	27	N/a	35	N/a
Poverty	Self-identified as low-income	62	39 in NCR (National Capital Region) (Philippine Statistics Authority, 2022)	48	No data
	Self-identified as not low-income	19	61 in NCR	50	No data
	Below poverty line		17		19
Religion	Christian	93	92	24	60
	Muslim	1	6	3	4
	Other	3	2	10	11
	None	3	0	64	26

¹ All data about the Philippines taken from The World Factbook – the Philippines (Central Intelligence Agency, 2021a) unless otherwise stated.

² All data about the UK taken from The World Factbook – the UK (Central Intelligence Agency, 2021b) unless otherwise stated.



Food security	UK Pupil Premium (Free School Meals) (United Kingdom Government, 2021)	n/a	n/a	22	20 (United Kingdom Government, 2021)
	The Philippines Census Subsistence indicators (Philippine Statistics Authority, 2019)	59	17 (Philippine Statistics Authority, 2019)	n/a	n/a
Access to Water	Improved water	64	98 (urban)	n/a	100
Access to Sanitation (urban)	Improved sanitation	57	95	n/a	100
	Unimproved sanitation	43	5	n/a	0
Education	National Curriculum (public schools)	53	78(Philippine Statistics Authority, 2022)	58	42 (United Kingdom Government, 2022)
	Alternative Curriculum or none (private schools and Out-of-School)	47	22	42	58
School grade/year completion	Grade 6 elementary/Primary	14	No data	0	n/a
	Grade 10 Junior High/Secondary	46	No data	7	N/a
	Grade 12 Senior High/Sixth form	32	No data	92	N/a
	Not known	8	No data	1	N/a

The two countries were chosen to provide contrast in key socio-demographic parameters. The Philippine is a lower-middle income country, and the UK is a high-income country.



According to the world bank, the per capita gross national income (GNI) of the Philippines is \$3.850. The international poverty line is drawn at \$1.90 per day. In the Philippines this is modified to \$3.2 dollars per day. In the UK the GNI is \$43.460 (World Bank, 2022). The census data and any updates from the offices of national statistics were collected to compare the demographic characteristics of the national populations (Office for National Statistics UK 2022, 2022; Philippine Statistics Authority, 2023). With similar land masses, The Philippines has a larger population, and it is concentrated in the National Central Region of Luzon (Metro Manila which consists of a conurbation of 16 cities). There is a large contrast between urban and rural life. The densely packed streets of the city are known as Eskinitas (dark hall or alleyway) and facilities are often shared. It is common for the water and sanitation to be unimproved. The Philippines is a low to middle-income country with a lower GDP per capita than the UK. The ONS claim that less people in the Philippines live below the poverty line than in the United Kingdom. It is difficult to account for this statistic. If the data is correct, it could be that this is an average of a country that has huge differences between the rich and the poor. A more telling statistic is that the people have a lower life expectancy than in the UK. Other differences are a lower literacy rate, less years in school and less internet coverage than in the United Kingdom. They are, however, a more religious society, with over 90% being Roman Catholic (ibid).

The UK is a high-income country but data from the ONS shows that 18.6% live below the poverty line. Poverty may be a subjective concept, but 22.5% of school children are in receipt of free school meals, which is a means-tested benefit.

The samples were broadly representative of the national population in both countries. Many more females chose to answer the questionnaire than males, undoubtedly because menstruation is a topic of greater interest to them.

In the Philippines, recruitment targeted those from low-income backgrounds and the sample contained a greater proportion of respondents who perceived themselves to have a low-income and who indicated that they had experienced food insecurity. They also had less access to improved water and sanitation than the population as a whole. More of the sample were in Alternative Education compared to the national average, which is another consequence of having a low-income.

In the UK the sample differed from the national population in that they represented urban and rural environments equally, whereas there is a much higher proportion of people who



live in urban areas nationally. They were also less religious (although this could be true of the age group as the national data is on the population as a whole) and they were more likely to have gone to a state school.

5.3 Sources of Menstrual Knowledge

5.3.1 The Philippines

79.9% of the respondents said their mother or a close female relative were the first people to tell them about menstruation. Only 14.2% of respondents first heard about menstruation from an external source to the family such as a teacher or a friend. 29.5% had not heard about menstruation until they were over the age of 12. Most (69.5%) had been taught about menstruation at school at some point, and if further information had been sought, it was largely from the family (76.6%).

5.3.2 The United Kingdom

In the UK, about half (50.5%) had first heard about menstruation from their mother but almost a third had first heard about menstruation from a teacher. 75.2% thought they had been taught about it at school and 93.2% said they had heard about it before the age of 12. They were most likely to turn to the internet (83.1%) for further information.

5.3.3 Comparison

In both countries, the primary source of menstrual information was the mother or close female relative. However, in the UK respondents were significantly less likely ($P=0.05$) to have been told about menstruation by their mother or female relative and more likely to have been told about it by somebody external to the household such as a teacher or friend.

There was also a significant difference ($P=0.05$) in the age at which they first learnt of menstruation, with 29.5% of Philippine respondents saying that they were over the age of 12, corresponding with just 6.8% of those in the UK.

In both countries, respondents had sought information about menstruation from other sources. Differences exist in the sources of information; in the Philippines, respondents were more likely to ask the family or a teacher (76.6% and 45.8% respectively) which is higher than in the UK at 64.6% and 33.1% respectively. The UK respondents were more



likely to access the internet and online sources (83.1% and 22.3% compared to 48% and 8.7% in the Philippines). The sources of information were not mutually exclusive.

Table 5.3 Sources of Menstrual Knowledge of sample

Question	Response	The Philippines /%	The UK/%
Who first told you about menstruation?	Mother	69.5*	50.5
	Female relatives	10.4*	4.8
	Teacher	10.9	30.4*
	Friend	3.3	7.4*
How old were you when you first learned about menstruation?	Age 9 – 11	45.2	68.2*
	12+	29.4*	6.8
Have you been taught about menstruation at school?	Definitely yes	69.5	75.2
	Probably yes	19.6	17.6
Have you sought information from other sources? Choose 3	Books	23.7	32.2*
	Family	76.6*	64.6
	Nurse	16.3	29.1*
	Online group	8.7	22.3*
	Religious leader	4.4	1.1
	Teacher	45.8*	33.1
	Internet	48.0	83.1*

*significantly different at P0.05



5.4 Menstrual Knowledge, Attitude and Perception (KAP) and Experience Scores to answer research question 1a and 1b

1a. What is the knowledge, attitude and perceptions (KAP) of adolescents aged 16-19 years old with regard to menstruation?

1b. What is the experience of adolescents aged 16-19 with regard to menstruation?

Descriptive statistic scores and quartiles by country and gender (where applicable)

Table 5.4 Descriptive Statistics of Knowledge, Attitudes and Practices, and KAP and Experience Score Quartiles

Country	Philippines		UK	
Gender	Females n = 312	Males = 44	Females = 405	Males = 30
Knowledge Score/55				
Mean (SD)	37.68 (4.62)	35.66(5.58)	41.31 (3.96)	41.83(3.30)
Min-max	23-49	24-46	28-50	35-47
1 st quartile (%)	2.56	11.37	3.45	16.67
2 nd quartile (%)	36.53	36.37	19.01	26.67
3 rd quartile (%)	50.96	34.01	56.54	33.33
4 th quartile (%)	9.94	18.18	20.99	23.33
A and P Score/60				
Mean (SD)	37.34 (6.64)	34.34 (7.43)	49.14 (4.78)	46.23 (4.54)
Min-max	19-53	20-50	22-58	38-59
1 st quartile (%)	8.65	18.18	0.49	26.67
2 nd quartile (%)	26.28	36.36	4.20	50.00
3 rd quartile (%)	50.96	29.54	44.20	20.00
4 th quartile (%)	14.10	15.91	51.11	3.33
KAP Score/115				
Mean (SD)	75.03 (9.30)	70.00 (12.02)	90.45 (6.86)	88.07 (6.05)



Min-max	50-96	50-94	58-105	75-102
1 st quartile (%)	9.0	29.5	1.2	16.7
2 nd quartile (%)	32.7	25.0	9.6	46.7
3 rd quartile (%)	42.0	29.5	51.4	30.0
4 th quartile (%)	16.3	15.9	37.8	6.7
Experience/60	N= 308		N = 405	
Mean (SD)	36.57 (6.11)	N/a	36.60 (7.72)	N/a
Min-max	14 - 57	N/a	15-59	N/a
1 st quartile (%)	26.0	N/a	29.2	N/a
2 nd quartile (%)	31.4	N/a	20.9	N/a
3 rd quartile (%)	22.0	N/a	26.9	N/a
4 th quartile (%)	20.6	N/a	23.0	N/a

Table 5.5. Comparison of The Philippines and the UK mean scores (t-test)

Dependent variable	Mean (SD) PH females	Mean (SD) UK females	P value	Mean (SD) PH males	Mean (SD) UK males	P value
Knowledge	37.68 (4.62)	41.31 (3.96)	<0.001	35.66(5.58)	41.83(3.30)	<0.001
Attitude and Perceptions	37.34 (6.64)	49.14 (4.78)	<0.001	34.34 (7.43)	46.23 (4.54)	<0.001
KAP	75.03 (9.30)	90.45 (6.86)	<0.001	70.00 (12.02)	88.07 (6.05)	<0.001
Experience	36.57 (6.11)	36.60 (7.72)	0.916	N/a	N/a	N/a

There is a significant difference between the Philippines and the UK in Knowledge, Attitude and Perceptions and KAP of females ($P < 0.001$), and of males ($P < 0.001$).

The KAP of males is used as the baseline. They represent the knowledge that is gained through education and the attitudes and perceptions that are gained through cultural transmission. Females are thought to have access to specific knowledge (which mostly comes from their mother), which is possibly why their scores are higher in the Philippines. In the UK, the mother as a source of knowledge is less important and this is reflected in the data which shows that females in the UK don't have any more knowledge than males. That



the attitude and perceptions of males in the Philippines is less than in the UK may reflect cultural attitudes to the role of women.

There is no significant difference between Experience of menstruators in the two countries (P0.916). Despite the better resources for managing menstruation in the UK, the participants did not rate their experience of menstruation any better than those in the Philippines.

5.4.1 Is there a relationship between KAP Score and Experience Score?

Pearson's, Kendall's tau-b and Spearman's rho were all significant at the $P= 0.01$ level when the KAP score of menstruators was tested against their Experience score. There is a weak positive correlation between KAP score and Menstrual Experience in the Philippines ($r (304) = 0.266$ $p<0.0005$) and a moderate positive correlation in the UK ($r (399)= 0.381$ $p<0.0005$) on the Pearson Correlation test.



5.5 Regression Analysis to answer research question 2

2. What are the factors that influence menstrual experience?

Multiple linear regression was used to explore the association between the demographic variables (independent variables) and Knowledge Score, Attitudes and Perceptions Score, KAP Score and Experience Score (dependent variables).

5.5.1 Multiple linear regression The Philippines

Table 5.6 Multiple Linear Regression between background variables, Knowledge, Attitude and Perceptions, KAP and Experience in The Philippines

Background variables ³	Knowledge		Attitude and Perceptions		KAP		Experience	
	β and 95%CI	P	β and 95% CI	P	β and 95% CI	P	β and 95% CI	P
Age 18-19	-0.09 (-1.12 – 0.94)	0.861	0.25 (-1.23 – 1.73)	0.742	0.16 (-0.89 – 2.21)	0.881	0.45 (-0.87 – 1.78)	0.502
Scholar	0.86 (-0.49 – 2.12)	0.220	0.53 (-1.34 – 2.40)	0.578	1.34 (-1.25 – 3.94)	0.309	0.44 (-1.24 – 2.12)	0.608
Setting - Urban	-4.71 (-1.67 – 0.73)	0.440	0.85 (-0.88 – 2.57)	0.355	0.38 (-2.02 – 2.77)	0.757	0.71 (-0.83 – 2.26)	0.365
Perceived income - High	1.43 (0.33 – 2.53)	0.011	2.63 (1.05 – 4.21)	0.001	4.060 (1.87 – 6.25)	<0.001	2.389 (0.97 – 3.81)	0.001
Food security	0.648 (-0.434 – 1.730)	0.239	1.01 (-0.54 – 2.57)	0.201	1.66 (-0.50 – 3.82)	0.131	2.01 (0.61 – 3.41)	0.005

³Reference categories: Age = 16-17yrs; Scholar = not currently studying; Setting = Rural; Perceived income = Low; Food security = Insecure; Size of Household = Small 1 – 6; Number of females in household = Small 1 – 4; Water source = not piped; Sanitation = not flush/pour-flush; shared CR with another family = not shared; Waste-collection service = none; Schooling = not state-schooling.



Size of household - Big 6+	-0.68 (-1.87 – 0.51)	0.260	-1.154(-2.86 – 0.55)	0.184	-1.83 (-4.20 – -0.53)	0.128	0.11 (-1.43 – 1.64)	0.892
Number of females in household - Big 5+	-0.22 (-1.88 – 1.43)	0.793	2.96 (0.58 – 5.34)	0.580	2.74 (-0.56 – 6.04)	0.104	1.25 (-0.88 – 3.39)	0.249
Water source - Piped	0.83(-0.24 – 1.88)	0.128	-0.18 (-1.54 – 1.51)	0.981	0.80(-1.31 – 2.92)	0.455	-0.85 (-2.22 – -0.52)	0.221
Sanitation - Flush toilet	1.07 (0.00 – 2.18)	0.049	0.50 (-1.03 – 2.02)	0.523	1.56 (-0.56 – 3.68)	0.148	1.49 (0.12 – 2.86)	0.033
Shared CR with another family	-0.30 (-1.31 – 0.71)	0.556	-1.60 (-3.05 – 0.15)	0.031	-1.90 (-3.91 – -0.10)	0.064	-1.06 (-2.63 – -0.24)	0.109
Waste collection service	-0.04 (-1.26 – 1.19)	0.042	1.10 (-0.66 – 2.86)	-0.662	1.06 (-1.38 – 3.51)	0.393	0.46 (-1.12 – 2.04)	0.564
Schooling - State	1.06 (0.04 – 2.08)	0.043	0.14 (-1.32 – 1.61)	0.847	1.20 (-0.83 – 3.24)	0.246	0.49 (-0.82 – 1.81)	0.461

Knowledge Regression model

For knowledge, the fitted regression model was $35.347 - 0.91 (\text{age}) + 0.814 (\text{scholar}) - 0.471 (\text{setting}) + 1.428 (\text{income}) + 0.648 (\text{food security}) - 0.681 (\text{size of household}) - 0.221 (\text{number of females}) + 0.822 (\text{water source}) + 1.065 (\text{sanitation system}) - 0.301 (\text{shared CR}) - 0.037 (\text{waste collection}) + 1.056 (\text{state schooling})$.

The overall regression was statistically significant ($R^2 = 0.090$, $F(12, 303) = 2.496$, $p = 0.004$).



It was found that perceived high income, flush or pour-flush toilet, waste-collection service and state schooling significantly predicted Knowledge score ($\beta = 1.43$ (0.33 – 2.53), $p = 0.011$ for perceived income, $\beta = 1.07$ (0.00 – 2.18), $p = 0.049$ for sanitation system, $\beta = -0.04$ (-1.26 – 1.19), $p = 0.042$ for waste-collection service and $\beta = 1.06$ (0.04 – 2.08), $p = 0.043$ for state schooling).

It was found that age, being a scholar, setting, food security, size of household, number of females in household, water source, and sharing a C.R. did not significantly predict Knowledge Score.

It is possible that income level determines whether one has commodities such as a flush or pour-flush toilet, and whether one lives at an address that has a waste-collection service. In the Philippines, it also determines whether children go to state-schooling and how regularly. Therefore it is logical that income underpins these factors that have a bearing on knowledge.

Attitude and Perceptions Regression model

For Attitude and Perceptions, the fitted regression model was $34.381 + 0.248$ (age) + 0.530 (scholar) + 0.847 (setting) + 2.632 (income) + 1.013 (food security) – 1.154 (size of household) + 2.959 (number of females) – 0.018 (water source) + 0.497 (sanitation system) – 1.599 (shared C.R.) + 1.099 (waste collection service) + 0.144 (state schooling).

The overall regression was statistically significant ($R^2 = 0.106$, $F(12,303) = 2.988$, $p = <001$).

It was found that perceived income and shared C.R. significantly predicted Attitude and Perceptions Score ($\beta = 2.63$ (1.05 – 4.21), $p = 0.001$ for perceived income and $\beta = -1.60$ (-3.05 - -0.15, $p = 0.031$ for shared C.R.).

It was found that age, being a scholar, setting, food security, size of household, number of females, water source, sanitation system, having a waste-collection service and receiving state education did not significantly predict Attitudes and Perceptions Score.

In terms of Attitude and Perceptions regarding menstruation, perceived income is likely to affect the choice of menstrual product. Having sufficient and suitable menstrual product available is very likely to make girls feel more positive about menstruation. The β for shared C.R. is negative, meaning sharing reduces the score. Having a private C.R. that is not shared with another family is more likely to make girls feel comfortable about



menstruation, as it affords privacy and reduces anxiety and embarrassment caused by blood or used menstrual materials being seen more publicly.

Knowledge, Attitude and Perceptions (KAP) Regression model

For Knowledge, Attitude and Perceptions (KAP) score, the fitted regression model was $69.728 + 0.156 (\text{age}) + 1.344 (\text{scholar}) + 0.376 (\text{setting}) + 4.060 (\text{income}) + 1.661 (\text{food security}) - 1.834 (\text{size of household}) + 2.738 (\text{number of females}) + 0.804 (\text{water source}) + 1.562 (\text{sanitation system}) - 1.901 (\text{shared C.R.}) + 1.063 (\text{waste collection service}) + 1.201 (\text{state schooling})$.

The overall regression was statistically significant ($R^2 = 0.122$, $F(12,303) = 3.524$, $p = <0.001$).

It was found that perceived income and shared C.R. significantly predicted KAP Score ($\beta = 4.060$ (1.87 – 6.25, $p = <0.001$ for income and $\beta = -1.90$ (-3.91 – 0.10), $p = 0.064$ for shared C.R.). Shared C.R. was included as a predictor of KAP because even though the p value was not <0.05 , it was deemed close enough.

It was found that age, being a scholar, setting, food security, size of household, number of females, water source, sanitation system, having a waste-collection service and receiving state education did not significantly predict KAP score.

KAP score was also predicted by perceived income and having a shared C.R. Again, it is likely that perceived income has positive effect on school attendance, affecting knowledge, and product choice, affecting attitude and perceptions. A bathroom shared with another family is also an indicator of poverty and sharing affects attitudes to menstruation due to increased anxiety and embarrassment.

Experience Regression model

For Experience, the fitted regression model was $33.176 + 0.452 (\text{age}) + 0.438 (\text{scholar}) + 0.713 (\text{setting}) + 2.389 (\text{income}) + 2.009 (\text{food security}) + 0.106 (\text{size of household}) + 1.253 (\text{number of females}) - 0.853 (\text{water source}) + 1.492 (\text{sanitation system}) - 1.061 (\text{shared C.R.}) + 0.463 (\text{waste collection service}) + 0.494 (\text{state schooling})$.

The overall regression was statistically significant ($R^2 = 0.138$, $F(12,303) = 4.029$, $p = 0.001$)

It was found that income, food security and sanitation system significantly predicted experience score ($\beta = 2.389$ (0.97 – 3.81), $p = 0.001$ for income, $\beta = 2.01$ (0.61 – 3.41), $p = 0.005$ for food security and $\beta = 1.49$ (0.12 – 2.86), $p = 0.033$ for sanitation system).



It was found that age, being a scholar, setting, size of household, number of females, water source, shared C.R., having a waste-collection service and receiving state education did not significantly predict the Experience Score.

The predictors of experience are all associated with poverty; perceived income, food security and sanitation system. A more positive menstrual experience is determined by things that money can buy; having sufficient good quality product and a place to wash and change.



5.5.2 Multiple Regression model in the UK

Table 5.7 Multiple Linear Regression between background variables, Knowledge, Attitude and Perceptions, KAP and Experience The UK

Background variables ⁴	Knowledge		Attitude and Perceptions		KAP		Experience	
	β and 95%CI	P	β and 95% CI	P	β and 95% CI	P	β and 95% CI	P
Age 18-19	0.27 (-0.94 – 1.42)	0.648	0.88 (-0.52 – 2.29)	0.216	1.15 (-0.83 – 3.12)	0.821	1.93 (-0.28 – 4.14)	0.087
Scholar Yes	-0.90 (-2.56 – 0.76)	0.286	0.84 (-1.18 – 2.85)	0.417	-0.07 (-2.91 – 2.78)	0.964	0.23 (-2.95 – 3.41)	0.888
Setting Urban	1.21 (0.42 – 2.01)	0.003	0.96 (-0.01 – 1.93)	0.053	2.17 (0.80 – 3.54)	0.002	1.51 (-0.012 – 3.04)	0.052
Perceived income High	1.39 (0.54 – 2.23)	0.001	0.97 (-0.06 – 2.01)	0.064	2.36 (0.91 – 3.81)	0.002	3.45 (1.82 – 5.07)	<0.001
Pupil premium No	0.24 (-0.73 – 1.21)	0.621	0.77 (-0.41 – 1.95)	0.200	1.02 (-0.65 – 2.68)	0.231	0.956 (-0.90 – 2.82)	0.312
Size of household Big 5+	-0.37 (-1.60 – 0.86)	0.555	0.57 (-0.93 – 2.07)	0.455	0.20 (-1.91 – 2.31)	0.852	0.74 (-1.62 – 3.09)	0.541
Number of females in household	-0.04 (-0.87 – 0.80)	0.930	-0.14 (-1.16 – 0.88)	0.790	-0.18 (-1.61 – 1.26)	0.810	0.95 (-2.56 – 0.65)	0.243

⁴ Reference categories: Age = 16-17; Scholar = not currently studying; Setting = Rural; Perceived income = Low; Pupil premium = yes; Size of Household = Small 1 – 4; Number of females in household = Small 1 – 2; Number sharing a bathroom = Small (1-4); Schooling = not state-schooling.



Big 3+								
Number sharing a bathroom Large (5+)	0.05 (-1.28 – 1.39)	0.938	-0.94 (-2.57 – -0.69)	0.256	-0.89 (-3.18 – -1.40)	0.447	-1.16 (-3.72 – 1.40)	0.374
Schooling State	0.42 (-0.34 – 1.18)	0.278	0.81 (-0.12 – 1.73)	0.089	1.23 (-0.08 – 2.53)	0.066	0.34 (-1.13 – 1.80)	0.653

Knowledge regression model

For knowledge, the fitted regression model was $40.294 + 0.294(\text{age}) - 0.901(\text{scholar}) + 1.213(\text{setting}) + 1.386(\text{income}) + 0.244(\text{pupil premium}) - 0.369(\text{size of household}) - 0.037(\text{number of females}) + 0.052(\text{shared bathroom}) + 0.421(\text{state schooling})$.

The overall regression was statistically significant ($R^2 = 0.67$, $F(9,395) = 3.158$, $p = 0.001$)

The value for R^2 is high which suggests that 67% of the variation in knowledge is accounted for in the model.

It was found that setting and perceived income significantly predicted Knowledge Score ($\beta = 1.21$ (0.42 – 2.01), $p = 0.003$ for setting and $\beta = 1.39$ (0.54 – 2.23), $p = 0.001$ for income).

It was found that age, being a scholar, in receipt of pupil premium, size of household, number of females in household, number sharing a bathroom and receiving state education did not significantly predict Knowledge Score.

Urban settings tend to be associated with Knowledge acquisition as there is so much information readily available where there are higher densities of people, whether that be through conversation, or libraries, or advertising bill boards. A higher perceived income is also associated with higher Knowledge scores. Although there is universal education in the UK, income determines where you live and whether you can go to a 'good' school. It undoubtedly has an effect on knowledge.

Attitude and Perceptions Regression model



For Attitude and Perceptions, the fitted regression model was $46.169 + 0.884 (\text{age}) + 0.417 (\text{scholar}) + 0.957 (\text{setting}) + 0.974 (\text{income}) + 0.771 (\text{pupil premium}) + 0.569 (\text{size of household}) - 0.138 (\text{number of females}) - 0.941 (\text{number sharing a bathroom}) + 0.805 (\text{state schooling})$.

The overall regression was statistically significant ($R^2 = 0.051$, $F(9,395) = 2.340$, $p = 0.014$)

Although none of the variables had a p value below 0.05, three were close enough to be considered predictors; setting, perceived income and schooling. ($\beta = 0.96 (-0.01 - 1.93)$, $p = 0.053$ for setting and $\beta = 0.97 (-0.06 - 2.01)$, $p = 0.064$ for perceived income and $\beta = 0.81 (-0.12 - 1.73)$ for schooling).

It was found that age, being a scholar, in receipt of pupil premium, size of household, number of females in household, and number sharing a bathroom did not significantly predict Attitudes and Perceptions Score.

Girls in urban settings are more likely to have positive attitudes and perceptions towards menstruation compared to those in rural areas, because they have a greater choice of products and more up-to-date facilities, which helps them to manage their menstruation more easily, as well as exposure to ideas diverse people that challenge stigma, which can be deeply rooted in rural traditional communities. Attitudes and Perceptions of communities spill over into schooling.

Knowledge, Attitude and Perceptions (KAP) regression model

For Knowledge, Attitude and Perceptions (KAP), the fitted regression model was $86.464 + 1.151 (\text{age}) - 0.066 (\text{scholar}) + 2.170 (\text{setting}) + 2.360 (\text{income}) + 1.015 (\text{pupil premium}) + 0.200 (\text{size of household}) - 0.175 (\text{number of females}) - 0.888 (\text{shared bathroom}) + 1.226 (\text{state schooling})$.

The overall regression was statistically significant ($R^2 = 0.086$, $F(9,395) = 4.150$, $p = <0.001$).

It was found that setting, income were significant ($\beta = 2.17 (0.80 - 3.54)$, $p = 0.002$ for setting, $\beta = 2.36 (0.91 - 3.81)$, $p = 0.002$ for income). State-schooling is also considered as a predictor as the p value was close to 0.05 ($\beta = 1.23 (-0.08 - 2.53)$, $p = 0.066$ for state-schooling).



It was found that age, being a scholar, in receipt of pupil premium, size of household, number of females in household, and number sharing a bathroom did not significantly predict the KAP Score.

As discussed, setting and perceived income are determinants of Knowledge, and Attitudes and Perceptions separately. Many of the schools that are non-state in the UK are schools with a religious affiliation and they may project more conservative attitudes to menstruation.

Experience Regression Model

For Experience, the fitted regression model was $32.830 + 1.929 (\text{age}) + 0.229 (\text{scholar}) + 1.512 (\text{setting}) + 3.447 (\text{income}) + 0.958 (\text{pupil premium}) + 0.735 (\text{size of household}) - 0.953 (\text{number of females}) - 1.160 (\text{shared bathroom}) + 0.335 (\text{state schooling})$.

The overall regression was statistically significant ($R^2 = 0.095$, $F(9, 395) = 4.620$, $p = <0.001$).

It was found that setting and income were significant ($\beta = 1.51 (-0.012 - 3.04)$, $p = 0.052$ for setting and $\beta = 3.45 (1.82 - 5.07)$, $p = <0.001$ for income). Age was also included as a predictor as its p value is close to $P0.05$ ($\beta = 1.93 (-0.28 - 4.14)$, $p = 0.087$ for age).

It was found that being a scholar, in receipt of pupil premium, size of household, number of females in household, number sharing a bathroom and receiving state education did not significantly predict the Experience Score.

Setting and income are significant predictors of menstrual experience in the UK because of accessibility of products. It is likely that those in rural areas and those on low incomes have less access to choice of products and sufficiency of products, which will fundamentally affect their menstrual experience. Menstrual experience may also be associated with attitudes and perceptions, which as discussed, are possibly more traditional and restrictive in rural settings compared to urban settings. Experience usually improves with practice, and it is seen here that older girls have better experiences than younger girls.



5.6 Summary of quantitative data

5.6.1 Demographic differences and similarities between the samples from the Philippines and the UK.

The respondents in the Philippines were both absolutely and relatively poorer than their UK counterparts; they came from more urban environments, bigger households, and were less likely to have access to improved water or sanitation.

There was a large difference in religious adherence (it being greater in the Philippines) and school completion (it being greater in the UK). Around half in each country had been in been educated in a public or state school and received the national curriculum.

These items were found to be significantly different between the respondents of the two countries: Age, Religion, Setting, School completion, Perceived Income, Size of household. These items were not significantly different, Gender, Status, Type of Schooling, Number of females in the household. Access to water, sanitation or hygiene could not be compared.

Sources of menstrual knowledge. Respondents in the Philippines learnt about menstruation first from their mother or a close female relative and if they sought further information, it was likely to be from family members. Respondents in the UK were younger when they first heard about menstruation; it was also primarily from their mother, but they may have heard about it in school too. If they sought further information, it was mostly online.

5.6.2 Menstrual KAP

There was a significant difference between the Philippines and the UK in Knowledge, Attitude and Perceptions and KAP ($P < 0.001$).

Determinants of Menstrual Knowledge, Attitude and Perceptions and KAP

In the Philippines, it was found that perceived high income, flush or pour-flush toilet, waste-collection service and state schooling significantly predicted Knowledge score.

It was found that perceived income and shared C.R. significantly predicted Attitude and Perceptions Score and KAP Score



In the UK it was found that setting and perceived income significantly predicted Knowledge Score, and setting, perceived income and schooling affected Attitude and Perceptions and KAP score.

5.6.3 Menstrual Experience

There was no significant difference between Experience in the two countries ($P=0.916$)

Determinants of Menstrual Experience

In the Philippines, it was found that perceived income, food security and sanitation system significantly predicted experience score.

In the UK it was found that setting, perceived income and age predicted experience.

5.7 Using the qualitative results to explain the quantitative data

The focus group data was initially coded using a WASH framing to provide greater insight into the results of the quantitative questionnaire. In some cases, it provided confirmation of a phenomenon, and in others an explanation. Where the data sets were contradictory, it allowed further interrogation of the quantitative data to yield a better understanding.

5.7.1 Summary of the focus group data using the logical framework that was confirmatory and/or explanatory.

The first question was 'What is the Knowledge, Attitude and Perceptions (KAP) of menarche and menstruation?'

It was found that not all girls were aware of menstruation prior to experiencing menarche, and even if they were aware, the reality was very different to what they had been led to believe. They saw the information they had received as incomplete. Girls in the Philippines knew very little about the physiology of menstruation. Girls in the UK lamented their lack of practical knowledge.

Mothers were the initial source of menstrual knowledge. Girls sought out knowledge from other sources to plug the gap. In the Philippines they were likely to discuss it with family and friends, but girls in the UK found it difficult to talk about and were more likely to read a book or consult the internet.



In the Philippines there were cultural traditions associated with menarche, but the girls were not very clear on their meanings. Celebrations of menarche were quietly celebrated within families. However, in the UK, menarche was not acknowledged, and the menstrual taboo was so strong that girls began a lifelong practice of pretending menstruation wasn't happening to them.

The second question was 'What are the Experiences and Practices of menarche and menstruation?'

The girls listed a number of effects of menstruation on their health and well-being: Dysmenorrhea, other menstrual disorders, smell, PMS, embarrassment, anxiety and shame, which were common concerns in both countries.

They mentioned that the availability of menstrual products, water, soap, waste-bins and cubicles with lock all affected how they managed their menstruation. Good quality products were a priority but what they wanted from bathrooms was privacy more than anything. Some girls asked each other to 'watch their back' whilst they changed if they did not have a physical door to lock.

Girls in the Philippines had less resources but were more able to rely on their friends and teachers for support. Girls in the UK rarely had shortages of resources, but they felt isolated in managing their menstruation and they had negative feelings around it. Some felt obliged to take the contraceptive pill to make their periods shorter, lighter and more manageable.

Unexpected results and contradictions between the quantitative and qualitative data warranted closer inspection and, in some cases, further interrogation of the quantitative results.

Some statements produced large differences in response between the UK and the Philippines. For example, 81.24% in the UK and 41.4% in the Philippines disagreed with the statement 'men and boys should not see menstrual blood'. Based upon the focus group discussion, girls in the UK have been exposed to feminist thinking and have strong feelings on issues of gender equality. Looking at the data more closely revealed that 54.57% of them *strongly* disagreed with the statement, compared to just 22.15% in the Philippines. They also felt that they should be given more slack when they were menstruating, with only 25% saying they should carry on as normal. Girls in the Philippines focus group



indicated that they were more accepting of menstruation (61% thought they should carry on as normal) but also that they were more accepting of traditional female roles, for example, one commented that they didn't need to study as they expected to get pregnant and become a mother.

When the scores were calculated, the KAP scores were lower in the Philippines compared to the UK. This was not unexpected, as the hypothesis had been that cultural and religious restrictions would affect the KAP score in the Philippines, however, the girls in Philippine focus group did not seem to feel particularly restricted by culture or religion.

It was decided to disaggregate the data and separate Knowledge from Attitudes and Perceptions in order to understand more precisely where the difference lies.

Both Knowledge Score and Attitude and Perceptions score were significantly different in the Philippines and in the UK. But the standard deviations were larger in the Philippines and greater for Attitudes and Perceptions than Knowledge. As a group, the Philippine respondents gave more varied responses. This suggests that members of the population can hold opposing views and this is quite likely in a young population within a deeply religious society.

Another seeming contradiction was about menstrual experience. In this case the mean scores for menstrual experience in the Philippines and in the UK were very similar and not statistically different, but the comments of the participants in the UK were noticeably more negative than those in the Philippines.

This was confirmed by closer inspection of the quantitative data; the question 'How do you feel when you are menstruating?' was answered negatively to positively in the ratio 10.41: 1 in the UK and only 1.87: 1 in the Philippines. This was an unexpected result.

5.7.2 Interpretation of quantitative and qualitative results

Sources of knowledge interpreted

Respondents in both the Philippines and the UK said that they first heard about menstruation from their mothers, which concurs with the literature (Valizadeh *et al.*, 2017).

In the Philippines, where families are extended and not nuclear, grandmothers, older sisters and *titas* (aunts who may or may not be biologically related) may also have



contributed to the participants' knowledge of menstruation. Most of the menstrual knowledge that was gained was tacit knowledge. Large extended families and shared sanitation systems means there are few secrets in Filipino households. Over half of the households (55% of the sample) share a C.R. with another household and 37.61% have more than 3 females over the age of 12, likely to be bleeding once a month. Blood-stained materials may have been left in the pan or in the trash can for all to see, therefore it is quite possible that girls in the Philippines knew about menstrual blood from a young age even if they did not understand much about the menstrual cycle.

In all countries it is likely that young children accompany their mothers to the bathroom when they are changing their own menstrual materials if there is nowhere safe to leave the child (Schmitt *et al.*, 2018). However, in the UK, many women go back to work as the child gets older, and children in childcare facilities may not be as exposed to menstrual products and menstruation as those at home with a sole female carer.

Although most of respondents in the UK credited their mother as the source of their menstrual knowledge, it was often the case that their mother had provided them with a book or a pamphlet to read. Some of the girls in the focus group described how uncomfortable the conversation was, and indicated it was fairly superficial in order to get it over with and move on swiftly. The attitude of mothers to their daughters' menarche has also been discussed in the literature. An analysis of comments on the website 'mumsnet' from predominantly UK mothers found there was 'secrecy, sorrow, a lack of competency and knowledge' and it was suggested that this was 'socialising their daughters to comply with and perpetuate the menstrual taboo that they endured themselves' (Bennett and Harden, 2014).

In the UK, a few participants thought that they had heard about menstruation at school, but nobody could recall a formal lesson; they thought it may have been mentioned in passing when sex education was being taught. This highlights a difficulty that UK society has historically had with menstrual education: whose responsibility is it to prepare girls? In the early 20th century 'Hygiene' and therefore 'Menstrual hygiene' entered the public domain and was written about in books and pamphlets, and later in the second half of the century, instruction was given in the form of public health information films. Mothers have been led to believe that 'authority figures' should be teaching about important issues to do with health, and by inference, menstrual health, but even though they are ideally placed



for mass education, schools have been slow to catch up with this thinking (Ghanoui, 2022). Until recently, 'menstruation' was not even specified in the school national curriculum. New guidelines for relationship and sex education (RSE) which refer to menstruation explicitly were implemented for the first time in September 2020.

Menarche rites of passage interpreted

In some cultures, menarche is a significant rite of passage. In the Philippines, the participants described traditional rituals that varied between individuals but were around the same theme, jumping up or down stairs and repeating it three times. They were not very clear about its purpose, most saying it was to 'grow', but others that 'it will give you three days of menstruation'. The religious reason is long forgotten, but like most menarche beliefs, it was probably to ask the gods for fertility (Dammery, 2015).

Menstrual KAP interpreted

I used KAP score as a proxy for Menstrual Literacy and found menstrual literacy to be higher in the UK than in the Philippines. The hypothesis was that the Knowledge component score reflects a difference in Income and Education, and that the Attitudes and Perceptions component score reflects a difference in Culture and Religion. The respondents in the Philippines were absolutely and relatively poorer, had less years in Education and a greater adherence to culture and religion than the respondents in the UK.

Indicators associated with income were predictors for KAP score: food security and sanitation system. In the Philippines, males and females that found themselves facing food insecurity performed less well on the KAP score. It is very likely that those in absolute poverty may not be able to go to school because they cannot pay the fees or afford the necessary equipment (Sommer *et al.*, 2017). It may also be that they need to work to feed themselves. Girls who have reached menarche may not be able to afford suitable menstrual products and may miss some school as a result (Haver *et al.*, 2018). Therefore, it is likely that those that are poor will be behind those who are more affluent in terms of their educational attainment and that girls will fall behind boys. There was no link between pupil premium (a proxy for food insecurity) and KAP score in the UK. The UK has a universal education system and income is not a barrier to school attendance.

In the Philippines, the type of sanitation system was a predictor for KAP score and is also an indicator associated with poverty. But in addition, the focus group explained that what



girls really want from a bathroom is privacy.

In both countries, those who perceived themselves to come from a low-resource background also performed significantly less well than those who did not. Girls in the Philippines felt obliged to go home if they could not purchase a disposable pad. They did not want to wear *pasadoras* at school as they were bulky and visible. Even in the UK, on a low-income, girls struggled to purchase their preferred menstrual product, and they said that they reduced their engagement with education as they were uncomfortable or worried about leaking with cheaper versions. Lack of concentration is a hidden cost of menstruation that is difficult to quantify (Sumpter and Torondel, 2013).

Another hypothesis is that state schools were more likely than non-state or private schools to mention menstruation because they teach the prescribed national curriculum (Sommer *et al.*, 2017). Although I found that the type of education received was shown to correlate with KAP, it is not possible to link this to a difference in menstrual education. In neither country was menstruation on the national curriculum in anything other than cursory form (usually concealed within sex education) and secondly, the participants recollected that menstrual education, when it had occurred, had only ever been opportunistic, and more to do with the individual teacher and the context, rather than the type of school.

Menstrual Experience interpreted

Finally, I can say that there is a positive correlation between Menstrual Literacy and Menstrual Experience. It has been suggested that a lack of menstrual knowledge contributes to a negative menstrual experience (Coast, Lattof and Strong, 2019). I reasoned that more menstrual knowledge would improve the menstrual experience, because Menstrual Literacy is a mitigating factor, making girls more prepared, more knowledgeable of self-help practices and more confident to seek help when necessary. Interestingly, although the UK girls scored higher on the range of measures that made up the menstrual experience score, they themselves rated their experience of menstruation as very negative and much more negative than the Filipina girls. Some of them expressed anger at their situation and the emerging paradox: more knowledge gave them more management options but at the same time it made them question whether they were managing their body for their own or others' convenience. These findings concur with cultural impositions in HIC known as 'the Menstrual Mandate' (Bobel, 2019).



A negative consequence of menstrual literacy was that it seemed to lead to greater menstrual anxiety. The UK participants were worried about what they didn't know, and particularly, whether their experiences were 'normal' or not. Menstrunormativity has different and somewhat paradoxical meanings (Persdotter, 2020). Parents and teachers treated the girls as if nothing remarkable had happened and they were just expected to get on with things. In this sense, menstruation was 'normal' because it was natural. But for the girls, there was some disbelief that anything so painful could be 'normal'. They weren't prepared for the pain and as it wasn't talked about, they thought nobody else was suffering as much, which led them to the conclusion that something was wrong, or medically abnormal. Girls in the UK may have been socially conditioned by recent trends in society for medicalisation of conditions, and the accompanying expectation that there will be a pharmaceutical or surgical solution (Van Dijk *et al.*, 2016).



Chapter 6 Qualitative results and thematic analysis

6.0 Factors affecting menstruators

The thematic analysis has been framed around the socio-ecological model, which sees individuals as interacting with their world on a number of different levels; Biological, Personal, Interpersonal, Environmental and Societal. These factors interact in a complex and context specific way, which has a profound impact on the experience of the individual. Some of the factors are facilitators and some of them are barriers, and the aim of the thematic analysis is to identify the factors that shape the menstrual experience of the participants of this study and influence menstrual health outcomes.

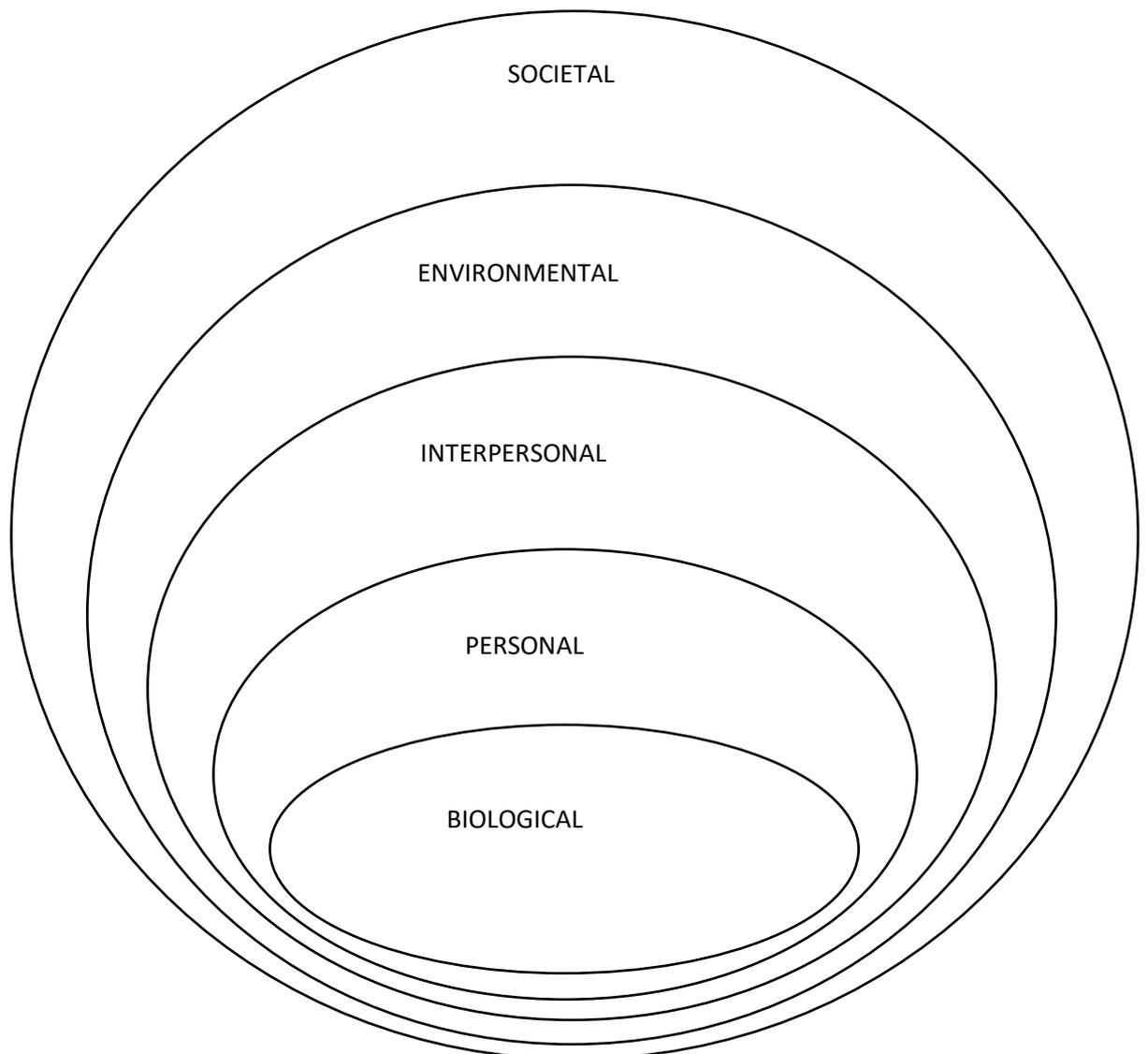


Figure 6.1 Socio-ecological model



6.1 The Socio-Ecological Model

The literature was consulted in order to define the categories more precisely. A pertinent ecological study of WASH in the Philippines used the categories Biological, Interpersonal, Personal, Environmental and Societal (Haver *et al.*, 2013). A different study using the socio-ecological model described the categories and sub-categories as Intrapersonal (Attitudes, Beliefs, Knowledge and Behaviours), Interpersonal (family, friends, social networks), Institutional (Schools, Health care administration, Business, Faith-based organisations, institutions), Community (relationships and communications between organisations and institutions), Policy (national, provincial/territorial, local laws and policy) (Ma, Chan and Loke, 2017). It was decided to combine the names of the categories from the first (as it was felt they accurately described the environment of menstruating girls) with the sub-category descriptors of the second.

Having defined the categories, the thematic analysis could then be conducted. Themes that had been identified from the word-frequency analysis and first order coding of the transcripts were revisited and reorganised into one of the different categories of the Socio-ecological model. Some of the themes cut across different categories. The evidence from the relevant quotes was examined in detail to analyse their precise contribution to Menstrual Health and this resulted in new sub-categories being created. They were:

Biological: preparedness, puberty, pain

Personal: pointers, practice v theory, period problems

Interpersonal: performance, primary school, preterition

Environmental: Products, Pandemic, Privacy

Societal: participation, precepts and predicament

This work was presented as a work in progress on a couple of occasions. Making the categories all starting with a 'P' was used for rhetorical effect. The presentation won 'Best presentation' at the PGR symposium in 2021 and the university 3-Minute Thesis Competition (3MT) in 2022.



6.2 The Biological Factors that influence Menstrual Health

Menarche is the first menstrual period and a biological manifestation of the development of the reproductive organs of a female. As such, it is a corporeal experience that cannot be disregarded, and it is accompanied by other physical or psychological changes. The experience of menarche can affect one's attitude and perceptions towards subsequent menstruation.

6.2.1 Preparedness

The participants awareness of menstruation prior to menarche was vague. A couple of girls in both countries reported that they literally knew nothing before they started bleeding and were completely surprised and scared by the appearance of the blood.

'I (did) not know much' PH 1

'It was scary, I didn't know what to do and I wasn't really prepared' UK 6

'I literally screamed through the house when I began!' UK 3

In the Philippines, most of the participants were aware that women bleed periodically. They had heard that menstruation could cause pain and that women needed to rest. They were also aware that it could cause bad smells.

'(I was told that) menstruation will give you head, abdomen and hip ache' PH 3

'(I was told that) if you have menstruation, you should take care of yourself so that you will not smell bad' PH 5

The majority of the UK participants had learnt about the anatomy of the reproductive system and the physiology of the menstrual cycle in sex education lessons.

'we were taught about puberty as a whole so all aspects came into it including all the biology too' UK 5



'I knew most things there is to know about the biology, why we have them etc' UK 4

However, the lessons did not necessarily prepare the girls for coping with the blood. As one participant said, (the lessons contained) *'nothing that would actually help when you got it' UK 6*. Another elaborated on what would have been helpful; *'I needed to know how you put a pad in, what size is best, etc' UK 3*

6.2.2 Puberty

The participants in both countries discussed the effects that puberty had on their physical health and well-being.

In the Philippines the participants limited their comments to menstruation *per se*. Many girls described physical symptoms such as stomach-ache and hip ache; one said she felt like she had a fever and another mentioned being very tired when she was menstruating. A few girls said that their mood changed and they felt irritable.

'my stomach and abdomen hurts' PH 3

'I feel like I have a fever' PH 11

'Sometimes I got tired easily. I don't want to talk to other people. I am moody' PH 8

'I feel irritable and awkward' PH 9

The participants of the UK focus group also described the physical symptoms and mood changes during their menstruation, but they included reference to other parts of the menstrual cycle and linked this to hormonal changes.

'My emotions are all over the place before and during my period' UK 4

'They'll (the family will) just recognise when I'm hormonal' UK 3

Some of them alluded to well-being issues and mental health as being impacts of puberty and menstruation.

'It's something that is definitely hard to put up with ...menstruating has an impact on mental health' UK 7



6.2.3 Pain

Nearly all of the participants in both countries suffered from dysmenorrhea which at times was debilitating. Girls commonly mentioned suffering from abdominal cramps, backache and a feeling of weakness. Pain was reportedly not continuous and was usually worse on the first couple of days.

'(the) first day of menstruation is the most painful. I will just stay on my bed the whole day.'

-PH 3

In the Philippines, one girl said she used a hot compress to relieve the pain, and others spoke of curling up and resting until the pain had passed. The girls in the Philippines did not mention taking any medication to manage the pain, though some mentioned dietary restrictions, such as the avoidance of sour fruit like green mangos, which were thought to irritate the stomach and make the pain worse.

Five of the girls in the UK focus group said that they experienced significant pain. One said that she used a hot water bottle to relieve abdominal cramps, and another said she had recently bought an adhesive heating pad which activated on contact with the skin. This prompted a discussion about whether it could be worn under baggy clothing, and whether it would be less obvious than a hot water bottle. The girl who had bought it said that she would recommend it. Some of the other girls asked where she had got it from (Poundland) and indicated that they would like to try it for the relief of their cramps.

6.3 The Personal Factors that Influence Menstrual Health

Personal factors relate to the individual but in a more abstract way than the purely biological. The individual's knowledge, attitude and perceptions affect their experience of menarche and menstruation, and vice versa.

6.3.1 Pointers

Participants in both countries received their menstrual knowledge and practical help from their mother initially.

Participants in the Philippines said that their mother or a close female relative had had a conversation with them about how to capture the blood and how to wash the body. In



some cases, the participants were warned about the change in their status, from girl to sexual being, and cautioned about their behaviour around men.

'my mom told me the effects of it' PH 8

'so that I would know what to do and not to do' PH 3

*'My tita and grandmother gave me information about it before hand.
They said that I should avoid male reproductive system to protect myself
and avoid further conflict' PH 2*

In the UK, participants explained that, rather than a verbal discussion, they were more likely to be given a book or pamphlet by their mother. None of the participants referred to a change in their sexual status.

*My mum wanted me to know about it before so she had a book about
puberty and everything UK 5*

6.3.2 Practice verses theory

Many of the participants described a disjunction between what they thought they knew about menstruation and the actual reality once they had experienced menarche.

'I only knew after having menarche' PH 1

'I didn't properly know what it was until I got it' UK 6

*'Because people said it was the lining of the womb, I didn't think it
would just be normal blood. I thought it would look like skin or
something.' UK 4*

As their experiential knowledge increased, the girls said that they also became more aware of what they didn't know, and this generated interest and questions. Sometimes they discussed their experiences with family and friends.

*'I was curious, then my mother, sisters, and friends discuss menstruation
to me' PH 4*



'you are all going through the same thing at the same time so it's easier to discuss with each other (friends)' UK 5

Only one participant in the Philippines mentioned doing research online, but participants in the UK said that they turned to the internet frequently to quickly get more information. Several girls mentioned YouTube videos specifically as being informative about puberty.

'I will do research online to increase my knowledge' PH 13

'Girl-talk You Tube videos' UK 7

'You Tube videos I used for things about emotions that develop during puberty' UK 3

In the UK, participants read articles about puberty which appeared on their social media feeds.

'Random YouTube video in my feed gave advice as well' UK 1

There was a discussion about how 'random' it was; it was noted that the algorithms of Facebook and other social media sites ensure related content appears in the feeds if the material has been 'liked'. They decided it wasn't so random after all.

A girl in the UK said that she wanted 'to know everything' and read all the relevant books in the library.

'I was the type of child who liked to know everything, and was also very taken with the idea of growing up, so I would take it upon myself to read all the human body books in the school library' UK 8

6.3.3 Problem periods

The participants in both countries discussed the difficulty of not knowing whether their menstrual experience was normal or not.

In the Philippines, participants could turn to members of their community for advice. One said that it was *'openly discussed... to share how painful it is.'* PH 8



Several girls in the Philippines said that they would like to be able to discuss menstruation with a doctor. Only a couple of Filipinas said that they may search for further information on the internet.

'(I would consult a) doctor - to discuss it correctly' PH 10

'I may also search it in the internet but I prefer it to be explained better.

-PH 3'

Participants in the UK were aware that everybody's experience was different, but they compared their own symptoms to friends or accounts posted by other girls that they found on the internet, to try to gauge whether their experience was out of the ordinary.

'Everyone's periods are completely different. One person may never experience cramps while another may experience the worst there is. I think we are lucky in the fact that we have the internet and we can speak to one another and maybe when you seem to experience something others don't or to a new level that's when you should seek support.'

UK 5

Participants in the UK said they would most likely consult the internet for more information if they were concerned about their periods in anyway. *'(I'd go to) websites'* UK 4 said one girl; *'social media'* UK 2 said another.

One girl had sought out information about her symptoms in this way. She had a lot of pain. She wanted to find out if her symptoms were unusual before seeking medical help, because her mum *'made out they were normal'* UK 2. Armed with information she found on the internet, the girl was able to approach the medical profession and articulate her concerns, which led to a referral and eventually a diagnosis of endometriosis.

'Only later did we discover I had endometriosis and a hormone-affected disability.' UK 2

In the UK, three of the girls said that they had been prescribed the contraceptive pill, which they thought had reduced their pain significantly. Two of the girls in the UK focus group had had a diagnosis of secondary dysmenorrhea. The aforementioned girl had endometriosis, and the other was not specific, but said that the pain caused her to 'trigger her vagus nerve' and faint. She had been prescribed Mefanamic Acid, which is an anti-inflammatory drug used to treat menstrual cramps.



6.4 The Interpersonal factors that affect menstrual health

Interpersonal factors originate from the people we come into contact with regularly, such as family, friends, school-teachers and doctors. Culture or tradition may require certain performances of menstruators, or impose restrictions on them, leading to a context-specific menstrual etiquette.

6.4.1 Performance

Participants in the Philippines describe a number of rituals that needed to be performed on attaining menarche. These included:

'Wash your face with menarche' PH 1 PH 3 Ph 7 PH 8 Ph 10 PH 12

'Jump on the third stair' PH 2

'On your menarche, jump to grow' PH 5

'Don't take a bath' PH 6

'Jump three times to gain height' PH 7

'Your height will increase on your menarche' PH 9

Washing your face with menarche was thought to prevent pimples which made one unattractive to males. Jumping was to encourage growth (a type of manifestation) to promoted maturation into a woman. Taking a bath was though to interfere negatively with fertility and was therefore avoided. All of these rituals were rites of passage that recognised the transition from girl to woman and acknowledge the acquisition of fertility.

The participants in the UK did not mention any ritual performances associated with menarche. It is not a celebrated as a rite of passage in the UK.

6.4.2 Primary School

In neither country was school the main source of menstrual knowledge. Participants had usually got some knowledge from close family members prior to it being covered in school. Addressing the topic seemed a bit *ad hoc* in both countries, depending more on the individual teacher than on the curriculum. (At the time of the research and in the



immediate years preceding, 'menstruation' was not explicitly on the school curriculum⁵).

In the Philippines, one girl said, '*I never heard a discussion of menstruation with my schools.*' PH 4 but another mentioned that she had heard about it in Elementary School when a classmate had experienced her menarche and stained her clothes, and the teacher had taken the opportunity to explain what had happened.

'(In) Grade 6, during discussion, my classmate had her menarche. My classmates laughed at her, she felt ashamed of herself. Then my teacher explained menstruation' PH 13

In the UK, a couple of girls said that they had received 'sex education' during year 5 or 6 of primary school, in which they had learnt about puberty, but not menstruation *per se*.

'We were taught 'sex education' in year 5.' PH 5

Participants in the UK said that menstruation was not covered until they studied biology or health education in secondary school.

'it wasn't until we did it at school in year 7 that I realised it lasts about a week. Before that I just thought a lot came out in one go and that was it!' -UK 4

6.4.3 Preterition

Participants in the UK expressed dissatisfaction with the menstrual information that they received, both at home and at school. They felt that important information, which would have been useful to them, had been omitted, or withheld.

One girl felt she was being treated as a child rather than a young adult by her parents.

'I was never taught about periods (at least from my parents) because they just didn't view me as being old enough to have one until it happened' UK 6

⁵ In the UK, new statutory guidance for Relationships and Sex Education RSE, which explicitly mentioned menstruation, was issued by the Department for Education for first implementation in September 2020.



Another, who had received a book, lamented that *'the book missed out the fact it hurts'* UK 2.

The participants had a discussion about whose responsibility it was to teach girls about menstruation, at what age and in what detail.

'More general guidance form schools for those whose parents don't speak to them about it' UK 5

'Earlier, more thoroughly and be someone entirely detached from the school' UK 2

'They should explain what it is and what to do and all the answers to embarrassing questions we might secretly have. They should let you see what the products are and what they do' UK 6

They agreed that it ought to be taught in schools, as parents weren't reliable, and wanted a greater focus on practical matters. They did not agree entirely about how much detail should be covered. The girl with endometriosis was adamant that endometriosis should be taught in schools, but not all thought that was reasonable.

'It's so common I think along with periods it should be taught about, I mean, 1 in 10 have it' UK 2

'We can't teach the whole population about every illness' UK 5

As well as what should be included, the UK girls discussed the merits of the different models of delivery. Some thought it should be the class teacher, some a health professional or expert. Again the same girl was quite opinionated about this, but they did not all agree.

'Definitely not (the class teacher) because say your teacher tells you about your vagina and then you see them in maths, that's really awkward plus it should be an expert' UK 2

One participant described how the school had used sixth formers to lead a more informal discussion. She was clearly in favour of this mode of delivery, as she found the sixth formers more approachable and less intimidating.



'We would also do this thing every so often when we would split into groups of four or five, with each group matched with two of the older sixth form girls, and they would lead a discussion with us/we would ask questions. This worked really well as they were much less 'scary' than an adult, and they were easier to talk to and relate to' UK8

6.5 The Environmental Factors that influence menstrual health

Menstruators need to engage with their environment in terms of obtaining products and having access to Water, Sanitation and Hygiene services to deal with their menstruation. Ease of access is an important factor in promoting menstrual health.

6.5.1 Products

Participants in both countries said that they wanted proprietary menstrual products that did not leak and gave them long lasting 'protection'.

In the Philippines, the girls in the focus group said that they did not like the traditional cloth *pasadors*. They were not convenient for school, because they were not secure and could easily move out of position, causing leaks. Wearing the cloth made the girls feel very conscious of their movements and they felt obliged to restrict their activities to avoid menstrual accidents. Their preferred menstrual absorbent was a 'napkin' or disposable pad.

'I am not comfortable with cloth because of a possible leak.' -PH 1

'Cloth is too thick and is more visible' PH 4

Many of the participants in the Philippines explained that they were unable to afford disposable pads as their 'routine' product. Instead, girls in the focus group spoke of adopting a hybrid model of wearing disposable pads to school and using cloths at home. One mentioned that she might use a diaper if the bleeding was particularly heavy.

'I use fabric when it is about to end or when at home' PH 8

'Sometimes diaper if the blood is plenty' PH2



On days when they had sufficient money available, they would buy a single disposable pad of good quality to give them a worry-free day in school.

'(I would buy) 'Whisper' (expensive brand) with wings' PH 6

All of the girls in the UK focus group used disposable pads, although some also used tampons occasionally. This allowed them to participate in other activities, such as swimming, that would not be possible with pads. None of them mentioned using any other type of absorbent or capture such as period pants or menstrual cups.

'I only use pads unless I want to go swimming' UK 4

'I switch between pads and tampons depending on my activities for the day' UK 5

They were, however, very conscious of leaks and had adapted their behaviour accordingly. If the menstrual blood flow was heavy, they would use extra pads or try to change more regularly.

'When I feel heavy, (I have) panty liners stuck at the front and the back of my pad' UK 7

'I'll change my pad every 2-3 hours whatever the 'fullness' is just to be safe' UK 5

Sometimes girls had to use products that were not their choice, either bought by parents or borrowed from friends in an emergency. Some of the girls said that their school or college provided products, but they were not impressed by their quality; one girl said *'but rubbish ones'* and another said that they were *'paper thin'* and didn't do the job.

Nearly all of the girls in the UK used over-the-counter painkillers to control their pain. One girl said that she used them routinely during her menstruation, *'just in case'* (i.e. prophylactically). Another commented that they made her period *'just about ok'* and rhetorically asked how she would cope without them. She said she felt sorry for people who were experiencing period poverty and weren't able to purchase pain relief.



6.5.2 Pandemic

Girls in the UK had a discussion about the difficulties of getting products during the pandemic. The Covid-19 pandemic affected menstruators because it made it more difficult to get products. The supply chain was affected and supermarkets were not always well stocked. Girls had to change to alternative products. Sometimes delivery slots were fully booked and girls could not get products at a convenient time for them. Girls who relied on their parents to provide products found their routine disrupted; one girl said her mum was shielding so she had to go to the shops with her dad as he didn't know what to buy. Schools were closed and it was not possible for girls to get emergency products from student services.

'I only used to buy what I needed but when covid came I started to get enough for 2 months because of the risk things would become unavailable' UK 6

'There was a point when getting online shopping slots was difficult at the start of the pandemic and we completely ran out of products a couple of days before our delivery. I had to search everywhere in my room to find a few pads that had been kept in bags from college and travelling'. UK 6

'it is quite difficult to go out and buy products and what is quite frustrating is that queues are long and sometimes those supplies are in short stock' UK 7

'I would have to go with my dad to the shops because only I knew the right one' UK 3

6.5.3 Privacy

The participants in both the Philippines and in the UK highlighted privacy as an important issue for them as menstruators.

In the Philippines, privacy wasn't always easy to come by, whether at home or at school, so the girls might rely on each other to be look-outs when they need to change their pad.

'Sometimes I don't have privacy, I ask someone to accompany.' PH 7



Girls who had to use public toilets were worried about safety. One girl said that she wanted to have her own comfort room (bathroom) in order to be safe.

In the UK, privacy at home was taken for-granted, and it was only mentioned as an infringement in school when the toilet cubicles doors did not lock, allowing others to see in.

'the doors either don't lock or you can see through them' UK 4

The participants from both countries did complain about other users of the bathrooms leaving them in such a state that they were put off using them.

'Sometimes it (pad) is in the bowl or not properly disposed in the trash where you can still see the blood.' PH 2

'In high school the kids would mess around and throw all the soap around. It would make the bathrooms really gross so people tended to only ever use the bathrooms in emergencies.' UK 6

6.6 The Societal factors that influence menstrual health.

Societal norms provide a framework for participation in organisations such as school and work. Menstruators find that they are subject to a number of written and unwritten rules as they enter work or school spaces and engage in wider programmes.

6.6.1 Participation

Most of the participants said that menstruation made them feel weak and unable to do much physical activity. Some felt in pain. This made it difficult for them to participate in activities in school that involved moving around.

'menstruation weakens me making it hard to move.' -PH 4

'(I feel) Irritable because I can not move freely' PH 10

Girls in the Philippines got support from their teachers and friends and were able to sit out of physical activities or go to the rest room temporarily if they needed to, without drawing too much attention to themselves.



'(I can't) dance, run and other activities that require movements.' -PH 6

'Sometimes no because it is painful. I prefer to rest' -PH 2

but I am lazy to participate especially when it hurts in my abdomen. PH

8

Girls in the UK said that they wished that they were able to sit out of activities such as P.E. but this was not an option.

'I tend to feel very weak on the first few days and I can't sit straight for long' – UK 4

'You should be able to have accommodations eg. I can't do P.E. or I need a chair.' UK 2

Most of the girls took painkillers *'just in case'* to enable them to manage throughout the school day.

Those who were taking the contraceptive pill had noticed a marked reduction in the duration and intensity of their menstrual periods, which allowed them to move more easily.

'I can now I'm on the pill' -UK 2

'it helped to regulate my periods and have also made them shorter and less painful' UK 5

Participants found their concentration was affected by menstruation. It made them anxious about starting a period in school, and when it was expected, they kept checking to see if they were bleeding. Once a period had started, they were anxious about the possibility of leaking. This made it very difficult to give their full attention to their studies.

I am conscious of possible leak – PH 11

I worry about the blood showing...I used to bleed into my underwear all the time UK 2



Some of them felt moody and irritable which excluded them socially.

my face goes spotty and I feel like a slob because I can't be bothered to do anything when I'm in pain. Safe to say I don't feel 'sexy' or 'upbeat' on my period UK 3

My emotions are all over the place before and during my period so I really struggle with that, rather than the physical stuff. UK 4

6.6.2 Precept (rule regulating behaviour)

Participants in both countries found that there were unwritten rules about how to behave when menstruating. Some wanted to conform to the rules, but others wanted to push back against them.

6.6.2.1 Menstrual stigma – remaining secret

Participants in both countries said that they were expected to keep their menstrual status secret.

In the Philippines, there was some disagreement about whether it should be secret from family and close friends. One girl said *'it is my privacy. I do not need to tell anybody'*, but others said it was discussed with family and close friends. Girls were also able to speak teachers about menstruation if they needed to go home from school to change.

In the UK, the participants found that they were expected to keep silent on the subject, only using whispers and euphemisms to allude to it, and mostly pretending that it wasn't happening. Family and friends were not supportive. Girls found this very isolating.

'I normally call it 'female problems' because I am too embarrassed to say what it actually is too (sic) my parents./I say period to friends but always feel a little embarrassed for some reason' UK 6

'a girl I know did (leak) but we didn't say anything about it, we just looked at each other and then she just ran to sort it out and we never spoke of it' UK 6

'it isn't mentioned' UK 2



In juxtaposition, girls were aware of other girls having periods and gossiping in the loos or in P.E. changing rooms about them. Two girls in the UK said that they started their periods much later than the other girls, and they felt they had been bullied as a result.

'I had heard girls gossip about them during pe changing rooms and I knew I was late having it.' UK 6

'I didn't tell anyone that I hadn't started my period at 14 - it would have been deemed 'uncool' because I started so late' UK 3

'I got bullied because I hadn't had mine as I was late'. UK 6

6.6.2.2 Menstrual taboo - Hiding the evidence

All of the participants talked about the need to hide the menstrual materials and blood.

Girls in the Philippines were worried that the sight or smell of blood would reveal their menstrual status. They feared being teased, especially by boys or younger children. They wanted products that did not leak and that disguised the smell. If they did leak, they tried to cover up the evidence. Sometimes they relied on their friends to help them.

'I would hide it to avoid the teasing'-PH 11

'My friend helps me to hide it' PH 12

'They (friends) told me that there was leak and they borrow clothes for me'.PH5

In the Philippines, they said that men should not see menstrual blood. Some said that they covered up by wearing a long dress, or by wrapping a shirt around their waist to hide the stains. Some said that they wore black garments to avoid the stains being obvious.

Wear long dress when you have menstruation Ph 4

The girls in the FGC all said that they would be ashamed if they leaked through their clothes and others saw it, as that was breaching the menstrual etiquette.

'Ashamed, that would be the worst that could happen to a female adolescent' PH 4



The girls in the UK also feared leaking and revealing their menstrual status. They also wore dark clothes if possible or tied extra clothing around their waist in the event of a leak. Others spoke of using combinations of pads, tampons and extra liners to prevent a leak.

'I wore black trousers' UK 1

'panty liners stuck at the front and back...sleeping on a towel, changing often' UK 7

'A friend leaked, and I told them so they tied something to their waste (sic) and went to the toilet' UK 1

Nobody in the UK explicitly said that men or boys should not see blood, but one girl commented that her brother *'was grossed out by it'* UK 3. UK girls did fear men joking about it. One girl said *'it was awful when mine first started. My stepdad made fun of me and told everyone.'*

Leaking caused the girls in the UK to feel embarrassed, but they did not say they were 'ashamed' as in the Philippines.

'when I realised I left my lesson super embarrassed to go to the toilet'
PH 1

6.6.2.3 Carrying on regardless

As well as not talking about it and not mentioning it, some participants felt under pressure to carry on with their daily activities regardless. This was more pronounced in the UK than in the Philippines.

The participants in the Philippines found their teachers to be empathetic. Most of them said that they would go home straight away if they started menstruating at school. This was to find some absorbent or improvised material and to change their clothes. They would just tell the teacher and then leave.

'my teachers understand' it PH2

Sometimes girls stayed at home during their menstruation if the pain was too bad. They did not seem to worry about missing school and did not indicate that they would get into trouble.



One of the girls was negative about girls attending school in the first place, suggesting that there was no point in studying if one was going to get pregnant. However, this did not seem to be a commonly held view; a couple of others said that they did not agree.

'Women should not study because they will eventually get pregnant' Ph

11

In the UK, the participants would not be able to go home during the school day due to school absence policies. Most had learnt, following a menstrual accident, to carry products with them for such an emergency. They did not want to mention it to their teachers.

It would make my day hell but I didn't go home UK 3

'you can ask the head of year if you need to (get pads) but that would be so embarrassing so I would just borrow from friends if I didn't have anything.' -UK 4

Although some of the girls in the UK FGD admitted that they had taken time off school for menstruation, they could not give the reason as 'menstruation' itself. They mostly said they were 'ill'. The word 'period' or 'menstruation' was unmentionable.

'my friends and I would choose a new 'code word' for periods regularly. UK 8

The UK participants indicated that this inability to acknowledge menstruation publicly extended to school rules about bathroom use. A number complained about school policies that would not let them out of the classroom to use the bathroom during lessons.

'You weren't allowed to go to the bathroom which I think is totally ridiculous' UK 6

Some girls said that they had found that a way around this was to embarrass the teacher by just hinting at the unmentionable. The teacher would let them out of the classroom, against the school policy, to avoid an embarrassing situation.

'in school you weren't allowed to go during lessons but I always just said like a sarky comment about being on and teachers just let you go' UK 5



Participants in the UK also complained that their pain was normalised and largely disregarded by others.

'I got loads of pain before I went on the contraceptive pill and my mum made out it was normal' UK 2

6.6.3. Predicament

For many of the girls in the UK, feminism has inspired them to feel that they should not have to hide their menstrual status or take part in physical activities when they can't easily move, or apologise for being grumpy. When talking about menstruation in the abstract or about other people, many said that they feel anger over menstrual restrictions and stigma and want to call it out.

'When we got older (sort of 16/17 - around the time we really discovered feminism) we would make a specific effort to use the word period publicly, as we had decided as a group we weren't going to be embarrassed.' UK 8

I have lots of Indian friends, and in Indian culture there is a really odd combination of a periods being a taboo as well as a cause for celebration. Lots of my friends had events called half sari parties when they first started their periods to celebrate 'becoming a woman', with the sari symbolising womanhood. At the same time, women are considered impure while menstruating, and aren't allowed to visit the temple, something which angered my friends alot. UK 8

I'm quite confrontational so I just say 'period'! UK 3

At the same time, when speaking about their own experiences, most mentioned feeling embarrassed or uncomfortable to reveal their menstrual status publicly. This puts them in a predicament as to how to behave. Although they felt that they should be able to talk about it with anyone, they still felt uncomfortable discussing menstruation, particularly with boys and men.



I think the stigma and general idea that it is gross and should be taboo should be taken away, it's something we can't help, making it a subject that's uncomfortable to talk about makes it difficult UK 6

it's always uncomfortable talking about them, which I don't think it should be because it's just a normal part of being a woman. UK 5

This predicament extended to whether menstruation should be medicalised or not.

The participants discussed using medication to control the pain and regulate their periods. Those that did were in favour, as they felt it made their menstruation more manageable. One who didn't at the time of the FGD said *'I think I would consider it as it would probably make mine a lot more regular'* UK 6.

A couple of the girls were concerned about the fact that half of the population (men and boys) did not realise what the experience was like, and that taking painkillers constantly made other people think there was not a problem, perpetuating the stigma. One girl said that there needs to be more education, particularly *'boys being educated about periods too and realistic experiences, so they know how to better support women'*.

There was a difference of opinion, with one girl saying *'I think all those things are talked about a lot and taken seriously'* UK 5 and another retorting,

'I find it interesting that they are taken so seriously yet if I told 100 boys I have endometriosis at least 75 would say 'what's that?' UK 2

The reply, from a girl who admitted that she did not suffer too badly with her periods, was lengthy.

'I think, women have had periods for billions and billions of years and all of them have continued through. It's just something, and although they are terrible and painful and uncomfortable at times, they are something we have to deal with because we all have them and we can't stop them. We have them for most of our lives and so coping methods are things we will develop and realise through the years as to what works specifically for us.'



I think if you feel it is necessary for you to have time off school or work or not participate fully then it's enough to go see a doctor who could sign you off for the extra time off if and when needed as otherwise it will be hard to draw a line. We have a period once a month so 12 weeks a year so 1/4 of year and if women just stopped working or going to school or not doing what they should then it would have more of an impact on other areas by them not working or going to school. I guess, yes, if someone doesn't want to participate in pe then fine as its one week which isn't gonna affect them. It's just about drawing the line as we can't get special treatment for something that's natural and women have dealt with for so long and will continue to for years. I think periods are used as an excuse for a lot of things.' UK 5

6.7 Photovoice activity – a photograph of what menstruation means to me

There were different types of images submitted from the girls in the Philippines. Several girls submitted GIFs. One was of a person in bed with a pillow pulled over their head entitled 'current mood'. One was of a hammer, another of a drill. Another was a wellness collection of images to do with menstrual care; food (fish and vegetables), painkillers, shower, and a meditating Buddha image. One was a hand-drawing of something red that could not be identified.

Girls in the UK did not submit images. They said they preferred to discuss it.

Reproduced here with permission are photographs from Participant 2 in the Philippines





Figure 6.2 photographs from Participant 2 in the Philippines

6.7.1 Visual description

There are three images of the same adolescent girl dressed in shorts and T-shirt. In the first she is sitting on a tiled floor in the corner of a room. She has her legs drawn in towards her bottom with a pillow placed underneath her knees. Her head is bowed and touches her knees. Her arms are folded across her stomach.

In the second picture she has changed position. She has put the pillow on the floor and is resting her head on it. Her body is curled up in the foetal position, on her side with knees bent. Her arms are folded across her stomach.

In the third picture she has changed position again. She lies flat on the floor on her stomach. She rests her head on her right arm, which is on the pillow. Her left arm is tucked under her body. Her feet are off the ground.

6.7.2 Interpretation

The girl seems to be trying out different positions to rest which suggests that she is not comfortable and is using the pillow to try to get comfortable. Her arms across her abdomen suggest that she feels uncomfortable in this area.

6.7.3 Conclusion from Photovoice activity

Most of the images depict menstruation as having a negative impact on well-being. Dysmenorrhea may manifest in many ways. Those who sent in images of a hammer or drill may be alluding to acute pain. The photographs of the girl changing her position to get comfortable reference the constant dull ache of dysmenorrhea that some girls experience. Notable in the collection of necessary items to do with menstrual care were painkillers.



The GIF of a girl in bed hiding under a pillow with the words 'current mood' suggests that menstruation has negative psychological effects as well.

6.8 Summary of Thematic Analysis

In this section, the themes that emerged from higher-order coding of the qualitative transcripts are summarised. This is to address research objective 1b in detail.

The research objective was:

- 1b) To explore the menstrual experiences and practices of menstruators aged 16-19 years old

The socio-ecological model was used to group the emergent themes. At the individual level, they were preparedness, puberty and pain; at the personal level, pointers, practice vs theory and problems; at the interpersonal level, performance, primary school and preterition; at the environmental level, products, pandemic and privacy, and at the societal level, participation, precepts, predicament.

6.8.1 Individual

Lack of awareness about menarche and menstruation meant that some participants were taken by surprise at menarche and others did not really know how to manage themselves, physically and emotionally, during their menstruation. Girls in the Philippines were more aware of the effects of menstruation and girls in the UK were more aware of the causes of menstruation.

Pain was mentioned frequently and impacted upon the participants sense of well-being. Girls in both countries sought out low-tech solutions to manage the pain.

6.8.2 Personal

Although girls got their initial menstrual knowledge from their mothers, their experience wasn't necessarily as expected. Some participants plugged the gap by seeking out further knowledge from friends or the internet. In some cases, it was used it as a springboard to increase their knowledge for self-advocacy to the medical profession. Pain and how to deal with it effectively was a recurrent theme.



6.8.3 Interpersonal

In both countries, early knowledge about menarche and menstruation was gained from within the family, usually the mother. This led to the perpetuation of inaccuracies or myths, and the omission of some truths. Teachers and Health Professionals were expected to be more objective and thorough in their explanations, however, there was no timely or consistent messaging from these actors about menstruation.

6.8.4 Environmental

Participants wanted products that were reliable at preventing leaks. They prioritised good quality products and privacy over WASH services. They complained about public bathrooms being misused by other people making them unpleasant, unhygienic and unsafe spaces.

6.8.5 Societal

Some participants found that menstruation limited their mobility and their concentration, making it difficult to participate fully in school and the wider society. The menstrual stigma prevented them from speaking about it. Girls in the UK expressed confusion and some anger at the fact that they were expected to carry on regardless, and the only way they could do that was to self-medicate.

6.8.6 Summary of chapter

The menstrual experiences of the participants have been captured in focus group discussions. A Photovoice activity was used to augment the interpretation. The transcripts were analysed using the socio-ecological framework. The factors identified as having an impact on Menstrual Health were mapped to the framework (see figure 6.3). Most of the factors discussed had a negative impact on menstrual health, with very few examples mentioned of good practice. Lack of knowledge, pain and menstrual stigma were the main ones. Girls felt let down by their immediate family, schoolteachers, health care professionals and ultimately societal policies. Some of the themes are inter-related and are antecedents or enablers of each other. This is explored further in the Thematic Synthesis.



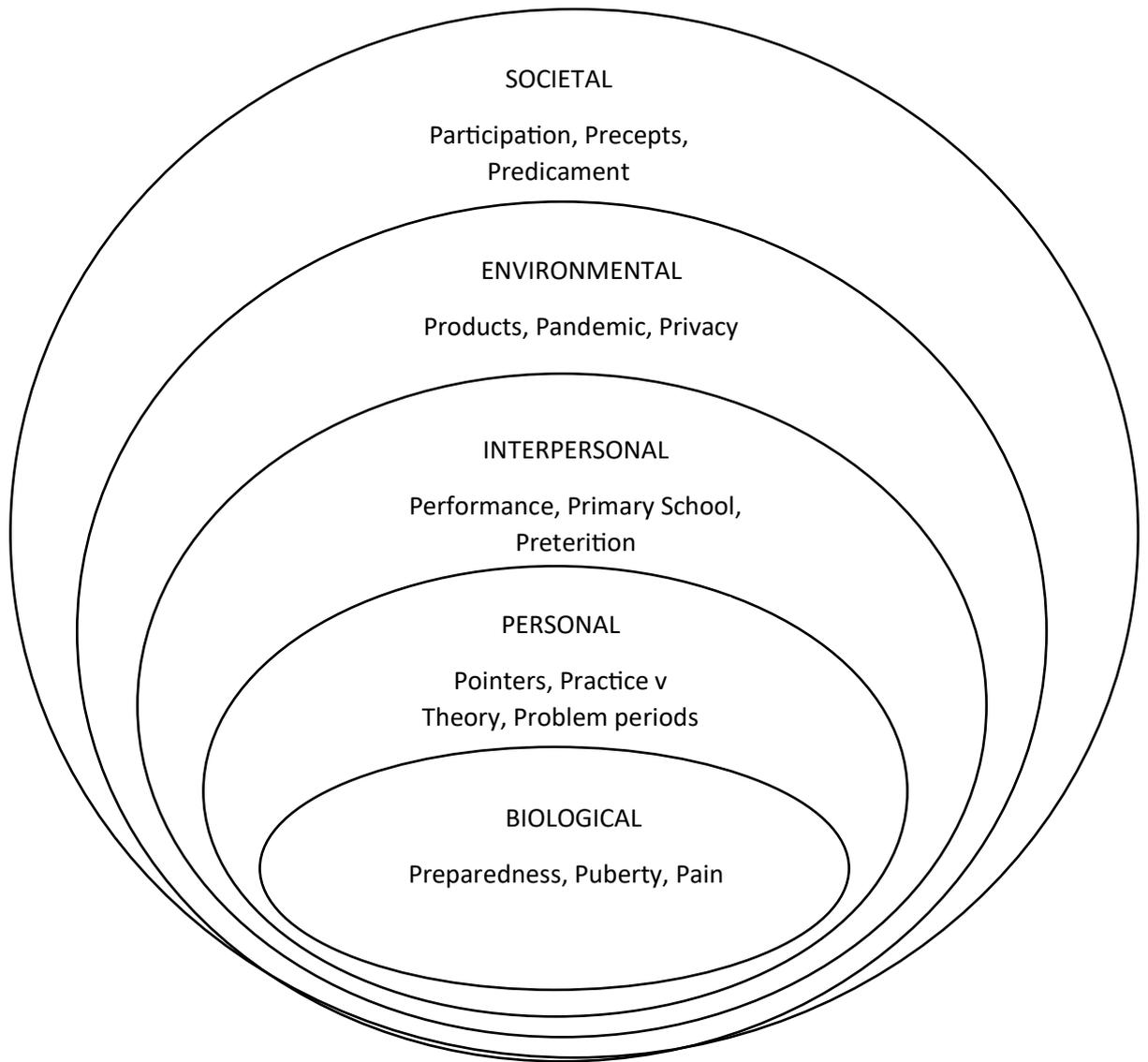


Figure 6.3 the emergent themes mapped to the socio-ecological model



Chapter 7 Thematic Synthesis and Discussion

7.0 A brief summary of results and analysis

This chapter brings together all of the learning from the quantitative survey, the qualitative focus groups, the photovoice activity and the systematic review. It draws out the key themes that develop a theory of change and augment the logic model further.

7.0.1 Summary of quantitative and qualitative results

In both the Philippines and in the UK, girls found menstruation surprising, difficult, painful and something that had a negative impact on their self-confidence. Girls were inadequately prepared. Although menstrual literacy was correlated with a better menstrual experience, it did not mitigate against a lack of products, facilities or the pervading stigma. In some cases, it made girls more aware of what they didn't know, and more anxious.

7.0.2 Summary of thematic analysis

The socio-ecological model was used to group the emergent themes. At the individual level, they were preparedness, puberty and pain; at the personal level, pointers, practice vs theory and problems; at the interpersonal level, performance, primary school and preterition; at the environmental level, products, pandemic and privacy, and at the societal level, participation, precepts and predicament.

In the Philippines, girls were more accepting of the limits of menstruation as the price paid for being a woman. In the UK, girls were confused as to whether to give in to their bodily limitations during menstruation or to pretend they didn't exist in the fight for gender equality.

7.0.3 Summary of Photovoice

The photovoice activity collected visual images of what menstruation meant to girls in the Philippines. Photographs of girls trying to get comfortable, and GIFs of hammers and drills were suggestive of the dominance of pain in the menstrual experience.

7.0.4 Summary of systematic review



A systematic review of Educational Interventions to improve Menstrual Health was undertaken. All 24 eligible studies reported a positive outcome; that there was an improvement in Menstrual Knowledge, Attitude or Practice. The meta-analysis on a sub-set of studies that measured an improvement in menstrual knowledge found that the effect size was greater with the more interactive interventions. Peer-education that facilitated discussion was as effective as that delivered by professionals. This was also true of practice; those interventions that targeted skill acquisition with hands on demonstrations were very successful. Only five studies reported on menstrual attitude. In four it had improved and in the fifth, anxiety had been reduced.

The review proposed a logic model which provided a framework for thinking about the antecedents of Menstrual Health.

7.1 Synthesis

7.1.1 The further development of the Logic Model

A grounded theory approach has been used to bring together the different types of data, apply an iterative approach to analysis, and generate new theory (Glaser, 1978; Barnett-Page and Thomas, 2009). This led to the a new understanding of how menstrual Knowledge, Attitude and Perceptions is acquired and a refinement of the logic model in which a theory of change to achieve menstrual literacy was constructed (Hennegan, Kibira, *et al.*, 2020).

This work was conceived within a human rights framework, that recognised the right of all people to dignity, privacy, hygiene, health and productivity. These principles guided the quantitative work. In this study, access to Water, Sanitation and Hygiene products and facilities have been confirmed to be a fundamental requirement for women and girls to physically capture menstrual blood and dispose of it properly.

The socio-ecological model was used to frame the qualitative work. The socio-ecological model places the individual at the centre of their world and describes the different actors that the individual interacts with and is influenced by. The model arranges these different levels of interaction in order of proximity to the individual through family, environment and society and suggests that these interactions define the individual's world view. The



thematic analysis took a phenomenological stance and identified several factors that influenced how girls thought about and dealt with their menstruation (Starks and Trinidad, 2007)

The logic model was constructed based on a systematic review of the literature and refined using the emerging quantitative and qualitative results. It started with the desired outcome, menstrual health, and worked backwards using causal logic to propose how it could be achieved. The initial model proposed three distinct levels or steps that needed to be climbed; proximal, intermediate and distal. The Proximal was Hygienic and Comfortable Menstruation, the Intermediate was Participation (not restricted by menstruation) and the Distal was Menstrual Health and Well-being. The quantitative results were used to develop a theory of change which resulted in a sub-proximal level (menstrual KAP) being added to the pyramid. The qualitative results were used to identify the themes or phenomenon that had significance to the girls in their experience of menstruation, and were used to flesh out the descriptors of each level and identify facilitators and barriers to moving up. This resulted in a macro-distal level (of cultural norms and national policies) being added to the top of the pyramid.

It had been assumed that the Proximal level of the pyramid, 'Hygienic and Comfortable Menstruation', would be achieved by the provision of simple resources; pads, water, hot-water bottles for example. Girls who had these resources would be able to manage their menstruation by using clean and dry materials to absorb the blood. Comfort could be achieved through changing materials when necessary, resting or using targeted heat therapy. However, this work has revealed the complexity involved in being able to access and use resources and has shown the importance of Menstrual KAP in achieving this.

A key theme regarding menstrual KAP was **Preterition**. Girls felt that they had been let down by parents, teachers and the medical profession, because they were ill-prepared for menstruation. They were all taken by surprise at menarche and were reliant on others to provide them with suitable and sufficient products. They did not know how to use them competently and they might have had to abandon their daily activities to deal with issues such as leaking and staining. Some were anxious about what was normal. Many of the girls felt that they did not have sufficient menstrual KAP prior to puberty to prevent menarche being traumatic.



Despite this, experience was an effective teacher and was associated with an increase in menstrual KAP. As they knew what to expect, they were more able to get prepared for the next time.

Menstrual KAP, therefore, underpins the proximal level of the pyramid. It is envisaged as a positive feedback cycle in which the more menstrual KAP leads to a better understanding of menstrual knowledge needs, leading to knowledge-seeking behaviour leading to more menstrual KAP. The sub-proximal menstrual KAP gets consolidated over time. This is the new theory that has emerged in this work.

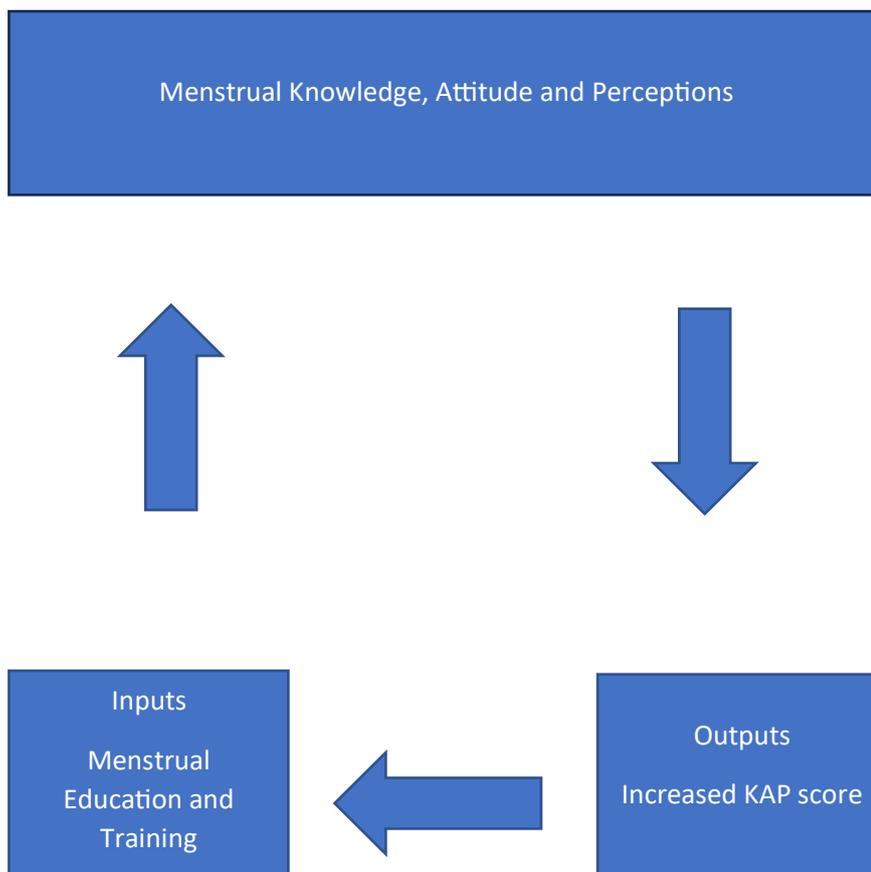


Figure 7.1 The positive feedback loop, derived from grounded theory



At the proximal level, if girls are better prepared, have access to suitable and sufficient products, and access to WASH facilities, they should be able to manage their menstruation such that they can at least attend school. But the results of the qualitative research additionally reveal that **painkillers** should be included in the list of products that girls find necessary and the facility that they most desire is the one that gives them **privacy**.

At the intermediate level, girls need to be able to manage their menstruation in such a way as to maintain their mobility and **participate** in normal activities. A theme that came out of this synthesis was that menstruation knocked girls' confidence. They felt anxious about their ability to manage their menstruation without leaks and smells, and they feared their spotty face or inability to run would make them the butt of teasing. **Menstrual confidence** was required to participate in normal activities.

At the distal level, girls want to feel in control of their menstruation, rather than it be in control of them. A key theme to emerge is that girls need to feel **empowered** and secure enough to question the menstrual **precepts** they face and challenge those that aren't in their best interests. They want to have agency to work with their menstrual cycle, so that they can achieve their full potential at school and in the wider world. They want product choice, pain management options (including rest) and to engage with health services for menstrual disorders.

A Macro-distal level can be added which is beyond self and represents the community or society or national level. Menstruators can achieve their represents a gender-equal society in which menstruators are supported to achieve their potential without restriction or discrimination because of menstruation. This would require menstrual justice policy changes to be implemented.

7.1.2 Conclusion

In conclusion, girls in the Philippines and in the UK were at different levels on the pyramid. Most of the girls in the Philippines focus group were at the proximal stage of actively managing their menstrual hygiene and comfort in a way which allows them to participate in school. They would like better products, privacy and pain relief. Girls in the UK were higher up the pyramid. They have products, privacy and pain relief and are able to participate in school with fewer restrictions. However, they struggled to have agency. Product options, pain management options and health service options were apparently



available to them, yet they found it difficult to get their pain or their anxiety taken seriously. They were cognizant of unwritten rules or precepts that required them to conceal their menstruation from others and they did not have sufficient confidence to challenge that.

The internal conflict that existed between acceptance of the precepts and resistance to them manifested itself slightly differently in the two countries.

For example, in both countries, girls suffered from great anxiety that a leak would reveal their menstrual status. But it was also because they did not want to look like they did not have control over their body. In the Philippines there was a sense of letting others down; in the UK it was more a sense of letting themselves down.

Girls in the UK felt more negative about menstruation than in the Philippines. It could be that the UK girls felt the predicament more keenly as they had been exposed to feminism from an early age and were further up the pyramid to gender equality as proposed by the logic model. They found that there was a big responsibility on their shoulders, to manage their menstruation, and to participate in activities fully, and to take painkillers and to engage with health services and to make it look easy, without offending others by mentioning menstruation (Hennegan, Kibira, *et al.*, 2020). The girls were less accepting of societal precepts but not quite empowered enough to shrug them off altogether and felt very torn. For some, the goal of claiming their equal rights in society seemed too much like hard work and reserved for the very few.



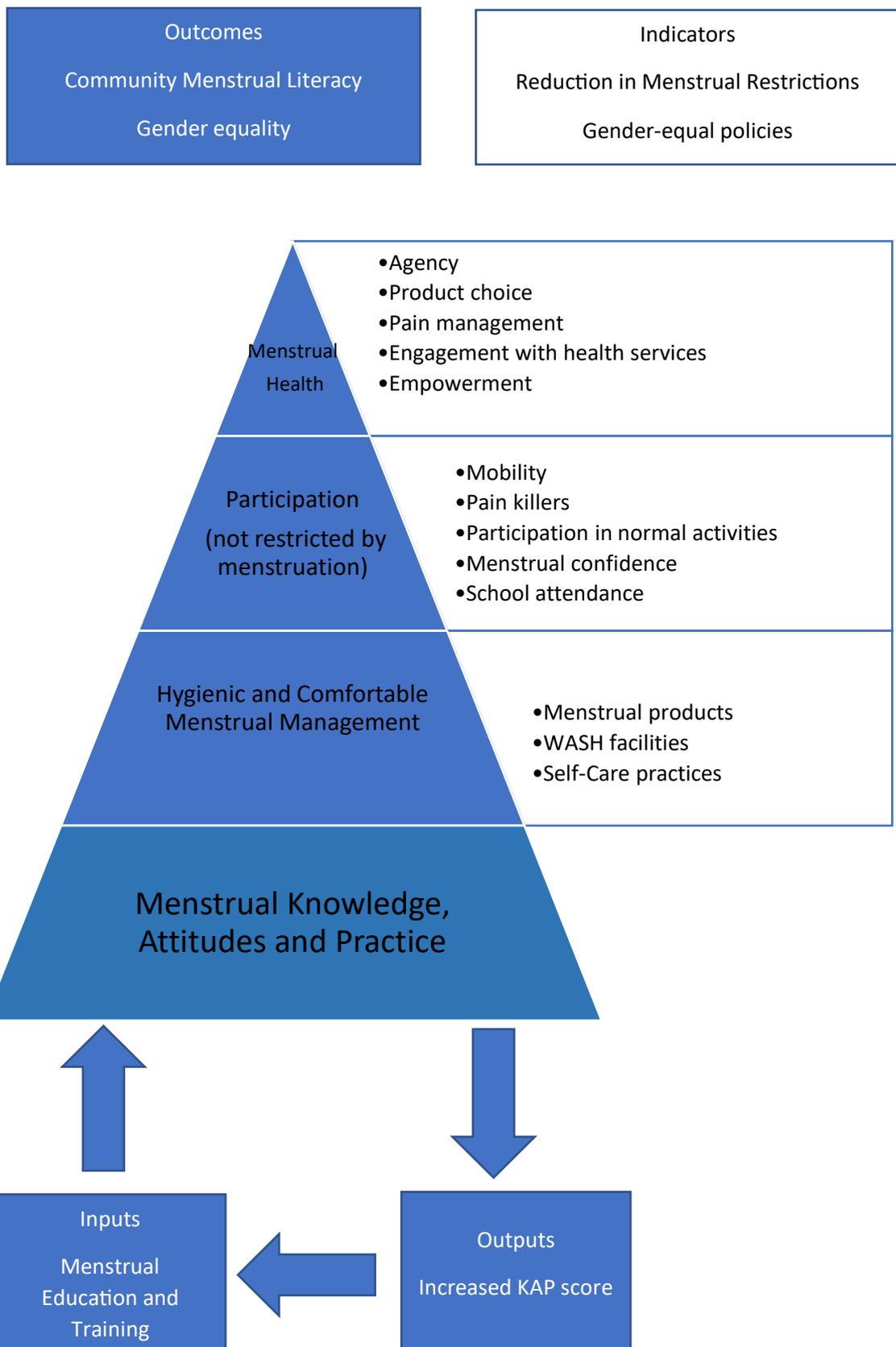


Figure 7.2 The Logic Model: Proximal, intermediate and distal outcomes and indicators of a menstrual health intervention, with inputs and outputs.



7.2 Discussion

The key themes of the synthesis were Preterition, Pain, Products, Privacy, Participation and Precepts, and they are discussed in the wider context here.

7.2.1 Preterition

This study confirms previous research that found knowledge of menstruation prior to menarche is incomplete and patchy (Chandra-Mouli and Patel, 2017). Some girls were not aware of it at all until it happened to them. It is important for girls to be prepared for menarche, the experience of which lasts long in the memory and can influence subsequent attitudes to menstruation (Marvan and Chrisler, 2018; Rizkia, Setyowati and Ungsianik, 2019; Setyowati, Rizkia and Ungsianik, 2019). Beyond menarche, understanding the menstrual cycle allows the mental preparation required for the next menstrual period, which may require obtaining products or postponing certain activities (Larson *et al.*, 2021). Girls also need knowledge about menstrual disorders and psycho-social effects, so that they can practise effective self-care or seek help if necessary (Hennegan and Montgomery, 2016). Knowledge should not be limited to solving technical and hygiene problems (McCarthy and Lahiri-Dutt, 2020). Nascent research in menstrual tracking through smart watches and apps has led to the realisation that sports performance may indeed be optimised through training tailored to the menstrual cycle which points the way to using menstrual knowledge more positively (Wardle *et al.*, 2021; Bruinvels, Hackney and Pedlar, 2022).

There is confusion as to whose responsibility it is to teach children about menstruation. It is often assumed to be mothers who discuss intimate issues with their daughters (DeMaria *et al.*, 2020) but mothers may not have the knowledge themselves (Valizadeh *et al.*, 2017) or may not have the time, particularly if they are working (Borjigen *et al.*, 2019). Schools are ideally placed to instruct children, but lessons about menstruation seem to be reserved for those who opt to study biology in high school, and do not come early enough in a child's education to be of any practical use to new menstruators. Children may have access to books or information online but these usually confine their information to the biological process. A girl in this study complained that the book 'left out the fact that it hurts'. There is more psycho-social information on social media but there is also a high prevalence of



misinformation and users may find it difficult to know what to trust (Suarez-Lledo and Alvarez-Galvez, 2021).

Menstruation is rarely mentioned in public and when it is, euphemisms are used, both by public entities (for example, the menstrual product aisle in supermarkets is often labelled 'Feminine Hygiene') and individuals (for example, the word 'blob' or 'code red' in conversation (Barney, 2019). Adverts for menstrual products are covert and use blue liquid instead of red blood and girls are shown fresh white clothing and smiling happily. They provide a very sanitised version of menstruation (Agnew and Sandretto, 2016). Girls are confused when they discover a disjunction between the expectation and the bodily experience (Przybylo and Fahs, 2020).

The paucity of menstrual education has been recognised by several authors (Coast, Lattof and Strong, 2019; Crockett *et al.*, 2019; Evans *et al.*, 2022). It may reflect a reluctance on the part of policymakers to mandate on a topic that usually falls under the heading of sex education. Sex education, both the content and the person delivering it, continues to provoke religious and political debate across the globe (Khubchandani, Clark and Kumar, 2014). Even in a relatively progressive country like the UK, the most recent guidance still gives parents the legal right to withdraw their children from sex education classes (Sex Education Forum, 2017). Menstrual education isn't sex education, however and carries no moral imperative. As one of the girls in this study said, 'its not as if we have a choice'. Girls clearly felt let down by adults who hadn't prepared them sufficiently for menstruation, an act of preterition.

7.2.2 Provisions

'Provisions' has been used to group the resources one needs for menstruation. In low-resource settings they may be in short-supply.

Since Menstrual Hygiene Management was recognised as a significant challenge for girls in LMIC settings (House, Mahon and Cavill, 2013), several studies have demonstrated the link between poverty and MHM. Funds are required to purchase menstrual products (even reusable ones) and poverty limits the quantity and quality one can buy (Hennegan *et al.*, 2019; Sebert Kuhlmann *et al.*, 2019) This study confirms that in the Philippines, there is a relationship between poverty and the menstrual experience.



It also sheds some light on 'period poverty' as a phenomenon which has appeared in high income countries in the last few years. Regression analysis reveals that 'perceived income' is a predictor of menstrual experience in the UK. School girls in the UK do not have an income to purchase products. They are dependent upon parents, guardians or charities to provide for them, and it is likely that they perceive themselves to suffer from period poverty.

In 2021, campaigners persuaded the UK government to abolish tax on period products, and a resolution was passed to provide free sanitary products to schools (Treasury, 2021). The success of this initiative has yet to be evaluated, but similar schemes have been inconsistent and not produced the step change needed (Plesons *et al.*, 2021). The evidence from this research suggests that period poverty is not just about products, it is more nuanced; it extends to not being able to use products of choice, of them not being available at the point-of use (school toilets) and of having to overcome a social stigma to ask for them in the first place. Some girls would rather go without than face the shame. In the USA, the act of having to ask others for products has been shown to have negative consequences for mental health (Cardoso *et al.*, 2021). This work substantiates the link between period poverty and menstrual health (Hennegan, 2019).

Findings also confirmed a self-evident truth that girls need access to facilities that include water for washing, soap for hygiene and a place for disposal in order to manage their menstruation hygienically. The link was formalised in the literature in 2016 by a study which found that the presence (or absence) of WASH facilities could be used as proxies for MHM (Loughnan *et al.*, 2016).

The girls in this study revealed that the thing they want most from a bathroom is privacy. Girls in the UK were more worried about the cubicle doors not locking than they were about the state of the toilets themselves (which were not good). In the Philippines, where there were no doors, or even cubicles, girls shielded each other from the eyes of onlookers as they changed. These girls constructed their own privacy. Privacy does not necessarily mean an enclosed physical space (McCarthy and Lahiri-Dutt, 2020). That being said, space has been shown to be an epidemiological variable that can be in short supply, for example, in slums.

Girls also said that they want a space to rest (Schmitt *et al.*, 2021). Menstrual pain affects girls physically and mentally and they need a space to manage it, possibly by adopting a comfortable position, such as a curled up foetal position, or maybe stretching out in a yoga



pose, or meditating (Ussher and Perz, 2006; Kennedy *et al.*, 2014; Borjigen *et al.*, 2019). Schools used to have school nurses and sick rooms but they have disappeared from many schools, particularly in high income countries in which the pressure to achieve is great, and time out of the classroom is to be discouraged (Parker, 2021). McCarthy A and Lahiri-Dutt (2020) suggest that wanting to rest when menstruating is not lazy but energy-saving (McCarthy and Lahiri-Dutt, 2020). Girls found it difficult to ask to leave the classroom, even temporarily to relieve themselves in the bathroom. Some schools have hard-line policies on taking bathroom breaks in lessons, and some girls feel judged if they do not comply to the social norm (Hebert-Beirne *et al.*, 2021). When they are trying to manage bleeding and discomfort, this can increase girls' anxiety (Hennegan and Sol, 2020). Some studies have found that menstrual pain contributes to inattentiveness (Aziato, Dedey and Clegg-Lampsey, 2014). Lack of concentration was shown to have a considerable effect on school productivity (Schoep *et al.*, 2019) and it is logical to assume that this has an effect on girl's achievement, but it is difficult to get quantitative data on this (Hennegan and Montgomery, 2016).

One study has challenged the use of the umbrella term 'low-resource settings' and suggested that it could be expanded into nine themes: financial pressure, suboptimal healthcare service delivery, underdeveloped infrastructure, paucity of knowledge, research challenges and considerations, restricted social resources, geographical and environmental factors, human resource limitations and the influence of beliefs and practices (Van Zyl *et al.*, 2021). This work confirms that low-resource settings can be found in both High Income Countries and Low-and-middle-income countries.

7.2.3 Pain

One of the most striking things about this study was the prevalence of menstrual pain. Nearly all of the girls suffered from primary dysmenorrhea that affected them physically. Pain was mostly in the abdomen, pelvic area, back and legs. Half of the girls mentioned symptoms of secondary dysmenorrhea, ranging from heavy bleeding to fainting to endometriosis. The visual analogue scale for pain has been used in some studies; in a cross-sectional study in Chandigarh, India, it showed that 90.34% of girls had pain during menstruation (Rani, Sharma and Singh, 2016). Other studies that report on menstrual pain have also found a high prevalence in adolescent girls (Hoppenbrouwers *et al.*, 2016; Hennegan, OlaOlorun, *et al.*, 2021). Pain is subjective and it was not quantified in this



study, but girls spoke of its impacts, at times curtailing their mobility and interfering with their concentration. The extent to which daily activities were affected depended upon the level and duration of the pain, their ability to manage it (requiring knowledge and resources) and the support of others.

The oft-cited figure of endometriosis prevalence being 1 in 10 is unsubstantiated. A recent systematic review found that the prevalence ranges from 1 – 5% (Sarria-Santamera *et al.*, 2021) but the authors recognise that this is likely to be an underestimate. This is particularly true of women and girls in LMIC who have restricted access to healthcare and will not have been able to obtain a clinical diagnosis. It is probably under-reported in HIC too, due to it being under-recognized (Jain *et al.*, 2022).

Globally, girls do not know what is normal, or not, and when to seek help, because the topic is so rarely spoken about. One in three women experience heavy bleeding at some point. It is often associated with pain (Jain *et al.*, 2022). Girls struggle to get their pain taken seriously by others, such as teachers and healthcare professionals, and even their mothers (Schmitt *et al.*, 2021). Menstrual pain reduces with the length of time post-menarche (Hoppenbrouwers *et al.*, 2016) and does not affect adult women as much as adolescent girls. There is some anecdotal evidence that mothers, who themselves learnt to cope, think that it is just a stage that their daughters have to put up with. The same has been said of successful career women; they can be dismissive of menstrual pain as it didn't stop them achieving. Menstrual pain has been normalised (Schmitt *et al.*, 2021).

In this study, girls in the UK had to carry out their own research into the cause of their symptoms and be persistent in seeking a diagnosis and medical assistance. Diagnosis has been hampered by there not being a clear definition of menstrual disorders. The International Federation of Gynaecology and Obstetrics (FIGO) Menstrual Disorders Committee (MDC) has recently characterised normal menstruation with a biomedical definition. For example, normally menstruation occurs every 24-38 days, lasts less than 8 days and has a cycle variation of less than 7-9 days (Jain *et al.*, 2022). This definition is only really of use in a clinical setting or research. It does not help young menstruators who can have very irregular periods anyway (Hoppenbrouwers *et al.*, 2016) and mostly present with subjective symptoms such as heavy menstrual bleeding and pain. In 2018 The National Institute for Health Care Excellence (NICE) issued a definition of Heavy Menstrual Bleeding as “excessive menstrual blood loss which interferes with a woman’s physical, social,



emotional and/or material quality of life” (National Institute for Health and Care Excellence, 2018) which acknowledges the impact on daily life. Whilst this has gone some way to speeding up diagnoses in doctors’ surgeries, it has yet to filter down to the rest of society, particularly those responsible for girls at home and at school.

In this study, pain management was governed by access to healthcare. Most girls in the UK had access to analgesics without a prescription, and took them regularly whilst menstruating, including prophylactically. Being pain free allowed their bodies and their minds to get on with daily living. Use of analgesics had the added advantage of helping them to conceal their menstruation (Larson *et al.*, 2021). Girls suffer the double burden of pain and the need to conceal it (Hennegan *et al.*, 2019).

NGOS working in LMIC have called for analgesics to be made available to schoolgirls in LMIC. There have been a limited number of trials and the results on feasibility and acceptability have been mixed. Certain cultures remain suspicious of pharmaceutical interventions (Hennegan *et al.*, 2019; Kansiime *et al.*, 2020). A Uganda study uncovered a rumour that painkillers could interfere with fertility (Kansiime *et al.*, 2020). In China there is a belief that Western medicine disrupts the yin and yang balance (Lui, So and Fong, 2008). In some countries, such as India, there has been a decline in trust in the medical profession and its medicines since the Covid-19 pandemic (Kane and Calnan, 2017).

Even in HIC with confidence in pharmaceutical interventions, there is a question of liability when it comes to the taking of medication in school. Teachers are not qualified health professionals to issue medication and schools lack guidance on how to make it available to those who need it. This has resulted in many schools taking the safest legal option and banning all drugs, legal and illegal, prescription and non-prescription from school premises (Schmitt *et al.*, 2021). Girls resort to taking analgesics from home and hiding them from authorities when they take them, which creates the impression that they are breaking the rules and adds to their impression that their pain isn’t validated.

A few of the girls in the UK focus group had been prescribed the contraceptive pill by their doctor and had realised the additional benefits it gave in reducing the volume and duration of menstrual bleeding and the need for analgesics. This encouraged other non-users in the focus group to consider the pill for menstrual suppression. Doctors, however, warn that menstrual suppression is not a universal panacea, possibly masking underlying health



problems (Jain *et al.*, 2022) and should be only be considered within the context of a menstrual health consultation.

Girls in the Philippines had limited access to analgesics or contraception and were more likely to use traditional symptomatic relief such as diet selection and rest. These self-care strategies were similar to those found in other LMIC countries (Rani, Sharma and Singh, 2016; Wall *et al.*, 2016; Wong, Ip and Lam, 2016). In the UK there was limited knowledge about non-pharmaceutical symptom management, except heat therapy, and the girls exhibited limited engagement with self-care practices. A study from the USA found that self-care remedies and practices were not feasible to use during the school day (Schmitt *et al.*, 2021). There was an internal concern that it would draw attention to their menstrual status and an external concern that time out of the classroom would have a negative effect on attainment.

Menstruating schoolgirls find themselves in a difficult position because they require permission from mothers or teachers to take time out to manage their pain. Particularly in HIC where academic achievement is prized, time out of the classroom is discouraged. Break times are often too short to change menstrual absorbents (Sivakami *et al.*, 2019). This makes medical interventions that suppress the bleeding and the pain highly desirable. However, there are a range of pain management options, not all pharmacological, and girls do not seem to be utilising them efficiently (Armour *et al.*, 2019).

7.2.4 Participation

In this study, the type of menstrual product used, the level of pain experienced and the emotional response to menstruation affected whether girls were able to participate in school. This concurs with research carried out in Sub-Saharan Africa (Jewitt and Ryley, 2014) and despite the intervening years, and some new innovations, particularly in products (Hennegan and Montgomery, 2016; Penelope A Phillips-Howard *et al.*, 2016; Van Eijk *et al.*, 2018) it continues to be a significant barrier to girls' education today (Sivakami *et al.*, 2019; McCammon *et al.*, 2020; Schmitt *et al.*, 2021).

Products that were bulky, such as cloth *pasadoras* in the Philippines, made it difficult to move easily, and girls moved cautiously to avoid them shifting or falling. This caused practical restrictions (Jewitt and Ryley, 2014). They may hold themselves cautiously, sitting in such a way or walking carefully so as to avoid a leak (Mason *et al.*, 2013). Some studies



even noted a reluctance for girls to stand in class to answer a question, which is common practice in some countries (Hennegan *et al.*, 2016). By necessity, girls withdrew from more vigorous activities.

As discussed above, menstrual pain is a barrier to participation, and menstrual pain has been cited as the cause of school absenteeism by several authors (Jewitt and Ryley, 2014; Rani, Sharma and Singh, 2016; Azagew, Kassie and Walle, 2020; Kansime *et al.*, 2020).

In this study, girls said that abdominal cramps were debilitating and impacted their ability to move around, making participation in Physical Education (P.E.) lessons and sports challenging. Other studies have described how backache prevented girls from sitting for too long, and bloating made them feel very uncomfortable in their uniforms (Rubinsky, Gunning and Cooke-Jackson, 2020). Menstrual pain is an almost universal experience, but there is a dearth of literature on its intensity and duration, making the experience difficult to quantify and generalise.

Cultural attitudes appear to be important in determining a girls' response to pain. In India girls are 'trained from early childhood to endure pain and discomfort' (Rani, Sharma and Singh, 2016). A study from Kenya found girls say they are 'sick' and stay in the sick room for three days (Jewitt and Ryley, 2014). In the Philippines, girls went home from school to rest. An Australian study found a normalisation of pain and a pressure not to be 'dramatic' (Seear, 2009). In the US, girls did not feel believed and wanted 'validation' of their menstrual pain (Rubinsky, Gunning and Cooke-Jackson, 2020). As shown by a participant in this study from the UK, amongst those who don't menstruate, or don't suffer menstrual pain, there is a suspicion that menstrual pain is exaggerated by the work-shy.

Presenteeism was found to be as much a problem as absenteeism in an article about productivity-loss due to menstruation-related symptoms (Schoep *et al.*, 2019). This study was conducted in the Netherlands, where 80.7% of women and girls reported presenteeism, with a loss of productivity of 8.9 days per year. The reasons women gave for being present rather than absent were not wanting to tell their employer the reason and a fear of the consequences. Being present does not mean that women can be productive or that schoolgirls can achieve their potential. It is well known that iron deficiency anaemia is highly prevalent in menstruating girls and causes them to be physically tired (Jain *et al.*, 2022) so compromising their learning. Being in pain effects their ability to concentrate



(Sivakami *et al.*, 2019) and other physical effects such as acne breakouts make them self-conscious. This can manifest as a disengagement with school activities.

The emotional menstrual-related symptoms might also be a reason for disengagement. Menstruation can cause emotional distress, either as a direct result of hormone fluctuations per se or as a result of a heightened level of anxiety around the experience (Ussher and Perz, 2006; Seear, 2009). Puberty has been described as a 'crisis' for adolescents (Mokari, Khaleghparast and Samani, 2016) and girls in particular. Hormonal changes have been blamed for moodiness and depression (Ussher and Perz, 2020) and a cause of social withdrawal. Much of the anxiety comes from the anticipation of menstruation itself, especially a fear of leaking and revealing one's menstrual status (Mason *et al.*, 2013). In China, a study found that girls thought it was better not to menstruate because of the psychological stress it caused (Altangarvdi *et al.*, 2019).

In some societies, restrictions to mobility were imposed upon menstruators (McCammon *et al.*, 2020). A study from Nepal found that 21.1% of participants were not allowed to attend school or work whilst menstruating, 38.4% did not enter the kitchen and 41.4% did not visit relatives and 39.1% did not attend social gatherings (Mukherjee *et al.*, 2020). Similarly extensive restrictions were found in a study in India that were associated with the Hindu religion (Van Eijk *et al.*, 2016). In this study, participants in the Philippines said that they were culturally restricted from taking a bath during their menstruation, which could mean a reluctance to get sweaty. Although there were less cultural and religious restrictions mentioned in HIC, studies in the USA found evidence of parents holding old-fashioned views that menstruation itself is an illness and that girls should not take part in physical activities (Schmitt *et al.*, 2021).

7.2.5 Precepts

There are unwritten societal rules about how girls should deal with menstruation. The menstrual taboo requires that all evidence of menstruation should be hidden (Sommer *et al.*, 2020). The menstrual stigma means that the topic is not openly discussed, and occasionally girls needed to use code words and euphemisms to refer to the subject discreetly (Plesons *et al.*, 2021).

Girls have to actively manage their menstruation, by being prepared with products, and regularly checking themselves for signs of a leak. A leak represents a failure to manage the



bodily functions, as dictated by societal norms, and the girl can be blamed for affronting the sensibilities of others (Bobel, 2019; Brewis *et al.*, 2019). This failure can cause girls much shame (Sommer, Hirsch, *et al.*, 2015; Duby *et al.*, 2019; Hennegan *et al.*, 2019) which is an impediment to girls' self-esteem and confidence (Chandra-Mouli and Patel, 2017).

The menstrual stigma is still a large barrier to girls being able to get on with life as menstruators. In most countries, social norms require girls to conceal all aspects of their menstruation, not just the blood (Seear, 2009; Larson *et al.*, 2021). Girls hide pads or tampons about their person if they leave the classroom to change their menstrual absorbent, and they may have to overcome their social anxiety to ask permission to go to the bathroom (Hennegan and Sol, 2020). This puts an enormous strain on menstruating girls. In the UK, girls felt an additional pressure to 'sort themselves out' with painkillers to be able to stay in the classroom, avoiding having to mention it and embarrassing friends and teachers, as well as themselves (Lahme, Stern and Cooper, 2018). Some have gone so far as to request the contraceptive pill to make their menstruation lighter and more manageable.

7.2.6 Predicament

In this study, girls in the UK had encountered feminist teaching which presented them with several paradoxes, and which they found confusing. If half the population menstruate, why was it hidden? If menstruation was normal, why was it painful? Should we listen and respond to our bodies' needs, instead of trying to deny them and medicalise them as problematic? If menstrual blood was natural, why was it seen as polluting? If women were respected for procreation, why did a menstrual accident elicit disgust? If periods are a part of being a woman, why are we trying to suppress them? (McCarthy and Lahiri-Dutt, 2020).

New technologies offered women and girls better management options. Pads with wings to prevent leaks. Tampons worn internally to go swimming. Menstrual cups last all day, removing the need to leave the classroom to change. Analgesics dull pain, allowing one to concentrate. Contraceptive pills reduce menstrual flow and allow one to move around more easily. Adverts for these products promise women and girls control over their bleeding. Empowered girls are portrayed as those that command their bodies, and not the other way around (Przbylo and Fahs, 2020). However, this puts a large responsibility put on the shoulders of young girls to select the 'correct' management option (Hennegan *et al.*,



2019) and what does it suggest about those who don't? Are they failures? Feminist ideas have encouraged girls to question this narrative (Hennegan and Sol, 2020; McCarthy and Lahiri-Dutt, 2020; Przybylo and Fahs, 2020).

In this study, girls found themselves in a predicament. On the one hand, they were empowered by feminism to take ownership of their own bodies, but on the other hand school policies and societal norms robbed them of agency and dictated that they maintain a silence over menstruation. This has been coined the 'menstrual mandate' by menstrual activists (Bobel, 2019). As the UK girls discovered, better management options facilitated concealment, which perpetuated the menstrual stigma, removing menstruation yet further from the collective consciousness and invalidating the negative experiences of girls, such as their pain. The provision of products and painkillers in schools may even have been counter-productive, as girls felt a pressure to 'put up and shut up' as if the 'problem' had been solved.

An unexpected finding of this study is that as girls progress up the menstrual health pyramid, they encounter new barriers to achieving menstrual health. Interventions that address menstrual literacy and provide products are unwittingly making girls complicit in perpetuating gendered societal norms by aiding them to conform to societal precepts. The menstrual stigma is reinforced and girls show increasing levels of anxiety in their attempts to either keep up or rebel.

There is a conflict between tradition roles of women which accepts the status quo and modern girl empowerment which challenges it. In order to resolve the predicament that exists between feminism and female roles, women and girls need menstrual justice to be acted out in policy change at national level.

7.3 What do girls want?

This research shows that girls want menstruation to be a more positive experience. They want access to proprietary products, including pain relief, that provide comfort and leak protection. They want a space to change, and they want to be able to wash themselves, launder their clothes and dispose of their menstrual materials in private. They want to be able to go about their daily lives without restriction.

They also want more information about menstruation. They want to be better prepared, but they also want to know more about menstrual symptoms and what is normal. They



don't just want to know more about the biology of menstruation, they want to know more about the emotional side. They want agency and to make their own choices about product choice, pain management and participation.

Girls want talk of menstruation to be normalised and not stigmatised. Girls want to be able to live authentically as menstruators. They also want changes in society at the policy level so that menstruators are not discriminated against.

7.4 What does the thesis add to existing knowledge?

The thesis adds to the growing body of work on menstruation in adolescents. It draws attention to the inequalities experienced by schoolgirls. It is one of the first to show that period poverty is not just a problem in LMIC, but is also a problem for schoolgirls HIC too, and that period poverty is not simply about lack of resources but also lack of participation in daily activities and the freedom to choose life courses.

Although many studies have been conducted in LMIC, and some in the Philippines previously, the majority have focussed on menstrual hygiene management and the need to provide resources such as pads and water (Haver *et al.*, 2013; Ellis *et al.*, 2016) in order to combat period poverty. Without doubt, MHM is of great concern to school-girls and they require resource provision. The study shows that girls in the UK, a high income country, were often, *de facto*, without resources and reliant on others to provide for them.

Further insights into period poverty were gained from comparing resource-poor participants in the Philippines to those who considered themselves to be resource-poor in the UK. Even if menstrual products were provided for them, girls felt that they lacked a variety of tangible and intangible resources such as knowledge, painkillers, healthcare and support for example. This revealed the multi-dimensional aspect of period poverty. Very recently the term 'menstrual (in)equity' has been adopted to better describe period poverty: menstrual inequity is when menstruators don't have access to products OR menstrual education OR reproductive health AND suffer stigma (Ghanoui, 2022).

The study confirms that menstrual equity is a problem in both LMIC and High Income countries and is not solved by menstrual hygiene interventions alone. In fact, the work from the UK suggests that the omnipresent menstrual stigma is more difficult to overcome and is therefore a greater barrier to menstrual health.



Menstrual stigma in both the Philippines and in the UK meant that people avoided talking about menstruation, it was often not mentioned by name, often alluded to by euphemism, and the facts about menstruation were difficult to separate from fiction. Because menstrual experiences weren't talked about, girls had no point of reference and had no idea whether their experiences were normal or not. In the Philippines, young girls were at the mercy of beliefs and myths that had little scientific basis. In the UK, where information was readily available in a variety of forms, it was difficult to know who or what to trust. Confusion about what was normal and lack of validation of their symptoms meant that girls were reluctant to approach health care professionals about menstrual problems. It has been suggested that healthcare and education sectors need to work much more closely together to support girls (Roux *et al.*, 2021)

The results of this study show that schools need to start their menstrual education much earlier and more comprehensively, covering the wide variety of menstrual symptoms, menstrual disorders and psycho-social effects as well as basic biology. Some work has been developed in Australia on an Ovulatory-Menstrual Health Literacy Programme which integrates spiritual, intellectual, social and emotional dimensions with physical changes at puberty (Roux *et al.*, 2019), and this kind of programme needs to be rolled out globally. A recent poll in the UK by YouGov 2022 asked the public if children were being taught enough about periods. They found that 73% of young people didn't think they were (Kirk, 2022). A new curriculum was introduced in the UK 2020 which included menstrual education for the first time. It's effect on the menstrual literacy of children will need to be evaluated further down the line, but and a study in 2022 on teachers' perceptions of menstrual education made the point that teachers did not feel confident to deliver it adequately and wanted more training (Brown *et al.*, 2022).

Other questions arose such as whether it is more effective to teach girls and boys together or separately, and this is also something that needs more research. This research showed that girls' experience of menarche and menstruation was correlated with menstrual literacy, and the experience was sometimes the catalyst for seeking out information about menstruation from other sources. Girls accessed similar-interest groups on social media to share their tips. The sample size of boys was not sufficient to measure their menstrual literacy with confidence, but without the experience and the chat groups, it is assumed that boys' knowledge is limited to the biology they learn in school and later on the singular experiences of their girlfriends or wives. However, there is a paucity of research into the



menstrual knowledge of boys and men and it is an area that requires further investigation to improve education policy recommendations.

This study also highlighted that schools may be underscoring the menstrual stigma by making menstruating girls conform to draconian rules in the classroom. In order to tackle challenging behaviour which is perceived to go on 'out of sight' in school toilet blocks, schools have restricted break times and restricted the time pupils can spend out of the classroom, in some cases banning pupils from going to the bathroom during lessons, and in extreme cases, locking toilets. This can cause girls much distress. The onset of menstruation or the amount of blood flow are not things that can be controlled. Girls may have an urgent need to manage their menstruation. If girls must ask the teacher to leave the classroom, they draw attention to their menstrual status, and often they would rather not. This can mean they lack concentration because they are worrying excessively about leaking. Schools need to take account of the needs of all their pupils and not just shut down access to toilets to control the behaviour of the few. The number of toilets and the length of the breaktime could also be considered. Even the design of school toilets could be investigated, as it should be possible to design something smarter and quicker to use. Not all cubicles need to have toilets for example, changing rooms may be all that is required by some girls. More research needs to be done on this.

This research has found that girls want to be positive about periods and have conversations about menstruation normalised. Schools are ideal places to model desirable behaviours and change societal norms. Senior leaders should create and implement policies to ensure that suitable infrastructure is provided for menstruating girls, that menstrual management materials are provided, that restrictive practices are removed and that girls are allowed to manage their menstruation how and when they need to. Senior leaders are also ideally placed to be menstrual health champions, and liaise with parents and other stakeholders to create events that empower girls and promote menstrual equity.

7.5 Recommendations for future research

Although the field of menstrual health is advancing rapidly, there are some significant gaps. One of those is the lack of hard data about the effect of menstruation on school achievement. It is assumed, but so far has eluded being quantified.



Dysmenorrhea is another area that needs to be investigated more fully. Not enough is known about menstrual pain. There have been no new drug therapies for 20 years and it takes 7 years to get a diagnosis of endometriosis in the UK, whilst it remains unheard of in many LMIC. Biologically, its causes are poorly understood although current work on mice models is unravelling what is going on in the endometrium. Furthering our understanding of the biology will provide better diagnostic capability and new targets for intervention (Jain *et al.*, 2022).

Not all menstrual pain needs medical intervention. But girls, parents and teachers lack knowledge about what is normal and what is not, and their home-made remedies are bound up in cultural myths and superstitions. There needs to be new research on the efficacy of self-help practices and the effect of improving menstrual literacy in the management of pain.

7.6 Specific Recommendations for the Philippines and for the UK

In both countries, menstrual education needs to be integrated into the school curriculum at a primary/elementary school level and returned to regularly in a spiral curriculum. Girls and boys need to be able to access education about menstruation, and there is a case for having some gender segregated interactive lessons where girls particularly, but boys also, can ask questions and discuss the issues that are concerning them without shame.

The education needs to be culturally appropriate. One size does not fit all. Teachers need to be properly trained to deliver menstrual education. There needs to be a menstrual champion in each school that can support teachers and menstruators.

In the Philippines, water safety is not guaranteed and there needs to be guidance provided about menstrual hygiene in such circumstances. Schools need to provide soap, and keep a supply of spare pads and clothes for menstrual accidents because they only wear shorts and tops and it is too hot to layer up. Girls need to be able to access them discreetly. Somebody needs to take responsibility to ensure that they are kept stocked. There needs to be culturally sensitive guidance on traditional practices that may be harmful.

Water is often provided in large drums and scooped out. Everybody needs to think carefully about how they use water efficiently and do not waste it, and also avoid it going



on the floor where it causes a hazard and combines with dirt making it very difficult for girls to change in a dry environment.

WASH facilities in schools need to be improved and to be fit for purpose for menstruating girls. Girls can offer their opinions on the design that would suit them. They should offer separate cubicles, with sufficient space to turn around. Hooks or shelves in order to hang bags and clothes up when changing and not risk dropping things on the floor which tend to get dirty. They need doors for privacy, which should be lockable. If a receptacle is provided for used paper, there should be a separate receptacle with a close-fitting lid for used pads. If possible, a paper bag should be provided for the disposal of used pads, to avoid others having to see the used pad. The toilets need regularly cleaning and the used pads need to be properly disposed of. Used pads that are exposed to the air smell. They need to be incinerated or taken off-site as part of a waste-disposal chain, which might require the engagement of specific contractors.

Regarding toilets in schools, girls need to have privacy and there should be an outer door on a toilet block as well as an inner door on a cubicle. If this is not possible, letting girls go to the toilet in pairs does allow them to create privacy and security. Water and soap need to be provided. For girls using reusable pads, laundry facilities and drying facilities could be provided.

An important part of providing WASH facilities is to consider their ongoing operational maintenance. Schools need to budget for cleaning and a regular maintenance programme. In reality, we know that resource-constrained settings may spend their meagre budget on more immediate needs. In the Philippines, it may be possible for there to be a small committee of staff/pupils who have a rota for tidying up and cleaning the bathroom to keep it nice for everybody.

Regarding policy, it is important that construction and maintenance is provided for WASH facilities and a programme could be developed centrally to ensure that all schools have well-maintained facilities. This would have the advantage of having specialists to do the repair and the cost-benefits of bulk purchases. This would ensure equity of experience for all school children.

In the UK policies that support menstruators in school need to be adopted. Toilets that have been built without an external door, or opening directly onto corridors, or gender-



neutral, are making girls nervous about going to the bathroom in case their menstrual status is revealed. Some girls are not even going to the bathroom to urinate and are holding urine in all day, which is not comfortable and puts them at risk of infections. These policies have been adopted to cut down on bullying and violence that is assumed to go on behind closed doors. But the needs of menstruators, a quiet 50% of the school population, are being overlooked by the more obvious need to keep people safe. Nobody is arguing that this isn't important, but there are alternative ways to do this, such as patrolling corridors by senior staff. This used to happen but has been dropped due to high workloads. However, girls are being penalised.

For the same reason, pupils are often not allowed to go to the toilet during class, only at breaktime. But this does not meet the needs of menstruators, who may have to address an urgent onset of menstruation or a leak, and it creates long queues for bathrooms when people are using the cubicle to change. It may be possible to rethink female bathrooms completely, providing a sort of urinal, a toilet and empty cubicles that are simply for changing. Receptacles need to be provided for used pads, but it could be possible to provide a different receptacle in which to empty menstrual blood. It may be possible in the future to develop a circular economy for menstrual blood. Some is already being used for stem cell research. Other people are looking at making it safe and using it to enrich compost as a fertiliser.

Schools need to remove the stigma. This can only be done by having menstrual champions and by engaging all pupils in menstrual literacy and celebrating landmarks such as menstrual hygiene day.

7.7 General Recommendations for policy and practice

This result of this study emphasizes the need for policy change. Menstrual equity is not the responsibility of young girls. They need to grow up in an environment that helps them to be positive as menstruators and gives them practical solutions to help them to cope. This requires governmental policy change and the buy-in of education and health sector stakeholders (Holmes *et al.*, 2021) to effect meaningful change that normalises menstruation.



A logical model has been constructed which places menstrual health at the top of a pyramid, supported by a number of pre-requisite achievements at each level. A theory of change has been developed which can inform the design of interventions. This piece of work suggests that missing pieces can destabilise the progress to menstrual health, a bit like a game of Jenga. Interventions need to be part of systemic change, which involves policy and programming at wider community, local and national level, to ensure that menstrual health can be achieved, and therefore this is a macro-distal level to the pyramid which is extremely important.

This study makes the case for interventions that increase menstrual literacy, providing girls with a solid foundation for their menstrual health journey. Interventions that involve menstrual education, removing preterition, and increasing knowledge will help girls to get onto the first platform of the pyramid and be able to manage their menstruation safely and hygienically.

All children (girls and boys) need to receive a comprehensive menstrual education at school from an early age. It should cover biological, social and emotional aspects of menstruation but stand independently of sex education. Whilst girls and boys can and should be taught together, there is justification in teaching them separately in secondary school, and in changing the emphasis from didactic teaching to facilitating discussion. The wide variety of practices and symptoms should be discussed, including menstrual disorders and sources of help. Girls may be taught self-help practices.

Menstrual literacy of the whole population needs to be increased, and it would be helpful for schools to appoint a menstrual health champion, ensuring that teachers and parents have a good understanding of their role in the promotion of menstrual health. Senior leaders should model good menstrual literacy in their choice of language, signage, and inclusive policies.

At the proximal level there need to be efforts to end period poverty and provide suitable facilities for menstruators in school. A choice of quality products should be provided, but mindful of the sustainable development goals, there should be provision for adequate disposal. Toilet cubicles should have space to change, hooks or shelves to avoid putting products or clothing on the floor, and most importantly, a lock. Water and soap should be provided for hand washing. Lockers are useful for keeping supplies. Dark uniforms are



preferred, in order to hide stains but schools can support menstruators by having spare clothes.

At the intermediate level, school policies can support menstruators to feel comfortable and reduce anxiety. Toilets should not be locked and should be accessible at all time, even during class. Teachers should not make girls explain in front of everybody the reason they need to go to the toilet. Pain needs to be taken seriously and girls need to be believed. Others, such as boys, and teachers, need to learn how they can support girls to manage their pain. Policies should not discriminate against menstruators, for example, when it comes to PE lessons. Girls need to be nurtured and they need to be taught how to work with their cycle, rather than against it.

Schools need to develop policies on pain management. Policies that allow menstruating girls to rest, or practice a self-help technique, or take non-prescription medicine need to be considered. Agency over their own bodies is the goal of the distal level. Schools need to work with health professionals, such as school nurses, to ensure that girls have access to healthcare for more severe pain. School policies should also include promotion of reproductive rights.

At the level of society, national and regional policies to support women and girls are required, with free period products, free access to healthcare, and no stigma regarding menstrual or reproductive health. Importantly, women need to be supported to have choice about whether they conceal their menstrual status or not, whether they 'free bleed' or use proprietary products, whether they take medication to control their pain or not, and whether they become pregnant or mothers, or not. They should not feel ashamed to meet their needs or feel that they are being judged. They should be able to take their place in society as equals and not be discriminated against as menstruators.

7.8 Strengths and Limitations

A strength of this work is that it is mixed methods. The quantitative and qualitative work stand alone to identify some of the determinants of menstrual literacy and experience, but together they shed light on the multitude of factors that have to optimise for a girl to have a good menstrual experience and be able to achieve menstrual health. At the quantitative level, this work adds to the body of evidence gained from measuring menstrual knowledge



around the world that girls' menstrual knowledge is incomplete, and it confirms that the menstrual experience is not good, in both the Philippines and in the UK. The qualitative aspect of this work illustrates the case for differentiating between menstrual hygiene management (MHM) and menstrual health (MH). It shows how very nuanced the girl's menstrual experience is. Together they show how important the social-cultural environment is for allowing girls to look after their wider needs as menstruators and achieve menstrual health. This concurs with the recent definition of Menstrual Health by a panel of experts as:

'a state of complete physical, mental and social well-being and not merely the absence of disease and infirmity, in relation to the menstrual cycle' (Hennegan, Winkler, *et al.*, 2021).

The quantitative survey and calculation of KAP and Experience Scores were designed especially for this study at a time when there was no unifying and validated instrument available. Specific knowledge of the Philippines and of the UK allowed the author to modify other instruments to create one suitable for both contexts. A limitation of this study is the desire to be context specific which resulted in item-reduction to increase parity. This trade-off between usefulness in context and generalisability to other contexts has been a concern of other researchers. Simultaneously to this study, experts have been working on this exact problem and the Menstrual Needs Practice Scale (MNPS) has been developed, piloted and evaluated (Hennegan, Nansubuga, *et al.*, 2020). As it happens, most of the 36 -items are very similar to the items in this survey, although the emphasis is not just on availability of resources but on their availability *at a time and place* to suit the user. It has been tested, with modifications, in several different populations and has high validity. This of course now supersedes the scale used in this study going forward.

The study originally intended to capture the lived experiences of menstruators through a participatory approach, and build theory directly and inductively using grounded theory (Hennegan, Kibira, *et al.*, 2020). The nature of the study changed dramatically as a result of the covid-19 pandemic, and it was not possible to conduct participatory fieldwork. The study had to rely more heavily on past research, and the systematic literature review became the starting point in bringing together different conceptualisations of menstrual KAP. This was a severe limitation to using grounded theory, although it was still utilised in building the theory of change at the individual level in these populations and pointing the way towards timely and comprehensive menstrual education to increase menstrual KAP as



a target for a menstrual health intervention more generally. It was less successful in developing a coherent theory of change that produced the step-changes required to produce a truly gender-equal society due to the complexity of factors required to be optimised to move up the logic model. Grounded theory had to be abandoned at this stage and phenomenology was used (Starks and Trinidad, 2007), which elucidated the emergence of new barriers as girls ascend the pyramid that were not within their control, and which showed that a top-down approach involving the whole community and policy changes is required simultaneously for them to achieve menstrual justice.

Certain methodological weaknesses also arose from the decision to sample participants online. The participants elected to join the study and give their views on a subject that was taboo, so it is possible that they have a personal interest in the topic or views that they wished to express, and therefore they could be biased; the participants were almost all female, and cis-gender. They cannot represent the views of all adolescents or the experiences of all menstruators. They were from only two countries and therefore are not representative of all geographies. They needed to have access to the internet, so those that don't have been missed. This could disproportionately affect the poor. The study aimed to recruit from low-resource settings, but the participants self-identified as such, and there appeared to be a wide range of incomes. The study also aimed to recruit participants over the age of 16 so that they could give their consent, but there was no way to independently verify any of these. Originally it was planned to investigate the effect of state or private or religious schooling on menstrual literacy, but the stratified cluster design that sampled different types of schooling could not be implemented online.

A strength of this work is that it incorporates and builds on a previous model (the SEM) by proposing a causal chain for the achievement of menstrual health. It exposes the limitations of current interventions, by showing that menstrual health is restricted by a pervasive menstrual stigma that requires a top-down approach involving policy change at the highest level to make a real difference. To date, most interventions have been grass-roots interventions that tackle period poverty by providing products and The WASH in Schools programme WinS has focussed on improving the infrastructure of school toilets. These programmes have helped individual girls but they are like a sticking plaster on an open wound. The problem of the menstrual taboo still exists. Multi-component interventions that address different stakeholders and actors simultaneously are more likely to drive systemic change.



It makes the case that without active promotion of a positive menstrual agenda running through schools and out to parents, communities and workplaces, gender equality will not be achievable and there will be no menstrual justice.

7.9 Conclusion

This work illustrates the many vulnerabilities of adolescent girls, many of which result from the physical and emotional effects of the menstrual cycle. Ensuring that girls feel positive about menstruation requires education and active support from the wider society. If girls have self-efficacy, they can look after their menstrual health needs, access health care and participate fully in education. This promotes their life skills, academic achievement and resilience, setting them upon a life-long trajectory that enables them to claim their human rights and access wider opportunities. (Blum *et al.*, 2014).

This work integrates a social-ecological model with a feminist ecology to propose a logic model where macro-distal level factors such as national policies, societal norms and political and economic forces influence the environment which in turn influences the community, school, family and peers, which in turn influence the adolescent. Clearly, girls find it difficult to achieve menstrual health on their own, and the combined results of this study point to the role of society in providing an enabling environment. This would pave the way for a gender-equal society in which there is menstrual justice.



Bibliography

- Abraham, M. *et al.* (2018) 'Using immersive research to understand rural sanitation : lessons from the Swachh Bharat Mission in India', *41st WEDC International Conference, Egerton University, Nakuru, Kenya*, pp. 1–6.
- Achkovska Leshkovska, E. and Miovska Spaseva, S. (2016) 'John Dewey'S educational theory and educational implications of Howard Gardner's multiple intelligences theory', *International Journal of Cognitive Research in Science, Engineering and Education*, 4(2), pp. 57–66. doi: 10.5937/IJCRSEE1602057A.
- Afsari, A. *et al.* (2015) 'The effects of educating mothers and girls on the girls' attitudes toward puberty health: A randomized controlled trial', *International Journal of Adolescent Medicine and Health*, 2015. doi: 10.1515/ijamh-2015-0043.
- Afsari, A. (2017) 'Predictors of knowledge of puberty health among girl students', *Bioscience Biotechnology Research Communications*, 10(2), pp. 264–269. doi: 10.21786/bbrc/10.2/45.
- Agnew, S. and Sandretto, S. (2016) 'A case for critical literacy analysis of the advertising texts of menstruation: responding to missed opportunities', *Gender and Education*. Taylor & Francis, 28(4), pp. 510–526. doi: 10.1080/09540253.2015.1114073.
- Ahmed, S. M. *et al.* (2016) 'Factors contributing to early menarche in school girls', *Journal of the Pakistan Medical Association*, 66(5), pp. 629–633.
- Al-Jayyousi, G. F. *et al.* (2021) 'Factors influencing public attitudes towards COVID-19 vaccination: A scoping review informed by the socio-ecological model', *Vaccines*, 9(6), pp. 1–27. doi: 10.3390/vaccines9060548.
- Alemu, F. *et al.* (2017) 'A socio-ecological analysis of barriers to the adoption, sustainability and consistent use of sanitation facilities in rural Ethiopia', *BMC Public Health*. BMC Public Health, 17(1), pp. 1–9. doi: 10.1186/s12889-017-4717-6.
- Ali, T. S. and Rizvi, S. N. (2010) 'Menstrual knowledge and practices of female adolescents in urban Karachi, Pakistan', *Journal of Adolescence*. Elsevier Ltd, 33(4), pp. 531–541. doi: 10.1016/j.adolescence.2009.05.013.
- Altangarvdi, B. *et al.* (2019) 'Status and factors of menstrual knowledge, attitudes, behaviors and their correlation with psychological stress in adolescent girls', *Journal of Pediatric and Adolescent Gynecology*. doi: <https://doi.org/10.1016/j.jpag.2019.08.007>.
- Altundağ, S. and Çalbayram, N. Ç. (2016) 'Teaching menstrual care skills to intellectually disabled female students', *Molecular Ecology*, 25(13–14), pp. 1962–1968. doi:



10.1111/jocn.13215.

Amaya, L., Marcatili, J. and Bhavaraju, N. (2020) 'Advancing gender equity by improving menstrual health', *Boston: FSG*. Available at:

<https://news.issuelab.org/resources/36554/36554.pdf>.

Arasteh, F. E. *et al.* (2019) 'Effect of group counseling on adolescent girls in improving knowledge and practice of menstrual hygiene in welfare boarding centers', *Journal of Postgraduate Medical Institute*, 33(1), pp. 46–51.

Arigo, D. *et al.* (2018) 'Using social media for health research: Methodological and ethical considerations for recruitment and intervention delivery', *Digital Health*, 4, p.

205520761877175. doi: 10.1177/2055207618771757.

Ariyanti, T. D. and Royanto, L. R. M. (2018) 'The Effectiveness of Social Stories and Video Modeling in Improving Self-Care Skills in Female Adolescents with Mild Intellectual Disabilities during Menstrual Periods', 135(Iciap 2017), pp. 189–199. doi: 10.2991/iciap-17.2018.16.

Armour, M. *et al.* (2019) 'Self-care strategies and sources of knowledge on menstruation in 12,526 young women with dysmenorrhea: A systematic review and meta-analysis', *PLoS ONE*, 14(7), pp. 1–18. doi: 10.1371/journal.pone.0220103.

Association of Internet Researchers (2012) 'Ethical Decision-making and internet research: recommendations from the AOIR ethics working committee'. Available at:

<http://wwwaoir.org>.

Azage, A. W., Kassie, D. G. and Walle, T. A. (2020) 'Prevalence of primary dysmenorrhea, its intensity, impact and associated factors among female students' at Gondar town preparatory school, Northwest Ethiopia', *BMC Women's Health*. *BMC Women's Health*, 20(1), pp. 1–7. doi: 10.1186/s12905-019-0873-4.

Aziato, L., Dedey, F. and Clegg-Lampsey, J. N. A. (2014) 'The experience of dysmenorrhoea among Ghanaian senior high and university students: Pain characteristics and effects', *Reproductive Health*, 11(1), pp. 1–8. doi: 10.1186/1742-4755-11-58.

Bakker, A. *et al.* (2019) 'Beyond small, medium, or large: points of consideration when interpreting effect sizes', *Educational Studies in Mathematics*. *Educational Studies in Mathematics*, 102(1), pp. 1–8. doi: 10.1007/s10649-019-09908-4.

Banning, J. (2009) 'Ecological Triangulation', *Website*, pp. 1–2. Available at:

http://mycahs.colostate.edu/James.H.Banning/PDFs/Ecological_Triangulation.pdf.

Barnett-Page, E. and Thomas, J. (2009) 'Methods for the synthesis of qualitative research: A



- critical review', *BMC Medical Research Methodology*, 9(1). doi: 10.1186/1471-2288-9-59.
- Barney, A. (2019) "'Aunt Flo" Is Not Dead Yet: The Continued Coded Language of Menstruation', *Women's Reproductive Health*. Taylor & Francis, 5(4), pp. 305–307. doi: 10.1080/23293691.2018.1523110.
- Baum, F. (1995) 'Researching public health: Behind the qualitative-quantitative methodological debate', *Social Science and Medicine*, 40(4), pp. 459–468. doi: 10.1016/0277-9536(94)E0103-Y.
- Baum, F., MacDougall, C. and Smith, D. (2006) 'Participatory action research', *Journal of Epidemiology and Community Health*, 60(10), pp. 854–857. doi: 10.1136/jech.2004.028662.
- Baumann, S. E., Lhaki, P. and Burke, J. G. (2019) 'Assessing the Role of Caste/Ethnicity in Predicting Menstrual Knowledge, Attitudes, and Practices in Nepal', *Global Public Health*. Taylor & Francis, 14(9), pp. 1–14. doi: 10.1080/17441692.2019.1583267.
- Baxter, S. K. *et al.* (2014) 'Using logic model methods in systematic review synthesis: Describing complex pathways in referral management interventions', *BMC Medical Research Methodology*, 14(1), pp. 1–9. doi: 10.1186/1471-2288-14-62.
- Behera, D., Sivakami, M. and Behera, M. R. (2015) 'Menarche and Menstruation in Rural Adolescent Girls in Maharashtra, India: A Qualitative Study', *Journal of Health Management*, 17(4), pp. 510–519. doi: 10.1177/0972063415612581.
- Bennett, C. and Harden, J. (2014) 'An exploration of mothers' attitudes towards their daughters' menarche', *Sex Education-Sexuality Society and Learning*, 14(4), pp. 457–470. doi: 10.1080/14681811.2014.922862.
- Benshaul-tolonen, A. *et al.* (2020) 'Measuring Menstruation-Related Absenteeism Among Adolescents in Low-Income Countries', in Bobel, C. (ed.) *The Palgrave handbook of critical menstruation studies*, pp. 702–723.
- Berchtold, A. (2016) 'Test–retest: Agreement or reliability?', *Methodological Innovations*, 9, p. 205979911667287. doi: 10.1177/2059799116672875.
- Berger, R. (2015) 'Now I see it, now I don't: researcher's position and reflexivity in qualitative research', *Qualitative Research*, 15(2), pp. 219–234. doi: 10.1177/1468794112468475.
- Bhagwat, A. and Jijina, P. (2020) 'A Psychosocial Lens on an Indigenous Initiative to Address Menstrual Health and Hygiene in Indian Villages', *Social Work in Public Health*. Routledge, 35(3), pp. 73–89. doi: 10.1080/19371918.2020.1738972.
- Bhakta, A. N. (2019) *Opening the doors to the hidden water, sanitation and hygiene needs*



of women from the onset of the perimenopause in urban Ghana.

Biddle, S. J. H. H. *et al.* (2005) 'Correlates of participation in physical activity for adolescent girls: A systematic review of recent literature', *Journal of Physical Activity and Health*, 2(4), pp. 423–434. doi: 10.1123/jpah.2.4.423.

Birdthistle, I. *et al.* (2011) *What impact does the provision of separate toilets for girls at school have on their primary and secondary school enrolment, attendance and completion? A systematic review of the evidence*, MARCH Centre, University of London.

Blake, S. *et al.* (2018) 'Teaching Girls About Puberty and Menstrual Hygiene Management in Rural Ethiopia: Findings From a Pilot Evaluation', *Journal of Adolescent Research*, 33(5), pp. 623–646. doi: 10.1177/0743558417701246.

Blum, R. W. *et al.* (2014) 'A conceptual framework for early adolescence: A platform for research', *International Journal of Adolescent Medicine and Health*, 26(3), pp. 321–331. doi: 10.1515/ijamh-2013-0327.

Bobel, C. (2019) *The Managed Body, The Managed Body*. doi: 10.1007/978-3-319-89414-0.

Boosey, R. and Wilson-Smith, E. (2013) 'A vicious cycle of silence', (September).

Borjigen, A. *et al.* (2019) 'Status and Factors of Menstrual Knowledge, Attitudes, Behaviors and Their Correlation with Psychological Stress in Adolescent Girls', *Journal of Pediatric and Adolescent Gynecology*. Elsevier Inc, 32(6), pp. 584–589. doi: 10.1016/j.jpag.2019.08.007.

Brewis, A. *et al.* (2019) 'Community hygiene norm violators are consistently stigmatized: Evidence from four global sites and implications for sanitation interventions', *Social Science and Medicine*. Elsevier, 220(July 2018), pp. 12–21. doi: 10.1016/j.socscimed.2018.10.020.

British Educational Research Association (2018) *Ethical Guidelines for Educational Research*. Available at: <https://www.bera.ac.uk/publication/ethical-guidelines-for-educational-research-2018> (Accessed: 12 February 2023).

Bronfenbrenner, U. (1977) 'Toward an experimental ecology of human development.', *American psychologist*. American Psychological Association, 32(7), p. 513.

Brown, N. *et al.* (2022) 'Teachers' Perceptions and Experiences of Menstrual Cycle Education and Support in UK Schools', *Frontiers in Global Women's Health*, 3(February), pp. 1–11. doi: 10.3389/fgwh.2022.827365.

Bruinvels, G., Hackney, A. C. and Pedlar, C. R. (2022) 'Menstrual Cycle: The Importance of Both the Phases and the Transitions Between Phases on Training and Performance', *Sports Medicine*. Springer International Publishing, 52(7), pp. 1457–1460. doi: 10.1007/s40279-022-01691-2.



- Calculator.net (2022) *Sample Size Calculator*. Available at: <https://www.calculator.net/sample-size-calculator.html> (Accessed: 13 December 2022).
- Cardoso, L. F. *et al.* (2021) 'Period poverty and mental health implications among college-aged women in the United States', *BMC Women's Health*. BioMed Central, 21(1), pp. 1–7. doi: 10.1186/s12905-020-01149-5.
- Central Intelligence Agency (2019) *The CIA World Factbook - Pakistan*. Available at: <https://www.cia.gov/the-world-factbook/countries/pakistan/> (Accessed: 8 June 2019).
- Central Intelligence Agency (2021a) *The CIA World Factbook - the Philippines 2021*. Available at: <https://www.cia.gov/the-world-factbook/countries/philippines/> (Accessed: 9 January 2023).
- Central Intelligence Agency (2021b) *The CIA World Factbook - United Kingdom 2021*. Available at: <https://www.cia.gov/the-world-factbook/countries/united-kingdom/> (Accessed: 16 November 2021).
- Chadalawada, U. ., Devi, A. and Rani, S. (2017) 'Effect of Health Education on Adolescent Girls Regarding Knowledge About Menstruation', *Journal of Evolution of Medical and Dental Sciences*, 6(13), pp. 1040–1043. doi: 10.14260/jemds/2017/223.
- Chambers, R. (2017) *Can We Know Better? Reflections for Deveopment*. Practical Action Publishing.
- Chandra-Mouli, V. and Patel, S. V (2017) 'Mapping the knowledge and understanding of menarche, menstrual hygiene and menstrual health among adolescent girls in low- and middle-income countries', *Reproductive health*, 14. doi: 10.1186/s12978-017-0293-6.
- Chard, A. N. and Freeman, M. C. (2018) 'Design, intervention fidelity, and behavioral outcomes of a school-based water, sanitation, and hygiene cluster-randomized trial in laos', *International Journal of Environmental Research and Public Health*, 15(4). doi: 10.3390/ijerph15040570.
- Cleland, J. (1973) 'A Critique of KAP Studies and Some Suggestions for Their Improvement', *Studies in Family Planning*, 4(2), p. 42. doi: 10.2307/1964829.
- Coast, E., Lattof, S. R. and Strong, J. (2019) 'Puberty and menstruation knowledge among young adolescents in low- and middle-income countries: a scoping review', *International Journal of Public Health*. Springer International Publishing, pp. 293–304. doi: 10.1007/s00038-019-01209-0.
- Collier-Harris, C. A. and Goldman, J. D. G. (2017) 'Is puberty education evident in Australia's first national curriculum?', *Sex Education-Sexuality Society and Learning*, 17(1), pp. 57–72.



doi: 10.1080/14681811.2016.1225259.

Crockett, L. J. *et al.* (2019) 'Puberty Education in a Global Context: Knowledge Gaps, Opportunities, and Implications for Policy', *Journal of Research on Adolescence*, 29(1), pp. 177–195. doi: 10.1111/jora.12452.

Crofts, T., Coates, S. and Fisher, J. (2014) *Menstruation hygiene management for schoolgirls*. Loughborough: WEDC, Loughborough University.

Crofts, T. and Fisher, J. (2012a) 'Menstrual hygiene in Ugandan schools: an investigation of low-cost sanitary pads', *Journal of Water, Sanitation and Hygiene for Development*. doi: 10.2166/washdev.2012.067.

Crofts, T. and Fisher, J. (2012b) 'Menstrual hygiene in Ugandan schools: An investigation of low-cost sanitary pads', *Journal of Water Sanitation and Hygiene for Development*. doi: 10.2166/washdev.2012.067.

Dalessandro, C. (2018) 'Recruitment Tools for Reaching Millennials: The Digital Difference', *International Journal of Qualitative Methods*, 17(1), pp. 1–7. doi: 10.1177/1609406918774446.

Dammery, S. (2015) *First blood: a cultural study of menarche*. Monash University Publishing.

Dasgupta, S., Agarwal, N. and Mukherjee, A. (2021) 'Moving up the On-Site Sanitation ladder in urban India through better systems and standards', *Journal of Environmental Management*. Elsevier Ltd, 280(December 2020), p. 111656. doi: 10.1016/j.jenvman.2020.111656.

Davies, M. R. *et al.* (2019) 'The Genetic Links to Anxiety and Depression (GLAD) Study: Online recruitment into the largest recontactable study of depression and anxiety', *Behaviour Research and Therapy*. Elsevier, 123(February), p. 103503. doi: 10.1016/j.brat.2019.103503.

Dawson, C. (2013) *Advanced research methods: A practical guide for social research projects*. Hachette UK.

DeMaria, A. L. *et al.* (2020) "'My mama told me it would happen": menarche and menstruation experiences across generations', *Women and Health*. Taylor & Francis, 60(1), pp. 87–98. doi: 10.1080/03630242.2019.1610827.

Dewey, J. (1938) 'Experience and Education [1938]'.

Van Dijk, W. *et al.* (2016) 'Medicalisation and overdiagnosis: What society does to medicine', *International Journal of Health Policy and Management*, 5(11), pp. 619–622. doi:



10.15171/ijhpm.2016.121.

Dreibelbis, R. *et al.* (2013) 'The integrated behavioural model for water, sanitation, and hygiene: a systematic review of behavioural models and a framework for designing and evaluating', *BMC Public Health*, 13(1015), pp. 1–13.

Duby, Z. *et al.* (2019) "'The state of mind tells me it's dirty": menstrual shame amongst women using a vaginal ring in Sub Saharan Africa', *Women and Health*. Taylor & Francis, 0(0), pp. 1–15. doi: 10.1080/03630242.2019.1607803.

Van Eijk, A. M. *et al.* (2016) 'Menstrual hygiene management among adolescent girls in India: A Systematic review and meta-analysis', *BMJ Open*, 6(3). doi: 10.1136/bmjopen-2015-010290.

Van Eijk, A. M. *et al.* (2018) 'Use of menstrual cups among school girls: Longitudinal observations nested in a randomised controlled feasibility study in rural western Kenya', *Reproductive Health*. *Reproductive Health*, 15(1), pp. 1–11. doi: 10.1186/s12978-018-0582-8.

El-Sayyed, N., Kabbash, I. A. and El-Gueniedy, M. (2008) 'Risk behaviours for HIV/AIDS infection among men who have sex with men in Cairo, Egypt', *Eastern Mediterranean Health Journal*, 14(4), pp. 905–915.

Ellis, A. *et al.* (2016) 'WASH challenges to girls' menstrual hygiene management in Metro Manila, Masbate, and South Central Mindanao, Philippines', *Waterlines*, 35(3), pp. 306–323. doi: 10.3362/1756-3488.2016.022.

Elmahy, A. G. (2018) 'Reaching Egyptian Gays Using Social Media: A Comprehensive Health Study and a Framework for Future Research', *Journal of Homosexuality*. Routledge, 65(13), pp. 1867–1876. doi: 10.1080/00918369.2017.1395658.

Elmhirst, R. (2011) 'Introducing new feminist political ecologies', *Geoforum*. Elsevier Ltd, 42(2), pp. 129–132. doi: 10.1016/j.geoforum.2011.01.006.

Elsworthy, E. (2018) 'More than 137700 girls in UK missed school last year because they can't afford sanitary products', *The Independent Newspaper*. Available at:

<https://www.independent.co.uk/news/international-women-s-day-period-girls-missed-school-uk-sanitary-products-menstruation-a8244396.html>.

Evans, R. L. *et al.* (2022) 'Systematic review of educational interventions to improve the menstrual health of young adolescent girls', *BMJ Open*, 12(6), p. e057204. doi: 10.1136/bmjopen-2021-057204.

Evans, R. R. (2018) *Menstrual Hygiene Management in Manila Slums; Beliefs, Practices and*



Challenges. Loughborough University.

Exley, J. L. R. *et al.* (2015) 'The sanitation ladder, what constitutes an improved form of sanitation?', *Environmental Science and Technology*, 49(2), pp. 1086–1094. doi: 10.1021/es503945x.

Ferguson, R. M. (2009) *The Construction of Shared Knowledge through Asynchronous Dialogue*.

Fetters, M. D., Curry, L. A. and Creswell, J. W. (2013) 'Achieving integration in mixed methods designs - Principles and practices', *Health Services Research*, 48(6 PART2), pp. 2134–2156. doi: 10.1111/1475-6773.12117.

Ford, K. L. *et al.* (2019) 'Youth Study Recruitment Using Paid Advertising on Instagram, Snapchat, and Facebook: Cross-Sectional Survey Study', *JMIR Public Health and Surveillance*, 5(4), p. e14080. doi: 10.2196/14080.

Freeman, S. *et al.* (2014) 'Active learning increases student performance in science, engineering, and mathematics', *Proceedings of the National Academy of Sciences of the United States of America*, 111(23), pp. 8410–8415. doi: 10.1073/pnas.1319030111.

Fricker, E. and Cooper, D. E. (2018) 'The Epistemology of Testimony Author (s): Elizabeth Fricker and David E. Cooper Source : Proceedings of the Aristotelian Society , Supplementary Volumes , Vol . 61 (1987) , pp . Published by : Oxford University Press on behalf of The Aristotelian Soci', 61(1987), pp. 57–83.

Ghanoui, S. L. (2022) "'Responsible Body": Menstrual Education Films and Sex Education in the United States and Scotland, 1970s–1980s', *Open Library of Humanities*, 8(2), pp. 1–21. doi: 10.16995/olh.6349.

Gignac, G. E. and Szodorai, E. T. (2016) 'Effect size guidelines for individual differences researchers', *Personality and Individual Differences*. Elsevier Ltd, 102(December), pp. 74–78. doi: 10.1016/j.paid.2016.06.069.

Glaser, B. (1978) *Theoretical sensitivity: Advances in the methodology of grounded theory*.

Gontier, N. (2006) 'Introduction to evolutionary epistemology, language and culture BT - Evolutionary Epistemology, Language and Culture: A Non-Adaptationist, Systems Theoretical Approach', in Gontier, N., Van Bendegem, J. P., and Aerts, D. (eds). Dordrecht: Springer Netherlands, pp. 1–29. doi: 10.1007/1-4020-3395-8_1.

Graber, R. (2020) 'Guidance on Conducting and Supervising Community-Oriented Psychology Research During COVID-19.', pp. 1–12.

Greene, J. C., Caracelli, V. J. and Graham, W. F. (1989) 'Toward a Conceptual Framework for



- Mixed-Method Evaluation Designs', *Educational Evaluation and Policy Analysis*, 11(3), pp. 255–274. doi: 10.3102/01623737011003255.
- Grix, J. (2002) 'Introducing Students to the Generic Terminology of Social Research', *Politics*, 22(3), pp. 175–186. doi: 10.1111/1467-9256.00173.
- Guetterman, T. C. *et al.* (2019) 'Contemporary Approaches to Mixed Methods–Grounded Theory Research: A Field-Based Analysis', *Journal of Mixed Methods Research*, 13(2), pp. 179–195. doi: 10.1177/1558689817710877.
- Guillory, J. *et al.* (2018) 'Recruiting hard-to-reach populations for survey research: Using Facebook and Instagram advertisements and in-person intercept in LGBT bars and nightclubs to recruit LGBT young adults', *Journal of Medical Internet Research*, 20(6), pp. 1–14. doi: 10.2196/jmir.9461.
- Gultie, T., Hailu, D. and Workineh, Y. (2014) 'Age of Menarche and Knowledge about Menstrual Hygiene Management among Adolescent School Girls in Amhara Province, Ethiopia: Implication to Health Care Workers & School Teachers', *PloS one*, 9(9). doi: 10.1371/journal.pone.0108644.
- Gumanga, S. K. (2012) 'Original Articles Menstrual Characteristics in Some Adolescent Girls in', *Ghana Medical Journal*, 46(1), pp. 3–7.
- Gupta, P. *et al.* (2018) 'Knowledge and practices pertaining to menstruation among the school going adolescent girls of UHTC/RHTC area of Government Medical College, Kota, Rajasthan', *International Journal Of Community Medicine And Public Health*, 5(2), p. 652. doi: 10.18203/2394-6040.ijcmph20180245.
- Haque, S. E. *et al.* (2014) 'The effect of a school-based educational intervention on menstrual health: An intervention study among adolescent girls in Bangladesh', *BMJ Open*, 4(7), pp. 1–9. doi: 10.1136/bmjopen-2013-004607.
- Harris, K. *et al.* (2019) 'School-based self-management interventions for asthma in children and adolescents : a mixed methods systematic review (Review)'. doi: 10.1002/14651858.CD011651.pub2.Copyright.
- Haver, J. *et al.* (2013) *WASH in Schools Empowers Girls' Education in Masbate Province and Metro Manila, Philippines An Assessment of Menstrual Hygiene Management in Schools*. New York. Available at: www.unicef.org/wash/schools.
- Haver, J. *et al.* (2018) 'New directions for assessing menstrual hygiene management (MHM) in schools: A bottom-up approach to measuring program success', *Studies in Social Justice*, 12(2), pp. 372–381. doi: 10.26522/SSJ.V12I2.1947.



- Hawkey, A. J. *et al.* (2017) 'Experiences and Constructions of Menarche and Menstruation among Migrant and Refugee Women', *Qualitative Health Research*, 27(10), pp. 1473–1490. doi: 10.1177/1049732316672639.
- Hebert-Beirne, J. *et al.* (2021) 'Social Processes Informing Toileting Behavior Among Adolescent and Adult Women: Social Cognitive Theory as an Interpretative Lens', *Qualitative Health Research*, 31(3), pp. 430–442. doi: 10.1177/1049732320979168.
- Hemphill, J. F. (2003) 'Interpreting the Magnitudes of Correlation Coefficients', *American Psychologist*, 58(1), pp. 78–79. doi: 10.1037/0003-066X.58.1.78.
- Hennegan, J. *et al.* (2016) 'Measuring the prevalence and impact of poor menstrual hygiene management: A quantitative survey of schoolgirls in rural Uganda', *BMJ Open*, 6. doi: 10.1136/bmjopen-2016-012596.
- Hennegan, J. *et al.* (2017) 'A qualitative understanding of the effects of reusable sanitary pads and puberty education: implications for future research and practice', *Reproductive health*, 14. doi: 10.1186/s12978-017-0339-9.
- Hennegan, J. (2019) 'Inserting informed choice into global menstrual product use and provision', *The Lancet Public Health*. The Author(s). Published by Elsevier Ltd. This is an Open Access article under the CC BY 4.0 license, 4(8), pp. e361–e362. doi: 10.1016/s2468-2667(19)30126-4.
- Hennegan, J. *et al.* (2019) *Women's and girls' experiences of menstruation in low-and middle-income countries: A systematic review and qualitative metasynthesis*, *PLoS Medicine*. doi: 10.1371/journal.pmed.1002803.
- Hennegan, J., Kibira, S. P. S. S., *et al.* (2020) 'I do what a woman should do': A grounded theory study of women's menstrual experiences at work in Mukono District, Uganda', *BMJ Global Health*, 5(11), pp. 1–11. doi: 10.1136/bmjgh-2020-003433.
- Hennegan, J., Nansubuga, A., *et al.* (2020) 'Measuring menstrual hygiene experience: Development and validation of the Menstrual Practice Needs Scale (MPNS-36) in Soroti, Uganda', *BMJ Open*, 10(2). doi: 10.1136/bmjopen-2019-034461.
- Hennegan, J., Winkler, I. T., *et al.* (2021) 'Menstrual health: a definition for policy, practice, and research', *Sexual and Reproductive Health Matters*, 29(1), pp. 31–38. doi: 10.1080/26410397.2021.1911618.
- Hennegan, J., OlaOlorun, F. M., *et al.* (2021) 'School and work absenteeism due to menstruation in three West African countries: findings from PMA2020 surveys', *Sexual and Reproductive Health Matters*, 29(1). doi: 10.1080/26410397.2021.1915940.



- Hennegan, J. M. (2017) 'Menstrual Hygiene Management and Human Rights: The Case for an Evidence-Based Approach', *Women's Reproductive Health*. doi: 10.1080/23293691.2017.1388720.
- Hennegan, J. and Montgomery, P. (2016) 'Do menstrual hygiene management interventions improve education and psychosocial outcomes for women and girls in low and middle income countries? A systematic review', *PLoS ONE*, 11(2), pp. 1–22. doi: 10.1371/journal.pone.0146985.
- Hennegan, J. and Sol, L. (2020) 'Confidence to manage menstruation at home and at school: findings from a cross-sectional survey of schoolgirls in rural Bangladesh', *Culture, Health and Sexuality*. Taylor & Francis, 22(2), pp. 146–165. doi: 10.1080/13691058.2019.1580768.
- Hetherington, E. *et al.* (2017) 'Participatory science and innovation for improved sanitation and hygiene: process and outcome evaluation of project SHINE, a school-based intervention in Rural Tanzania', *BMC Public Health*. BMC Public Health, 17(1), pp. 1–15. doi: 10.1186/s12889-017-4100-7.
- Holmes, K. *et al.* (2021) 'Adolescent menstrual health literacy in low, middle and high-income countries: A narrative review', *International Journal of Environmental Research and Public Health*, 18(5), pp. 1–14. doi: 10.3390/ijerph18052260.
- Hoppenbrouwers, K. *et al.* (2016) 'Characteristics of the menstrual cycle in 13-year-old Flemish girls and the impact of menstrual symptoms on social life', *European Journal of Pediatrics*. European Journal of Pediatrics, 175(5), pp. 623–630. doi: 10.1007/s00431-015-2681-7.
- House, S., Mahon, T. and Cavill, S. (2013) 'Menstrual Hygiene Matters: A resource for improving menstrual hygiene around the world', *Reproductive Health Matters*. 1st edn. London: Informa UK Limited, 21(41), p. 354. doi: 10.1016/s0968-8080(13)41712-3.
- Hurwitz, L. B. *et al.* (2018) "'A New You, That's Who": an evaluation of short videos on puberty and human reproduction', *Palgrave Communications*. Springer US, 4(1). doi: 10.1057/s41599-018-0147-z.
- Hutchison, D. and Styles, B. (2010) 'A guide to running randomised controlled trials for educational researchers', *National Foundation for Educational Research (NFER)*, pp. 1–65. Available at: <https://www.nfer.ac.uk/media/2114/rct01.pdf>.
- Ifould, R. (2016) "'I worried people would forget about me": can teenagers survive without social media?', *The Guardian*, 18 June. Available at:



<https://www.theguardian.com/media/2016/jun/18/can-teenagers-survive-without-social-media>.

İşgüven, P., Yörük, G. and Çizmeciğlu, F. M. (2015) 'Educational needs of adolescents regarding normal puberty and menstrual patterns', *JCRPE Journal of Clinical Research in Pediatric Endocrinology*, 7(4), pp. 312–322. doi: 10.4274/jcrpe.2144.

Jain, V. *et al.* (2022) 'Uterine bleeding: how understanding endometrial physiology underpins menstrual health', *Nature Reviews Endocrinology*. Springer US, 18(5), pp. 290–308. doi: 10.1038/s41574-021-00629-4.

Jarrahi, R., Golmakani, N. and Mazlom, S. R. (2020) 'Effect of menstrual hygiene education based on peer and small group teaching methods on hygiene behaviors in female adolescents: A comparative study', *Evidence Based Care Journal*, 10(1), pp. 70–74. doi: 10.22038/ebcj.2020.40806.2074.

Jewitt, S. and Ryley, H. (2014) 'It's a girl thing: Menstruation, school attendance, spatial mobility and wider gender inequalities in Kenya', *Geoforum*. Elsevier Ltd, 56, pp. 137–147. doi: 10.1016/j.geoforum.2014.07.006.

Johnson, J. L., Adkins, D. and Chauvin, S. (2020) 'A review of the quality indicators of rigor in qualitative research', *American Journal of Pharmaceutical Education*, 84(1), pp. 138–146. doi: 10.5688/ajpe7120.

Johnson, R. B. and Onwuegbuzie, A. J. (2004) 'Mixed Methods Research: A Research Paradigm Whose Time Has Come', *Educational Researcher*, 33(7), pp. 14–26. doi: 10.3102/0013189X033007014.

Kågesten, A. E. *et al.* (2017) 'Transitions into puberty and access to sexual and reproductive health information in two humanitarian settings: A cross-sectional survey of very young adolescents from Somalia and Myanmar', *Conflict and Health*, 11(Suppl 1). doi: 10.1186/s13031-017-0127-8.

Kane, S. and Calnan, M. (2017) 'Erosion of trust in the medical profession in India: Time for doctors to act', *International Journal of Health Policy and Management*, 6(1), pp. 5–8. doi: 10.15171/ijhpm.2016.143.

Kansiime, C. *et al.* (2020) 'Menstrual health intervention and school attendance in Uganda (MENISCUS-2): A pilot intervention study', *BMJ Open*, 10(2), pp. 1–11. doi: 10.1136/bmjopen-2019-031182.

Kaur, R. and Nagaich, S. (2019) 'Understanding Feminist Research Methodology in Social Sciences', *SSRN Electronic Journal*, pp. 1–15. doi: 10.2139/ssrn.3392500.



- Kennedy, S. *et al.* (2014) 'Evaluation of a group based cognitive behavioural therapy programme for menstrual pain management in young women with intellectual disabilities : protocol for a mixed methods controlled clinical trial', pp. 1–10.
- Kheirollahi, F. *et al.* (2017) 'Puberty health status among adolescent girls: A model- based educational program', *International Journal of Pediatrics*, 5(7), pp. 5369–5378. doi: 10.22038/ijp.2017.23174.1950.
- Khubchandani, J., Clark, J. and Kumar, R. (2014) 'Beyond controversies: Sexuality education for adolescents in India', *Journal of Family Medicine and Primary Care*, 3(3), p. 175. doi: 10.4103/2249-4863.141588.
- Kidney, M., Galvin, C. and Syombua Nthusi, J. (2018) 'A holistic approach to tackling menstrual hygiene management in rural communities in Kenya', (May 2017), pp. 1–6. Available at: <https://wedc-knowledge.lboro.ac.uk/resources/conference/41/Kidney-2918.pdf>.
- Kilanowski, J. F. (2017) 'Breadth of the Socio-Ecological Model', *Journal of Agromedicine*. Taylor & Francis, 22(4), pp. 295–297. doi: 10.1080/1059924X.2017.1358971.
- Kirk, I. (2022) *Are children being taught enough about periods in school?*, YouGov. Available at: <https://yougov.co.uk/health/articles/44643-are-children-being-taught-enough-about-periods-sch> (Accessed: 25 October 2023).
- Kirk, J. and Sommer, M. (2006) 'Menstruation and body awareness: linking girls' health with girls' education', *Royal Tropical Institute*, pp. 1–22. Available at: https://www.susana.org/_resources/documents/default/2-1200-kirk-2006-menstruation-kit-paper.pdf.
- Krosnick, J. A. (2018) 'Questionnaire design', in *The Palgrave handbook of survey research*. Springer, pp. 439–455.
- Lahme, A. M., Stern, R. and Cooper, D. (2018) 'Factors impacting on menstrual hygiene and their implications for health promotion', *Global Health Promotion*, 25(1), pp. 54–62. doi: 10.1177/1757975916648301.
- Larson, E. *et al.* (2021) 'Capturing menstrual health and hygiene in national surveys: insights from performance monitoring and accountability 2020 resident enumerators in Niamey, Niger', *Journal of Water, Sanitation and Hygiene for Development*, 11(2), pp. 295–303. doi: 10.2166/washdev.2021.177.
- Launiala, A. (1970) 'How much can a KAP survey tell us about people's knowledge, attitudes and practices? Some observations from medical anthropology research on malaria in



- pregnancy in Malawi', *Anthropology Matters*, 11(1), pp. 1–13. doi: 10.22582/am.v11i1.31.
- Lee, B. X. *et al.* (2016) 'Transforming Our World: Implementing the 2030 Agenda Through Sustainable Development Goal Indicators', *Journal of Public Health Policy*, 37(1), pp. S13–S31. doi: 10.1057/s41271-016-0002-7.
- Lilford, R. *et al.* (2019) 'Because space matters: Conceptual framework to help distinguish slum from non-slum urban areas', *BMJ Global Health*, 4(2). doi: 10.1136/bmjgh-2018-001267.
- Litwin, M. S. (1995) *How to measure survey reliability and validity*. Sage.
- Lock, A. and Strong, T. (eds) (2010) 'Introduction', in *Social Constructionism: Sources and Stirrings in Theory and Practice*. Cambridge: Cambridge University Press, pp. 1–11. doi: DOI: 10.1017/CBO9780511815454.002.
- Loughnan, L. *et al.* (2016) 'Sanitation Tell Us About Menstrual Hygiene Management?', *Waterlines*, 35(3).
- Luetke Lanfer, H. and Reifegerste, D. (2021) 'Correction to: Embracing challenging complexity: exploring handwashing behavior from a combined socioecological and intersectional perspective in Sierra Leone (BMC Public Health, (2021), 21, 1, (1857), 10.1186/s12889-021-11923-1)', *BMC Public Health*. BMC Public Health, 21(1), pp. 1–17. doi: 10.1186/s12889-021-12291-6.
- Lui, L. Y. Y., So, W. K. W. W. and Fong, D. Y. T. T. (2008) 'Knowledge and attitudes regarding pain management among nurses in Hong Kong medical units', *Journal of Clinical Nursing*, 17(15), pp. 2014–2021. doi: 10.1111/j.1365-2702.2007.02183.x.
- Ma, P. H. X., Chan, Z. C. Y. and Loke, A. Y. (2017) 'The Socio-Ecological Model Approach to Understanding Barriers and Facilitators to the Accessing of Health Services by Sex Workers: A Systematic Review', *AIDS and Behavior*. Springer US, 21(8), pp. 2412–2438. doi: 10.1007/s10461-017-1818-2.
- Mahon, T. and Fernandes, M. (2010) 'Menstrual hygiene in South Asia: A neglected issue for WASH (water, sanitation and hygiene) programmes', *Gender and Development*, 18(1), pp. 99–113. doi: 10.1080/13552071003600083.
- Manorama, S. and Desai, R. (2020) 'Menstrual justice: A missing element in India's health policies', in *The Palgrave handbook of critical menstruation studies*, pp. 511–527.
- Marván, M. L. and Alcalá-Herrera, V. (2014) 'Age at Menarche, Reactions to Menarche and Attitudes towards Menstruation among Mexican Adolescent Girls', *Journal of Pediatric and Adolescent Gynecology*, 27(2), pp. 61–66. doi: <https://doi.org/10.1016/j.jpag.2013.06.021>.



- Marvan, M. L. and Chrisler, J. C. (2018) 'Menarcheal timing, memories of menarche, and later attitudes toward menstruation', *Cogent Psychology*, 5(1), pp. 1–12. doi: 10.1080/23311908.2018.1525840.
- Marván, M. L. and Molina-Abolnik, M. (2012) 'Mexican Adolescents' Experience of Menarche and Attitudes Toward Menstruation: Role of Communication Between Mothers and Daughters', *Journal of Pediatric and Adolescent Gynecology*, 25(6), pp. 358–363. doi: 10.1016/j.jpjg.2012.05.003.
- Mason, L. *et al.* (2013) "'We keep it secret so no one should know" - A qualitative study to explore young schoolgirls attitudes and experiences with menstruation in rural Western Kenya', *PLoS ONE*, 8(11). doi: 10.1371/journal.pone.0079132.
- McCammon, E. *et al.* (2020) 'Exploring young women's menstruation-related challenges in Uttar Pradesh, India, using the socio-ecological framework', *Sexual and Reproductive Health Matters*. Taylor & Francis, 28(1), pp. 291–302. doi: 10.1080/26410397.2020.1749342.
- McCarthy, A. and Lahiri-Dutt, K. (2020) 'Bleeding in public? Rethinking narratives of menstrual management from Delhi's slums', *The Palgrave handbook of critical menstruation studies*. Palgrave Macmillan, Singapore, pp. 15–30.
- McMichael, C. (2019) 'Water, sanitation and hygiene (WASH) in schools in low-income countries: A review of evidence of impact', *International Journal of Environmental Research and Public Health*, 16(3), pp. 1–21. doi: 10.3390/ijerph16030359.
- Milne, C. (2019) 'Period Poverty – How widespread is it?' FullFact.org. Available at: <https://fullfact.org/health/period-poverty-how-widespread-it/> accessed 10/12/21.
- Mokari, H., Khaleghparast, S. and Samani, L. N. (2016) 'Impact of Puberty Health Education on Anxiety of Adolescents', *International Journal of Medical Research & Health Sciences*, 5(5, S, SI), pp. 284–291.
- Montgomery, P. *et al.* (2016) 'Menstruation and the Cycle of Poverty: A Cluster Quasi-Randomised Control Trial of Sanitary Pad and Puberty Education Provision in Uganda', *PLoS one*, 11(12). doi: 10.1371/journal.pone.0166122.
- Morella, E., Foster, V. and Banerjee, S. G. (2008) 'Climbing the Ladder: The State of Sanitation in Sub-Saharan Africa', *Fish and Shellfish Immunology*, 48(June), pp. 273–284. Available at: http://www.energytoolbox.org/library/infra2008/references/34_12-17-08_africas_infrastructure_foster.pdf.
- Morrison, J. *et al.* (2018) 'Girls' menstrual management in five districts of Nepal: Implications for policy and practice', *Studies in Social Justice*, 12(2), pp. 251–272. doi:



10.26522/SSJ.V12I2.1623.

Mukherjee, A. *et al.* (2020) 'Perception and practices of menstruation restrictions among urban adolescent girls and women in Nepal: A cross-sectional survey', *Reproductive Health*. *Reproductive Health*, 17(1), pp. 1–10. doi: 10.1186/s12978-020-00935-6.

Nalugya, R. *et al.* (2020) 'Assessing the effectiveness of a comprehensive menstrual health intervention program in Ugandan schools (MENISCUS): process evaluation of a pilot intervention study', *Pilot and Feasibility Studies*. *Pilot and Feasibility Studies*, 6(1), pp. 1–15. doi: 10.1186/s40814-020-00585-2.

National Institute for Health and Care Excellence. (2018) 'Heavy menstrual bleeding: assessment and management. NICE guideline NG88.' doi: 10.1002/psb.1687.

Ndlovu, E. and Bhala, E. (2016) 'Menstrual hygiene - A salient hazard in rural schools: A case of Masvingo district of Zimbabwe', *Jamba: Journal of Disaster Risk Studies*.

NHS Health Scotland (2014) *Logic Models*. Available at: <http://www.healthscotland.com/scotlands-health/planning/logic-models.aspx> 2014. (Accessed: 21 September 2023).

Nuss, H. J. *et al.* (2012) 'Applying the social ecological model to evaluate a demonstration colorectal cancer screening program in Louisiana', *Journal of Health Care for the Poor and Underserved*, 23(3), pp. 1026–1035. doi: 10.1353/hpu.2012.0120.

O’Cathain, A., Murphy, E. and Nicholl, J. (2007) 'Why, and how, mixed methods research is undertaken in health services research in England: A mixed methods study', *BMC Health Services Research*, 7, pp. 1–11. doi: 10.1186/1472-6963-7-85.

Office for National Statistics UK (2011) *Census 2011*. Available at: <https://www.ons.gov.uk/census/2011census> (Accessed: 19 August 2019).

Office for National Statistics UK 2022 (2022) *Data and Analysis from the Census 2021*. Available at: <https://www.ons.gov.uk/> (Accessed: 4 January 2023).

Okomoto, N. (2019) *A Global Glossary - the Menstrual Movement*, *Period Org*. Available at: <https://www.period.org/blog/glossary> accessed 11/06/19.

Al Omari, O. *et al.* (2016) 'Experience of Menarche Among Jordanian Adolescent Girls: An Interpretive Phenomenological Analysis', *Journal of Pediatric and Adolescent Gynecology*, 29(3), pp. 246–251. doi: 10.1016/j.jpjg.2015.09.005.

Al Omari, O., Razeq, N. M. A. and Fooladi, M. M. (2016) 'Experience of Menarche Among Jordanian Adolescent Girls: An Interpretive Phenomenological Analysis', *Journal of Pediatric and Adolescent Gynecology*, 29(3), pp. 246–251. doi: 10.1016/j.jpjg.2015.09.005.

Pakistan Ministry of Education and National Training MOENT (2019) *National Vision 2016-*



2025. Available at: <https://moent.gov.pk> (Accessed: 11 June 2019).
- Parker, K. (2021) *Where did all the school nurses go?*, *Times Educational Supplement*. Available at: <https://www.tes.com/magazine/pastoral/where-did-all-school-nurses-go> (Accessed: 19 January 2023).
- Pedrajas, M. and Choritz, S. (2016) 'Getting to the last mile in least developed countries', p. 85. Available at: www.undp.org.
- Persdotter, J. (2020) 'Introducing menstrunormativity: Toward a complex understanding of "menstrual monsterings"', *The Palgrave Handbook of Critical Menstruation Studies*. Palgrave Macmillan, Singapore, pp. 357–373.
- Philippine Statistics Authority (2019) 'Proportion of Poor Filipinos was Estimated at 16.6 Percent in 2018', *Philippine Statistics Authority*. Available at: <https://psa.gov.ph/poverty-press-releases/nid/144752>.
- Philippine Statistics Authority (2022) *National Quickstat December 2022, Quickstat*. Available at: <https://psa.gov.ph/statistics/quickstat/national-quickstat/2022/%2A> (Accessed: 9 January 2023).
- Philippine Statistics Authority (2023) *Philippine Statistics Authority Quickstat, Quickstat*. Available at: <https://psa.gov.ph/statistics/quickstat> (Accessed: 9 January 2023).
- Phillips-Howard, Penelope A *et al.* (2016) 'Menstrual cups and sanitary pads to reduce school attrition, and sexually transmitted and reproductive tract infections: A cluster randomised controlled feasibility study in rural Western Kenya', *BMJ Open*. doi: 10.1136/bmjopen-2016-013229.
- Phillips-Howard, Penelope A. *et al.* (2016) 'Menstrual hygiene management among adolescent schoolgirls in low- and middle-income countries: Research priorities', *Global Health Action*, 9(1). doi: 10.3402/GHA.V9.33032.
- PHS (2019) *Lifting the lid on period poverty*. Available at: https://www.phs.co.uk/media/2401/phs_periodpoverty-whitepaper.pdf.
- Plesons, M. *et al.* (2021) 'The state of adolescent menstrual health in low- and middle-income countries and suggestions for future action and research', *Reproductive Health*. BioMed Central, 18(1), pp. 1–13. doi: 10.1186/s12978-021-01082-2.
- Przybylo, E. and Fahs, B. (2020) 'Empowered bleeders and cranky menstruators; Menstrual positivity and the "liberated" era of new menstrual product advertisements', in *The Palgrave handbook of critical menstruation studies*, pp. 375–394.
- Przybylo, E. and Fahs, B. (2020) 'Empowered bleeders and cranky menstruators: Menstrual



- positivity and the “liberated” era of new menstrual product advertisements’, *The Palgrave Handbook of Critical Menstruation Studies*. Palgrave Macmillan, Singapore, pp. 375–394.
- Raj, A. *et al.* (2015) ‘Age at menarche, education, and child marriage among young wives in rural Maharashtra, India’, *International Journal of Gynecology & Obstetrics*, 131(1), pp. 103–104. doi: 10.1016/j.ijgo.2015.04.044.
- Ramaiya, A. *et al.* (2019) ‘How does a Social and Behavioral Change Communication Intervention Predict Menstrual Health and Hygiene Management: A Cross-Sectional Study’, *BMC Public Health*. BMC Public Health, 19(1), pp. 1–12. doi: 10.1186/s12889-019-7359-z.
- Ramo, D. E. and Prochaska, J. J. (2012) ‘Broad reach and targeted recruitment using Facebook for an online survey of young adult substance use.’, *Journal of medical Internet research*, 14(1), pp. 1–10. doi: 10.2196/jmir.1878.
- Rani, A., Sharma, M. K. and Singh, A. (2016) ‘Practices and perceptions of adolescent girls regarding the impact of dysmenorrhea on their routine life: A comparative study in the urban, rural, and slum areas of Chandigarh’, *International Journal of Adolescent Medicine and Health*, 28(1), pp. 3–9. doi: 10.1515/ijamh-2014-0063.
- Raskova, M. and Stolinska, D. P. (2017) ‘COMMUNICATION ABOUT PUBERTY AMONG MIDDLE-SCHOOL-AGED CHILDREN’, in Bekirogullari, Z., Minas, M. Y., and Thambusamy, R. X. (eds) *International Conference on Education and Educational Psychology*, pp. 194–202. doi: 10.15405/epsbs.2017.10.18.
- Rizkia, M., Setyowati and Ungsianik, T. (2019) ‘Female Adolescents’ Preparations, Knowledge, and Emotional Response toward Menarche: A Preliminary Study’, *Comprehensive Child and Adolescent Nursing*. Taylor & Francis, 42(sup1), pp. 108–114. doi: 10.1080/24694193.2019.1578431.
- Robins, C. S. *et al.* (2008) ‘Dialogues on mixed-methods and mental health services research: Anticipating challenges, building solutions’, *Psychiatric Services*, 59(7), pp. 727–731. doi: 10.1176/ps.2008.59.7.727.
- Rocheleau, D. and Nirmal, P. (2014) ‘Feminist Political Ecology: Global issues and local experience’, in Baksh, R. and Harcourt, W. (eds) *The Oxford Handbook of Transnational Feminist Movements*. Oxford University Press.
- Roux, F. *et al.* (2019) ‘Developing and trialling a school-based ovulatory-menstrual health literacy programme for adolescent girls: A quasi-experimental mixed-method protocol’, *BMJ Open*, 9(3), pp. 1–8. doi: 10.1136/bmjopen-2018-023582.
- Roux, F. I. *et al.* (2021) ‘Progressing Toward Adolescents’ Ovulatory-Menstrual Health



- Literacy: A Systematic Literature Review of School-Based Interventions', *Women's Reproductive Health*. Taylor & Francis, 8(2), pp. 92–114. doi: 10.1080/23293691.2021.1901517.
- Rubin, C. *et al.* (2009) 'Timing of maturation and predictors of menarche in girls enrolled in a contemporary British cohort', *Paediatric and Perinatal Epidemiology*, 23(5), pp. 492–504. doi: 10.1111/j.1365-3016.2009.01055.x.
- Rubinsky, V., Gunning, J. N. and Cooke-Jackson, A. (2020) "'I Thought I Was Dying:' (Un)Supportive Communication Surrounding Early Menstruation Experiences', *Health Communication*. Routledge, 35(2), pp. 242–252. doi: 10.1080/10410236.2018.1548337.
- Russell-Mundine, G. (2012) 'Reflexivity in indigenous research: Reframing and decolonising research?', *Journal of Hospitality and Tourism Management*. CAUTHE, 19(1), pp. 85–90. doi: 10.1017/jht.2012.8.
- Rycroft-Malone, J. *et al.* (2012) 'Realist synthesis: illustrating the method for implementation research', *Implementation Science*. BioMed Central Ltd, 7(1), p. 1. doi: 10.1186/1748-5908-7-33.
- Sandelowski, M. (2000) 'Combining Qualitative and Quantitative Sampling, Data Collection, and Analysis Techniques in Mixed-Method Studies', *Research in Nursing & Health*, 23(3), pp. 246–255. doi: 10.1002/1098-240x(200006)23:3<246::aid-nur9>3.3.co;2-8.
- Sarria-Santamera, A. *et al.* (2021) 'Systematic review and meta-analysis of incidence and prevalence of endometriosis', *Healthcare (Switzerland)*, 9(1), pp. 1–16. doi: 10.3390/healthcare9010029.
- Schillinger, D. (2021) 'Social Determinants, Health Literacy, and Disparities: Intersections and Controversies', *Health literacy research and practice*, 5(3), pp. e234–e243. doi: 10.3928/24748307-20210712-01.
- Schmitt, M. L. *et al.* (2018) 'Making the case for a female-friendly toilet', *Water (Switzerland)*. MDPI AG, 10(9), p. 9. doi: 10.3390/w10091193.
- Schmitt, M. L. *et al.* (2021) 'The intersection of menstruation, school and family: Experiences of girls growing up in urban areas in the U.S.A.', *International Journal of Adolescence and Youth*. Routledge, 26(1), pp. 94–109. doi: 10.1080/02673843.2020.1867207.
- Schoep, M. E. *et al.* (2019) 'Productivity loss due to menstruation-related symptoms: A nationwide cross-sectional survey among 32 748 women', *BMJ Open*, 9(6), pp. 1–10. doi: 10.1136/bmjopen-2018-026186.



- Sebert Kuhlmann, A. *et al.* (2019) 'Unmet Menstrual Hygiene Needs among Low-Income Women', *Obstetrics and Gynecology*, 133(2), pp. 238–244. doi: 10.1097/AOG.0000000000003060.
- Seear, K. (2009) 'The etiquette of endometriosis: Stigmatisation, menstrual concealment and the diagnostic delay', *Social Science and Medicine*. Elsevier Ltd, 69(8), pp. 1220–1227. doi: 10.1016/j.socscimed.2009.07.023.
- Setyowati, S., Rizkia, M. and Ungsianik, T. (2019) 'Improving Female Adolescents' Knowledge, Emotional Response, and Attitude toward Menarche following Implementation of Menarcheal Preparation Reproductive Health Education', *Asian/Pacific Island Nursing Journal*, 4(2), pp. 84–91. doi: 10.31372/20190402.1041.
- Sex Education Forum (2017) *Can parents withdraw their children from school RSE?* Available at: <https://www.sexeducationforum.org.uk/resources/frequently-asked-questions/7-can-parents-withdraw-their-children-school-rse> (Accessed: 19 January 2023).
- Shah, V. *et al.* (2019) 'A rite of passage : a mixed methodology study about knowledge , perceptions and practices of menstrual hygiene management in rural Gambia', *BMC Public Health*. BMC Public Health, 19(277), pp. 1–15. doi: 10.1186/S12889-019-6599-2).
- Shaikh, M. A., Mubeen, S. M. and Furqan, M. (2017) 'Learning about facts of life: Perspective from medical students on sources and preferences about puberty and sex education in Karachi', *Journal of the Pakistan Medical Association*, 67(11), pp. 1747–1750.
- Sharma, A., McCall-Hosenfeld, J. S. and Cuffee, Y. (2022) 'Systematic review of menstrual health and hygiene in Nepal employing a social ecological model', *Reproductive Health*. BioMed Central, 19(1), pp. 1–21. doi: 10.1186/s12978-022-01456-0.
- Sharma, R. *et al.* (2015) 'Menstrual hygiene among adolescent girls', *Indian Journal of Community Health*, 27(3), pp. 376–380. Available at: <http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=cagh&AN=20163019906>.
- Sivakami, M. *et al.* (2019) 'Effect of menstruation on girls and their schooling, and facilitators of menstrual hygiene management in schools: Surveys in government schools in three states in India, 2015', *Journal of Global Health*, 9(1). doi: 10.7189/jogh.09.010408.
- Skandhan, K. P. *et al.* (1988) 'Menarche - Prior Knowledge and Experience', *Adolescence*, 23(89), pp. 149–154.
- Soberon and Arroyo-Pena, B. (2017) 'Are fundamental niches larger than the realized? Testing a 50-year-old prediction by Hutchinson. Biodiversity Research Center and



Department of Ecology and Evolutionary Biology, University of Kansas, Lawrence, Kansas, United States of America', *PLoS ONE*, (4), pp. 1–14.

Sommer, M. (2009) 'Ideologies of sexuality, menstruation and risk: girls' experiences of puberty and schooling in northern Tanzania', *Source: Culture, Health & Sexuality Culture Health & Sexuality*, 11(4), pp. 383–398. Available at: <http://www.jstor.org/stable/27784458>.

Sommer, M. (2010) 'Putting menstrual hygiene management on to the school water and sanitation agenda', *Waterlines*, 29(4), pp. 268–278. doi: 10.3362/1756-3488.2010.030.

Sommer, M. (2011) 'An Early Window of Opportunity for Promoting Girls', *Health Sommer International Electronic Journal of Health Education*, 14, pp. 77–92.

Sommer, M., Ackatia-Armah, N., et al. (2015) 'A comparison of the menstruation and education experiences of girls in Tanzania, Ghana, Cambodia and Ethiopia', *Compare*, 45(4), pp. 589–609. doi: 10.1080/03057925.2013.871399.

Sommer, M., Hirsch, J. S., et al. (2015) 'Comfortably, safely, and without shame: Defining menstrual hygiene management as a public health issue', *American Journal of Public Health*, 105(7), pp. 1302–1311. doi: 10.2105/AJPH.2014.302525.

Sommer, M. et al. (2016) 'A Time for Global Action: Addressing Girls' Menstrual Hygiene Management Needs in Schools', *PLOS Medicine*, 13(2), p. e1001962. doi: 10.1371/journal.pmed.1001962.

Sommer, M. et al. (2017) 'Attention to menstrual hygiene management in schools: An analysis of education policy documents in low- and middle-income countries', *International Journal of Educational Development*. Elsevier, 57(April), pp. 73–82. doi: 10.1016/j.ijedudev.2017.09.008.

Sommer, M. et al. (2020) 'Menstruation and homelessness: Challenges faced living in shelters and on the street in New York City', *Health and Place*. Elsevier Ltd, 66(July), p. 102431. doi: 10.1016/j.healthplace.2020.102431.

Sommer, M. et al. (2021) 'How addressing menstrual health and hygiene may enable progress across the Sustainable Development Goals', *Global Health Action*. Taylor & Francis, 14(1), p. 1920315. doi: 10.1080/16549716.2021.1920315.

Sommer, M., Kjellén, M. and Pensulo, C. (2013) 'Girls' and women's unmet needs for menstrual hygiene management (MHM): The interactions between MHM and sanitation systems in low-income countries', *Journal of Water Sanitation and Hygiene for Development*, 3(3), pp. 283–297. doi: 10.2166/washdev.2013.101.



- Sommer, M. and Sahin, M. (2013) 'Advancing the global agenda for menstrual hygiene management for schoolgirls', *American Journal of Public Health*, 103(9), pp. 1556–1559. doi: 10.2105/AJPH.2013.301374.
- Sooki, Z. *et al.* (2016) 'The Role of Mother in Informing Girls About Puberty: A Meta-Analysis Study', *Nursing and Midwifery Studies*, Inpress(Inpress), pp. 1–10. doi: 10.17795/nmsjournal30360.
- Sperling, G. B., Winthrop, R. and Kwauk, C. (2016) *What Works in Girls' Education*. The Brookings Institution Press.
- Srivastava, S. and Chandra, M. (2017) 'Study on the knowledge of school girls regarding menstrual and reproductive health and their perceptions about family life education program', *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, 6(2), p. 688. doi: 10.18203/2320-1770.ijrcog20170406.
- Ssemugabo, C. *et al.* (2020) 'A socio-ecological perspective of the facilitators and barriers to uptake of water, sanitation and hygiene interventions in a slum setting in kampala, uganda: A qualitative study', *Journal of Water Sanitation and Hygiene for Development*, 10(2), pp. 227–237. doi: 10.2166/washdev.2020.124.
- Starks, H. and Trinidad, S. B. (2007) 'Choose your method: A comparison of phenomenology, discourse analysis, and grounded theory', *Qualitative Health Research*, 17(10), pp. 1372–1380. doi: 10.1177/1049732307307031.
- STrauss, A and Corbin, J. (1994) *Handbook of Qualitative Research. Strategies of Inquiry; grounded theory - an overview*.
- Strauss, A. and Corbin, J. (1994) 'Grounded Theory Methodology', in Denain N, K. and Lincoln Y, S. (eds) *Handbook of Qualitative Research*. Thousand Oaks: Sage Publications Inc, pp. 273–285.
- Su, J. J. and Lindell, D. (2016) 'Promoting the menstrual health of adolescent girls in China', *Nursing and Health Sciences*, 18(4), pp. 481–487. doi: 10.1111/nhs.12295.
- Suarez-Lledo, V. and Alvarez-Galvez, J. (2021) 'Prevalence of health misinformation on social media: Systematic review', *Journal of Medical Internet Research*, 23(1). doi: 10.2196/17187.
- Sumpter, C. and Torondel, B. (2013) 'A Systematic Review of the Health and Social Effects of Menstrual Hygiene Management', *PLoS ONE*, 8(4). doi: 10.1371/journal.pone.0062004.
- Swachh Bharat Mission (2018) *Swachh Bharat Mission*. Available at: <http://swachhbharatmission.gov.in/SBMCMS/about-us.htm>.



- Tamiztousi, T. *et al.* (2019) 'Education for Menstrual Hygiene Promotion in Iranian Girls: A Systematic Review and Meta-Analysis', *International Journal of Pediatrics*, 7(6), pp. 9507–9515. doi: 10.22038/ijp.2019.36894.3213.
- Testa, A. C. and Coleman, L. M. (2006) 'Assessing research participants in schools: A case study of a UK adolescent sexual health survey', *Health Education Research*, 21(4), pp. 518–526. doi: 10.1093/her/cyh078.
- Tey, N. P., Lai, S. L. and Ng, S. T. (2019) 'AGE at MENARCHE and SEXUAL DEBUT among YOUNG Filipino WOMEN', *Journal of Biosocial Science*, 51(1), pp. 77–94. doi: 10.1017/S0021932017000682.
- Thomas, J. and Harden, A. (2008) 'Methods for the thematic synthesis of qualitative research in systematic reviews', *BMC Medical Research Methodology*, 8(45), pp. 1–10. doi: 10.1186/1471-2288-8-45.
- Tigges, B. B. (2003) 'Parental consent and adolescent risk behavior research', *Health Policy and systems*, pp. 283–289.
- Tindana, P. O., Kass, N. and Patricia, A. (2006) 'The Informed Consent Process in a Rural African Setting', *IRb Ethics and Human Research*, 28(3), pp. 1–6.
- Tingle, C & Vora, S. (2018) 'Break the Barriers : Girls ' Experiences of', *Plan International UK*, pp. 1–68. Available at: <https://plan-uk.org/file/plan-uk-break-the-barriers-report-032018pdf/download?token=Fs-HYP3v>.
- Tiwari, A., Ekka, I. J. and Thakur, R. (2018) 'Assessment of knowledge and practices regarding menstrual hygiene among adolescent girls of Government higher secondary school, station Murhipar, Rajnandgaon (C.G.)', *International Journal Of Community Medicine And Public Health*, 5(4), pp. 1335–1338. doi: 10.18203/2394-6040.ijcmph20180973.
- Tobi, H. and Kampen, J. K. (2018) 'Research design: the methodology for interdisciplinary research framework', *Quality and Quantity*. Springer Netherlands, 52(3), pp. 1209–1225. doi: 10.1007/s11135-017-0513-8.
- Townsend, N. and Foster, C. (2013) 'Developing and applying a socio-ecological model to the promotion of healthy eating in the school', *Public Health Nutrition*, 16(6), pp. 1101–1108. doi: 10.1017/S1368980011002655.
- Treasury, U. K. (2021) *Tampon Tax abolished from today*. Available at: <https://www.gov.uk/government/news/tampon-tax-abolished-from-today> (Accessed: 18 January 2023).



Tuli, A. *et al.* (2019) “‘it’s a girl thing’”: Examining challenges and opportunities around menstrual health education in india’, *ACM Transactions on Computer-Human Interaction*, 26(5). doi: 10.1145/3325282.

UN Organisation (no date) *We can End Poverty Millenium Development Goals and Beyond 2015*. Available at: <https://www.un.org/millenniumgoals/education.shtml> (Accessed: 6 December 2022).

UNESCO (2020) *Global education monitoring report 2020: Gender report, A new generation: 25 years of efforts for gender equality in education*. Available at: <https://en.unesco.org/gem-report/2020genderreport>.

United Kingdom Department for Education (2014) *Schools: Statutory guidance*. Available at: <https://www.gov.uk/government/collections/statutory-guidance-schools#curriculum> (Accessed: 9 February 2023).

United Kingdom Department for Education (2019) ‘Relationships Education, Relationships and Sex Education (RSE) and Health Education’, (November), pp. 1–6. Available at: https://consult.education.gov.uk/pshe/relationships-education-rse-health-education/supporting_documents/20170718_Draft_guidance_for_consultation.pdf.

United Kingdom Government (2019) *Index of Multiple Deprivation 2019*. Available at: <https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019> (Accessed: 9 August 2019).

United Kingdom Government (2021) *Free School Meals Autumn Term 2021*. Available at: www.explore-education-statistics.service.gov.uk/find-statistics/free-school-meals-autumn-term/2020-21-autumn-term (Accessed: 17 November 2021).

United Kingdom Government (2022) *Schools, Pupils and their Characteristics 2021/22, Explore Education Statistics*. Available at: <https://explore-education-statistics.service.gov.uk/find-statistics/school-pupils-and-their-characteristics#dataBlock-fdf8e3d7-4420-441d-8084-6a8d82ff4bea-tables> (Accessed: 9 January 2023).

United Nations Children’s Fund (UNICEF) and World Health Organization, 2018 (2018) *Drinking Water, Sanitation and Hygiene in Schools : Global baseline report 2018, Unicef*. Available at: https://washdata.org/sites/default/files/documents/reports/2018-11/JMP_WASH_in_Schools_WEB_final.pdf.

United Nations Press Release 16 January (2004) *No Development Tool More Effective Than Education of Girls, UN Press reselase 16 January 2004*. United Nations. Available at: <https://press.un.org/en/2004/sgsm9118.doc.htm> (Accessed: 7 February 2023).



- United Nations Sustainable Development Group UNSDG (2020) *SDGs Decade of Action*. Available at: <https://www.un.org/sustainabledevelopment/decade-of-action/> (Accessed: 6 December 2022).
- United Nations Sustainable Development Group UNSDG (no date) *Sustainable Development Goals*. Available at: <https://www.undp.org/sustainable-development-goals> (Accessed: 9 October 2023).
- Ussher, J. M. and Perz, J. (2006) 'Evaluating the relative efficacy of a self-help and minimal psycho-educational intervention for moderate premenstrual distress conducted from a critical realist standpoint', *Journal of Reproductive and Infant Psychology*, 24(4), pp. 347–362. doi: 10.1080/02646830600974147.
- Ussher, J. M. and Perz, J. (2020) 'Resisting the mantle of the monstrous feminine; Women's construction and experience of premenstrual embodiment', in *The Palgrave Handbook of Critical Menstruation Studies*, pp. 215–231.
- Valizadeh, S. et al. (2017) 'Educating Mothers and Girls about Knowledge and Practices toward Puberty Hygiene in Tabriz, Iran: A Randomized Controlled Clinical Trial', *Iranian Red Crescent Medical Journal*, 19(2). doi: 10.5812/ircmj.28593.
- Vygotsky, L. (1978) 'Interaction between learning and development', *Readings on the development of children*, 23(3), pp. 34–41.
- Wall, L. L. et al. (2016) 'A community-based study of menstrual beliefs in Tigray, Ethiopia', *International Journal of Gynecology & Obstetrics*, 135(3), pp. 310–313. doi: <https://doi.org/10.1016/j.ijgo.2016.05.015>.
- Wardle, S. L. et al. (2021) 'Feeding female soldiers: Consideration of sex-specific nutrition recommendations to optimise the health and performance of military personnel', *Journal of Science and Medicine in Sport*. Elsevier Ltd, 24(10), pp. 995–1001. doi: 10.1016/j.jsams.2021.08.011.
- Whitehead, S. and Biddle, S. (2008) 'Adolescent girls' perceptions of physical activity: A focus group study', *European Physical Education Review*, 14(2), pp. 243–262. doi: 10.1177/1356336X08090708.
- Willows, N. D., Hanley, A. J. G. G. and Delormier, T. (2012) 'A socioecological framework to understand weight-related issues in Aboriginal children in Canada', *Applied Physiology, Nutrition and Metabolism*, 37(1), pp. 1–13. doi: 10.1139/H11-128.
- Wilson, E. et al. (2015) 'Does Menstrual Hygiene Matter?', *SCHARR Report Series*, 31(August).



Wong, C. L., Ip, W. Y. and Lam, L. W. (2016) 'Original Article Self-Care Strategies among Chinese Adolescent Girls with Dysmenorrhea : A Qualitative Study', *Pain Management Nursing*. American Society for Pain Management Nursing, 17(4), pp. 262–271. doi: 10.1016/j.pmn.2016.04.001.

World Bank (2022) *Countries and Economies*. Available at:

<https://data.worldbank.org/country> (Accessed: 9 January 2023).

Yilmaz, S. K., Bohara, A. K. and Chowdhury, S. R. (2020) 'Touch for Health: Use of Pavlovian Processes with Physical Touch as a Means to Improve Menstrual Hygiene Management Initiatives, Measured by Willingness to Pay', *PharmacoEconomics - Open*. Springer International Publishing, 4(2), pp. 263–276. doi: 10.1007/s41669-019-0168-6.

Van Zyl, C. *et al.* (2021) 'Unravelling low-resource settings': A systematic scoping review with qualitative content analysis', *BMJ Global Health*, 6(6), pp. 1–14. doi: 10.1136/bmjgh-2021-005190.



Appendices

Appendix 1 Abbreviations

LMIC Low-and-Middle Income Country

HIC High Income Country

HIV Human Immunodeficiency Virus

FGM Female Genital Mutilation

GBV Gender-Based Violence

WASH Water, Sanitation and Hygiene

BPfA Beijing Declaration Platform for Action

UNESCO United Nations Educational, Scientific and Cultural Organisation

MDG Millenium Development Goals

SDG Sustainable Development Goals

NGO Non-Government Organisation

UNICEF United Nations International Children's Emergency Fund

WinS WASH in Schools

FSH Follicle Stimulating Hormone

RSE Relationship and Sex Education

LRS Low-Resource Settings

KAP study Knowledge, Attitude and Practices Study OR Knowledge, Attitude and Perceptions Study

CBO Community Based Organisation

NIHR National Institute for Health Research

ALS Alternative Learning System

OOSY Out-of-school-youth



EMP Eclectic Methodological Pluralism

PIL Participant Information Leaflet

GLM General Linear Model

PRISMA Preferred Reporting Items for Systematic Reviews and Meta-analyses

MMAT Mixed methods appraisal tool



Appendix 2 Facebook recruitment adverts



Appendix 3 Systematic Review published in the BMJ Open

TITLE PAGE

Title:

A systematic Review of Educational Interventions to improve the Menstrual Health of young adolescent girls.

Authors:

Ms Rebecca Lane-Evans, Warwick Medical School, Warwick Medical School, University of Warwick, Coventry, CV4 7AL United Kingdom.

Ms Chinwe Onuegbu, Warwick Medical School, Warwick Medical School, University of Warwick, Coventry, CV4 7AL United Kingdom.

Dr Bronwyn Harris, Warwick Medical School, Warwick Medical School, University of Warwick, Coventry, CV4 7AL United Kingdom.

Professor Frances Griffiths, Warwick Medical School, Warwick Medical School, University of Warwick, Coventry, CV4 7AL United Kingdom.

Word Count: 4186

ABSTRACT

Objectives

To systematically review interventions that include an element of menstrual education delivered to young adolescent girls.

Design

This was a systematic review and meta-analysis. Selected articles were quality assessed using the Mixed Methods Assessment Tool (MMAT) quality appraisal checklist. A meta-analysis was conducted on a subset of articles that provided quantitative results, and the effect size of the intervention was calculated using Cohen's *d*. A logic model was constructed to frame the effect of Menstrual Education Interventions on Menstrual Health.

Setting

Papers reporting on interventions in High and Low-and Middle-Income countries were sought.

Information Sources

Seven electronic databases were searched for English-language entries that were published between January 2014 and May 2020.

Participants

The interventions were aimed at younger adolescent girls aged 10 -14 years old.

Interventions



The interventions were designed to improve the Menstrual Health of the recipients, by addressing one or more elements of Menstrual Knowledge, Attitude or Practices (KAP).

Eligibility criteria

Interventions in which there was a component of menstrual information transfer were included. Interventions which had not been evaluated were excluded.

Primary and Secondary Outcomes

The most common type of output was a difference in knowledge or skill score ascertained from a pre- and post-test. Some studies measured additional outcomes, such as attitude or confidence.

Results

Twenty-four eligible studies were identified. Nineteen addressed Menstrual Knowledge, and five addressed Menstrual Skills such as pad replacement or cup insertion. The number of participants varied from 1 to 2564. The total number of participants was 10362. All studies reported improvements in menstrual Knowledge, Attitudes and Practices. The meta-analysis indicates that larger effect sizes were attained by those that encouraged discussion than those that distributed pamphlets.

Conclusions

Education interventions are effective in increasing the menstrual knowledge of young adolescent girls and skills training improves competency to manage menstruation more hygienically and comfortably. Interactive interventions, with discussions, are more motivating than didactic or written. Sharing concerns gives girls confidence and helps them to gain agency on the path to menstrual health.

STRENGTHS AND LIMITATIONS

- This review is of the international literature including high and low-and-middle-income countries
- It utilises mixed methods approaches and synthesises both quantitative and qualitative studies
- A logic model has been constructed to frame the effect of Menstrual Education Interventions on Menstrual Health
- There may be publication bias in the reporting of positive outcomes only
- A full meta-analysis was not possible due to heterogeneity in methods

INTRODUCTION



Globally, young adolescent girls are ill-prepared for menarche and menstruation (Mason *et al.*, 2013; Marván and Alcalá-Herrera, 2014; Chandra-Mouli and Patel, 2017; Setyowati, Rizkia and Ungsianik, 2019). In many cultures, menstruation is a taboo subject (Shah *et al.*, 2019) and many girls are ignorant of it until they start bleeding (Sharma *et al.*, 2015). Negative experiences of menarche and early menstruation can cause poor Menstrual Health (Marván and Alcalá-Herrera, 2014; Coast, Lattof and Strong, 2019).

'Menstrual Health' is an emerging area of Health Research. It is a broad term which encompasses the hygienic management of menstruation and the psychological components of well-being such as confidence, dignity and self-esteem (Ramaiya *et al.*, 2019; Nalugya *et al.*, 2020). It is an expansion of the concept of Menstrual Hygiene Management (MHM), mostly used in Low- and Middle- Income Country (LMIC) contexts to describe the challenges of hygienically managing menstruation with a lack of resources, especially pads, water and soap (House, Mahon and Cavill, 2013; Ellis *et al.*, 2016; Hennegan, 2017). The use of dirty rags to absorb menstrual blood has been proposed as a cause of Reproductive Tract Infections (RTIs) and cervical cancer (Sumpter and Torondel, 2013; Rani, Sharma and Singh, 2016; Tiwari, Ekka and Thakur, 2018), as infectious agents may be introduced into the reproductive tract from such materials. Even clean materials that are not changed regularly may smell (Mason *et al.*, 2013) and some materials can cause chafing and irritation. Without sufficient water to wash the blood from their genitals or their hands (Sommer, Kjellén and Pensulo, 2013), girls can become uncomfortable and anxious (Hennegan, 2019). Several studies in LMIC have shown that menstruation is associated with a reduction in participation in activities and an increase in school absenteeism (Sumpter and Torondel, 2013; Hennegan *et al.*, 2017; Kansiiime *et al.*, 2020). In High Income Countries (HIC), 'Period Poverty' has only recently been recognised as an issue for certain groups, such as homeless women (Sebert Kuhlmann *et al.*, 2019), but a whitepaper by PHS Group UK (a Hygiene Services provider in the UK) suggests period poverty is more wide-reaching, particularly amongst school girls, and is a factor contributing to menstrual anxiety and school absenteeism (PHS, 2019). Significantly less research has been conducted in HICs around menstruation and participation, although it is widely recognised that girls drop out of sports activities around the age of puberty (Biddle *et al.*, 2005; Whitehead and Biddle, 2008).

Discussing menstruation is almost universally a taboo, making it difficult for girls to learn about it and know what is normal or when to seek help. A study by Gultie *et al* 2014 into Menstrual Knowledge of adolescents in Ethiopia found that 33% of participants never talked about it with anyone (Gultie, Hailu and Workineh, 2014). In Jordan, a phenomenological analysis of experiences of menarche reported that girls believed talking about menstruation was 'rude' (Al Omari, Razeq and Fooladi, 2016). A study into puberty communication in the Czech Republic and China found that both men and women were complicit in perpetuating menstrual stigma, with mothers instructing their daughters to keep their menstrual status 'secret' (Raskova and Stolinska, 2017). In India, Rani *et al* 2016 found that although 61.3% of adolescent girls suffered from debilitating dysmenorrhea, they felt they were expected to 'tolerate' it as a natural process and only 1.6% had ever consulted a physician (Rani, Sharma and Singh, 2016).

Menstrual knowledge usually comes from mothers (Coast, Lattof and Strong, 2019) but a number of studies have shown that the knowledge of mothers themselves may be



incomplete (Bennett and Harden, 2014; Afsari, 2017) and they may actually perpetuate cultural myths and misinformation (Sooki *et al.*, 2016; Valizadeh *et al.*, 2017). In HICs such as Australia and the UK, menstruation may be taught at school as part of sex education, if it is mentioned at all, but many girls do not get the practical information that they need (Collier-Harris and Goldman, 2017; Tingle, C & Vora, 2018). In both HIC and LMIC non-government agencies have stepped in to try to plug the gap by providing Menstrual Education Interventions.

In this review our objective was to describe and evaluate the impact of menstrual education interventions intended to equip young adolescent girls with the knowledge and skills to promote Menstrual Health.

Two previous reviews of papers published prior to January 2015 focussed on the more narrow 'Menstrual Hygiene Management' in LMIC (Sumpter and Torondel, 2013; Hennegan and Montgomery, 2016). The term Menstrual Health is now preferred to hygiene, partly to avoid the suggestion that menstruation *per se* is unclean, but mostly to emphasize the holistic nature of the menstrual experience. This literature review only includes publications since 2014 in order to capture that change.

METHODS

This is a systematic review of published literature of interventions that include an element of menstrual education delivered to young adolescent girls. We report according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

Patient and Public Involvement

No patient involvement.

Publication Date and Language

This review draws upon papers published from January 2014 until May 2020 to bring the field up to date. Only reviews published in the English language have been included.

Participants

For this review we were interested in interventions targeted at young adolescent girls aged 10 -14 years old.

Inclusion and Exclusion Criteria

Studies of interventions which had been evaluated were sought.

All interventions which had a component of menstrual information transfer were included if the intervention sought to:

- Increase knowledge of menstruation to reduce anxiety and shame, and normalise the



- experience
- Increase skills and competencies to manage menstruation comfortably and hygienically
- Increase awareness of strategies for self-care of menstrual symptoms

Interventions that were straightforward ‘Menstrual Education’ in which lessons about puberty, anatomy, and hygiene were delivered by teachers or other educators, to both boys and girls, were eligible. Interventions focussed on skills training, such as correct menstrual cup insertions, and delivered by nurses or other key workers were also eligible. Programmes that facilitated peer or self-guided learning through the provision of resources or spaces (both physical and remote) for learning to occur were also eligible for inclusion.

Studies were excluded if the improvements were in hardware such as toilets or pads without any accompanying education or training, or if they provided hygiene education without reference to menstruation specifically. Studies were excluded if they were about abnormal menstruation, menstrual problems as a co-morbidity, or if the research was investigating endocrinology or non-human models. Studies that described existing Knowledge, Attitudes and Practice without any intervention were also excluded.

Studies that included adolescents up to the age of 19 were not excluded if the aim were to instruct menstruators with limited experience of menstruation. Some studies included older girls because they were intellectually disabled and were part of the intervention based on intellectual age rather than chronological age. Some studies included older girls because they were members of classes assigned by grade rather than age. Studies about interventions aimed at adult women were excluded.

Study design and quality were not part of the criteria to capture as broad an interpretation of menstrual education as possible.

Protocol for Identification of Academic Literature

Screening

As the field of Menstrual Health Education is highly interdisciplinary, we searched key medical and social science databases: ASSIA Applied Social Science Index and Abstracts; CINAHL Cumulative Index to Nursing and Allied Health Literature; EMBASE Excerpta Medica database; MEDLINE Medical Literature Analysis and Retrieval System Online; Sociological Abstracts; Web of Science; IBBS International Bibliography of the Social Sciences; TRoPHI Trials Register of Promoting Health Interventions.

The search parameters combined the target population, menstruation, education and programme.

Table 1. Search Terms Used

Search Terms Used
Search term 1



'adolescen* OR girl* OR teenage* OR youth* OR young OR pre-adolescen* OR school-girl OR Out-of-School-Youth OR OOSY OR female OR woman AND Search term 2 Menstrua* OR menarche* OR mense* OR catamenia OR menarche* OR menstrual health OR menstrual hygiene OR menstrual management OR sanitation OR menstrual etiquette AND Search term 3 know* OR understand* OR manage* OR learn* OR apprenhe* OR comprehensi* OR educat* OR aware* OR familiar* OR proficien* AND Search term 4 AND arrangement* OR evaluat* OR initiative* OR intervention* OR model* OR package* OR pilot* OR program* OR project* OR provision* OR regime* OR scheme* OR strateg* OR trial* OR approach* OR polic*		
Database Returns		
Database	Search Terms and filters	Returns
ASSIA (proquest)	1 (ab), 2 (ti), 3 (ab), 4 (ab) 01/01/14 to 01/09/19	15
CINAHL	1 (ab), 2 (ti), 3 (ab), 4 (ab) 01/01/14 to 01/09/19	126
EMBASE Including MEDLINE	1 (ab), 2 (ti), 3 (ab), 4 (ab) 2014 -2019 English, Female	732
Sociological abstracts (proquest)	1 (ab), 2 (ti), 3 (ab), 4 (ab) 01/01/14 to 01/09/19	14
Web of Science	TS=(1), (3), (4) AND Ti=(2) Last 5 years	323
IBBS (proquest)	1 (ab), 2 (ti), 3 (ab), 4 (ab) 01/01/14 to 01/09/19	26
TRoPHI (Eppi centre, google)	No wild cards Title Menstruation and Knowledge 2014-2019	4
TOTAL SAVED to EXCEL		1240

Two reviewers (RE and CO) screened abstracts and full texts of all citations obtained for eligibility independently. Data extraction of eligible material and the quality assessment was conducted by RE using a data extraction framework agreed upon by FG, BH and RE. The quality assessment tool was agreed upon by RE, FG and BH. RE used the MMAT to assess the quality and this was verified by FG and BH.

Outputs and Data Extraction

The outputs of Menstrual Education are changes to Menstrual Knowledge, Attitudes and Practices (KAP). In quantitative studies, Pre- and Post-Intervention KAP scores were collected, as well as data to support the validity of the scores, such as sample frame and number of participants. Other descriptive measures used in qualitative studies and



contextual factors that might have a bearing on the outputs were also recorded where given.

Quality Assessment

We used the Mixed Methods Appraisal Tool (MMAT) for quality assessment because it is suitable for a variety of study designs. The MMAT components focus on the clarity of the research questions and the appropriateness of the data collection methods. Our intention was to consider the MMAT assessment in the interpretation of study findings.

Analysis and Synthesis

Quantitative analysis

The results of quantitative studies were tabulated for comparison. Not all data could be converted but for studies that reported quantitative results with a pre- and post- test score of Menstrual Knowledge, we found the effect size by calculating the Standard Mean Difference using Cohen's *d*. Effect sizes can lie between 0 and infinity. Cohen suggested that a small effect size is a value of 0.2, a medium one is 0.5 and a large one is 0.8. Some social science disciplines report much larger sizes and the statistical guidance was revised to suggest that a medium effect is the average of those in the relevant literature (Hemphill, 2003; Gignac and Szodorai, 2016). However, Cohen's *d* has not previously been calculated for this discipline. We found the average of those in this review and ranked the results accordingly (Bakker *et al.*, 2019).

Qualitative analysis

A Qualitative Comparative Analysis (QCA) (Thomas and Harden, 2008) was made of all studies by scrutinising the data extracted for common themes and reporting them in a narrative summary.

Synthesis: Building A Logic Model

Logic models enable the key findings of the analysis to be synthesized into a theory of change. We constructed a logic model to frame the effect of Menstrual Education Interventions on Menstrual Health.

RESULTS

A total of 1240 papers were recovered using the search terms. 900 remained after the removal of duplicates and 48 were saved to Excel for full text screening. 852 did not meet the inclusion criteria. This was largely because they were not interventions but studies of menstruation.

PRIFLO

Figure 1. PRISMA Flow-chart



Study Characteristics

Twenty-four papers met the inclusion criteria: They were grouped into the following categories of study design according to the MMAT Quality Appraisal tool: 12 Randomised Controlled Trials (RCTs); 5 quantitative descriptive studies; 1 quantitative non-random study; 5 mixed-methods studies and 1 qualitative study. *See Supplementary Files for further detail on study design.*

The study dates ranged from 2012 to 2017, with dates of publication ranging from 2014 to 2019. Studies were undertaken in Iran (six), Turkey, Indonesia (two), Ethiopia, India (four), Bangladesh, Uganda (four), USA, Nepal, Kenya (two) and China.

Of the studies, two included boys (Hurwitz *et al.*, 2018; Kansime *et al.*, 2020; Nalugya *et al.*, 2020); one included mothers (Afsari, 2017; Valizadeh *et al.*, 2017) and two focussed on intellectually-disabled adolescent girls (Altundağ and Çalbayram, 2016; Ariyanti and Royanto, 2018). The number of study participants varied from 1 to 2564. The total number of participants in the 20 different intervention studies was 10362.

The amount of time after the completion of the intervention to the assessment varied from the same day to up to 5 years, with 13 of the studies in the range of 1 – 9 months, and the mode being 1 month. A common theme was allowing one menstrual cycle to pass before re-testing.

Delivery

Eight of the interventions used health professionals as instructors (Sharma *et al.*, 2015; Altundağ and Çalbayram, 2016; Montgomery *et al.*, 2016; Chadalawada, Devi and Rani, 2017; Valizadeh *et al.*, 2017; Van Eijk *et al.*, 2018; Ramaiya *et al.*, 2019; Jarrahi, Golmakani and Mazlom, 2020; Nalugya *et al.*, 2020). Five were researcher-led (Afsari *et al.*, 2015; Mokari, Khaleghparast and Samani, 2016; Su and Lindell, 2016; Valizadeh *et al.*, 2017; Ariyanti and Royanto, 2018); five were led by teachers (Haque *et al.*, 2014; Blake *et al.*, 2018; Morrison *et al.*, 2018; Sivakami *et al.*, 2019; Kansime *et al.*, 2020); two used peer-educators (Ramaiya *et al.*, 2019; Jarrahi, Golmakani and Mazlom, 2020) and the others did not make it clear. A wide range of intensity and duration models were used, ranging from three 5-minute videos in the space of one afternoon (Hurwitz *et al.*, 2018) to 1 hour per day for four months (Chadalawada, Devi and Rani, 2017). Only two embedded menstrual education into the school curriculum (Morrison *et al.*, 2018; Sivakami *et al.*, 2019).

Quality Assessment

The methodological quality of study designs was mixed: Eleven were rated as high quality and thirteen as moderate to low. Those considered to be of the highest quality were randomized controlled trials which included comparison groups. Some of the studies (nine) did this at the whole-school level which is recommended in educational interventions to prevent contamination of the intervention group with the control (Hutchison and Styles, 2010). The research questions were clear and the data collection methods appropriate. Of the other studies, several methodological limitations were noted; commonly, neither the delivery team nor the participants were blinded (nine); adequate randomization of the participants was lacking (ten) and /or relevant confounds were not identified or controlled



(four). The quality of data analysis also varied considerably, with the weakest having small sample sizes and no measure of statistical significance (two).

Interventions

There was a range of intervention types. Eight of the interventions employed traditional education in the form of didactic teaching, sometimes supplemented with posters, flip-charts, and question-and-answer sessions (Mokari, Khaleghparast and Samani, 2016; Montgomery *et al.*, 2016; Su and Lindell, 2016; Chadalawada, Devi and Rani, 2017; Hennegan *et al.*, 2017; Kheirollahi *et al.*, 2017; Morrison *et al.*, 2018; Sivakami *et al.*, 2019). Two interventions employed a more formal lecture presentation and gave out some supporting literature (Afsari *et al.*, 2015; Valizadeh *et al.*, 2017). Two interventions used stories and video presentations (Ariyanti and Royanto, 2018; Hurwitz *et al.*, 2018) and two interventions distributed puberty books (Blake *et al.*, 2018; Setyowati, Rizkia and Ungsianik, 2019) without further teacher input. Three interventions facilitated learning through peer-education (Arasteh *et al.*, 2019; Ramaiya *et al.*, 2019; Jarrahi, Golmakani and Mazlom, 2020) and seven different interventions focussed on Menstrual Hygiene Management training: some demonstrated pad usage with a menstrual kit (Haque *et al.*, 2014; Ariyanti and Royanto, 2018; Kansime *et al.*, 2020; Nalugya *et al.*, 2020) or using a doll (Altundağ and Çalbayram, 2016) and two instructed participants on the use of menstrual cups (Penelope A Phillips-Howard *et al.*, 2016; Van Eijk *et al.*, 2018).

Aims of the Studies

The common aim of the studies was to evaluate the impact of a Menstrual Education Intervention on Menstrual Health for adolescent girls. A number of studies were more broadly about puberty education (Afsari *et al.*, 2015; Mokari, Khaleghparast and Samani, 2016; Valizadeh *et al.*, 2017; Blake *et al.*, 2018; Hurwitz *et al.*, 2018; Morrison *et al.*, 2018). Several studies measured Menstrual Knowledge, Attitudes and Practices (KAP) (Haque *et al.*, 2014; Sharma *et al.*, 2015; Su and Lindell, 2016; Valizadeh *et al.*, 2017; Chadalawada, Devi and Rani, 2017; Kheirollahi *et al.*, 2017; Blake *et al.*, 2018; Hurwitz *et al.*, 2018; Arasteh *et al.*, 2019; Setyowati, Rizkia and Ungsianik, 2019; Jarrahi, Golmakani and Mazlom, 2020). Nearly all of the studies used a pre-test, post-test model but one study used a post-test only model (Hurwitz *et al.*, 2018). A small number specifically focussed on Menstrual Hygiene Management and evaluated training on pad replacement or cup insertion (Altundağ and Çalbayram, 2016; Hennegan and Montgomery, 2016; Montgomery *et al.*, 2016; Penelope A Phillips-Howard *et al.*, 2016; Van Eijk *et al.*, 2016; Ariyanti and Royanto, 2018; Jarrahi, Golmakani and Mazlom, 2020; Kansime *et al.*, 2020; Nalugya *et al.*, 2020).

Analysis

The quantitative and qualitative results are reported under four main themes: Menstrual Knowledge, Menstrual Attitudes, Menstrual Practices and Multi-component interventions.



Quantitative results

Menstrual Knowledge.

A meta-analysis was conducted on 11 studies which measured a change in menstrual knowledge following an intervention. A visual inspection of forest plots showed that all studies found a significant improvement in menstrual knowledge. Where studies reported the mean and standard deviation of a menstrual knowledge questionnaire, we calculated the effect size (Cohen's d). (See table 2).

The average effect size of studies in this review was 3.44. Taking this as a medium effect size, we ranked them lowest – highest and suggest that <2 is low and >5 is high. Where we could not calculate an effect size, we have calculated % change in score. Due to the limited and heterogeneous nature of the data, we interpret the results only relative to the other studies in this review.

The effect size of those that distributed pamphlets and books was lowest at 0.33 (Valizadeh *et al.*, 2017), followed by those that showed videos 1.40 (Hurwitz *et al.*, 2018) and then lectures with question and answer sessions 2.13 (Su and Lindell, 2016) and 4.81 (Kheirollahi *et al.*, 2017). Small group or peer-teaching was high at 5.337 and 10.044 respectively. Large effect sizes may occur due to small sample sizes.



Table 2 Effect size of interventions designed to improve menstrual knowledge

Study type and measure	First author and date of publication	Intervention	Number of questions / N	Reliability/ Cronbach's alpha (except where stated otherwise)	Sample size / n	Treatment	Mean / arbitrary units (except where stated otherwise)	Standard Deviation / Arbitrary units (except where stated otherwise)	Number of individuals scoring > 75% (good)	% change in number of individuals scoring >75%	Statistical test / p value	Effect size / Cohen's d / Rank and Impact
Control and intervention pre-test, post test	Blake et al 2018	Distribution of puberty education books in the local language	9	0.77	318	control	(Mean Difference = 0.18)	(Pooled SD = 1.4)	No data		Wald Chi-squared, <0.001	0.79 Second Low
					318	intervention	(MD = 1.06)	(Pooled SD = 1.52)				
	Jarrahi et al 2020	Small group and peer teaching	34	0.78	30	control pre	45.1	8.4	No data		Kruskal-Wallis test, <0.001	small group 5.34 Eighth High
					30	control post	52.2	1				
					30	intervention 1 pre (small group)	48.3	6.1				
					30	intervention 1 post	84.5	8.5				
					30	intervention 2 pre (peer)	44.1	1.7				Peer group 10.04 Ninth High



					30	intervention 2 post	93.3	5.7					
Setyowati et al 2019	Booklet distriution	14	0.886	87	control pre	No data	No data	No data	No data	Chi-squared<0.001	(medium)		
				87	control post							17.2	
				87	intervention pre							58.6	54.95
				87	intervention post							90.8	
Sharma et al 2015	Interactive Teaching programme led by School Nurses	15	test, retest r = 0.93	25	control pre	8.02	No data	No data	No data	t-test <0.001	4.48 Sixth Medium		
				25	control post							8.06	
				25	intervention pre							8.04	
				25	intervention post							12.6	
Su et al 2016	Lecture, question and answer session	13	KR20= 0.64	56	control pre	5.5	2.54	No data	No data	t-test <0.001	2.13 Fifth Medium		
				56	control post							5.71	2.3
				60	intervention pre							5.73	2.56
				60	intervention post							10.22	1.92



	Valizadeh et al 2017	Lecture, booklet and pamphlets	15	0.72	120	control pre	8.5	2.5	No data		general linear model <0.002	0.33 First Low
					120	control post	9.1	2.4				
					124	intervention pre	8.2	2				
					124	intervention post	9.8	1.8				
	Kheirollahi et al 2017	Lecture, question and answer session	23 (100 point scale)	0.8	76	control pre	52.58	6.58	No data		t-test <0.001	4.81 Seventh Medium
					76	control post	52.77	6.87				
					76	intervention pre	55.83	6.77				
					76	intervention post	86.36	7.11				
Control and intervention post-test only	Hurwitz et 2017	Health education videos, using animation	27	0.72	40	control	11.27	3.73	No data		t-test <0.001	1.40 Third Low
					40	intervention	15.67	2.4				
one group pre-test, post test	Arasteh et al 2019	Group counselling and pamphlets	15	0.8	30	pre	6.8	3.32	No data		Chi-squared <0.001	1.64 Fourth Low
					30	post	11.3	2				
	Haque et al 2014	Training with Field manual by medical professionals	10	0.73	416	pre	No data	No data	51	61.57	chi-squared <0.05	(high)
					416	post			82.4			



	Chadawada et al 2017	Didactic teaching with posters, and videos	4	no data	250	pre			72.7	19.12	chi-squared<0.05	(low)
					250	post			86.6			



Menstrual Attitudes. Five studies measured Menstrual Attitudes (Haque *et al.*, 2014; Afsari *et al.*, 2015; Su and Lindell, 2016; Hurwitz *et al.*, 2018; Setyowati, Rizkia and Ungsianik, 2019).

Four interventions reported significantly different ($p < 0.05$) attitude scores, and three of those provided pamphlets that addressed cultural restrictions (Haque *et al.*, 2014; Afsari *et al.*, 2015; Setyowati, Rizkia and Ungsianik, 2019). The other was an intervention on dysmenorrhea and self-care and included pamphlets with video and peer-sharing. Girls who had taken part had a significant increase in confidence and decrease ($p < 0.001$) in 'bothersome' menstrual attitude (Su and Lindell, 2016). The only intervention which did not find a significant difference in attitude pre- and post-test involved puberty education videos shown to early adolescent boys and girls (Hurwitz *et al.*, 2018).

Menstrual Practice. An intervention that trained intellectually-disabled adolescents in an 18-item pad replacement skill set found that pre-training and post-training differences were statistically significant ($p < 0.001$) (Altundağ and Çalbayram, 2016). A feasibility trial into the use of the menstrual cup by school girls in Kenya (Van Eijk *et al.*, 2018) found that usage increased as time went on and culminated in 96% usage after nine months. There was also an increase in hygiene, with the menstrual cup reported as reducing the prevalence of STIs from 19.2% to 12.9% ($p = 0.018$) (Penelope A Phillips-Howard *et al.*, 2016).

Multi-component interventions

An education intervention in India was part of a bigger project that involved pad provision and improved sanitation in schools. After four years, compared to unimproved schools, school attrition had fallen from 11% to 6% ($P < 0.003$) (Sivakami *et al.*, 2019). The effect of menstrual education alone cannot be separated out.

Qualitative results

Menstrual Knowledge. All studies reported an increase in Menstrual Knowledge. Interventions that used peer education and group counselling (Ramaiya *et al.*, 2019; Jarrahi, Golmakani and Mazlom, 2020) were as effective as those delivered by medical professionals (Haque *et al.*, 2014).

Those interventions that had a degree of interactivity were more effective than those that only gave out information. Those that encouraged discussions found that they led to an increased willingness to talk about menstruation and a greater awareness of what is normal (Mokari, Khaleghparast and Samani, 2016; Ramaiya *et al.*, 2019).

Only two interventions embedded menstrual education into the school curriculum (Morrison *et al.*, 2018; Sivakami *et al.*, 2019). In Nepal, some schools had received the WASH in Schools programme (WinS) (United Nations Children's Fund (UNICEF) and World Health Organization, 2018). However, the girls were highly critical of their teachers, especially male teachers. They complained that 'Teachers often got embarrassed, referred students to their textbook, and did not answer questions' (Morrison *et al.*, 2018).

Menstrual Attitudes. Most studies commented on an improved menstrual attitude and one noted a reduction in anxiety (Mokari, Khaleghparast and Samani, 2016). More than one study noted an improvement in confidence in performing menstrual health care behaviour, such as requesting pain relief for dysmenorrhea (Su and Lindell, 2016). Some studies observed an increased confidence of girls to push back against cultural restrictions, or harmful practices (Haque *et al.*, 2014; Mokari, Khaleghparast and Samani, 2016; Hennegan *et al.*, 2017; Ramaiya *et al.*, 2019; Bhagwat and Jijina, 2020).

Menstrual Practices. Skills are required to use pads and cups so that they are positioned correctly, are comfortable and don't leak. The cup feasibility trial in Kenya found that on-going training and support may be required to master the technique over a period of six months to one year (Penelope A Phillips-Howard *et al.*, 2016; Van Eijk *et al.*, 2018). Education was also found to be an important component of skill acquisition in Uganda, where pad-provision accompanied by education was shown to be more effective than pad-provision alone (Hennegan *et al.*, 2017).

Multi-component interventions

The MENISCUS intervention in Uganda attributed its success to the synergy of five combined elements; teacher training on puberty education, a drama skit, pad provision, pain relief provision, and Water, Sanitation and Hygiene (WASH) facility improvements (Nalugya *et al.*, 2020).

Synthesis: The Logic Model

Guided by logic models developed for school-based interventions (Harris *et al.*, 2019), we worked backwards from the higher order aim of good Menstrual Health to propose a chain of causal events.

The aim of good Menstrual Health is the distal outcome to the intervention. It is characterized by girls feeling empowered and having agency to make choices about their own bodies and lives. They can choose a suitable menstrual product to meet their individual needs. They track their menstrual cycle to be well-prepared so that they are not caught out at school and have to go home, and they engage as necessary with reproductive health services, without shame or stigma. Girls that have agency are able to control their menstruation and not the other way around. They can focus on their school work and reach their potential.

Preceding the distal outcome is the intermediate outcome; unrestricted mobility and participation. Girls should be able to carry out normal activities such as eating/drinking with the family, attending school and playing sport when they are menstruating. This requires confidence in their own ability to manage outside of the confines of the house, and determination to enter spaces from which they are traditionally excluded.

Below that is the proximal outcome; hygienic and comfortable menstruation management. Girls should be able to use suitable menstrual products. They should be able to use water and soap to clean away menstrual blood, and they should be able to practise self-care to relieve the symptoms of dysmenorrhea, such as yoga. If they need painkillers or a rest, they should be able to request them of parents and teachers without embarrassment.

Menstrual KAP underpins these outcomes. In a theory of change, girls require knowledge of the menstrual cycle to prepare products. They may need skills to use the products correctly to avoid the risk of discomfort, leaks or of contracting reproductive tract infections. They may need confidence to ask for products and services. They may need awareness of self-care practices. They should know what is normal and when to seek help.

Inputs and Outputs to the Logic Model

Menstrual Education and training are the inputs. The output is improved menstrual knowledge, attitude and practices (KAP). The outputs are linked to the outcomes.

LOGMOD

Figure 2 The Logic Model

The results of the review provide evidence that menstrual education improves the menstrual knowledge, attitude and practices (KAP) of young adolescent girls. It is suggested that increasing the menstrual KAP of girls increases their confidence to seek further knowledge and skills in a positive feedback loop (see fig 2). Menstrual Education is viewed as underpinning the logic model and is the first step to achieving Menstrual Health.

DISCUSSION

All twenty-four included studies that evaluated some form of menstrual education intervention reported that there was a measurable improvement in the Menstrual Knowledge, Attitude or Practices of young adolescent girls. Menstrual experience and need may be the motivators, as there was little improvement in the knowledge or attitude of very early adolescent girls or boys.

Most of the interventions were delivered in the school setting where it is relatively easy to reach the target group, although only two embedded the education into the school curriculum. In theory, schools should have good coverage and objectivity for delivery of this sensitive information at an appropriate time. However, teachers themselves may be ill-equipped to teach about menstruation without proper training (United Kingdom Department for Education, 2019).

A larger effect was gained with the more interactive interventions that included question and answer sessions. We suggest that this relates to the higher degree of participation, and concurs with current educational philosophy about the importance of active learning (Freeman *et al.*, 2014), based on constructivist theory (Dewey, 1938; Vygotsky, 1978). Gardner added to Dewey's early work on active learning when he described 'transformative' teaching. This involves using a range of methods that encourage the learner to find their own entry point and engage with the subject, often utilising space and creativity, and linking with their own experience (Achkovska Leshkovska and Miovska Spaseva, 2016). Discussing menstruation gives the girls agency to determine what it is that they need to know for themselves.

Those interventions that demonstrated skills and allowed for physical touch were also very effective. Other hygiene interventions that have been evaluated have pointed to the positive impact of a physical interaction with the tools of behaviour change (Yilmaz, Bohara and Chowdhury, 2020).

A logic model has been constructed to frame the effect of menstrual education interventions on Menstrual Health. Menstrual Education is seen as underpinning all desirable outcomes and programmes can be optimised by including an education aspect. There was evidence that interventions were successful in normalising menstruation and improving menstruation management, which is the proximal outcome of the logic model. There was more limited evidence for an improvement in school attendance and mobility or a refusal to accept menstrual restrictions. These are intermediate outcomes and it might be expected to take some time to move from the proximal to the intermediate outcomes in the theory of change.

Multi-component interventions may be more successful than single components in achieving the distal outcome of Menstrual Health and Well-being. Girls need an enabling environment as well as knowledge. From a constructivist perspective which places learning within a social context (Vygotsky, 1978; Lock and Strong, 2010) interventions that seek to improve the menstrual literacy of the whole community and reduce menstrual stigma may be more effective in achieving the macro-distal outcomes of girl empowerment and gender equality.

Implications for Policy and Practice

This review provides evidence that menstrual education has a positive effect on the menstrual knowledge, attitudes and practices of adolescent girls and needs to be delivered by trained personnel who are confident to lead discussion. Especially but not exclusively in LMIC, where resources are limited, it would be prudent to ensure that menstrual education is embedded into the school curriculum and that teachers receive specialist training.

Progress towards Menstrual Health is limited without an enabling environment. In order to achieve the more distal outcomes of the logic model, programme and policy makers need to address the menstrual literacy of the wider population. Multi-component interventions that speak to different actors and include hardware and software provision alongside menstrual education may make Menstrual Health more attainable.

Covid-19

This review was carried out on studies conducted before the Global Pandemic began in March 2020. The subsequent lockdown has had a profound effect on education, and many programmes have had to go on-line. We would encourage menstrual educators to be mindful of the benefits of interaction and make use of on-line teaching platforms that facilitate discussion in break-out rooms.

Limitations of this Review

The review was carried out in the English language, which may have missed some publications. Because menstrual health is an emerging topic with evolving terminology, search terms may not have adequately captured all currently used descriptors.

As a mixed methods review, there are a number of systemic limitations derived from comparing heterogeneous data sets. In particular, the studies did not measure the same outputs and the methodological quality of the studies was mixed. It is possible that the level of knowledge in some LMIC was so low at base-line that any educational intervention is an improvement.

Although all interventions reported positive outcomes, this may be due to publication bias, where only significant results are shared. Cohen's *d* has not previously been calculated for this discipline and therefore the magnitude of the effect size can only be considered relative to others in this review.

The number of studies was small, and only one study was from a High Income Country, so it is difficult to say how applicable the conclusions are to a HIC. More research needs to be done in this area, particularly as period poverty has been increasingly reported since the start of the pandemic in HIC.

REGISTRATION

For this review, a protocol was not prepared or registered.

REFERENCES

- Abraham, M. *et al.* (2018) 'Using immersive research to understand rural sanitation : lessons from the Swachh Bharat Mission in India', *41st WEDC International Conference, Egerton University, Nakuru, Kenya*, pp. 1–6.
- Achkovska Leshkovska, E. and Miovska Spaseva, S. (2016) 'John Dewey'S educational theory and educational implications of Howard Gardner's multiple intelligences theory', *International Journal of Cognitive Research in Science, Engineering and Education*, 4(2), pp. 57–66. doi: 10.5937/IJCRSEE1602057A.
- Afsari, A. *et al.* (2015) 'The effects of educating mothers and girls on the girls' attitudes toward puberty health: A randomized controlled trial', *International Journal of Adolescent Medicine and Health*, 2015. doi: 10.1515/ijamh-2015-0043.
- Afsari, A. (2017) 'Predictors of knowledge of puberty health among girl students', *Bioscience Biotechnology Research Communications*, 10(2), pp. 264–269. doi: 10.21786/bbrc/10.2/45.
- Agnew, S. and Sandretto, S. (2016) 'A case for critical literacy analysis of the advertising texts of menstruation: responding to missed opportunities', *Gender and Education*. Taylor & Francis, 28(4), pp. 510–526. doi: 10.1080/09540253.2015.1114073.
- Ahmed, S. M. *et al.* (2016) 'Factors contributing to early menarche in school girls', *Journal of the Pakistan Medical Association*, 66(5), pp. 629–633.
- Al-Jayyousi, G. F. *et al.* (2021) 'Factors influencing public attitudes towards COVID-19 vaccination: A scoping review informed by the socio-ecological model', *Vaccines*, 9(6), pp. 1–27. doi: 10.3390/vaccines9060548.
- Alemu, F. *et al.* (2017) 'A socio-ecological analysis of barriers to the adoption, sustainability and consistent use of sanitation facilities in rural Ethiopia', *BMC Public Health*. BMC Public Health, 17(1), pp. 1–9. doi: 10.1186/s12889-017-4717-6.
- Ali, T. S. and Rizvi, S. N. (2010) 'Menstrual knowledge and practices of female adolescents in urban Karachi, Pakistan', *Journal of Adolescence*. Elsevier Ltd, 33(4), pp. 531–541. doi: 10.1016/j.adolescence.2009.05.013.
- Altangarvdi, B. *et al.* (2019) 'Status and factors of menstrual knowledge, attitudes, behaviors and their correlation with psychological stress in adolescent girls', *Journal of Pediatric and Adolescent Gynecology*. doi: <https://doi.org/10.1016/j.jpjag.2019.08.007>.
- Altundağ, S. and Çalbayram, N. Ç. (2016) 'Teaching menstrual care skills to intellectually disabled female students', *Molecular Ecology*, 25(13–14), pp. 1962–1968. doi: 10.1111/jocn.13215.
- Amaya, L., Marcatili, J. and Bhavaraju, N. (2020) 'Advancing gender equity by improving menstrual health', *Boston: FSG*. Available at: <https://news.issuelab.org/resources/36554/36554.pdf>.
- Arasteh, F. E. *et al.* (2019) 'Effect of group counseling on adolescent girls in improving knowledge and practice of menstrual hygiene in welfare boarding centers', *Journal of Postgraduate Medical Institute*, 33(1), pp. 46–51.
- Arigo, D. *et al.* (2018) 'Using social media for health research: Methodological and ethical

considerations for recruitment and intervention delivery', *Digital Health*, 4, p. 205520761877175. doi: 10.1177/2055207618771757.

Ariyanti, T. D. and Royanto, L. R. M. (2018) 'The Effectiveness of Social Stories and Video Modeling in Improving Self-Care Skills in Female Adolescents with Mild Intellectual Disabilities during Menstrual Periods', 135(Iciap 2017), pp. 189–199. doi: 10.2991/iciap-17.2018.16.

Armour, M. *et al.* (2019) 'Self-care strategies and sources of knowledge on menstruation in 12,526 young women with dysmenorrhea: A systematic review and meta-analysis', *PLoS ONE*, 14(7), pp. 1–18. doi: 10.1371/journal.pone.0220103.

Association of Internet Researchers (2012) 'Ethical Decision-making and internet research: recommendations from the AOIR ethics working committee'. Available at: <http://wwwaoir.org>.

Azagew, A. W., Kassie, D. G. and Walle, T. A. (2020) 'Prevalence of primary dysmenorrhea, its intensity, impact and associated factors among female students' at Gondar town preparatory school, Northwest Ethiopia', *BMC Women's Health*. *BMC Women's Health*, 20(1), pp. 1–7. doi: 10.1186/s12905-019-0873-4.

Aziato, L., Dedey, F. and Clegg-Lampsey, J. N. A. (2014) 'The experience of dysmenorrhoea among Ghanaian senior high and university students: Pain characteristics and effects', *Reproductive Health*, 11(1), pp. 1–8. doi: 10.1186/1742-4755-11-58.

Bakker, A. *et al.* (2019) 'Beyond small, medium, or large: points of consideration when interpreting effect sizes', *Educational Studies in Mathematics*. *Educational Studies in Mathematics*, 102(1), pp. 1–8. doi: 10.1007/s10649-019-09908-4.

Banning, J. (2009) 'Ecological Triangulation', *Website*, pp. 1–2. Available at: http://mycahs.colostate.edu/James.H.Banning/PDFs/Ecological_Triangulation.pdf.

Barnett-Page, E. and Thomas, J. (2009) 'Methods for the synthesis of qualitative research: A critical review', *BMC Medical Research Methodology*, 9(1). doi: 10.1186/1471-2288-9-59.

Barney, A. (2019) "'Aunt Flo" Is Not Dead Yet: The Continued Coded Language of Menstruation', *Women's Reproductive Health*. Taylor & Francis, 5(4), pp. 305–307. doi: 10.1080/23293691.2018.1523110.

Baum, F. (1995) 'Researching public health: Behind the qualitative-quantitative methodological debate', *Social Science and Medicine*, 40(4), pp. 459–468. doi: 10.1016/0277-9536(94)E0103-Y.

Baum, F., MacDougall, C. and Smith, D. (2006) 'Participatory action research', *Journal of Epidemiology and Community Health*, 60(10), pp. 854–857. doi: 10.1136/jech.2004.028662.

Baumann, S. E., Lhaki, P. and Burke, J. G. (2019) 'Assessing the Role of Caste/Ethnicity in Predicting Menstrual Knowledge, Attitudes, and Practices in Nepal', *Global Public Health*. Taylor & Francis, 14(9), pp. 1–14. doi: 10.1080/17441692.2019.1583267.

Baxter, S. K. *et al.* (2014) 'Using logic model methods in systematic review synthesis: Describing complex pathways in referral management interventions', *BMC Medical Research Methodology*, 14(1), pp. 1–9. doi: 10.1186/1471-2288-14-62.

Behera, D., Sivakami, M. and Behera, M. R. (2015) 'Menarche and Menstruation in Rural Adolescent Girls in Maharashtra, India: A Qualitative Study', *Journal of Health Management*, 17(4), pp. 510–519. doi: 10.1177/0972063415612581.

Bennett, C. and Harden, J. (2014) 'An exploration of mothers' attitudes towards their daughters' menarche', *Sex Education-Sexuality Society and Learning*, 14(4), pp. 457–470. doi: 10.1080/14681811.2014.922862.

- Benshaul-tolonen, A. *et al.* (2020) 'Measuring Menstruation-Related Absenteeism Among Adolescents in Low-Income Countries', in Bobel, C. (ed.) *The Palgrave handbook of critical menstruation studies*, pp. 702–723.
- Berchtold, A. (2016) 'Test–retest: Agreement or reliability?', *Methodological Innovations*, 9, p. 205979911667287. doi: 10.1177/2059799116672875.
- Berger, R. (2015) 'Now I see it, now I don't: researcher's position and reflexivity in qualitative research', *Qualitative Research*, 15(2), pp. 219–234. doi: 10.1177/1468794112468475.
- Bhagwat, A. and Jijina, P. (2020) 'A Psychosocial Lens on an Indigenous Initiative to Address Menstrual Health and Hygiene in Indian Villages', *Social Work in Public Health*. Routledge, 35(3), pp. 73–89. doi: 10.1080/19371918.2020.1738972.
- Bhakta, A. N. (2019) *Opening the doors to the hidden water, sanitation and hygiene needs of women from the onset of the perimenopause in urban Ghana*.
- Biddle, S. J. H. H. *et al.* (2005) 'Correlates of participation in physical activity for adolescent girls: A systematic review of recent literature', *Journal of Physical Activity and Health*, 2(4), pp. 423–434. doi: 10.1123/jpah.2.4.423.
- Birdthistle, I. *et al.* (2011) *What impact does the provision of separate toilets for girls at school have on their primary and secondary school enrolment, attendance and completion? A systematic review of the evidence*, MARCH Centre, University of London.
- Blake, S. *et al.* (2018) 'Teaching Girls About Puberty and Menstrual Hygiene Management in Rural Ethiopia: Findings From a Pilot Evaluation', *Journal of Adolescent Research*, 33(5), pp. 623–646. doi: 10.1177/0743558417701246.
- Blum, R. W. *et al.* (2014) 'A conceptual framework for early adolescence: A platform for research', *International Journal of Adolescent Medicine and Health*, 26(3), pp. 321–331. doi: 10.1515/ijamh-2013-0327.
- Bobel, C. (2019) *The Managed Body, The Managed Body*. doi: 10.1007/978-3-319-89414-0.
- Boosey, R. and Wilson-Smith, E. (2013) 'A vicious cycle of silence', (September).
- Borjigen, A. *et al.* (2019) 'Status and Factors of Menstrual Knowledge, Attitudes, Behaviors and Their Correlation with Psychological Stress in Adolescent Girls', *Journal of Pediatric and Adolescent Gynecology*. Elsevier Inc, 32(6), pp. 584–589. doi: 10.1016/j.jpjag.2019.08.007.
- Brewis, A. *et al.* (2019) 'Community hygiene norm violators are consistently stigmatized: Evidence from four global sites and implications for sanitation interventions', *Social Science and Medicine*. Elsevier, 220(July 2018), pp. 12–21. doi: 10.1016/j.socscimed.2018.10.020.
- British Educational Research Association (2018) *Ethical Guidelines for Educational Research*. Available at: <https://www.bera.ac.uk/publication/ethical-guidelines-for-educational-research-2018> (Accessed: 12 February 2023).
- Bronfenbrenner, U. (1977) 'Toward an experimental ecology of human development.', *American psychologist*. American Psychological Association, 32(7), p. 513.
- Brown, N. *et al.* (2022) 'Teachers' Perceptions and Experiences of Menstrual Cycle Education and Support in UK Schools', *Frontiers in Global Women's Health*, 3(February), pp. 1–11. doi: 10.3389/fgwh.2022.827365.
- Bruinvels, G., Hackney, A. C. and Pedlar, C. R. (2022) 'Menstrual Cycle: The Importance of Both the Phases and the Transitions Between Phases on Training and Performance', *Sports Medicine*. Springer

International Publishing, 52(7), pp. 1457–1460. doi: 10.1007/s40279-022-01691-2.

Calculator.net (2022) *Sample Size Calculator*. Available at: <https://www.calculator.net/sample-size-calculator.html> (Accessed: 13 December 2022).

Cardoso, L. F. *et al.* (2021) 'Period poverty and mental health implications among college-aged women in the United States', *BMC Women's Health*. BioMed Central, 21(1), pp. 1–7. doi: 10.1186/s12905-020-01149-5.

Central Intelligence Agency (2019) *The CIA World Factbook - Pakistan*. Available at: <https://www.cia.gov/the-world-factbook/countries/pakistan/> (Accessed: 8 June 2019).

Central Intelligence Agency (2021a) *The CIA World Factbook - the Philippines 2021*. Available at: <https://www.cia.gov/the-world-factbook/countries/philippines/> (Accessed: 9 January 2023).

Central Intelligence Agency (2021b) *The CIA World Factbook - United Kingdom 2021*. Available at: <https://www.cia.gov/the-world-factbook/countries/united-kingdom/> (Accessed: 16 November 2021).

Chadalawada, U. ., Devi, A. and Rani, S. (2017) 'Effect of Health Education on Adolescent Girls Regarding Knowledge About Menstruation', *Journal of Evolution of Medical and Dental Sciences*, 6(13), pp. 1040–1043. doi: 10.14260/jemds/2017/223.

Chambers, R. (2017) *Can We Know Better? Reflections for Deveopment*. Practical Action Publishing.

Chandra-Mouli, V. and Patel, S. V (2017) 'Mapping the knowledge and understanding of menarche, menstrual hygiene and menstrual health among adolescent girls in low- and middle-income countries', *Reproductive health*, 14. doi: 10.1186/s12978-017-0293-6.

Chard, A. N. and Freeman, M. C. (2018) 'Design, intervention fidelity, and behavioral outcomes of a school-based water, sanitation, and hygiene cluster-randomized trial in laos', *International Journal of Environmental Research and Public Health*, 15(4). doi: 10.3390/ijerph15040570.

Cleland, J. (1973) 'A Critique of KAP Studies and Some Suggestions for Their Improvement', *Studies in Family Planning*, 4(2), p. 42. doi: 10.2307/1964829.

Coast, E., Lattof, S. R. and Strong, J. (2019) 'Puberty and menstruation knowledge among young adolescents in low- and middle-income countries: a scoping review', *International Journal of Public Health*. Springer International Publishing, pp. 293–304. doi: 10.1007/s00038-019-01209-0.

Collier-Harris, C. A. and Goldman, J. D. G. (2017) 'Is puberty education evident in Australia's first national curriculum?', *Sex Education-Sexuality Society and Learning*, 17(1), pp. 57–72. doi: 10.1080/14681811.2016.1225259.

Crockett, L. J. *et al.* (2019) 'Puberty Education in a Global Context: Knowledge Gaps, Opportunities, and Implications for Policy', *Journal of Research on Adolescence*, 29(1), pp. 177–195. doi: 10.1111/jora.12452.

Crofts, T., Coates, S. and Fisher, J. (2014) *Menstruation hygiene management for schoolgirls*. Loughborough: WEDC, Loughborough University.

Crofts, T. and Fisher, J. (2012a) 'Menstrual hygiene in Ugandan schools: an investigation of low-cost sanitary pads', *Journal of Water, Sanitation and Hygiene for Development*. doi: 10.2166/washdev.2012.067.

Crofts, T. and Fisher, J. (2012b) 'Menstrual hygiene in Ugandan schools: An investigation of low-cost sanitary pads', *Journal of Water Sanitation and Hygiene for Development*. doi: 10.2166/washdev.2012.067.

- Dalessandro, C. (2018) 'Recruitment Tools for Reaching Millennials: The Digital Difference', *International Journal of Qualitative Methods*, 17(1), pp. 1–7. doi: 10.1177/1609406918774446.
- Dammery, S. (2015) *First blood: a cultural study of menarche*. Monash University Publishing.
- Dasgupta, S., Agarwal, N. and Mukherjee, A. (2021) 'Moving up the On-Site Sanitation ladder in urban India through better systems and standards', *Journal of Environmental Management*. Elsevier Ltd, 280(December 2020), p. 111656. doi: 10.1016/j.jenvman.2020.111656.
- Davies, M. R. *et al.* (2019) 'The Genetic Links to Anxiety and Depression (GLAD) Study: Online recruitment into the largest recontactable study of depression and anxiety', *Behaviour Research and Therapy*. Elsevier, 123(February), p. 103503. doi: 10.1016/j.brat.2019.103503.
- Dawson, C. (2013) *Advanced research methods: A practical guide for social research projects*. Hachette UK.
- DeMaria, A. L. *et al.* (2020) "'My mama told me it would happen": menarche and menstruation experiences across generations', *Women and Health*. Taylor & Francis, 60(1), pp. 87–98. doi: 10.1080/03630242.2019.1610827.
- Dewey, J. (1938) 'Experience and Education [1938]'.
 Van Dijk, W. *et al.* (2016) 'Medicalisation and overdiagnosis: What society does to medicine', *International Journal of Health Policy and Management*, 5(11), pp. 619–622. doi: 10.15171/ijhpm.2016.121.
- Dreibelbis, R. *et al.* (2013) 'The integrated behavioural model for water, sanitation, and hygiene: a systematic review of behavioural models and a framework for designing and evaluating', *BMC Public Health*, 13(1015), pp. 1–13.
- Duby, Z. *et al.* (2019) "'The state of mind tells me it's dirty": menstrual shame amongst women using a vaginal ring in Sub Saharan Africa', *Women and Health*. Taylor & Francis, 0(0), pp. 1–15. doi: 10.1080/03630242.2019.1607803.
- Van Eijk, A. M. *et al.* (2016) 'Menstrual hygiene management among adolescent girls in India: A Systematic review and meta-analysis', *BMJ Open*, 6(3). doi: 10.1136/bmjopen-2015-010290.
- Van Eijk, A. M. *et al.* (2018) 'Use of menstrual cups among school girls: Longitudinal observations nested in a randomised controlled feasibility study in rural western Kenya', *Reproductive Health*. Reproductive Health, 15(1), pp. 1–11. doi: 10.1186/s12978-018-0582-8.
- El-Sayyed, N., Kabbash, I. A. and El-Gueniedy, M. (2008) 'Risk behaviours for HIV/AIDS infection among men who have sex with men in Cairo, Egypt', *Eastern Mediterranean Health Journal*, 14(4), pp. 905–915.
- Ellis, A. *et al.* (2016) 'WASH challenges to girls' menstrual hygiene management in Metro Manila, Masbate, and South Central Mindanao, Philippines', *Waterlines*, 35(3), pp. 306–323. doi: 10.3362/1756-3488.2016.022.
- Elmahy, A. G. (2018) 'Reaching Egyptian Gays Using Social Media: A Comprehensive Health Study and a Framework for Future Research', *Journal of Homosexuality*. Routledge, 65(13), pp. 1867–1876. doi: 10.1080/00918369.2017.1395658.
- Elmhirst, R. (2011) 'Introducing new feminist political ecologies', *Geoforum*. Elsevier Ltd, 42(2), pp. 129–132. doi: 10.1016/j.geoforum.2011.01.006.
- Elsworthy, E. (2018) 'More than 137700 girls in UK missed school last year because they can't afford sanitary products', *The Independent Newspaper*. Available at:

<https://www.independent.co.uk/news/international-women-s-day-period-girls-missed-school-uk-sanitary-products-menstruation-a8244396.html>.

Evans, R. L. *et al.* (2022) 'Systematic review of educational interventions to improve the menstrual health of young adolescent girls', *BMJ Open*, 12(6), p. e057204. doi: 10.1136/bmjopen-2021-057204.

Evans, R. R. (2018) *Menstrual Hygiene Management in Manila Slums; Beliefs, Practices and Challenges*. Loughborough University.

Exley, J. L. R. *et al.* (2015) 'The sanitation ladder, what constitutes an improved form of sanitation?', *Environmental Science and Technology*, 49(2), pp. 1086–1094. doi: 10.1021/es503945x.

Ferguson, R. M. (2009) *The Construction of Shared Knowledge through Asynchronous Dialogue*.

Fetters, M. D., Curry, L. A. and Creswell, J. W. (2013) 'Achieving integration in mixed methods designs - Principles and practices', *Health Services Research*, 48(6 PART2), pp. 2134–2156. doi: 10.1111/1475-6773.12117.

Ford, K. L. *et al.* (2019) 'Youth Study Recruitment Using Paid Advertising on Instagram, Snapchat, and Facebook: Cross-Sectional Survey Study', *JMIR Public Health and Surveillance*, 5(4), p. e14080. doi: 10.2196/14080.

Freeman, S. *et al.* (2014) 'Active learning increases student performance in science, engineering, and mathematics', *Proceedings of the National Academy of Sciences of the United States of America*, 111(23), pp. 8410–8415. doi: 10.1073/pnas.1319030111.

Fricker, E. and Cooper, D. E. (2018) 'The Epistemology of Testimony Author (s): Elizabeth Fricker and David E . Cooper Source : Proceedings of the Aristotelian Society , Supplementary Volumes , Vol . 61 (1987) , pp . Published by : Oxford University Press on behalf of The Aristotelian Soci', 61(1987), pp. 57–83.

Ghanoui, S. L. (2022) "'Responsible Body": Menstrual Education Films and Sex Education in the United States and Scotland, 1970s–1980s', *Open Library of Humanities*, 8(2), pp. 1–21. doi: 10.16995/olh.6349.

Gignac, G. E. and Szodorai, E. T. (2016) 'Effect size guidelines for individual differences researchers', *Personality and Individual Differences*. Elsevier Ltd, 102(December), pp. 74–78. doi: 10.1016/j.paid.2016.06.069.

Glaser, B. (1978) *Theoretical sensitivity: Advances in the methodology of grounded theory*.

Gontier, N. (2006) 'Introduction to evolutionary epistemology, language and culture BT - Evolutionary Epistemology, Language and Culture: A Non-Adaptationist, Systems Theoretical Approach', in Gontier, N., Van Bendegem, J. P., and Aerts, D. (eds). Dordrecht: Springer Netherlands, pp. 1–29. doi: 10.1007/1-4020-3395-8_1.

Graber, R. (2020) 'Guidance on Conducting and Supervising Community-Oriented Psychology Research During COVID-19.', pp. 1–12.

Greene, J. C., Caracelli, V. J. and Graham, W. F. (1989) 'Toward a Conceptual Framework for Mixed-Method Evaluation Designs', *Educational Evaluation and Policy Analysis*, 11(3), pp. 255–274. doi: 10.3102/01623737011003255.

Grix, J. (2002) 'Introducing Students to the Generic Terminology of Social Research', *Politics*, 22(3), pp. 175–186. doi: 10.1111/1467-9256.00173.

Guetterman, T. C. *et al.* (2019) 'Contemporary Approaches to Mixed Methods–Grounded Theory Research: A Field-Based Analysis', *Journal of Mixed Methods Research*, 13(2), pp. 179–195. doi:

10.1177/1558689817710877.

Guillory, J. *et al.* (2018) 'Recruiting hard-to-reach populations for survey research: Using Facebook and Instagram advertisements and in-person intercept in LGBT bars and nightclubs to recruit LGBT young adults', *Journal of Medical Internet Research*, 20(6), pp. 1–14. doi: 10.2196/jmir.9461.

Gultie, T., Hailu, D. and Workineh, Y. (2014) 'Age of Menarche and Knowledge about Menstrual Hygiene Management among Adolescent School Girls in Amhara Province, Ethiopia: Implication to Health Care Workers & School Teachers', *PloS one*, 9(9). doi: 10.1371/journal.pone.0108644.

Gumanga, S. K. (2012) 'Original Articles Menstrual Characteristics in Some Adolescent Girls in', *Ghana Medical Journal*, 46(1), pp. 3–7.

Gupta, P. *et al.* (2018) 'Knowledge and practices pertaining to menstruation among the school going adolescent girls of UHTC/RHTC area of Government Medical College, Kota, Rajasthan', *International Journal Of Community Medicine And Public Health*, 5(2), p. 652. doi: 10.18203/2394-6040.ijcmph20180245.

Haque, S. E. *et al.* (2014) 'The effect of a school-based educational intervention on menstrual health: An intervention study among adolescent girls in Bangladesh', *BMJ Open*, 4(7), pp. 1–9. doi: 10.1136/bmjopen-2013-004607.

Harris, K. *et al.* (2019) 'School-based self-management interventions for asthma in children and adolescents : a mixed methods systematic review (Review)'. doi: 10.1002/14651858.CD011651.pub2.Copyright.

Haver, J. *et al.* (2013) *WASH in Schools Empowers Girls' Education in Masbate Province and Metro Manila, Philippines An Assessment of Menstrual Hygiene Management in Schools*. New York. Available at: www.unicef.org/wash/schools.

Haver, J. *et al.* (2018) 'New directions for assessing menstrual hygiene management (MHM) in schools: A bottom-up approach to measuring program success', *Studies in Social Justice*, 12(2), pp. 372–381. doi: 10.26522/SSJ.V12I2.1947.

Hawkey, A. J. *et al.* (2017) 'Experiences and Constructions of Menarche and Menstruation among Migrant and Refugee Women', *Qualitative Health Research*, 27(10), pp. 1473–1490. doi: 10.1177/1049732316672639.

Hebert-Beirne, J. *et al.* (2021) 'Social Processes Informing Toileting Behavior Among Adolescent and Adult Women: Social Cognitive Theory as an Interpretative Lens', *Qualitative Health Research*, 31(3), pp. 430–442. doi: 10.1177/1049732320979168.

Hemphill, J. F. (2003) 'Interpreting the Magnitudes of Correlation Coefficients', *American Psychologist*, 58(1), pp. 78–79. doi: 10.1037/0003-066X.58.1.78.

Hennegan, J. *et al.* (2016) 'Measuring the prevalence and impact of poor menstrual hygiene management: A quantitative survey of schoolgirls in rural Uganda', *BMJ Open*, 6. doi: 10.1136/bmjopen-2016-012596.

Hennegan, J. *et al.* (2017) 'A qualitative understanding of the effects of reusable sanitary pads and puberty education: implications for future research and practice', *Reproductive health*, 14. doi: 10.1186/s12978-017-0339-9.

Hennegan, J. (2019) 'Inserting informed choice into global menstrual product use and provision', *The Lancet Public Health*. The Author(s). Published by Elsevier Ltd. This is an Open Access article under the CC BY 4.0 license, 4(8), pp. e361–e362. doi: 10.1016/s2468-2667(19)30126-4.

Hennegan, J. *et al.* (2019) *Women's and girls' experiences of menstruation in low-and middle-income*

countries: A systematic review and qualitative metasynthesis, PLoS Medicine. doi: 10.1371/journal.pmed.1002803.

Hennegan, J., Kibira, S. P. S. S., *et al.* (2020) 'I do what a woman should do': A grounded theory study of women's menstrual experiences at work in Mukono District, Uganda', *BMJ Global Health*, 5(11), pp. 1–11. doi: 10.1136/bmjgh-2020-003433.

Hennegan, J., Nansubuga, A., *et al.* (2020) 'Measuring menstrual hygiene experience: Development and validation of the Menstrual Practice Needs Scale (MPNS-36) in Soroti, Uganda', *BMJ Open*, 10(2). doi: 10.1136/bmjopen-2019-034461.

Hennegan, J., Winkler, I. T., *et al.* (2021) 'Menstrual health: a definition for policy, practice, and research', *Sexual and Reproductive Health Matters*, 29(1), pp. 31–38. doi: 10.1080/26410397.2021.1911618.

Hennegan, J., OlaOlorun, F. M., *et al.* (2021) 'School and work absenteeism due to menstruation in three West African countries: findings from PMA2020 surveys', *Sexual and Reproductive Health Matters*, 29(1). doi: 10.1080/26410397.2021.1915940.

Hennegan, J. M. (2017) 'Menstrual Hygiene Management and Human Rights: The Case for an Evidence-Based Approach', *Women's Reproductive Health*. doi: 10.1080/23293691.2017.1388720.

Hennegan, J. and Montgomery, P. (2016) 'Do menstrual hygiene management interventions improve education and psychosocial outcomes for women and girls in low and middle income countries? A systematic review', *PLoS ONE*, 11(2), pp. 1–22. doi: 10.1371/journal.pone.0146985.

Hennegan, J. and Sol, L. (2020) 'Confidence to manage menstruation at home and at school: findings from a cross-sectional survey of schoolgirls in rural Bangladesh', *Culture, Health and Sexuality*. Taylor & Francis, 22(2), pp. 146–165. doi: 10.1080/13691058.2019.1580768.

Hetherington, E. *et al.* (2017) 'Participatory science and innovation for improved sanitation and hygiene: process and outcome evaluation of project SHINE, a school-based intervention in Rural Tanzania', *BMC Public Health*. BMC Public Health, 17(1), pp. 1–15. doi: 10.1186/s12889-017-4100-7.

Holmes, K. *et al.* (2021) 'Adolescent menstrual health literacy in low, middle and high-income countries: A narrative review', *International Journal of Environmental Research and Public Health*, 18(5), pp. 1–14. doi: 10.3390/ijerph18052260.

Hoppenbrouwers, K. *et al.* (2016) 'Characteristics of the menstrual cycle in 13-year-old Flemish girls and the impact of menstrual symptoms on social life', *European Journal of Pediatrics*. European Journal of Pediatrics, 175(5), pp. 623–630. doi: 10.1007/s00431-015-2681-7.

House, S., Mahon, T. and Cavill, S. (2013) 'Menstrual Hygiene Matters: A resource for improving menstrual hygiene around the world', *Reproductive Health Matters*. 1st edn. London: Informa UK Limited, 21(41), p. 354. doi: 10.1016/s0968-8080(13)41712-3.

Hurwitz, L. B. *et al.* (2018) "'A New You, That's Who": an evaluation of short videos on puberty and human reproduction', *Palgrave Communications*. Springer US, 4(1). doi: 10.1057/s41599-018-0147-z.

Hutchison, D. and Styles, B. (2010) 'A guide to running randomised controlled trials for educational researchers', *National Foundation for Educational Research (NFER)*, pp. 1–65. Available at: <https://www.nfer.ac.uk/media/2114/rct01.pdf>.

Ifould, R. (2016) "'I worried people would forget about me": can teenagers survive without social media?', *The Guardian*, 18 June. Available at: <https://www.theguardian.com/media/2016/jun/18/can-teenagers-survive-without-social-media>.

İşgüven, P., Yörük, G. and Çizmecioğlu, F. M. (2015) 'Educational needs of adolescents regarding

- normal puberty and menstrual patterns', *JCRPE Journal of Clinical Research in Pediatric Endocrinology*, 7(4), pp. 312–322. doi: 10.4274/jcrpe.2144.
- Jain, V. *et al.* (2022) 'Uterine bleeding: how understanding endometrial physiology underpins menstrual health', *Nature Reviews Endocrinology*. Springer US, 18(5), pp. 290–308. doi: 10.1038/s41574-021-00629-4.
- Jarrahi, R., Golmakani, N. and Mazlom, S. R. (2020) 'Effect of menstrual hygiene education based on peer and small group teaching methods on hygiene behaviors in female adolescents: A comparative study', *Evidence Based Care Journal*, 10(1), pp. 70–74. doi: 10.22038/ebcj.2020.40806.2074.
- Jewitt, S. and Ryley, H. (2014) 'It's a girl thing: Menstruation, school attendance, spatial mobility and wider gender inequalities in Kenya', *Geoforum*. Elsevier Ltd, 56, pp. 137–147. doi: 10.1016/j.geoforum.2014.07.006.
- Johnson, J. L., Adkins, D. and Chauvin, S. (2020) 'A review of the quality indicators of rigor in qualitative research', *American Journal of Pharmaceutical Education*, 84(1), pp. 138–146. doi: 10.5688/ajpe7120.
- Johnson, R. B. and Onwuegbuzie, A. J. (2004) 'Mixed Methods Research: A Research Paradigm Whose Time Has Come', *Educational Researcher*, 33(7), pp. 14–26. doi: 10.3102/0013189X033007014.
- Kågesten, A. E. *et al.* (2017) 'Transitions into puberty and access to sexual and reproductive health information in two humanitarian settings: A cross-sectional survey of very young adolescents from Somalia and Myanmar', *Conflict and Health*, 11(Suppl 1). doi: 10.1186/s13031-017-0127-8.
- Kane, S. and Calnan, M. (2017) 'Erosion of trust in the medical profession in India: Time for doctors to act', *International Journal of Health Policy and Management*, 6(1), pp. 5–8. doi: 10.15171/ijhpm.2016.143.
- Kansiime, C. *et al.* (2020) 'Menstrual health intervention and school attendance in Uganda (MENISCUS-2): A pilot intervention study', *BMJ Open*, 10(2), pp. 1–11. doi: 10.1136/bmjopen-2019-031182.
- Kaur, R. and Nagaich, S. (2019) 'Understanding Feminist Research Methodology in Social Sciences', *SSRN Electronic Journal*, pp. 1–15. doi: 10.2139/ssrn.3392500.
- Kennedy, S. *et al.* (2014) 'Evaluation of a group based cognitive behavioural therapy programme for menstrual pain management in young women with intellectual disabilities : protocol for a mixed methods controlled clinical trial', pp. 1–10.
- Kheirollahi, F. *et al.* (2017) 'Puberty health status among adolescent girls: A model-based educational program', *International Journal of Pediatrics*, 5(7), pp. 5369–5378. doi: 10.22038/ijp.2017.23174.1950.
- Khubchandani, J., Clark, J. and Kumar, R. (2014) 'Beyond controversies: Sexuality education for adolescents in India', *Journal of Family Medicine and Primary Care*, 3(3), p. 175. doi: 10.4103/2249-4863.141588.
- Kidney, M., Galvin, C. and Syombua Nthusi, J. (2018) 'A holistic approach to tackling menstrual hygiene management in rural communities in Kenya', (May 2017), pp. 1–6. Available at: <https://wedc-knowledge.lboro.ac.uk/resources/conference/41/Kidney-2918.pdf>.
- Kilanowski, J. F. (2017) 'Breadth of the Socio-Ecological Model', *Journal of Agromedicine*. Taylor & Francis, 22(4), pp. 295–297. doi: 10.1080/1059924X.2017.1358971.
- Kirk, I. (2022) *Are children being taught enough about periods in school?*, YouGov. Available at:

<https://yougov.co.uk/health/articles/44643-are-children-being-taught-enough-about-periods-sch> (Accessed: 25 October 2023).

Kirk, J. and Sommer, M. (2006) 'Menstruation and body awareness: linking girls' health with girls' education', *Royal Tropical Institute*, pp. 1–22. Available at:

https://www.susana.org/_resources/documents/default/2-1200-kirk-2006-menstruation-kit-paper.pdf.

Krosnick, J. A. (2018) 'Questionnaire design', in *The Palgrave handbook of survey research*. Springer, pp. 439–455.

Lahme, A. M., Stern, R. and Cooper, D. (2018) 'Factors impacting on menstrual hygiene and their implications for health promotion', *Global Health Promotion*, 25(1), pp. 54–62. doi: 10.1177/1757975916648301.

Larson, E. *et al.* (2021) 'Capturing menstrual health and hygiene in national surveys: insights from performance monitoring and accountability 2020 resident enumerators in Niamey, Niger', *Journal of Water, Sanitation and Hygiene for Development*, 11(2), pp. 295–303. doi: 10.2166/washdev.2021.177.

Launiala, A. (1970) 'How much can a KAP survey tell us about people's knowledge, attitudes and practices? Some observations from medical anthropology research on malaria in pregnancy in Malawi', *Anthropology Matters*, 11(1), pp. 1–13. doi: 10.22582/am.v11i1.31.

Lee, B. X. *et al.* (2016) 'Transforming Our World: Implementing the 2030 Agenda Through Sustainable Development Goal Indicators', *Journal of Public Health Policy*, 37(1), pp. S13–S31. doi: 10.1057/s41271-016-0002-7.

Lilford, R. *et al.* (2019) 'Because space matters: Conceptual framework to help distinguish slum from non-slum urban areas', *BMJ Global Health*, 4(2). doi: 10.1136/bmjgh-2018-001267.

Litwin, M. S. (1995) *How to measure survey reliability and validity*. Sage.

Lock, A. and Strong, T. (eds) (2010) 'Introduction', in *Social Constructionism: Sources and Stirrings in Theory and Practice*. Cambridge: Cambridge University Press, pp. 1–11. doi: DOI: 10.1017/CBO9780511815454.002.

Loughnan, L. *et al.* (2016) 'Sanitation Tell Us About Menstrual Hygiene Management?', *Waterlines*, 35(3).

Luetke Lanfer, H. and Reifegerste, D. (2021) 'Correction to: Embracing challenging complexity: exploring handwashing behavior from a combined socioecological and intersectional perspective in Sierra Leone (BMC Public Health, (2021), 21, 1, (1857), 10.1186/s12889-021-11923-1)', *BMC Public Health*. BMC Public Health, 21(1), pp. 1–17. doi: 10.1186/s12889-021-12291-6.

Lui, L. Y. Y., So, W. K. W. W. and Fong, D. Y. T. T. (2008) 'Knowledge and attitudes regarding pain management among nurses in Hong Kong medical units', *Journal of Clinical Nursing*, 17(15), pp. 2014–2021. doi: 10.1111/j.1365-2702.2007.02183.x.

Ma, P. H. X., Chan, Z. C. Y. and Loke, A. Y. (2017) 'The Socio-Ecological Model Approach to Understanding Barriers and Facilitators to the Accessing of Health Services by Sex Workers: A Systematic Review', *AIDS and Behavior*. Springer US, 21(8), pp. 2412–2438. doi: 10.1007/s10461-017-1818-2.

Mahon, T. and Fernandes, M. (2010) 'Menstrual hygiene in South Asia: A neglected issue for WASH (water, sanitation and hygiene) programmes', *Gender and Development*, 18(1), pp. 99–113. doi: 10.1080/13552071003600083.

- Manorama, S. and Desai, R. (2020) 'Menstrual justice: A missing element in India's health policies', in *The Palgrave handbook of critical menstruation studies*, pp. 511–527.
- Marván, M. L. and Alcalá-Herrera, V. (2014) 'Age at Menarche, Reactions to Menarche and Attitudes towards Menstruation among Mexican Adolescent Girls', *Journal of Pediatric and Adolescent Gynecology*, 27(2), pp. 61–66. doi: <https://doi.org/10.1016/j.jpag.2013.06.021>.
- Marvan, M. L. and Chrisler, J. C. (2018) 'Menarcheal timing, memories of menarche, and later attitudes toward menstruation', *Cogent Psychology*, 5(1), pp. 1–12. doi: 10.1080/23311908.2018.1525840.
- Marván, M. L. and Molina-Abolnik, M. (2012) 'Mexican Adolescents' Experience of Menarche and Attitudes Toward Menstruation: Role of Communication Between Mothers and Daughters', *Journal of Pediatric and Adolescent Gynecology*, 25(6), pp. 358–363. doi: 10.1016/j.jpag.2012.05.003.
- Mason, L. *et al.* (2013) "'We keep it secret so no one should know" - A qualitative study to explore young schoolgirls attitudes and experiences with menstruation in rural Western Kenya', *PLoS ONE*, 8(11). doi: 10.1371/journal.pone.0079132.
- McCammon, E. *et al.* (2020) 'Exploring young women's menstruation-related challenges in Uttar Pradesh, India, using the socio-ecological framework', *Sexual and Reproductive Health Matters*. Taylor & Francis, 28(1), pp. 291–302. doi: 10.1080/26410397.2020.1749342.
- McCarthy, A. and Lahiri-Dutt, K. (2020) 'Bleeding in public? Rethinking narratives of menstrual management from Delhi's slums', *The Palgrave handbook of critical menstruation studies*. Palgrave Macmillan, Singapore, pp. 15–30.
- McMichael, C. (2019) 'Water, sanitation and hygiene (WASH) in schools in low-income countries: A review of evidence of impact', *International Journal of Environmental Research and Public Health*, 16(3), pp. 1–21. doi: 10.3390/ijerph16030359.
- Milne, C. (2019) 'Period Poverty – How widespread is it?' FullFact.org. Available at: <https://fullfact.org/health/period-poverty-how-widespread-it/> accessed 10/12/21.
- Mokari, H., Khaleghparast, S. and Samani, L. N. (2016) 'Impact of Puberty Health Education on Anxiety of Adolescents', *International Journal of Medical Research & Health Sciences*, 5(5, S, SI), pp. 284–291.
- Montgomery, P. *et al.* (2016) 'Menstruation and the Cycle of Poverty: A Cluster Quasi-Randomised Control Trial of Sanitary Pad and Puberty Education Provision in Uganda', *PloS one*, 11(12). doi: 10.1371/journal.pone.0166122.
- Morella, E., Foster, V. and Banerjee, S. G. (2008) 'Climbing the Ladder: The State of Sanitation in Sub-Saharan Africa', *Fish and Shellfish Immunology*, 48(June), pp. 273–284. Available at: http://www.energytoolbox.org/library/infra2008/references/34_12-17-08_africas_infrastructure_foster.pdf.
- Morrison, J. *et al.* (2018) 'Girls' menstrual management in five districts of Nepal: Implications for policy and practice', *Studies in Social Justice*, 12(2), pp. 251–272. doi: 10.26522/SSJ.V12I2.1623.
- Mukherjee, A. *et al.* (2020) 'Perception and practices of menstruation restrictions among urban adolescent girls and women in Nepal: A cross-sectional survey', *Reproductive Health*. Reproductive Health, 17(1), pp. 1–10. doi: 10.1186/s12978-020-00935-6.
- Nalugya, R. *et al.* (2020) 'Assessing the effectiveness of a comprehensive menstrual health intervention program in Ugandan schools (MENISCUS): process evaluation of a pilot intervention study', *Pilot and Feasibility Studies*. Pilot and Feasibility Studies, 6(1), pp. 1–15. doi: 10.1186/s40814-

020-00585-2.

National Institute for Health and Care Excellence. (2018) 'Heavy menstrual bleeding: assessment and management. NICE guideline NG88.' doi: 10.1002/psb.1687.

Ndlovu, E. and Bhala, E. (2016) 'Menstrual hygiene - A salient hazard in rural schools: A case of Masvingo district of Zimbabwe', *Jamba: Journal of Disaster Risk Studies*.

NHS Health Scotland (2014) *Logic Models*. Available at: <http://www.healthscotland.com/scotlands-health/planning/logic-models.aspx> 2014. (Accessed: 21 September 2023).

Nuss, H. J. *et al.* (2012) 'Applying the social ecological model to evaluate a demonstration colorectal cancer screening program in Louisiana', *Journal of Health Care for the Poor and Underserved*, 23(3), pp. 1026–1035. doi: 10.1353/hpu.2012.0120.

O’Cathain, A., Murphy, E. and Nicholl, J. (2007) 'Why, and how, mixed methods research is undertaken in health services research in England: A mixed methods study', *BMC Health Services Research*, 7, pp. 1–11. doi: 10.1186/1472-6963-7-85.

Office for National Statistics UK (2011) *Census 2011*. Available at: <https://www.ons.gov.uk/census/2011census> (Accessed: 19 August 2019).

Office for National Statistics UK 2022 (2022) *Data and Analysis from the Census 2021*. Available at: <https://www.ons.gov.uk/> (Accessed: 4 January 2023).

Okomoto, N. (2019) *A Global Glossary - the Menstrual Movement*, *Period Org*. Available at: <https://www.period.org/blog/glossary> accessed 11/06/19.

Al Omari, O. *et al.* (2016) 'Experience of Menarche Among Jordanian Adolescent Girls: An Interpretive Phenomenological Analysis', *Journal of Pediatric and Adolescent Gynecology*, 29(3), pp. 246–251. doi: 10.1016/j.jpag.2015.09.005.

Al Omari, O., Razeq, N. M. A. and Fooladi, M. M. (2016) 'Experience of Menarche Among Jordanian Adolescent Girls: An Interpretive Phenomenological Analysis', *Journal of Pediatric and Adolescent Gynecology*, 29(3), pp. 246–251. doi: 10.1016/j.jpag.2015.09.005.

Pakistan Ministry of Education and National Training MOENT (2019) *National Vision 2016-2025*. Available at: <https://moent.gov.pk> (Accessed: 11 June 2019).

Parker, K. (2021) *Where did all the school nurses go?*, *Times Educational Supplement*. Available at: <https://www.tes.com/magazine/pastoral/where-did-all-school-nurses-go> (Accessed: 19 January 2023).

Pedrajas, M. and Choritz, S. (2016) 'Getting to the last mile in least developed countries', p. 85. Available at: www.undp.org.

Persdotter, J. (2020) 'Introducing menstrunormativity: Toward a complex understanding of “menstrual monsterings”', *The Palgrave Handbook of Critical Menstruation Studies*. Palgrave Macmillan, Singapore, pp. 357–373.

Philippine Statistics Authority (2019) 'Proportion of Poor Filipinos was Estimated at 16.6 Percent in 2018', *Philippine Statistics Authority*. Available at: <https://psa.gov.ph/poverty-press-releases/nid/144752>.

Philippine Statistics Authority (2022) *National Quickstat December 2022*, *Quickstat*. Available at: <https://psa.gov.ph/statistics/quickstat/national-quickstat/2022/%2A> (Accessed: 9 January 2023).

Philippine Statistics Authority (2023) *Philippine Statistics Authority Quickstat*, *Quickstat*. Available at:

<https://psa.gov.ph/statistics/quickstat> (Accessed: 9 January 2023).

Phillips-Howard, Penelope A *et al.* (2016) 'Menstrual cups and sanitary pads to reduce school attrition, and sexually transmitted and reproductive tract infections: A cluster randomised controlled feasibility study in rural Western Kenya', *BMJ Open*. doi: 10.1136/bmjopen-2016-013229.

Phillips-Howard, Penelope A. *et al.* (2016) 'Menstrual hygiene management among adolescent schoolgirls in low- and middle-income countries: Research priorities', *Global Health Action*, 9(1). doi: 10.3402/GHA.V9.33032.

PHS (2019) *Lifting the lid on period poverty*. Available at: https://www.phs.co.uk/media/2401/phs_periodpoverty-whitepaper.pdf.

Plesons, M. *et al.* (2021) 'The state of adolescent menstrual health in low- and middle-income countries and suggestions for future action and research', *Reproductive Health*. BioMed Central, 18(1), pp. 1–13. doi: 10.1186/s12978-021-01082-2.

Przybylo, E. and Fahs, B. (2020) 'Empowered bleeders and cranky menstruators; Menstrual positivity and the "liberated" era of new menstrual product advertisements', in *The Palgrave handbook of critical menstruation studies*, pp. 375–394.

Przybylo, E. and Fahs, B. (2020) 'Empowered bleeders and cranky menstruators: Menstrual positivity and the "liberated" era of new menstrual product advertisements', *The Palgrave Handbook of Critical Menstruation Studies*. Palgrave Macmillan, Singapore, pp. 375–394.

Raj, A. *et al.* (2015) 'Age at menarche, education, and child marriage among young wives in rural Maharashtra, India', *International Journal of Gynecology & Obstetrics*, 131(1), pp. 103–104. doi: 10.1016/j.ijgo.2015.04.044.

Ramaiya, A. *et al.* (2019) 'How does a Social and Behavioral Change Communication Intervention Predict Menstrual Health and Hygiene Management: A Cross-Sectional Study', *BMC Public Health*. BMC Public Health, 19(1), pp. 1–12. doi: 10.1186/s12889-019-7359-z.

Ramo, D. E. and Prochaska, J. J. (2012) 'Broad reach and targeted recruitment using Facebook for an online survey of young adult substance use.', *Journal of medical Internet research*, 14(1), pp. 1–10. doi: 10.2196/jmir.1878.

Rani, A., Sharma, M. K. and Singh, A. (2016) 'Practices and perceptions of adolescent girls regarding the impact of dysmenorrhea on their routine life: A comparative study in the urban, rural, and slum areas of Chandigarh', *International Journal of Adolescent Medicine and Health*, 28(1), pp. 3–9. doi: 10.1515/ijamh-2014-0063.

Raskova, M. and Stolinska, D. P. (2017) 'COMMUNICATION ABOUT PUBERTY AMONG MIDDLE-SCHOOL-AGED CHILDREN', in Bekirogullari, Z., Minas, M. Y., and Thambusamy, R. X. (eds) *International Conference on Education and Educational Psychology*, pp. 194–202. doi: 10.15405/epsbs.2017.10.18.

Rizkia, M., Setyowati and Ungsianik, T. (2019) 'Female Adolescents' Preparations, Knowledge, and Emotional Response toward Menarche: A Preliminary Study', *Comprehensive Child and Adolescent Nursing*. Taylor & Francis, 42(sup1), pp. 108–114. doi: 10.1080/24694193.2019.1578431.

Robins, C. S. *et al.* (2008) 'Dialogues on mixed-methods and mental health services research: Anticipating challenges, building solutions', *Psychiatric Services*, 59(7), pp. 727–731. doi: 10.1176/ps.2008.59.7.727.

Rocheleau, D. and Nirmal, P. (2014) 'Feminist Political Ecology: Global issues and local experience', in Baksh, R. and Harcourt, W. (eds) *The Oxford Handbook of Transnational Feminist Movements*. Oxford

University Press.

Roux, F. *et al.* (2019) 'Developing and trialling a school-based ovulatory-menstrual health literacy programme for adolescent girls: A quasi-experimental mixed-method protocol', *BMJ Open*, 9(3), pp. 1–8. doi: 10.1136/bmjopen-2018-023582.

Roux, F. I. *et al.* (2021) 'Progressing Toward Adolescents' Ovulatory-Menstrual Health Literacy: A Systematic Literature Review of School-Based Interventions', *Women's Reproductive Health*. Taylor & Francis, 8(2), pp. 92–114. doi: 10.1080/23293691.2021.1901517.

Rubin, C. *et al.* (2009) 'Timing of maturation and predictors of menarche in girls enrolled in a contemporary British cohort', *Paediatric and Perinatal Epidemiology*, 23(5), pp. 492–504. doi: 10.1111/j.1365-3016.2009.01055.x.

Rubinsky, V., Gunning, J. N. and Cooke-Jackson, A. (2020) "'I Thought I Was Dying:'" (Un)Supportive Communication Surrounding Early Menstruation Experiences', *Health Communication*. Routledge, 35(2), pp. 242–252. doi: 10.1080/10410236.2018.1548337.

Russell-Mundine, G. (2012) 'Reflexivity in indigenous research: Reframing and decolonising research?', *Journal of Hospitality and Tourism Management*. CAUTHE, 19(1), pp. 85–90. doi: 10.1017/jht.2012.8.

Rycroft-Malone, J. *et al.* (2012) 'Realist synthesis: illustrating the method for implementation research', *Implementation Science*. BioMed Central Ltd, 7(1), p. 1. doi: 10.1186/1748-5908-7-33.

Sandelowski, M. (2000) 'Combining Qualitative and Quantitative Sampling, Data Collection, and Analysis Techniques in Mixed-Method Studies', *Research in Nursing & Health*, 23(3), pp. 246–255. doi: 10.1002/1098-240x(200006)23:3<246::aid-nur9>3.3.co;2-8.

Sarria-Santamera, A. *et al.* (2021) 'Systematic review and meta-analysis of incidence and prevalence of endometriosis', *Healthcare (Switzerland)*, 9(1), pp. 1–16. doi: 10.3390/healthcare9010029.

Schillinger, D. (2021) 'Social Determinants, Health Literacy, and Disparities: Intersections and Controversies', *Health literacy research and practice*, 5(3), pp. e234–e243. doi: 10.3928/24748307-20210712-01.

Schmitt, M. L. *et al.* (2018) 'Making the case for a female-friendly toilet', *Water (Switzerland)*. MDPI AG, 10(9), p. 9. doi: 10.3390/w10091193.

Schmitt, M. L. *et al.* (2021) 'The intersection of menstruation, school and family: Experiences of girls growing up in urban areas in the U.S.A.', *International Journal of Adolescence and Youth*. Routledge, 26(1), pp. 94–109. doi: 10.1080/02673843.2020.1867207.

Schoep, M. E. *et al.* (2019) 'Productivity loss due to menstruation-related symptoms: A nationwide cross-sectional survey among 32 748 women', *BMJ Open*, 9(6), pp. 1–10. doi: 10.1136/bmjopen-2018-026186.

Sebert Kuhlmann, A. *et al.* (2019) 'Unmet Menstrual Hygiene Needs among Low-Income Women', *Obstetrics and Gynecology*, 133(2), pp. 238–244. doi: 10.1097/AOG.0000000000003060.

Seear, K. (2009) 'The etiquette of endometriosis: Stigmatisation, menstrual concealment and the diagnostic delay', *Social Science and Medicine*. Elsevier Ltd, 69(8), pp. 1220–1227. doi: 10.1016/j.socscimed.2009.07.023.

Setyowati, S., Rizkia, M. and Ungsianik, T. (2019) 'Improving Female Adolescents' Knowledge, Emotional Response, and Attitude toward Menarche following Implementation of Menarcheal Preparation Reproductive Health Education', *Asian/Pacific Island Nursing Journal*, 4(2), pp. 84–91. doi: 10.31372/20190402.1041.

- Sex Education Forum (2017) *Can parents withdraw their children from school RSE?* Available at: <https://www.sexeducationforum.org.uk/resources/frequently-asked-questions/7-can-parents-withdraw-their-children-school-rse> (Accessed: 19 January 2023).
- Shah, V. *et al.* (2019) 'A rite of passage : a mixed methodology study about knowledge , perceptions and practices of menstrual hygiene management in rural Gambia', *BMC Public Health*. BMC Public Health, 19(277), pp. 1–15. doi: 10.1186/S12889-019-6599-2).
- Shaikh, M. A., Mubeen, S. M. and Furqan, M. (2017) 'Learning about facts of life: Perspective from medical students on sources and preferences about puberty and sex education in Karachi', *Journal of the Pakistan Medical Association*, 67(11), pp. 1747–1750.
- Sharma, A., McCall-Hosenfeld, J. S. and Cuffee, Y. (2022) 'Systematic review of menstrual health and hygiene in Nepal employing a social ecological model', *Reproductive Health*. BioMed Central, 19(1), pp. 1–21. doi: 10.1186/s12978-022-01456-0.
- Sharma, R. *et al.* (2015) 'Menstrual hygiene among adolescent girls', *Indian Journal of Community Health*, 27(3), pp. 376–380. Available at: <http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=cagh&AN=20163019906>.
- Sivakami, M. *et al.* (2019) 'Effect of menstruation on girls and their schooling, and facilitators of menstrual hygiene management in schools: Surveys in government schools in three states in India, 2015', *Journal of Global Health*, 9(1). doi: 10.7189/jogh.09.010408.
- Skandhan, K. P. *et al.* (1988) 'Menarche - Prior Knowledge and Experience', *Adolescence*, 23(89), pp. 149–154.
- Soberon and Arroyo-Pena, B. (2017) 'Are fundamental niches larger than the realized? Testing a 50-year-old prediction by Hutchinson. Biodiversity Research Center and Department of Ecology and Evolutionary Biology, University of Kansas, Lawrence, Kansas, United States of America', *PLoS ONE*, (4), pp. 1–14.
- Sommer, M. (2009) 'Ideologies of sexuality, menstruation and risk: girls' experiences of puberty and schooling in northern Tanzania', *Source: Culture, Health & Sexuality Culture Health & Sexuality*, 11(4), pp. 383–398. Available at: <http://www.jstor.org/stable/27784458>.
- Sommer, M. (2010) 'Putting menstrual hygiene management on to the school water and sanitation agenda', *Waterlines*, 29(4), pp. 268–278. doi: 10.3362/1756-3488.2010.030.
- Sommer, M. (2011) 'An Early Window of Opportunity for Promoting Girls', *Health Sommer International Electronic Journal of Health Education*, 14, pp. 77–92.
- Sommer, M., Ackatia-Armah, N., *et al.* (2015) 'A comparison of the menstruation and education experiences of girls in Tanzania, Ghana, Cambodia and Ethiopia', *Compare*, 45(4), pp. 589–609. doi: 10.1080/03057925.2013.871399.
- Sommer, M., Hirsch, J. S., *et al.* (2015) 'Comfortably, safely, and without shame: Defining menstrual hygiene management as a public health issue', *American Journal of Public Health*, 105(7), pp. 1302–1311. doi: 10.2105/AJPH.2014.302525.
- Sommer, M. *et al.* (2016) 'A Time for Global Action: Addressing Girls' Menstrual Hygiene Management Needs in Schools', *PLOS Medicine*, 13(2), p. e1001962. doi: 10.1371/journal.pmed.1001962.
- Sommer, M. *et al.* (2017) 'Attention to menstrual hygiene management in schools: An analysis of education policy documents in low- and middle-income countries', *International Journal of*

- Educational Development*. Elsevier, 57(April), pp. 73–82. doi: 10.1016/j.ijedudev.2017.09.008.
- Sommer, M. *et al.* (2020) 'Menstruation and homelessness: Challenges faced living in shelters and on the street in New York City', *Health and Place*. Elsevier Ltd, 66(July), p. 102431. doi: 10.1016/j.healthplace.2020.102431.
- Sommer, M. *et al.* (2021) 'How addressing menstrual health and hygiene may enable progress across the Sustainable Development Goals', *Global Health Action*. Taylor & Francis, 14(1), p. 1920315. doi: 10.1080/16549716.2021.1920315.
- Sommer, M., Kjellén, M. and Pensulo, C. (2013) 'Girls' and women's unmet needs for menstrual hygiene management (MHM): The interactions between MHM and sanitation systems in low-income countries', *Journal of Water Sanitation and Hygiene for Development*, 3(3), pp. 283–297. doi: 10.2166/washdev.2013.101.
- Sommer, M. and Sahin, M. (2013) 'Advancing the global agenda for menstrual hygiene management for schoolgirls', *American Journal of Public Health*, 103(9), pp. 1556–1559. doi: 10.2105/AJPH.2013.301374.
- Sooki, Z. *et al.* (2016) 'The Role of Mother in Informing Girls About Puberty: A Meta-Analysis Study', *Nursing and Midwifery Studies*, Inpress(Inpress), pp. 1–10. doi: 10.17795/nmsjournal30360.
- Sperling, G. B., Winthrop, R. and Kwauk, C. (2016) *What Works in Girls' Education*. The Brookings Institution Press.
- Srivastava, S. and Chandra, M. (2017) 'Study on the knowledge of school girls regarding menstrual and reproductive health and their perceptions about family life education program', *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, 6(2), p. 688. doi: 10.18203/2320-1770.ijrcog20170406.
- Ssemugabo, C. *et al.* (2020) 'A socio-ecological perspective of the facilitators and barriers to uptake of water, sanitation and hygiene interventions in a slum setting in kampala, uganda: A qualitative study', *Journal of Water Sanitation and Hygiene for Development*, 10(2), pp. 227–237. doi: 10.2166/washdev.2020.124.
- Starks, H. and Trinidad, S. B. (2007) 'Choose your method: A comparison of phenomenology, discourse analysis, and grounded theory', *Qualitative Health Research*, 17(10), pp. 1372–1380. doi: 10.1177/1049732307307031.
- STrauss, A and Corbin, J. (1994) *Handbook of Qualitative Research. Strategies of Inquiry; grounded theory - an overview*.
- Strauss, A. and Corbin, J. (1994) 'Grounded Theory Methodology', in Denain N, K. and Lincoln Y, S. (eds) *Handbook of Qualitative Research*. Thousand Oaks: Sage Publications Inc, pp. 273–285.
- Su, J. J. and Lindell, D. (2016) 'Promoting the menstrual health of adolescent girls in China', *Nursing and Health Sciences*, 18(4), pp. 481–487. doi: 10.1111/nhs.12295.
- Suarez-Lledo, V. and Alvarez-Galvez, J. (2021) 'Prevalence of health misinformation on social media: Systematic review', *Journal of Medical Internet Research*, 23(1). doi: 10.2196/17187.
- Sumpter, C. and Torondel, B. (2013) 'A Systematic Review of the Health and Social Effects of Menstrual Hygiene Management', *PLoS ONE*, 8(4). doi: 10.1371/journal.pone.0062004.
- Swachh Bharat Mission* (2018) *Swachh Bharat Mission*. Available at: <http://swachhbharatmission.gov.in/SBMCMS/about-us.htm>.
- Tamiztousi, T. *et al.* (2019) 'Education for Menstrual Hygiene Promotion in Iranian Girls: A Systematic

- Review and Meta-Analysis', *International Journal of Pediatrics*, 7(6), pp. 9507–9515. doi: 10.22038/ijp.2019.36894.3213.
- Testa, A. C. and Coleman, L. M. (2006) 'Accessing research participants in schools: A case study of a UK adolescent sexual health survey', *Health Education Research*, 21(4), pp. 518–526. doi: 10.1093/her/cyh078.
- Tey, N. P., Lai, S. L. and Ng, S. T. (2019) 'AGE at MENARCHE and SEXUAL DEBUT among YOUNG Filipino WOMEN', *Journal of Biosocial Science*, 51(1), pp. 77–94. doi: 10.1017/S0021932017000682.
- Thomas, J. and Harden, A. (2008) 'Methods for the thematic synthesis of qualitative research in systematic reviews', *BMC Medical Research Methodology*, 8(45), pp. 1–10. doi: 10.1186/1471-2288-8-45.
- Tigges, B. B. (2003) 'Parental consent and adolescent risk behavior research', *Health Policy and Systems*, pp. 283–289.
- Tindana, P. O., Kass, N. and Patricia, A. (2006) 'The Informed Consent Process in a Rural African Setting', *IRB Ethics and Human Research*, 28(3), pp. 1–6.
- Tingle, C & Vora, S. (2018) 'Break the Barriers : Girls ' Experiences of', *Plan International UK*, pp. 1–68. Available at: <https://plan-uk.org/file/plan-uk-break-the-barriers-report-032018pdf/download?token=Fs-HYP3v>.
- Tiwari, A., Ekka, I. J. and Thakur, R. (2018) 'Assessment of knowledge and practices regarding menstrual hygiene among adolescent girls of Government higher secondary school, station Murhipar, Rajnandgaon (C.G.)', *International Journal Of Community Medicine And Public Health*, 5(4), pp. 1335–1338. doi: 10.18203/2394-6040.ijcmph20180973.
- Tobi, H. and Kampen, J. K. (2018) 'Research design: the methodology for interdisciplinary research framework', *Quality and Quantity*. Springer Netherlands, 52(3), pp. 1209–1225. doi: 10.1007/s11135-017-0513-8.
- Townsend, N. and Foster, C. (2013) 'Developing and applying a socio-ecological model to the promotion of healthy eating in the school', *Public Health Nutrition*, 16(6), pp. 1101–1108. doi: 10.1017/S1368980011002655.
- Treasury, U. K. (2021) *Tampon Tax abolished from today*. Available at: <https://www.gov.uk/government/news/tampon-tax-abolished-from-today> (Accessed: 18 January 2023).
- Tuli, A. *et al.* (2019) "'it's a girl thing": Examining challenges and opportunities around menstrual health education in india', *ACM Transactions on Computer-Human Interaction*, 26(5). doi: 10.1145/3325282.
- UN Organisation (no date) *We can End Poverty Millenium Development Goals and Beyond 2015*. Available at: <https://www.un.org/millenniumgoals/education.shtml> (Accessed: 6 December 2022).
- UNESCO (2020) *Global education monitoring report 2020: Gender report, A new generation: 25 years of efforts for gender equality in education*. Available at: <https://en.unesco.org/gem-report/2020genderreport>.
- United Kingdom Department for Education (2014) *Schools: Statutory guidance*. Available at: <https://www.gov.uk/government/collections/statutory-guidance-schools#curriculum> (Accessed: 9 February 2023).
- United Kingdom Department for Education (2019) 'Relationships Education, Relationships and Sex Education (RSE) and Health Education', (November), pp. 1–6. Available at:

https://consult.education.gov.uk/pshe/relationships-education-rse-health-education/supporting_documents/20170718_Draft_guidance_for_consultation.pdf.

United Kingdom Government (2019) *Index of Multiple Deprivation 2019*. Available at: <https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019> (Accessed: 9 August 2019).

United Kingdom Government (2021) *Free School Meals Autumn Term 2021*. Available at: www.explore-education-statistics.service.gov.uk/find-statistics/free-school-meals-autumn-term/2020-21-autumn-term (Accessed: 17 November 2021).

United Kingdom Government (2022) *Schools, Pupils and their Characteristics 2021/22, Explore Education Statistics*. Available at: <https://explore-education-statistics.service.gov.uk/find-statistics/school-pupils-and-their-characteristics#dataBlock-fdf8e3d7-4420-441d-8084-6a8d82ff4bea-tables> (Accessed: 9 January 2023).

United Nations Children's Fund (UNICEF) and World Health Organization, 2018 (2018) *Drinking Water, Sanitation and Hygiene in Schools : Global baseline report 2018, Unicef*. Available at: https://washdata.org/sites/default/files/documents/reports/2018-11/JMP_WASH_in_Schools_WEB_final.pdf.

United Nations Press Release 16 January (2004) *No Development Tool More Effective Than Education of Girls, UN Press release 16 January 2004*. United Nations. Available at: <https://press.un.org/en/2004/sgsm9118.doc.htm> (Accessed: 7 February 2023).

United Nations Sustainable Development Group UNSDG (2020) *SDGs Decade of Action*. Available at: <https://www.un.org/sustainabledevelopment/decade-of-action/> (Accessed: 6 December 2022).

United Nations Sustainable Development Group UNSDG (no date) *Sustainable Development Goals*. Available at: <https://www.undp.org/sustainable-development-goals> (Accessed: 9 October 2023).

Ussher, J. M. and Perz, J. (2006) 'Evaluating the relative efficacy of a self-help and minimal psycho-educational intervention for moderate premenstrual distress conducted from a critical realist standpoint', *Journal of Reproductive and Infant Psychology*, 24(4), pp. 347–362. doi: 10.1080/02646830600974147.

Ussher, J. M. and Perz, J. (2020) 'Resisting the mantle of the monstrous feminine; Women's construction and experience of premenstrual embodiment', in *The Palgrave Handbook of Critical Menstruation Studies*, pp. 215–231.

Valizadeh, S. *et al.* (2017) 'Educating Mothers and Girls about Knowledge and Practices toward Puberty Hygiene in Tabriz, Iran: A Randomized Controlled Clinical Trial', *Iranian Red Crescent Medical Journal*, 19(2). doi: 10.5812/ircmj.28593.

Vygotsky, L. (1978) 'Interaction between learning and development', *Readings on the development of children*, 23(3), pp. 34–41.

Wall, L. L. *et al.* (2016) 'A community-based study of menstrual beliefs in Tigray, Ethiopia', *International Journal of Gynecology & Obstetrics*, 135(3), pp. 310–313. doi: <https://doi.org/10.1016/j.ijgo.2016.05.015>.

Wardle, S. L. *et al.* (2021) 'Feeding female soldiers: Consideration of sex-specific nutrition recommendations to optimise the health and performance of military personnel', *Journal of Science and Medicine in Sport*. Elsevier Ltd, 24(10), pp. 995–1001. doi: 10.1016/j.jsams.2021.08.011.

Whitehead, S. and Biddle, S. (2008) 'Adolescent girls' perceptions of physical activity: A focus group study', *European Physical Education Review*, 14(2), pp. 243–262. doi: 10.1177/1356336X08090708.

Willows, N. D., Hanley, A. J. G. G. and Delormier, T. (2012) 'A socioecological framework to understand weight-related issues in Aboriginal children in Canada', *Applied Physiology, Nutrition and Metabolism*, 37(1), pp. 1–13. doi: 10.1139/H11-128.

Wilson, E. *et al.* (2015) 'Does Menstrual Hygiene Matter?', *ScHARR Report Series*, 31(August).

Wong, C. L., Ip, W. Y. and Lam, L. W. (2016) 'Original Article Self-Care Strategies among Chinese Adolescent Girls with Dysmenorrhea : A Qualitative Study', *Pain Management Nursing*. American Society for Pain Management Nursing, 17(4), pp. 262–271. doi: 10.1016/j.pmn.2016.04.001.

World Bank (2022) *Countries and Economies*. Available at: <https://data.worldbank.org/country> (Accessed: 9 January 2023).

Yilmaz, S. K., Bohara, A. K. and Chowdhury, S. R. (2020) 'Touch for Health: Use of Pavlovian Processes with Physical Touch as a Means to Improve Menstrual Hygiene Management Initiatives, Measured by Willingness to Pay', *PharmacoEconomics - Open*. Springer International Publishing, 4(2), pp. 263–276. doi: 10.1007/s41669-019-0168-6.

Van Zyl, C. *et al.* (2021) 'Unravelling € low-resource settings': A systematic scoping review with qualitative content analysis', *BMJ Global Health*, 6(6), pp. 1–14. doi: 10.1136/bmjgh-2021-005190.

ADDITIONAL INFORMATION

Contributors

RE, FG and BH designed the review. RE and OC reviewed titles, abstracts and full-texts for eligibility. Disagreement was resolved by discussion and where necessary FG and BH offered their view. RE, FG and BH agreed on a data extraction framework, which was then carried out by RE. The quality assessment tool was agreed upon by RE, FG and BH. RE used the MMAT to assess the quality and this was verified by FG and BH. RE prepared the manuscript and it was reviewed and edited by FG and BH.

Corresponding author

Rebecca.R.Evans@warwick.ac.uk

Funding Statement

This work was supported by the National Institute for Health Research Unit on Improving Health in Slums. Funder reference: 16/136/87.

Ethical Approval

BSREC 43/19-20

Competing Interests

None declared

Patient Consent

None required

Data Sharing Statement

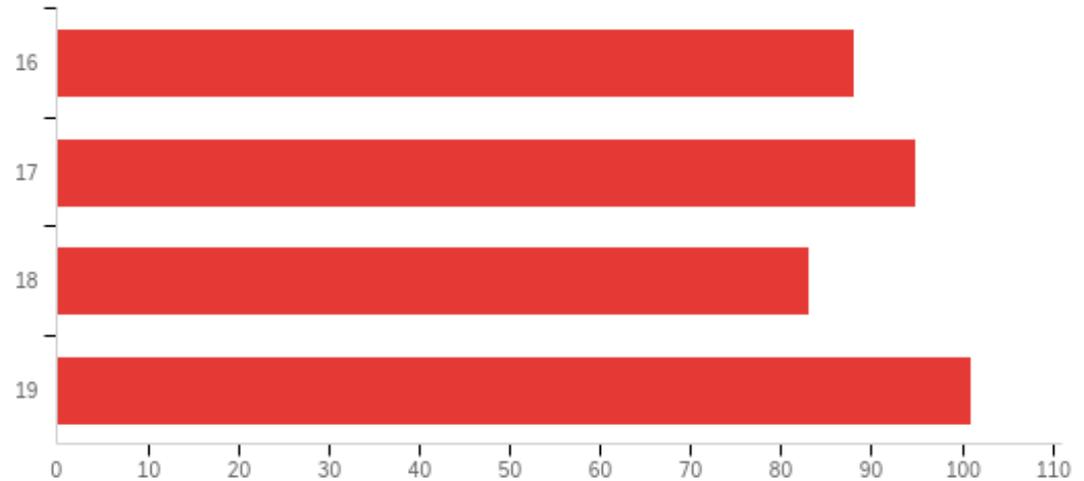
No original data were generated in this study

Appendix 4 Demographic results

The Philippines Demographic data from section 2 of the survey.

367 complete responses. Raw count, and % by question.

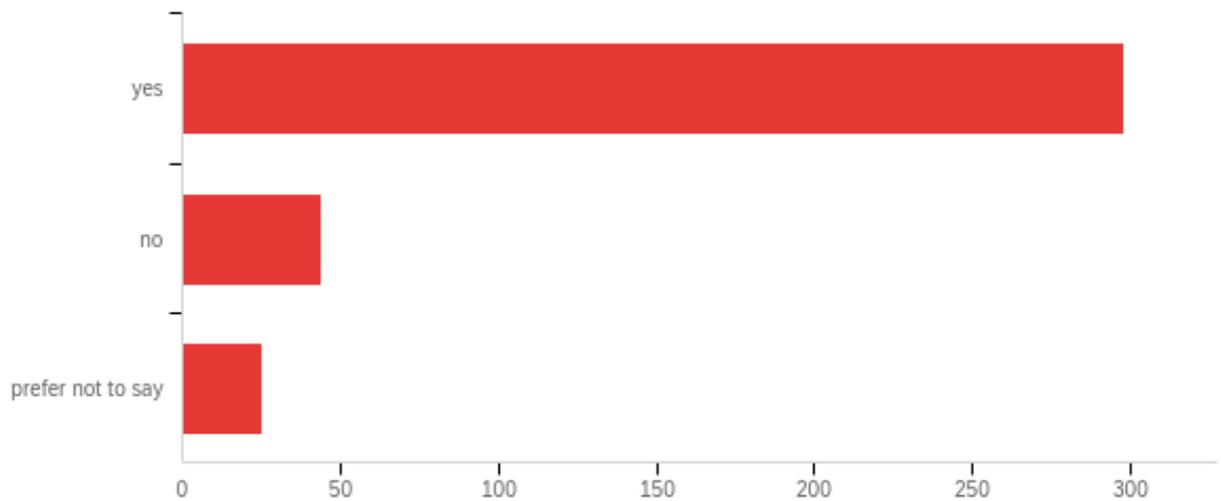
Q2.1 - What is your age?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	What is your age?	1.00	6.00	3.09	1.92	3.69	367

#	Answer	%	Count
1	16	23.98%	88
2	17	25.89%	95
3	18	22.62%	83
6	19	27.52%	101
	Total	100%	367

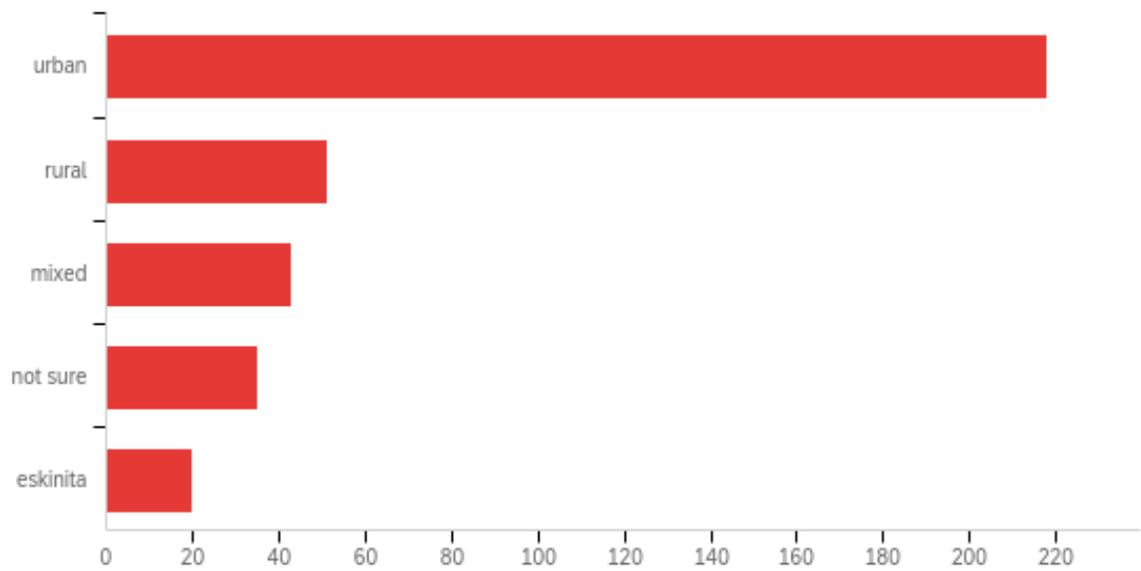
Q2.2 - Are you currently a school or college student?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Are you currently a school or college student?	1.00	3.00	1.26	0.57	0.33	367

#	Answer	%	Count
1	yes	81.20%	298
2	no	11.99%	44
3	prefer not to say	6.81%	25
	Total	100%	367

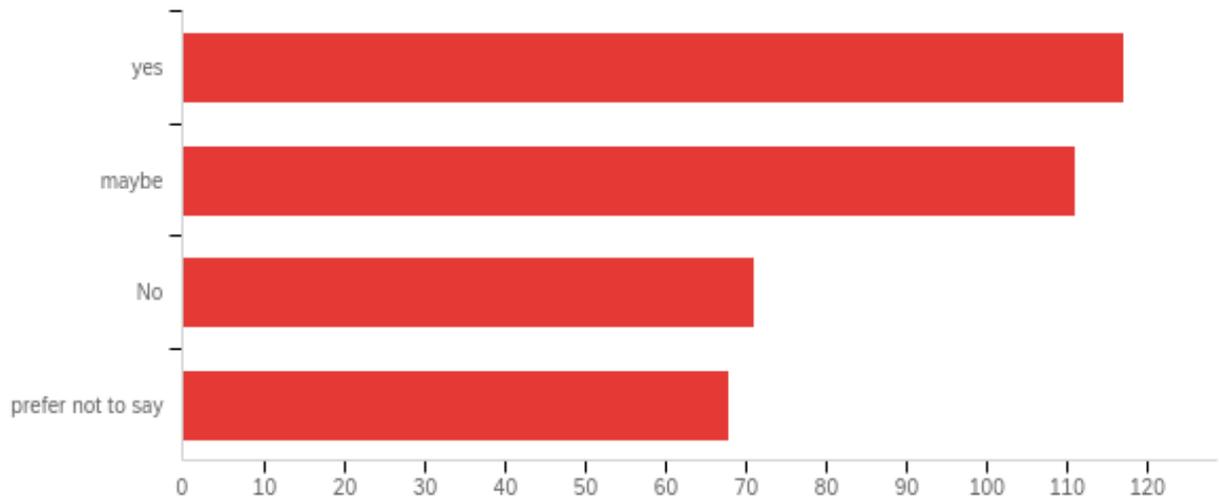
Q2.3 - Do you live in an urban or rural area?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Do you live in an urban or rural area?	1.00	5.00	1.88	1.25	1.57	367

#	Answer	%	Count
1	urban	59.40%	218
2	rural	13.90%	51
3	mixed	11.72%	43
4	not sure	9.54%	35
5	eskinita	5.45%	20
	Total	100%	367

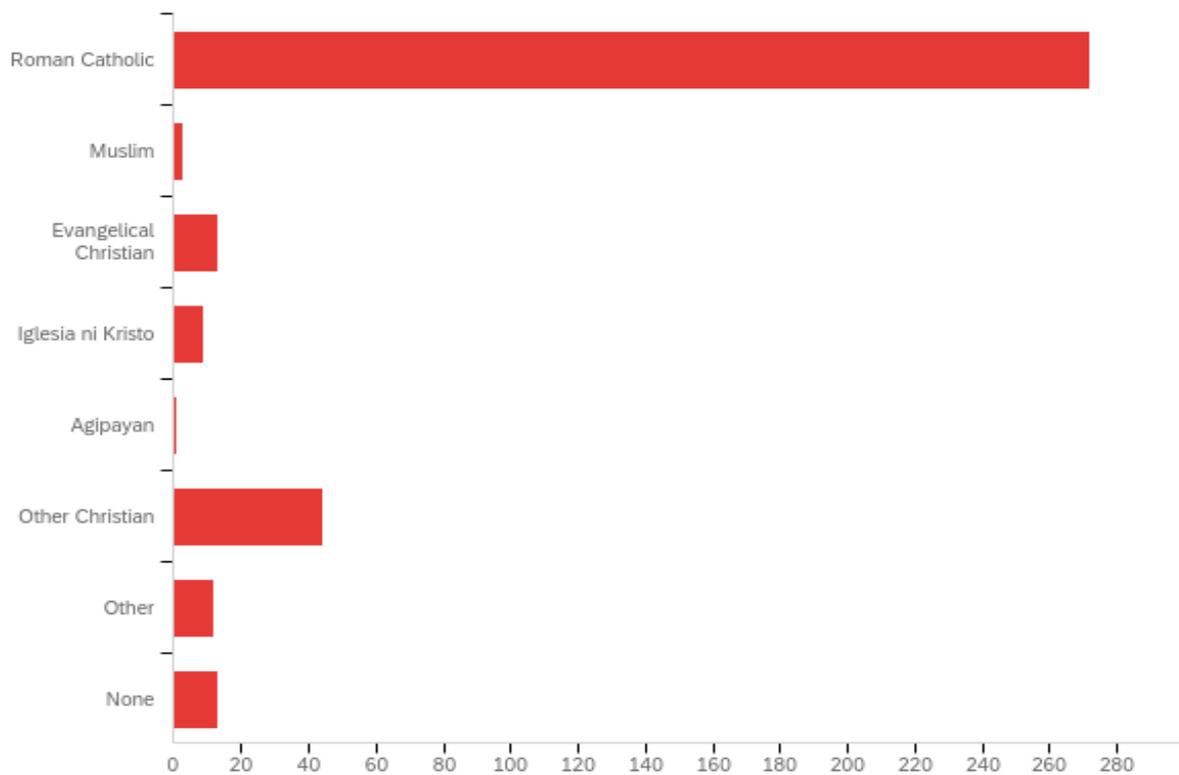
Q2.4 - Would you describe your circumstances as low-income or low-resource?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Would you describe your circumstances as low-income or low-resource?	4.00	8.00	5.43	1.41	1.99	367

#	Answer	%	Count
4	yes	31.88%	117
5	maybe	30.25%	111
6	No	19.35%	71
8	prefer not to say	18.53%	68
	Total	100%	367

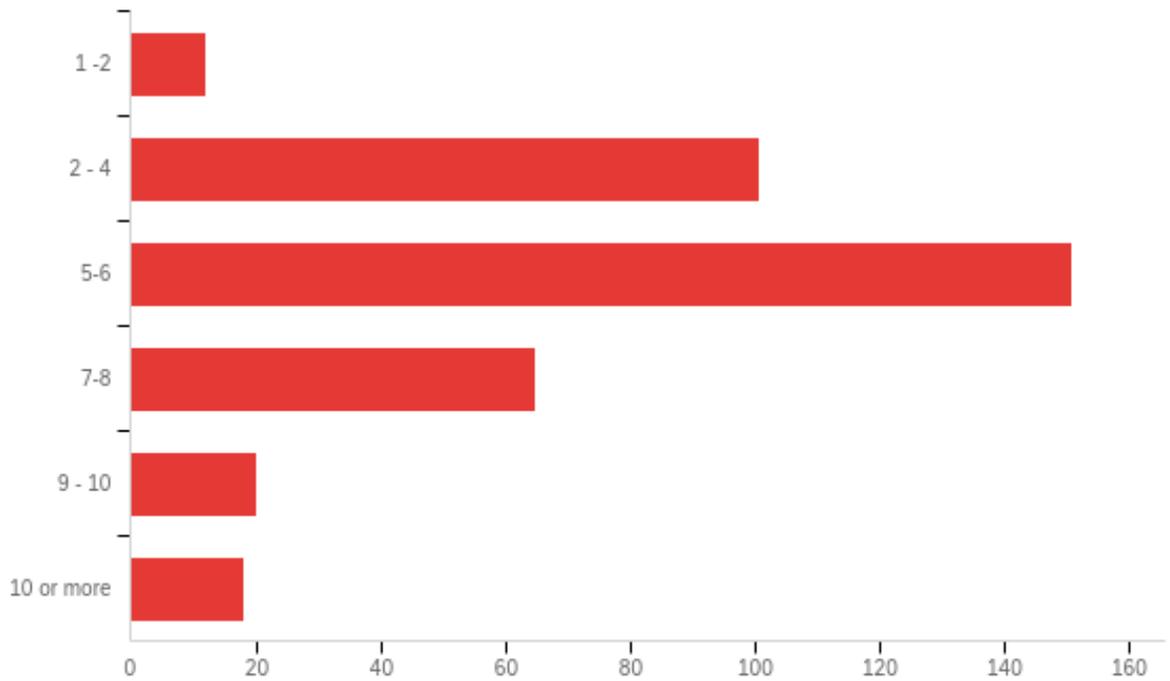
Q2.5 - What is your religion?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	What is your religion?	1.00	8.00	2.21	2.21	4.87	367

#	Answer	%	Count
1	Roman Catholic	74.11%	272
2	Muslim	0.82%	3
3	Evangelical Christian	3.54%	13
4	Iglesia ni Kristo	2.45%	9
5	Agipayan	0.27%	1
6	Other Christian	11.99%	44
7	Other	3.27%	12
8	None	3.54%	13
	Total	100%	367

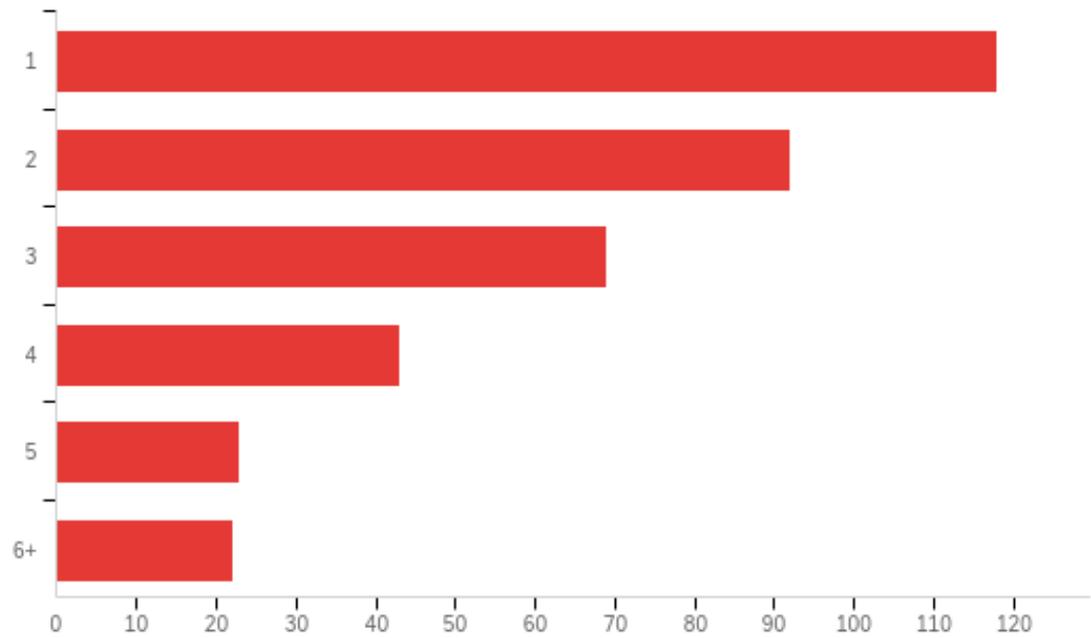
Q2.7 - How many people live in your house?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How many people live in your house?	1.00	6.00	3.09	1.11	1.23	367

#	Answer	%	Count
1	1 - 2	3.27%	12
2	2 - 4	27.52%	101
3	5-6	41.14%	151
4	7-8	17.71%	65
5	9 - 10	5.45%	20
6	10 or more	4.90%	18
	Total	100%	367

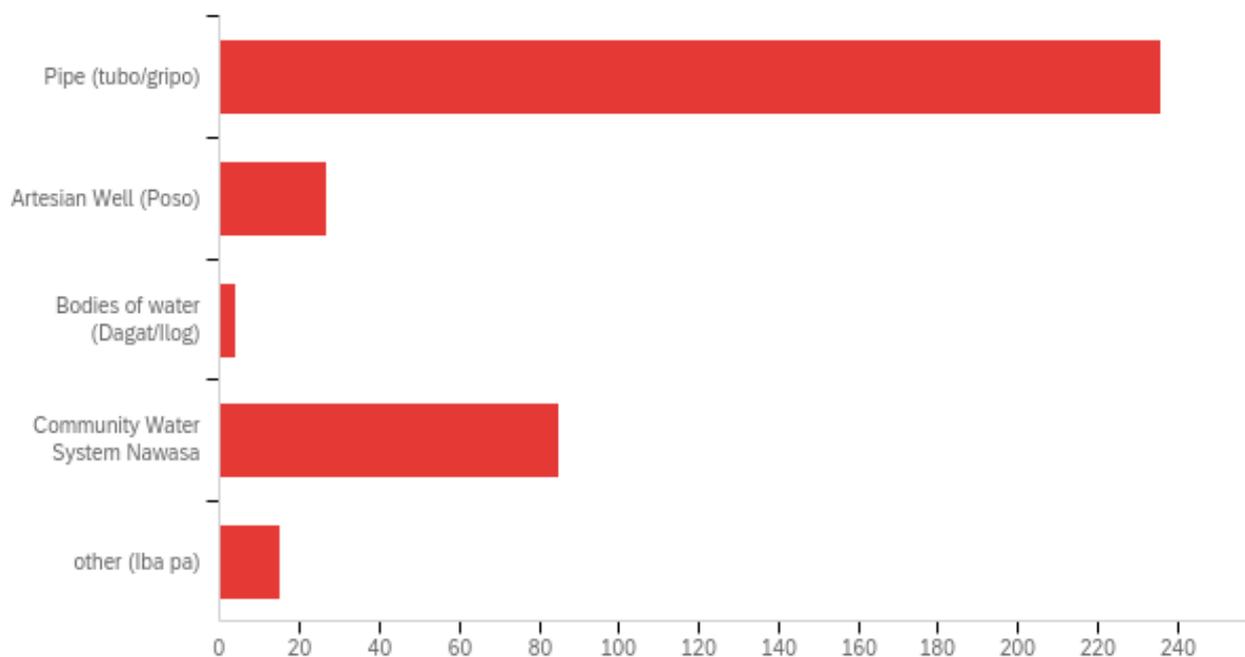
Q2.8 - How many are females over the age of 12?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How many are females over the age of 12?	1.00	6.00	2.53	1.49	2.22	367

#	Answer	%	Count
1	1	32.15%	118
2	2	25.07%	92
3	3	18.80%	69
4	4	11.72%	43
5	5	6.27%	23
6	6+	5.99%	22
	Total	100%	367

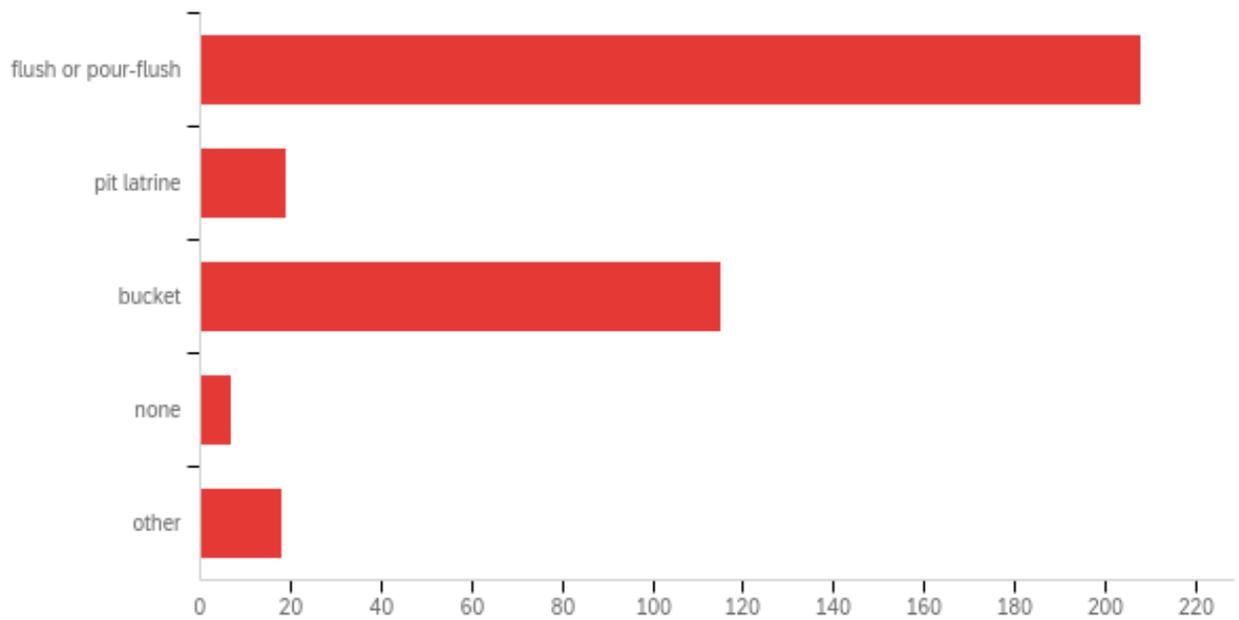
Q2.9 - What is the main source of water used by your household for hand-washing?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	What is the main source of water used by your household for hand-washing?	1.00	5.00	1.95	1.40	1.95	367

#	Answer	%	Count
1	Pipe (tubo/gripo)	64.31%	236
2	Artesian Well (Poso)	7.36%	27
3	Bodies of water (Dagat/Ilog)	1.09%	4
4	Community Water System Nawasa	23.16%	85
5	other (Iba pa)	4.09%	15
	Total	100%	367

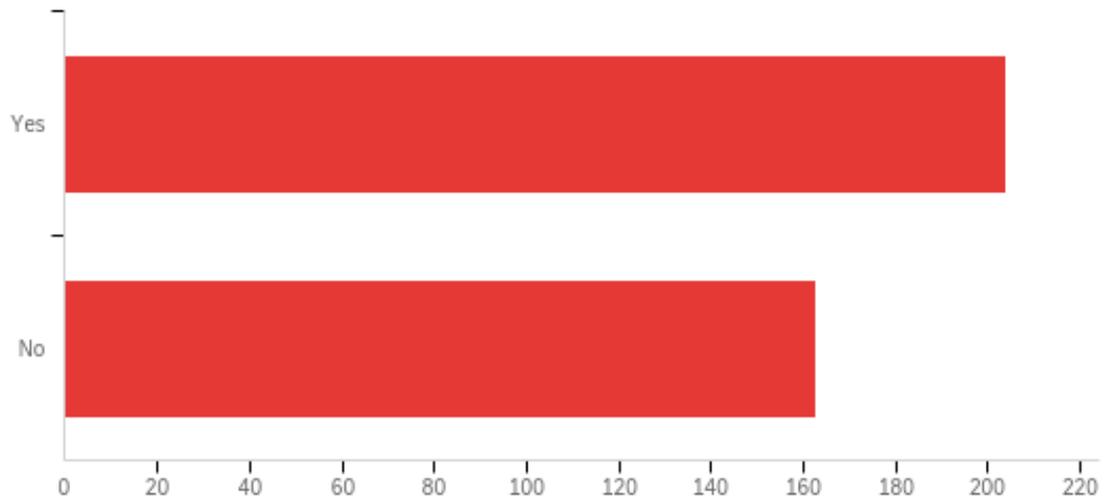
Q2.10 - What kind of C.R do members of your household usually use?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	What kind of C.R do members of your household usually use?	1.00	5.00	1.93	1.18	1.39	367

#	Answer	%	Count
1	flush or pour-flush	56.68%	208
2	pit latrine	5.18%	19
3	bucket	31.34%	115
4	none	1.91%	7
5	other	4.90%	18
	Total	100%	367

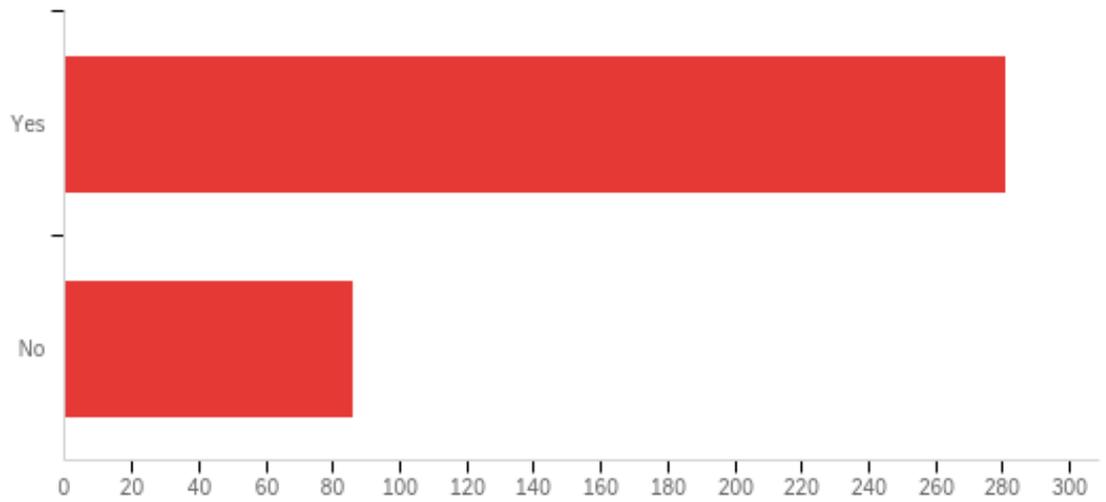
Q2.11 - Do you share this C.R. with other households?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Do you share this C.R. with other households?	1.00	2.00	1.44	0.50	0.25	367

#	Answer	%	Count
1	Yes	55.59%	204
2	No	44.41%	163
	Total	100%	367

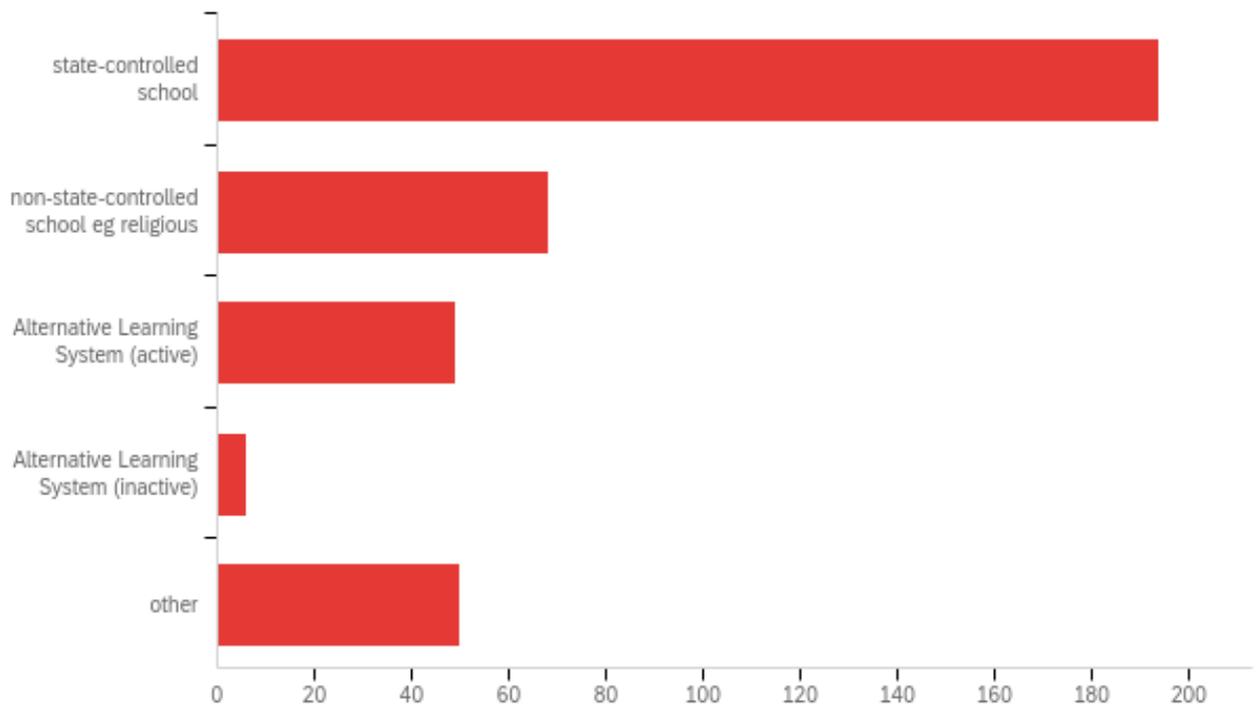
Q2.12 - Do you have a waste-collection service?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Do you have a waste-collection service?	4.00	5.00	4.23	0.42	0.18	367

#	Answer	%	Count
4	Yes	76.57%	281
5	No	23.43%	86
	Total	100%	367

Q2.13 - What sort of school did you attend for the last two years?



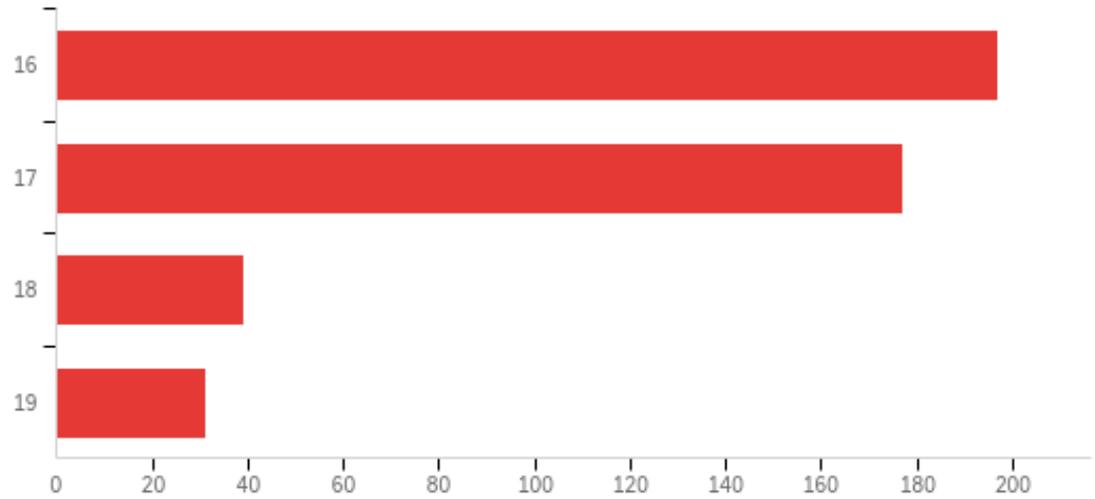
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	What sort of school did you attend for the last two years?	1.00	5.00	2.05	1.40	1.95	367

#	Answer	%	Count
1	state-controlled school	52.86%	194
2	non-state-controlled school eg religious	18.53%	68
3	Alternative Learning System (active)	13.35%	49
4	Alternative Learning System (inactive)	1.63%	6
5	other	13.62%	50
	Total	100%	367

The UK Demographic data from section 5 of the survey.

444 complete responses. Raw count, and % by question.

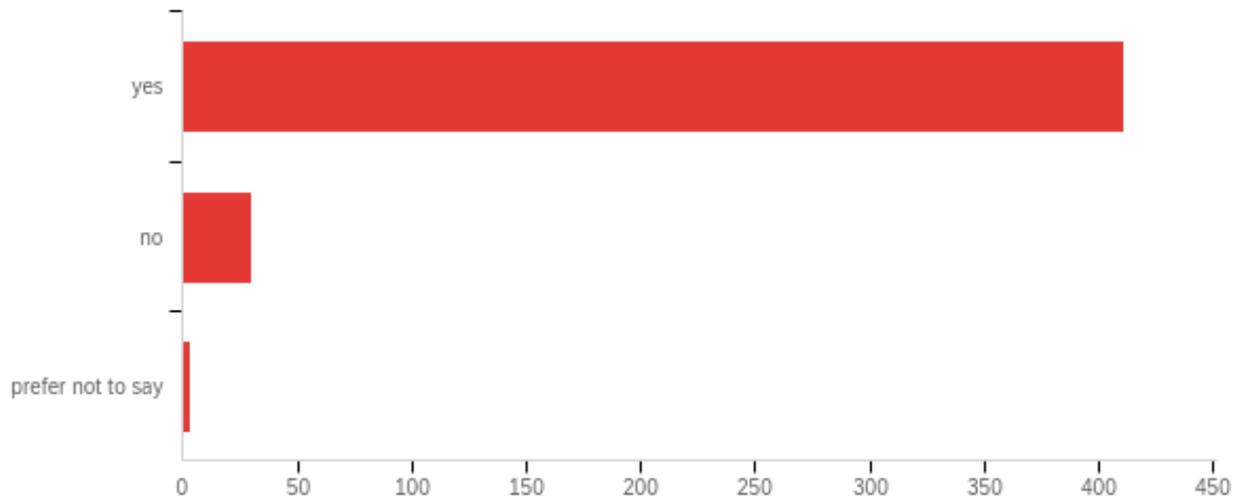
Q5.1 - What is your age?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	What is your age?	1.00	6.00	1.92	1.28	1.64	444

#	Answer	%	Count
1	16	44.37%	197
2	17	39.86%	177
3	18	8.78%	39
6	19	6.98%	31
	Total	100%	444

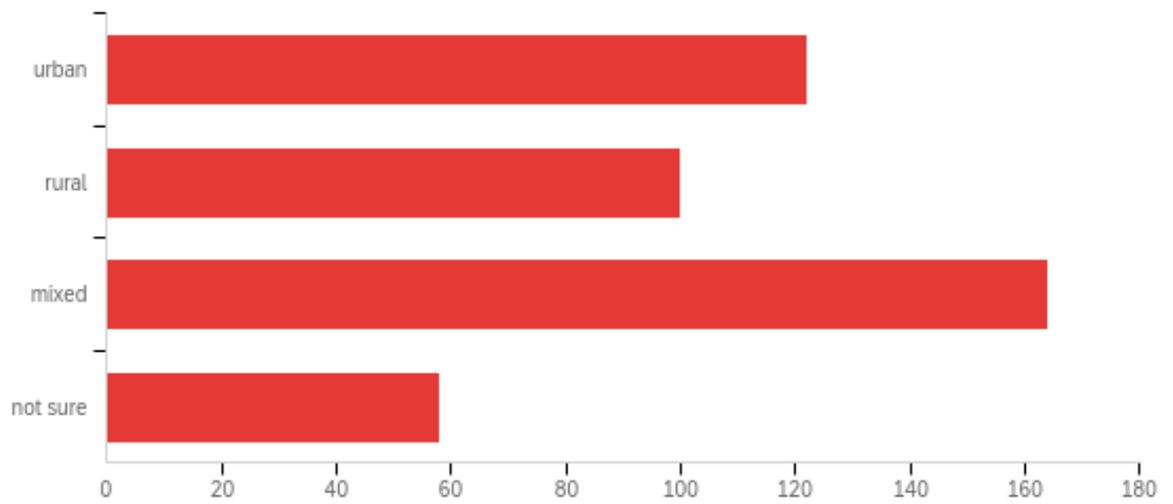
Q5.2 - Are you currently a school or college student?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Are you currently a school or college student?	1.00	3.00	1.08	0.30	0.09	444

#	Answer	%	Count
1	yes	92.57%	411
2	no	6.76%	30
3	prefer not to say	0.68%	3
	Total	100%	444

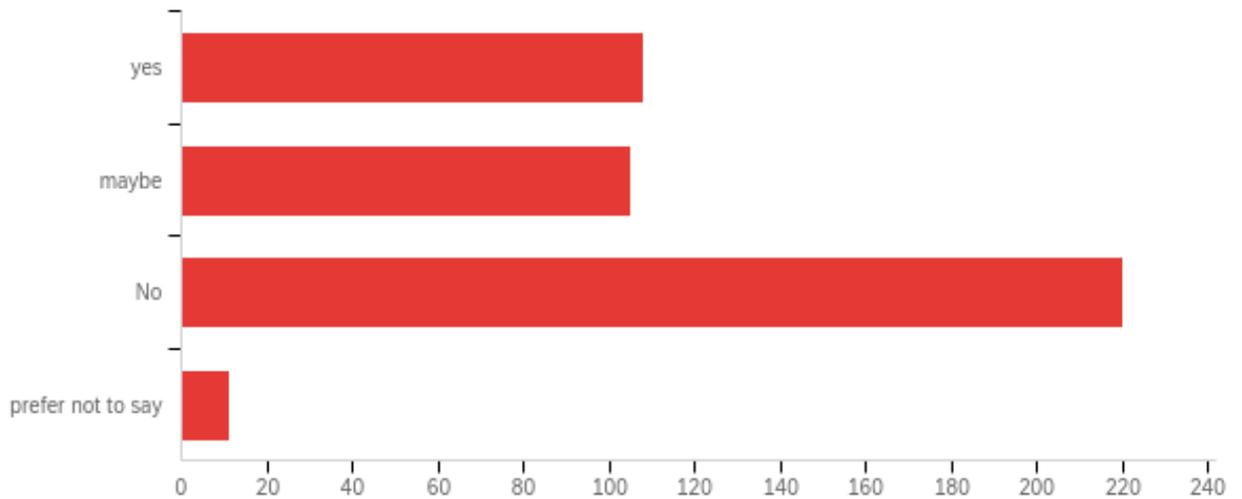
Q5.3 - Do you live in an urban or rural area?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Do you live in an urban or rural area?	1.00	4.00	2.36	1.02	1.04	444

#	Answer	%	Count
1	urban	27.48%	122
2	rural	22.52%	100
3	mixed	36.94%	164
4	not sure	13.06%	58
	Total	100%	444

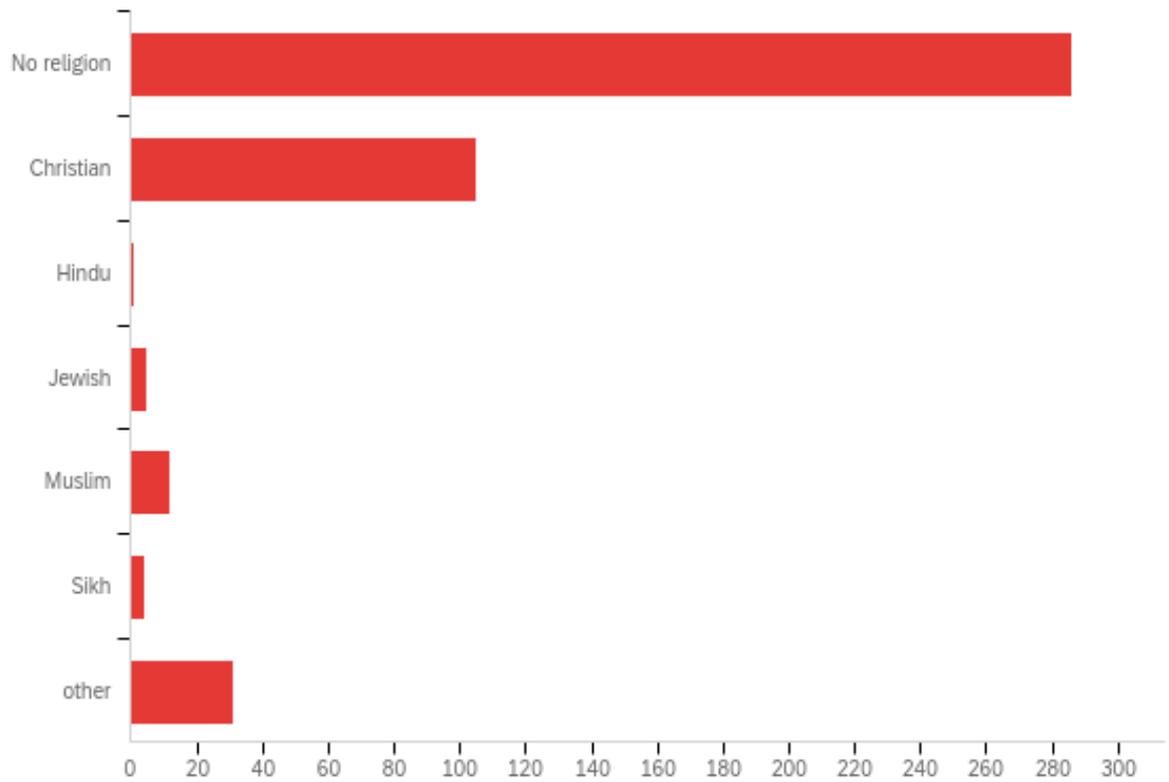
Q5.4 - Would you describe your circumstances as low-income or low-resource?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Would you describe your circumstances as low-income or low-resource?	4.00	8.00	5.33	0.92	0.86	444

#	Answer	%	Count
4	yes	24.32%	108
5	maybe	23.65%	105
6	No	49.55%	220
8	prefer not to say	2.48%	11
	Total	100%	444

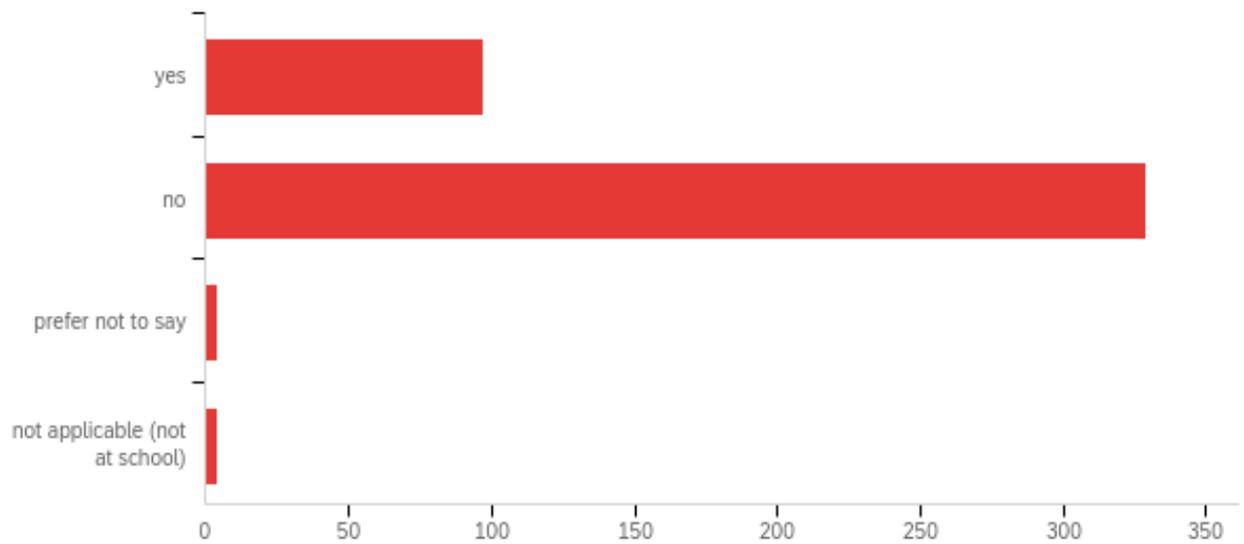
Q5.5 - What is your religion?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	What is your religion?	1.00	7.00	1.85	1.67	2.80	444

#	Answer	%	Count
1	No religion	64.41%	286
2	Christian	23.65%	105
3	Hindu	0.23%	1
4	Jewish	1.13%	5
5	Muslim	2.70%	12
6	Sikh	0.90%	4
7	other	6.98%	31
	Total	100%	444

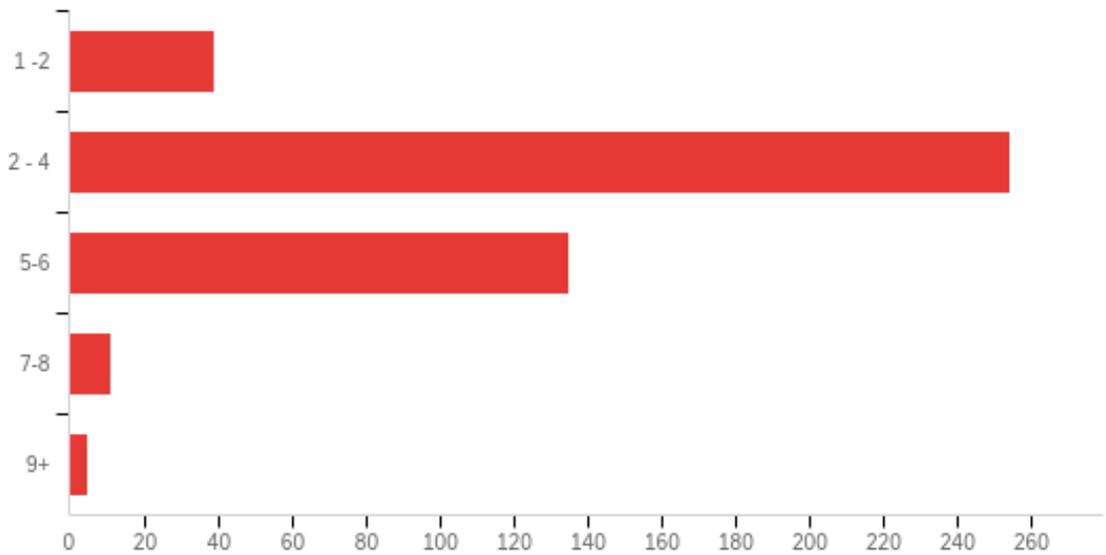
Q5.6 - Within the last 5 year years, have you received free school meals or pupil premium?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Within the last 5 year years, have you received free school meals or pupil premium?	1.00	5.00	1.82	0.56	0.31	434

#	Answer	%	Count
1	yes	22.35%	97
2	no	75.81%	329
4	prefer not to say	0.92%	4
5	not applicable (not at school)	0.92%	4
	Total	100%	434

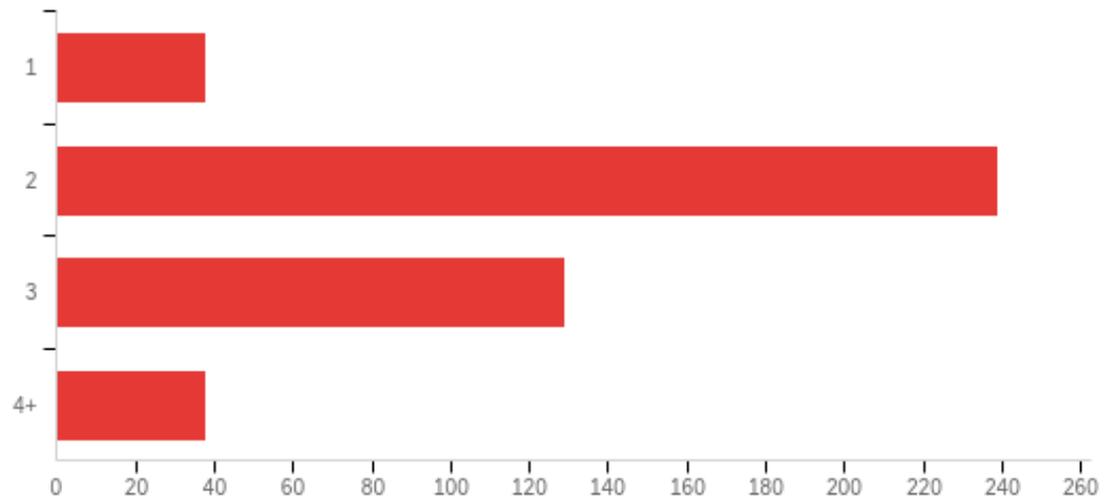
Q5.7 - How many people live in your house? (include yourself)



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How many people live in your house? (include yourself)	1.00	7.00	2.32	0.82	0.67	444

#	Answer	%	Count
1	1 -2	8.78%	39
2	2 - 4	57.21%	254
3	5-6	30.41%	135
4	7-8	2.48%	11
7	9+	1.13%	5
	Total	100%	444

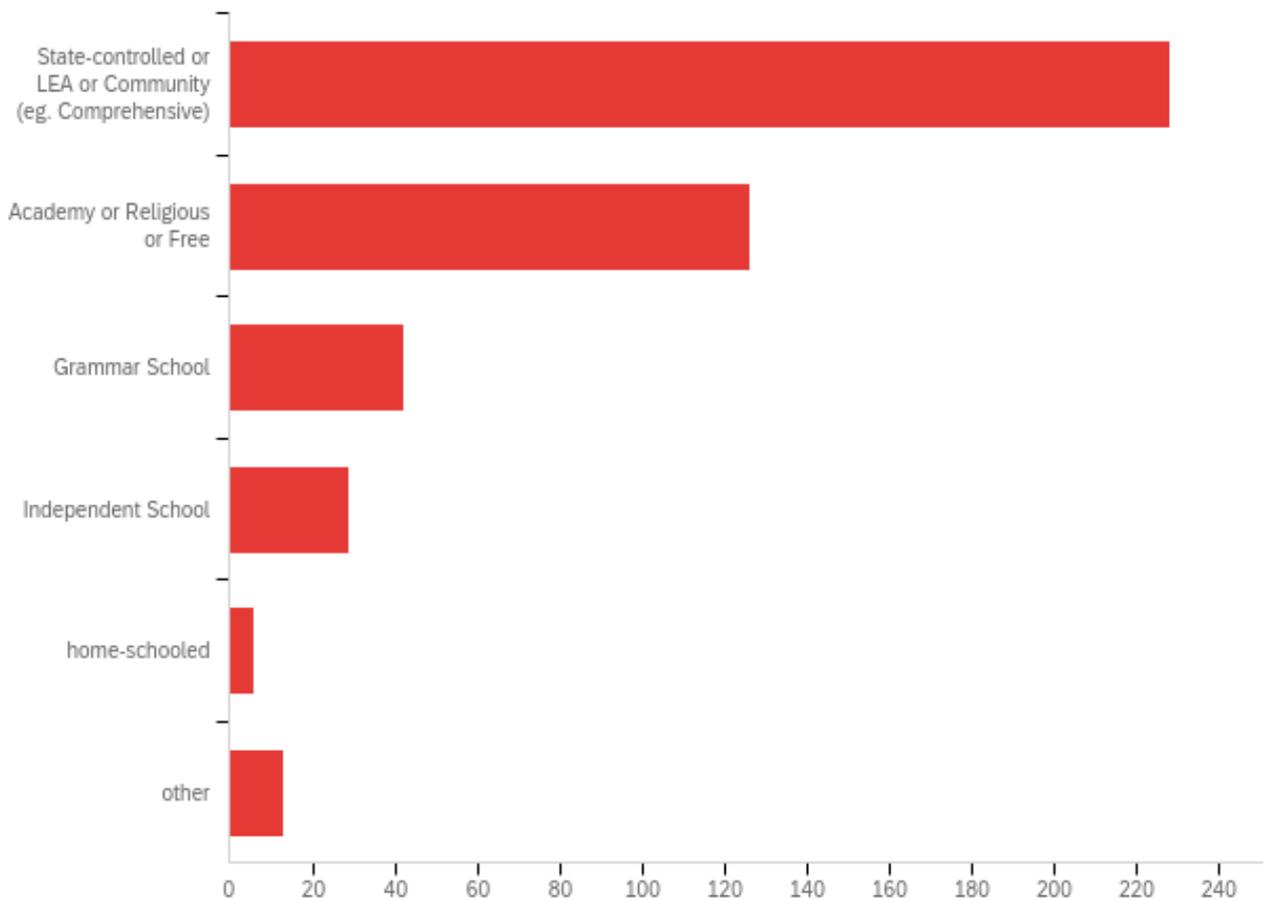
Q5.8 - How many people in your house are females over the age of 12? (include yourself if appropriate)



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How many people in your house are females over the age of 12? (include yourself if appropriate)	1.00	4.00	2.38	0.76	0.58	444

#	Answer	%	Count
1	1	8.56%	38
2	2	53.83%	239
3	3	29.05%	129
4	4+	8.56%	38
	Total	100%	444

Q5.10 - What sort of school did you attend up to the age of 16?



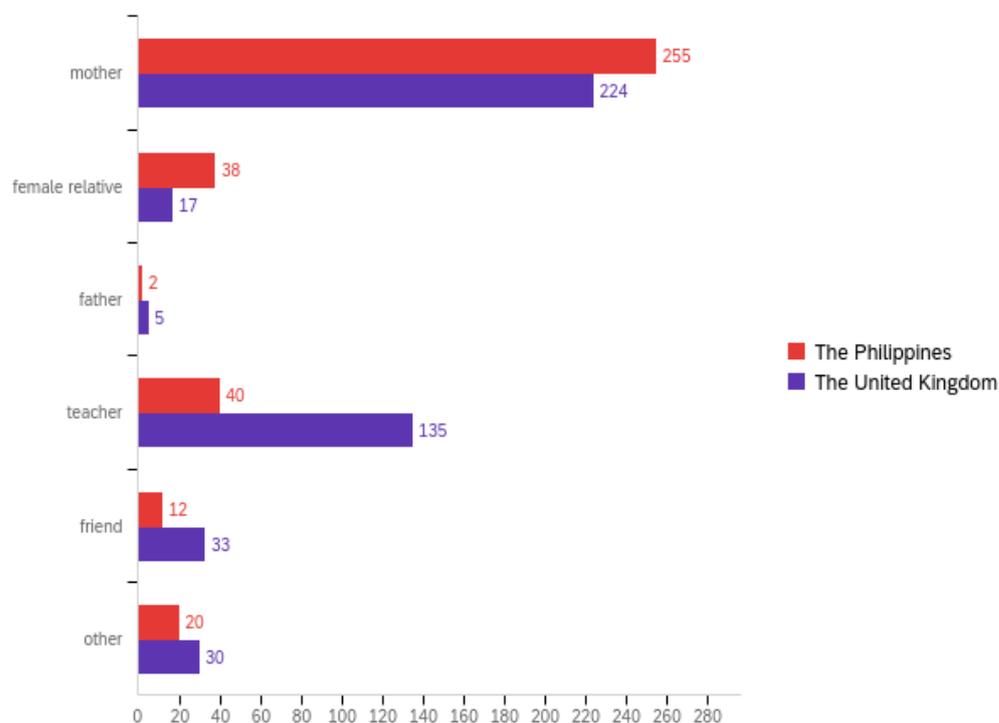
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	What sort of school did you attend up to the age of 16?	1.00	7.00	2.36	1.61	2.59	444

#	Answer	%	Count
1	State-controlled or LEA or Community (eg. Comprehensive)	51.35%	228
3	Academy or Religious or Free	28.38%	126
4	Grammar School	9.46%	42
5	Independent School	6.53%	29
6	home-schooled	1.35%	6
7	other	2.93%	13
	Total	100%	444

Appendix 5

Sources of Menstrual Knowledge The Philippines and the UK transposed

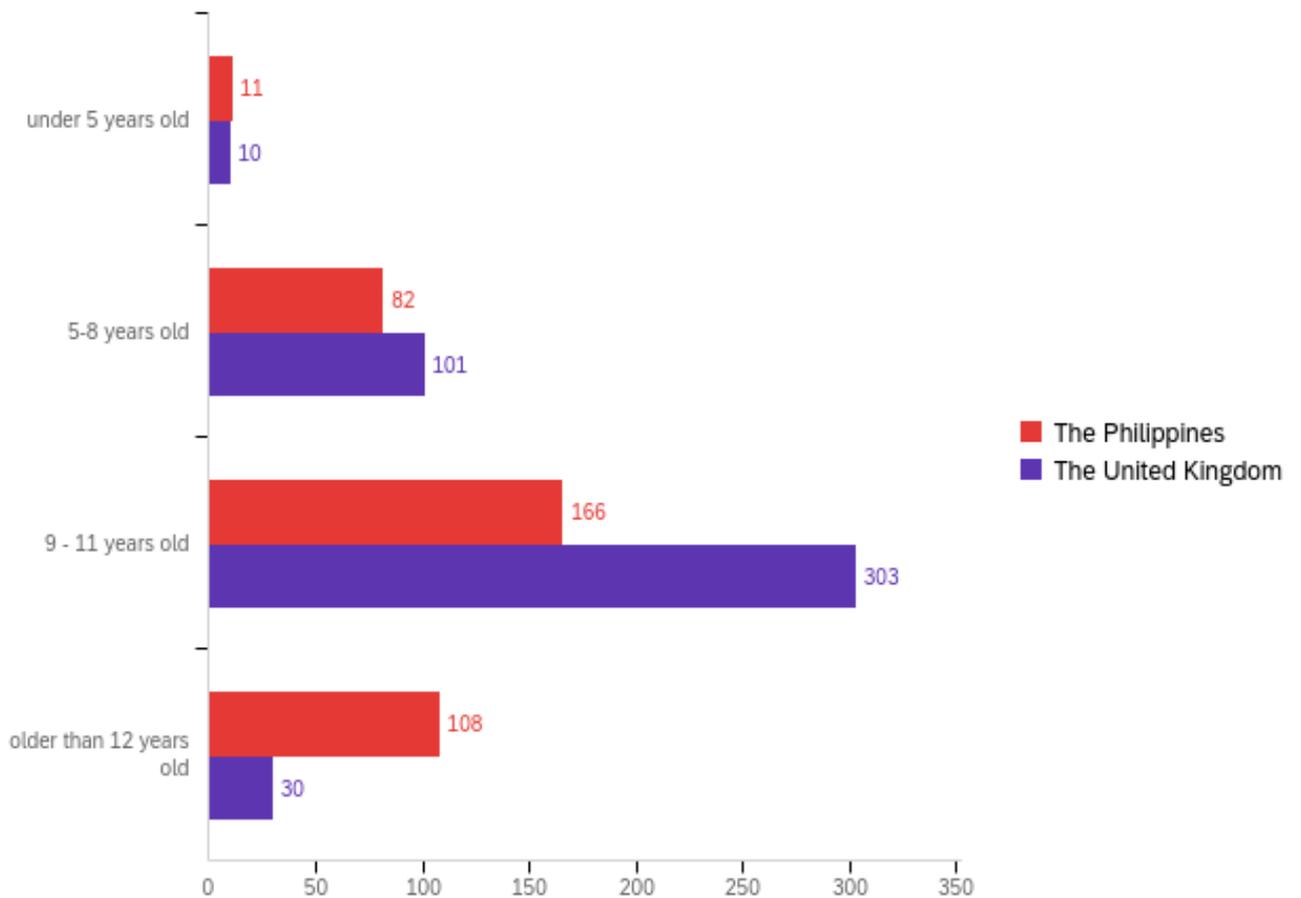
Q3.1 - Who first told you about menstruation?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Philippines	1.00	6.00	1.84	1.51	2.28	367
2	The United Kingdom	1.00	6.00	2.61	1.76	3.11	444

#	Question	The Philippines		The United Kingdom		Total
1	mother	53.24%	255	46.76%	224	479
2	female relative	69.09%	38	30.91%	17	55
3	father	28.57%	2	71.43%	5	7
4	teacher	22.86%	40	77.14%	135	175
5	friend	26.67%	12	73.33%	33	45
6	other	40.00%	20	60.00%	30	50

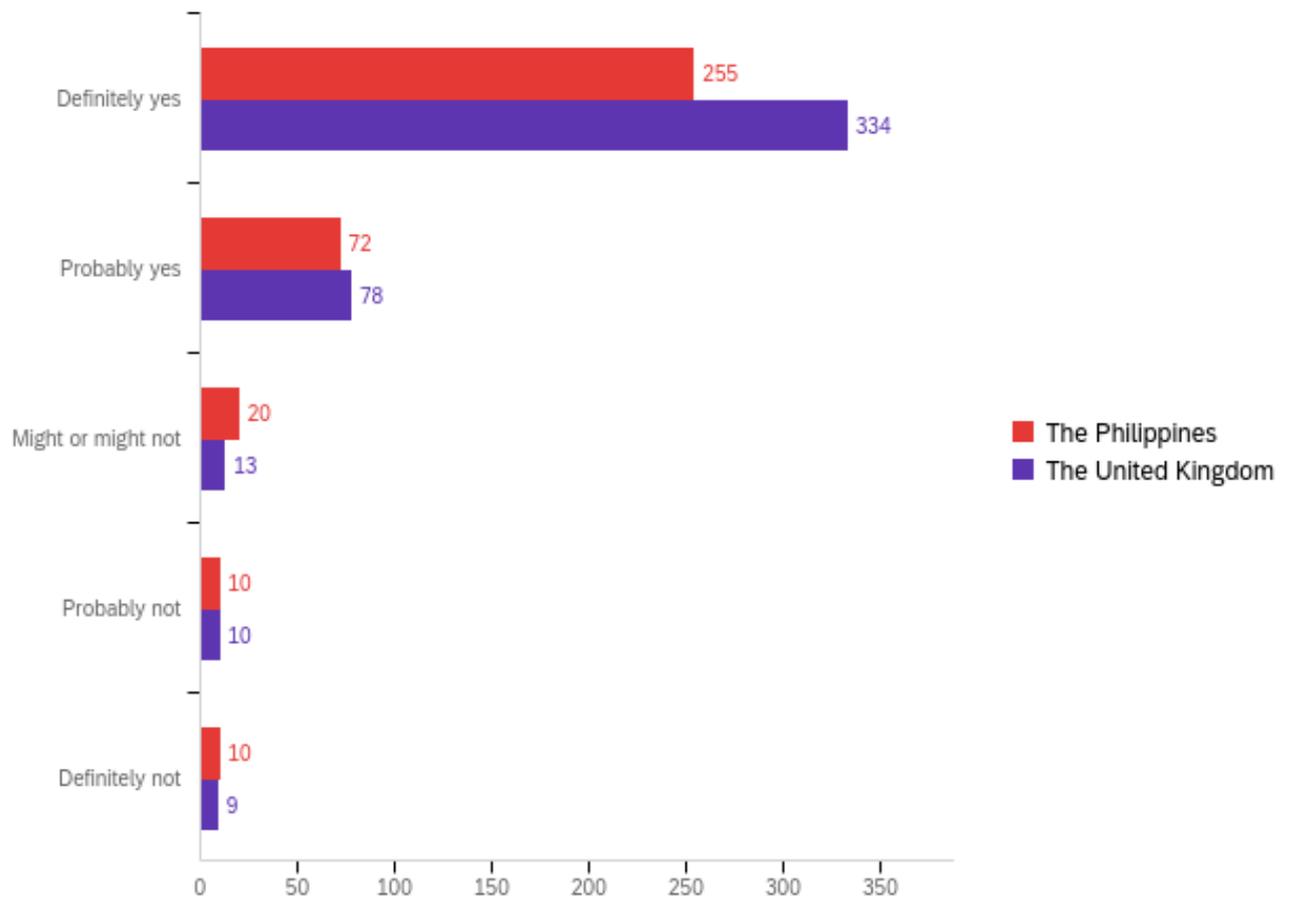
Q3.2 - How old were you when first learned about menstruation?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Philippines	1.00	4.00	3.01	0.80	0.64	367
2	The United Kingdom	1.00	4.00	2.80	0.59	0.34	444

#	Question	The Philippines		The United Kingdom		Total
1	under 5 years old	52.38%	11	47.62%	10	21
2	5-8 years old	44.81%	82	55.19%	101	183
3	9 - 11 years old	35.39%	166	64.61%	303	469
4	older than 12 years old	78.26%	108	21.74%	30	138

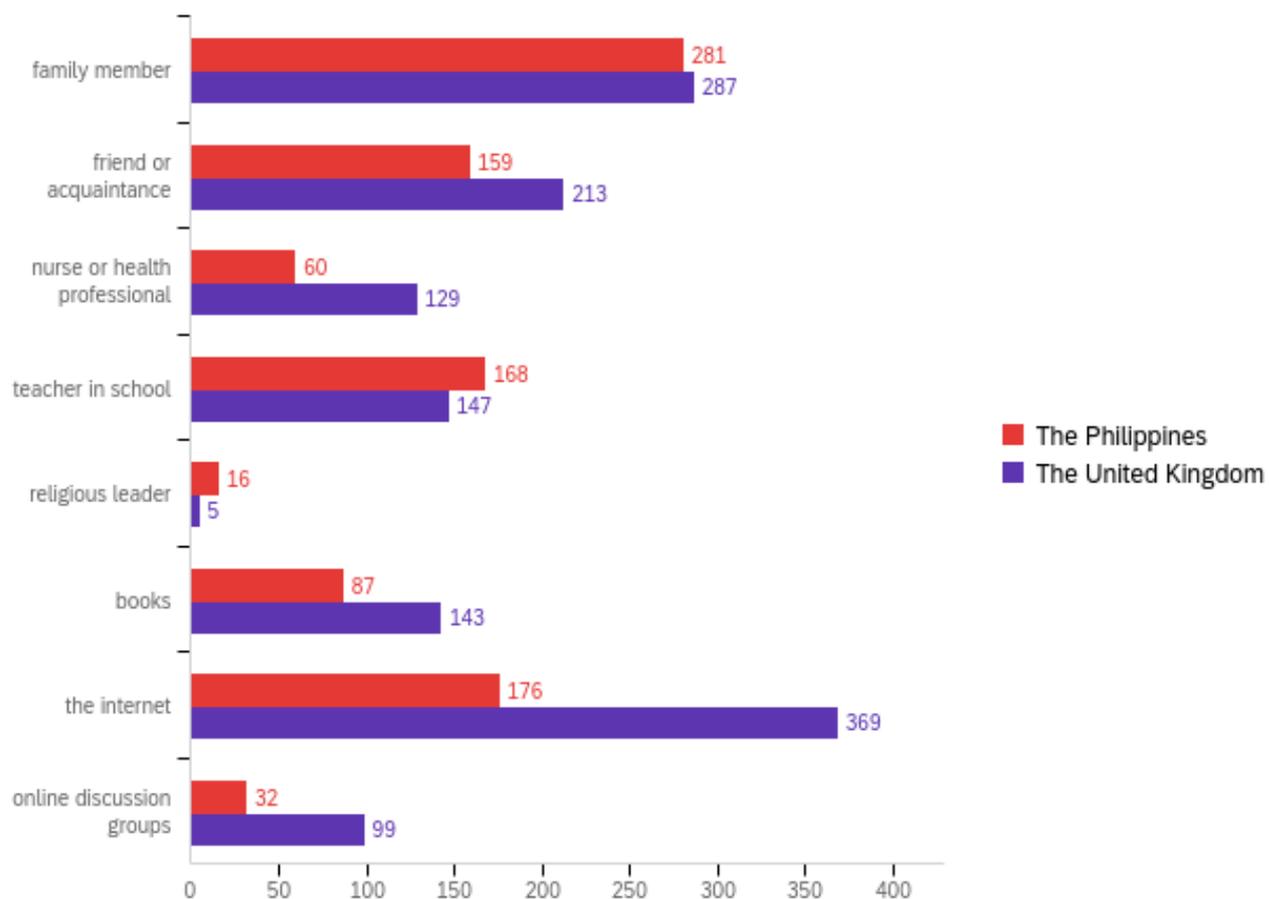
Q3.3 - Have you ever been taught about menstruation in a school lesson?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Philippines	1.00	5.00	1.50	0.92	0.85	367
2	The United Kingdom	1.00	5.00	1.38	0.82	0.67	444

#	Question	The Philippines		The United Kingdom		Total
1	Definitely yes	43.29%	255	56.71%	334	589
2	Probably yes	48.00%	72	52.00%	78	150
3	Might or might not	60.61%	20	39.39%	13	33
4	Probably not	50.00%	10	50.00%	10	20
5	Definitely not	52.63%	10	47.37%	9	19

Q3.4 - Have you sought information about menstruation from any of these sources? Choose all that apply

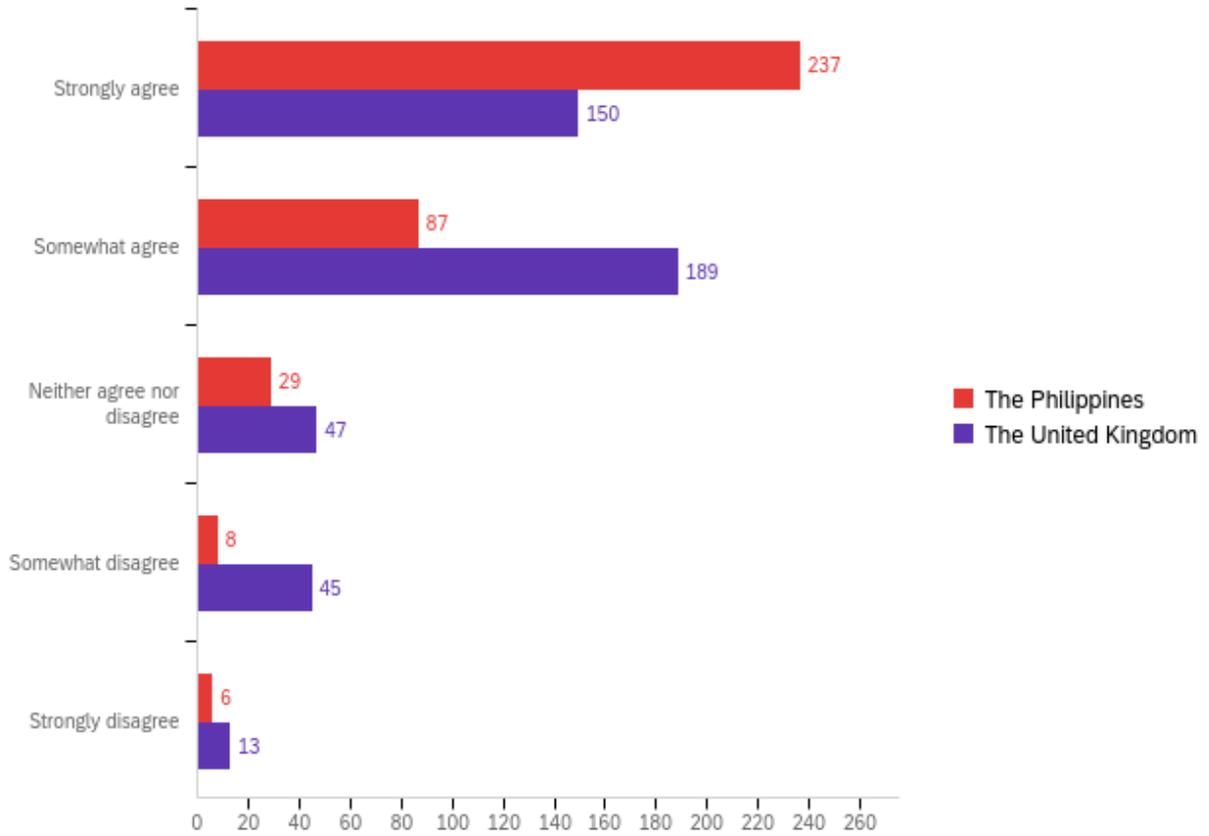


#	Question	The Philippines		The United Kingdom		Total
1	family member	49.47%	281	50.53%	287	568
2	friend or acquaintance	42.74%	159	57.26%	213	372
3	nurse or health professional	31.75%	60	68.25%	129	189
4	teacher in school	53.33%	168	46.67%	147	315
5	religious leader	76.19%	16	23.81%	5	21
6	books	37.83%	87	62.17%	143	230
7	the internet	32.29%	176	67.71%	369	545
8	online discussion groups	24.43%	32	75.57%	99	131

Appendix 6

Menstrual Knowledge The Philippines and UK transposed

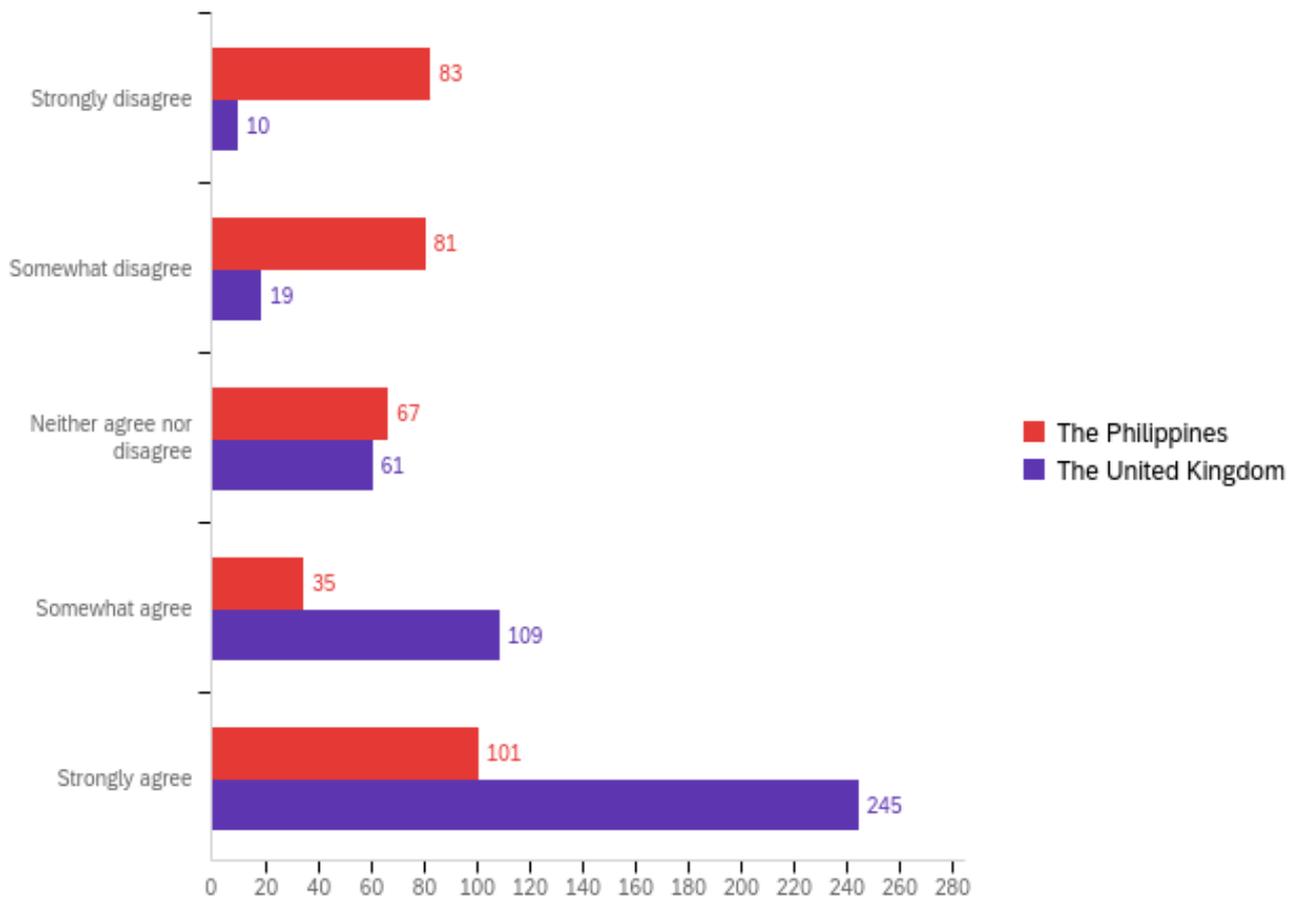
Q3.5 - Menstruation begins at puberty



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Menstruation begins at puberty	1.00	5.00	1.82	1.00	1.01	811

#	Answer	%	Count
1	Strongly agree	47.72%	387
2	Somewhat agree	34.03%	276
3	Neither agree nor disagree	9.37%	76
4	Somewhat disagree	6.54%	53
5	Strongly disagree	2.34%	19
	Total	100%	811

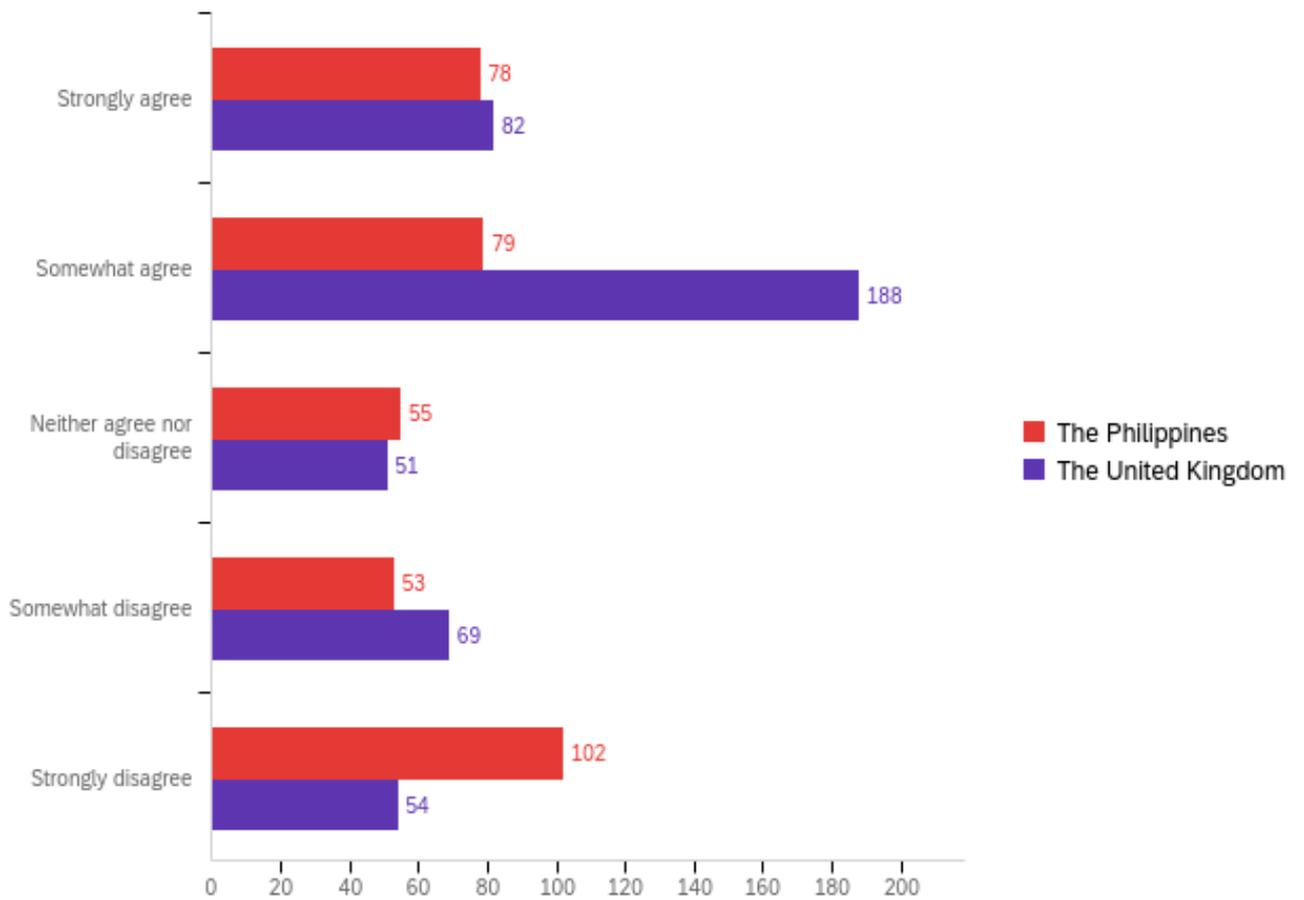
Q3.6 - The colour of the first menstruation is white



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The colour of the first menstruation is white	1.00	5.00	3.68	1.42	2.01	811

#	Answer	%	Count
1	Strongly disagree	11.47%	93
2	Somewhat disagree	12.33%	100
3	Neither agree nor disagree	15.78%	128
4	Somewhat agree	17.76%	144
5	Strongly agree	42.66%	346
	Total	100%	811

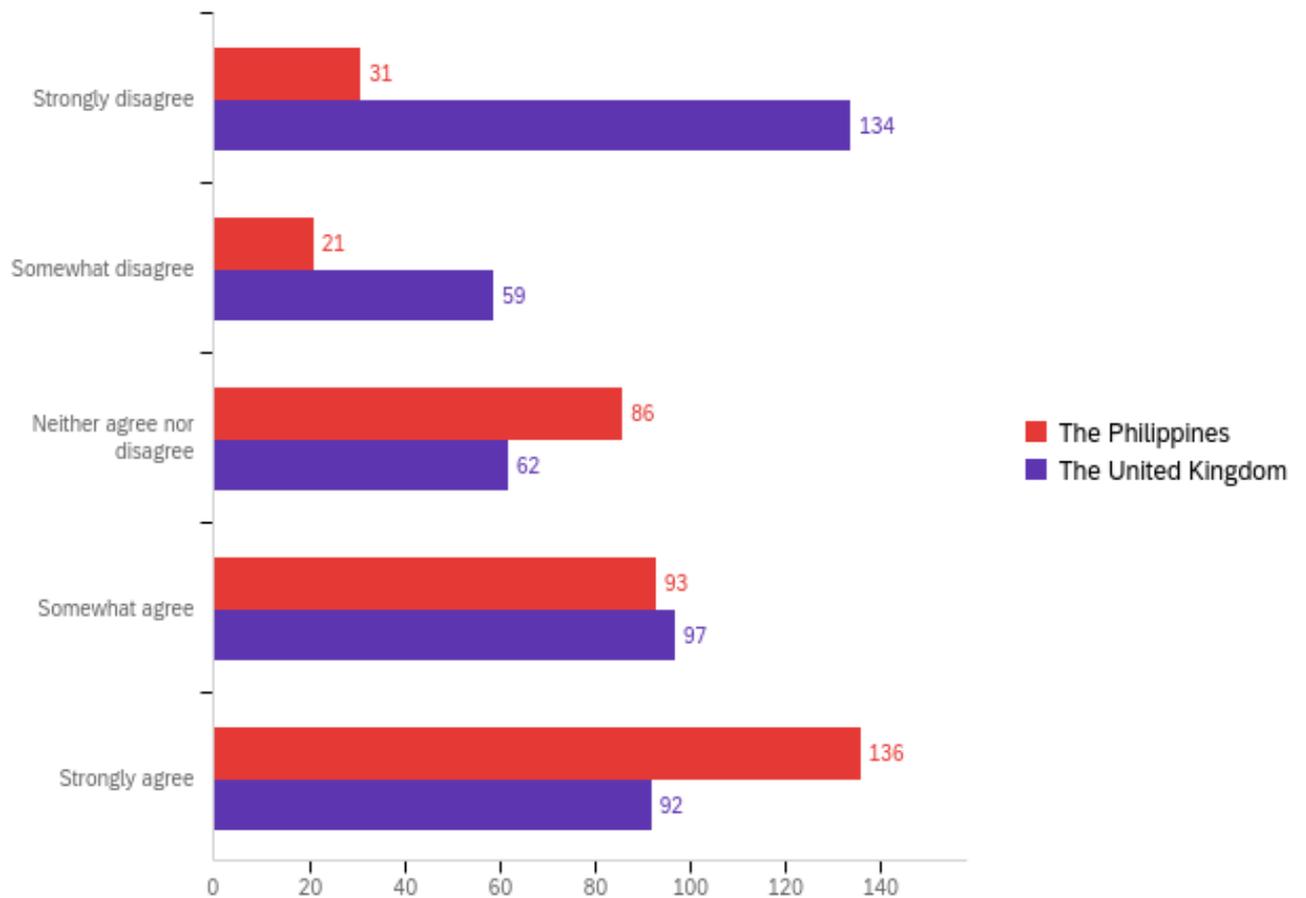
Q3.7 - Menstruation is blood loss



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Menstruation is blood loss	1.00	5.00	2.81	1.42	2.00	811

#	Answer	%	Count
1	Strongly agree	19.73%	160
2	Somewhat agree	32.92%	267
3	Neither agree nor disagree	13.07%	106
4	Somewhat disagree	15.04%	122
5	Strongly disagree	19.24%	156
	Total	100%	811

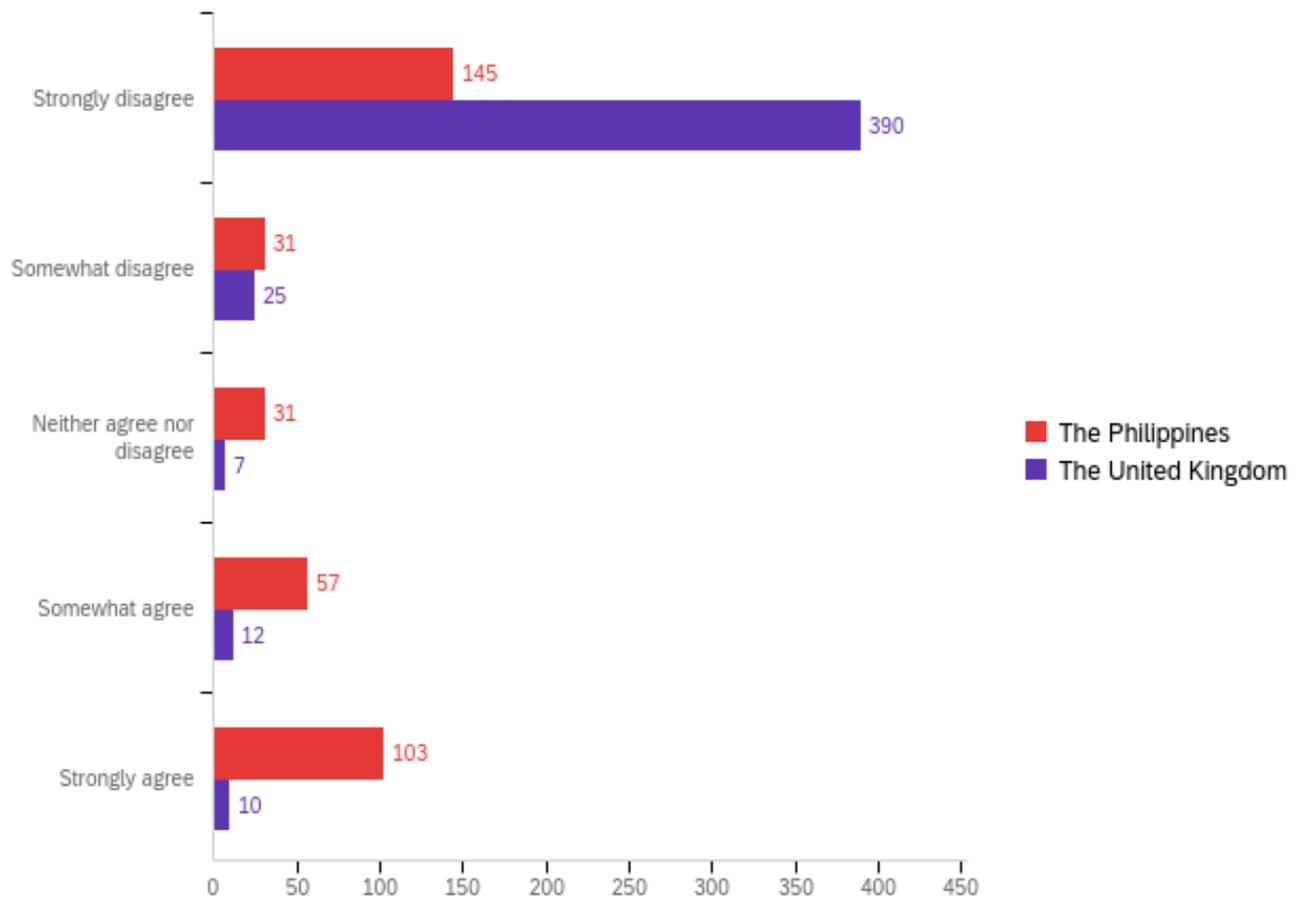
Q3.8 - Girls don't menstruate until their body produces eggs



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Girls don't menstruate until their body produces eggs	1.00	5.00	3.29	1.48	2.19	811

#	Answer	%	Count
1	Strongly disagree	20.35%	165
2	Somewhat disagree	9.86%	80
3	Neither agree nor disagree	18.25%	148
4	Somewhat agree	23.43%	190
5	Strongly agree	28.11%	228
	Total	100%	811

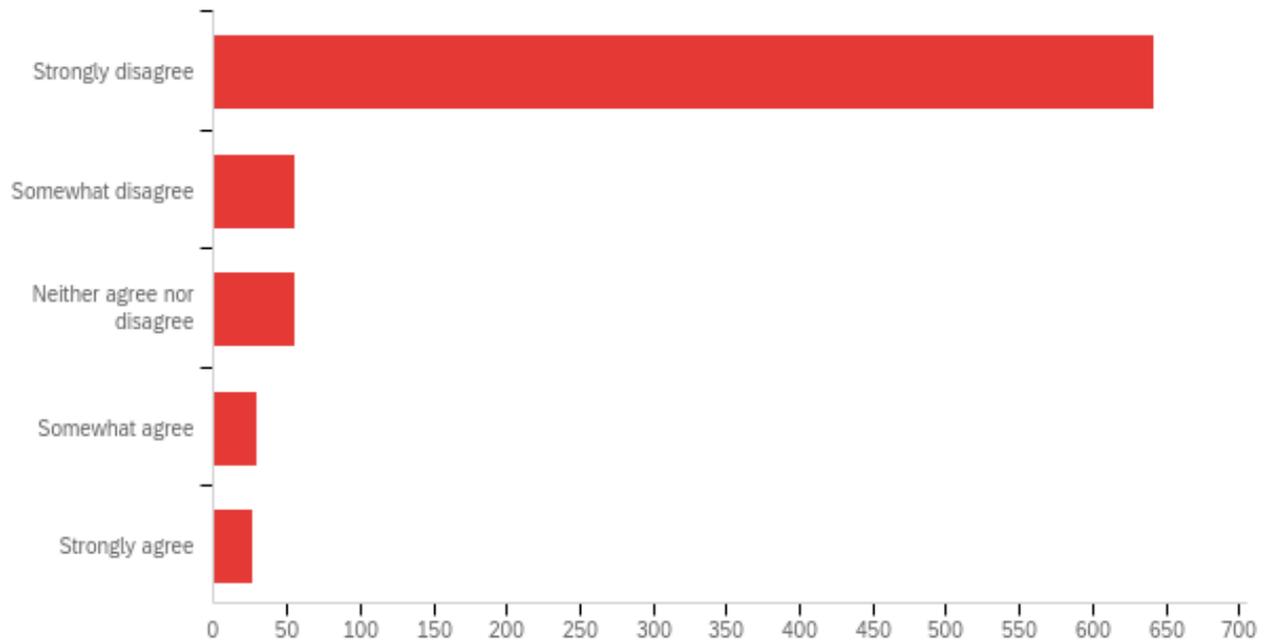
Q3.9 - Menstrual blood exits the body through the same opening as urine



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Menstrual blood exits the body through the same opening as urine	1.00	5.00	1.98	1.52	2.30	811

#	Answer	%	Count
1	Strongly disagree	65.97%	535
2	Somewhat disagree	6.91%	56
3	Neither agree nor disagree	4.69%	38
4	Somewhat agree	8.51%	69
5	Strongly agree	13.93%	113
	Total	100%	811

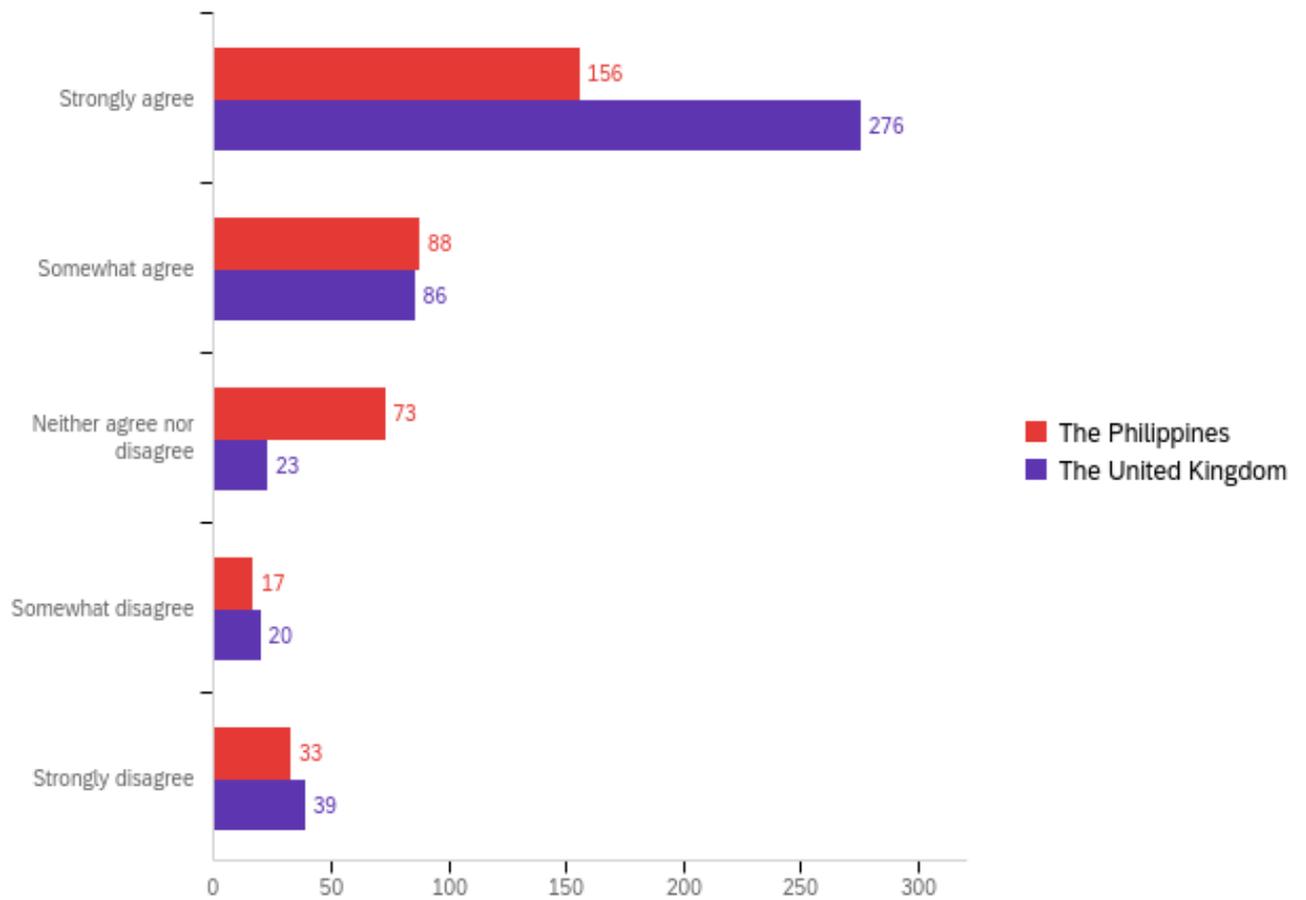
Q3.10 - Menstrual blood comes from the stomach where food is digested



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Menstrual blood comes from the stomach where food is digested	1.00	5.00	1.45	1.00	1.01	811

#	Answer	%	Count
1	Strongly disagree	79.16%	642
2	Somewhat disagree	6.91%	56
3	Neither agree nor disagree	6.91%	56
4	Somewhat agree	3.70%	30
5	Strongly agree	3.33%	27
	Total	100%	811

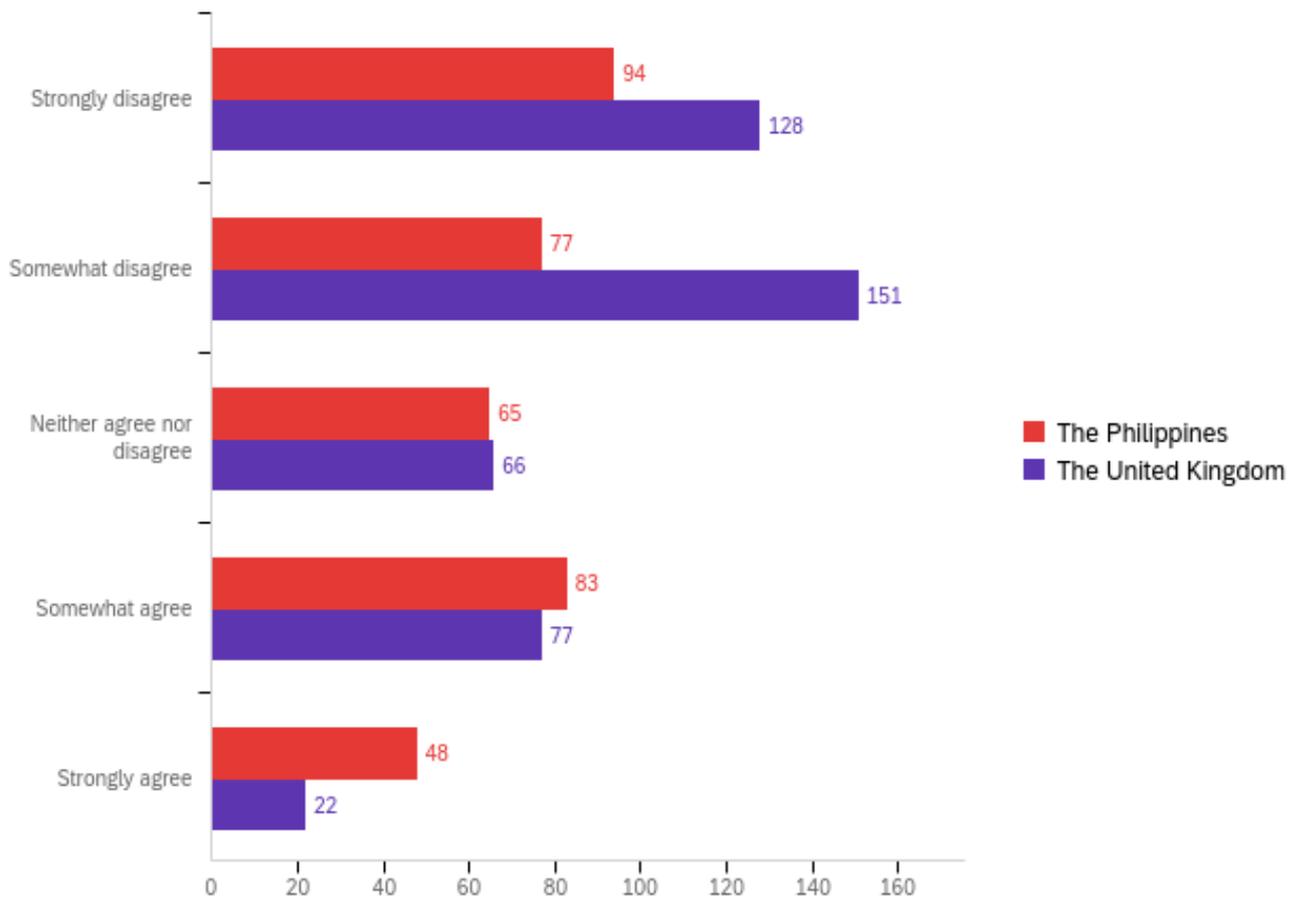
Q3.11 - Menstrual blood comes from the womb where babies grow



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Menstrual blood comes from the womb where babies grow	1.00	5.00	1.94	1.28	1.63	811

#	Answer	%	Count
1	Strongly agree	53.27%	432
2	Somewhat agree	21.45%	174
3	Neither agree nor disagree	11.84%	96
4	Somewhat disagree	4.56%	37
5	Strongly disagree	8.88%	72
	Total	100%	811

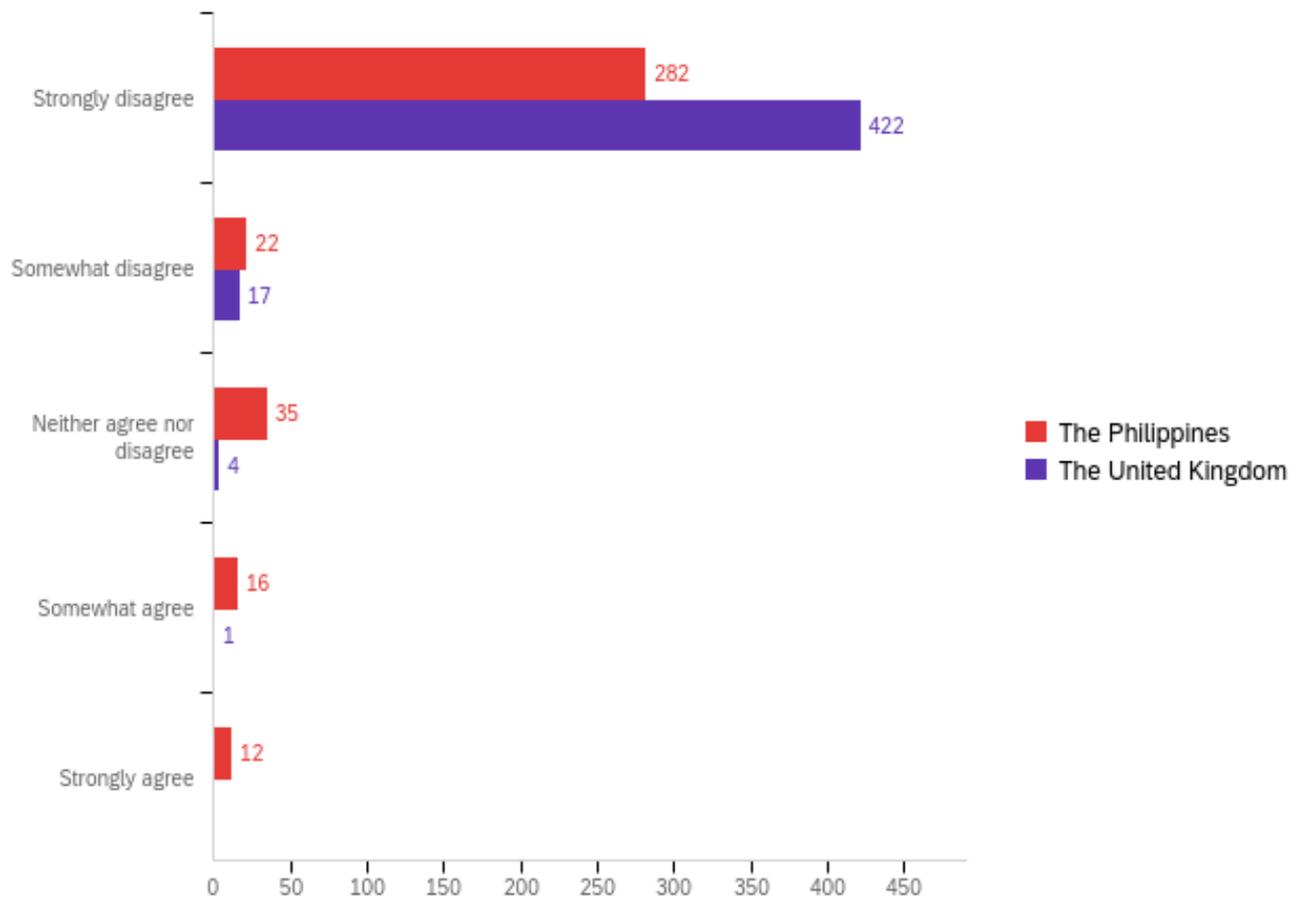
Q3.12 - A menstrual period lasts an average of 10 days



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	A menstrual period lasts an average of 10 days	1.00	5.00	2.54	1.31	1.71	811

#	Answer	%	Count
1	Strongly disagree	27.37%	222
2	Somewhat disagree	28.11%	228
3	Neither agree nor disagree	16.15%	131
4	Somewhat agree	19.73%	160
5	Strongly agree	8.63%	70
	Total	100%	811

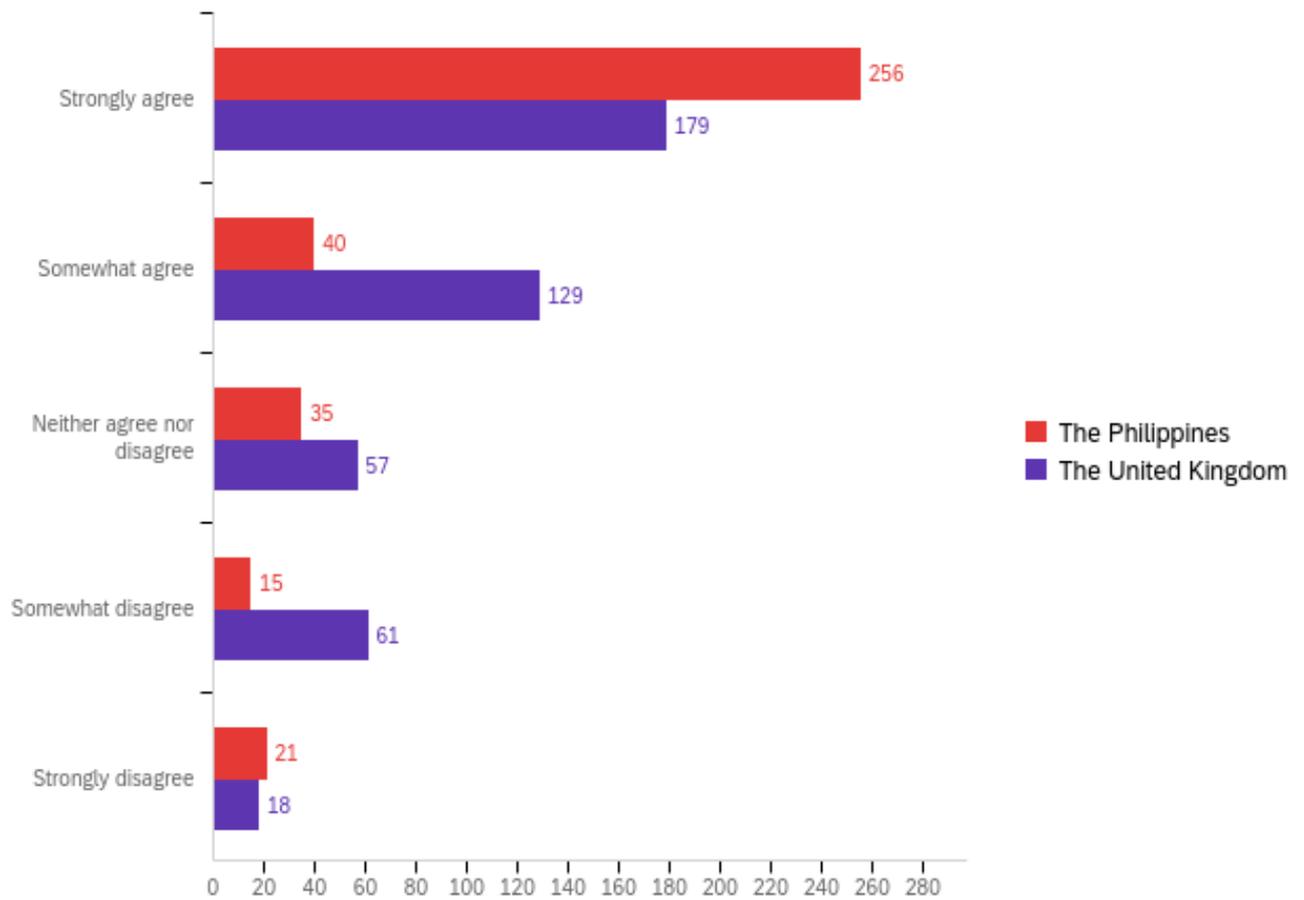
Q3.13 - Menstruation happens only twice a year



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Menstruation happens only twice a year	1.00	5.00	1.27	0.77	0.59	811

#	Answer	%	Count
1	Strongly disagree	86.81%	704
2	Somewhat disagree	4.81%	39
3	Neither agree nor disagree	4.81%	39
4	Somewhat agree	2.10%	17
5	Strongly agree	1.48%	12
	Total	100%	811

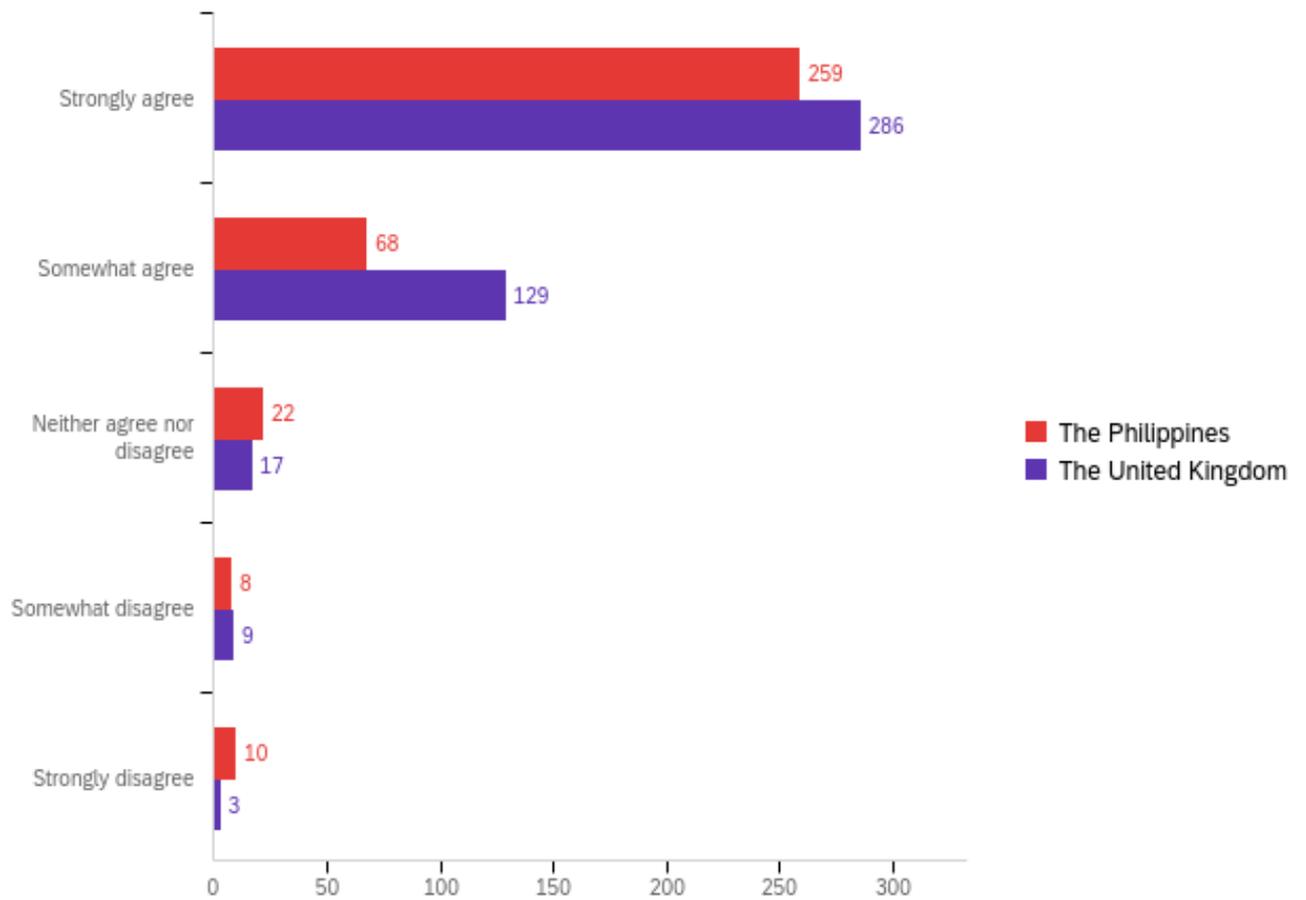
Q3.14 - Pregnant women don't menstruate



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Pregnant women don't menstruate	1.00	5.00	1.91	1.20	1.45	811

#	Answer	%	Count
1	Strongly agree	53.64%	435
2	Somewhat agree	20.84%	169
3	Neither agree nor disagree	11.34%	92
4	Somewhat disagree	9.37%	76
5	Strongly disagree	4.81%	39
	Total	100%	811

Q3.15 - Menstruation stops in old age



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Menstruation stops in old age	1.00	5.00	1.47	0.81	0.66	811

#	Answer	%	Count
1	Strongly agree	67.20%	545
2	Somewhat agree	24.29%	197
3	Neither agree nor disagree	4.81%	39
4	Somewhat disagree	2.10%	17
5	Strongly disagree	1.60%	13
	Total	100%	811

Appendix 7

Attitude and Perceptions

3.16 When a girl starts her periods, it's a cause for celebration (negative)
3.17 When girls start their periods, they should stop behaving like children and start behaving responsibly. (negative)
3.18 When girls start their periods, they are ready to start a family (negative)
3.19 Girls should not do vigorous physical activity if they are menstruating, (negative)
3.20 Girls who are menstruating look different (negative)
3.21 Girls who are menstruating are more emotional than usual (negative)
3.22 Girls should keep their menstrual status a secret (negative)
3.23 Men and boys should not see menstrual blood (negative)
3.24 Girls should carry on as normal during their menstruation (positive)
3.25 Menstrual pain or discomfort is largely in the mind (negative)
3.26 Boys should be taught about menstruation (positive)
3.27 Girls who are menstruating are unclean and cannot take part in religious ceremonies (negative)

Attitude and Perceptions Statements

		Q1.2: Where do you live?		
		Total	The Philippines	The United Kingdom
			A	B
Attitude and Perceptions Score	Total Count (Answering)	811.00	367.00	444.00
	Missing Count	0.00	0.00	0.00
	Total Count (All)	811.00	367.00	444.00
	Average	43.51	36.99	48.91
				A
	Overall Stat Test of Averages	1.1102230246251565e-16		
	Median	45.00	37.00	49.00
Standard Deviation	8.32	6.87	4.81	
Standard Error	0.29	0.36	0.23	

		Q3.28: What is your sex?			
		Total	Male	Female	prefer not to say
			A	B	C
Attitude and Perceptions Score	Total Count (Answering)	811.00	74.00	717.00	20.00
	Missing Count	0.00	0.00	0.00	0.00
	Total Count (All)	811.00	74.00	717.00	20.00
	Average	43.51	39.16	44.01	41.90
				A	
	Overall Stat Test of Averages	0.000023922116860419784			
	Median	45.00	40.00	45.00	42.50
Standard Deviation	8.32	8.73	8.15	8.37	
Standard Error	0.29	1.02	0.30	1.87	

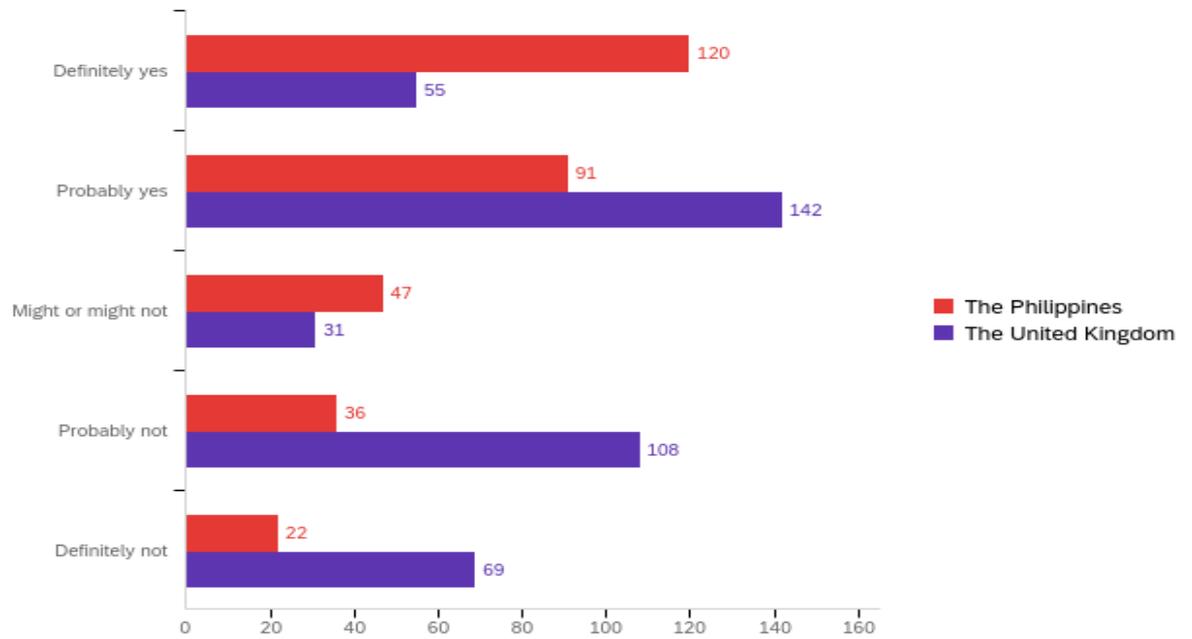
The Philippines		Q3.28: What is your sex?			
		Total	Male	Female	prefer not to say
			A	B	C
Attitude and Perceptions Score	Total Count (Answering)	367.00	44.00	312.00	11.00
	Missing Count	0.00	0.00	0.00	0.00
	Total Count (All)	367.00	44.00	312.00	11.00
	Average	36.99	34.34	37.34	37.45
				A	
	Overall Stat Test of Averages	0.0714545696744856			
	Median	37.00	34.50	37.50	37.00
Standard Deviation	6.87	7.51	6.66	8.54	
Standard Error	0.36	1.13	0.38	2.57	

The UK		Q3.28: What is your sex?			
		Total	Male	Female	prefer not to say
			A	B	C
Attitude and Perceptions Score	Total Count (Answering)	444.00	30.00	405.00	9.00
	Missing Count	0.00	0.00	0.00	0.00
	Total Count (All)	444.00	30.00	405.00	9.00
	Average	48.91	46.23	49.14	47.33
				A	
	Overall Stat Test of Averages	0.0016919279154661293			
	Median	49.00	46.50	50.00	47.00
	Standard Deviation	4.81	4.62	4.79	3.84
	Standard Error	0.23	0.84	0.24	1.28
	Median	91.00	88.00	91.00	82.00
Standard Deviation	6.87	6.15	6.87	6.91	
Standard Error	0.33	1.12	0.34	2.30	

Appendix 8

Menstrual Experiences

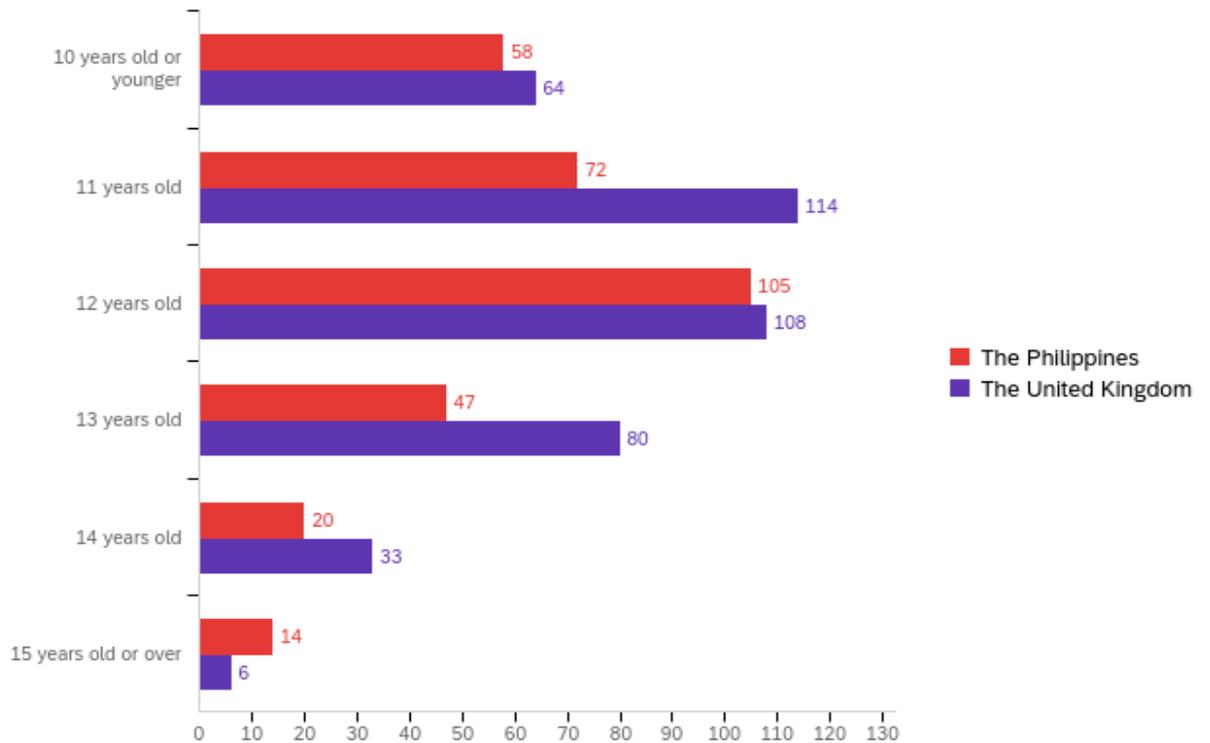
Q4.1 - Would you describe your periods as normal?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Philippines	1.00	5.00	2.21	1.25	1.57	316
2	The United Kingdom	1.00	5.00	2.99	1.36	1.84	405

#	Question	The Philippines		The United Kingdom		Total
1	Definitely yes	68.57%	120	31.43%	55	175
2	Probably yes	39.06%	91	60.94%	142	233
3	Might or might not	60.26%	47	39.74%	31	78
4	Probably not	25.00%	36	75.00%	108	144
5	Definitely not	24.18%	22	75.82%	69	91

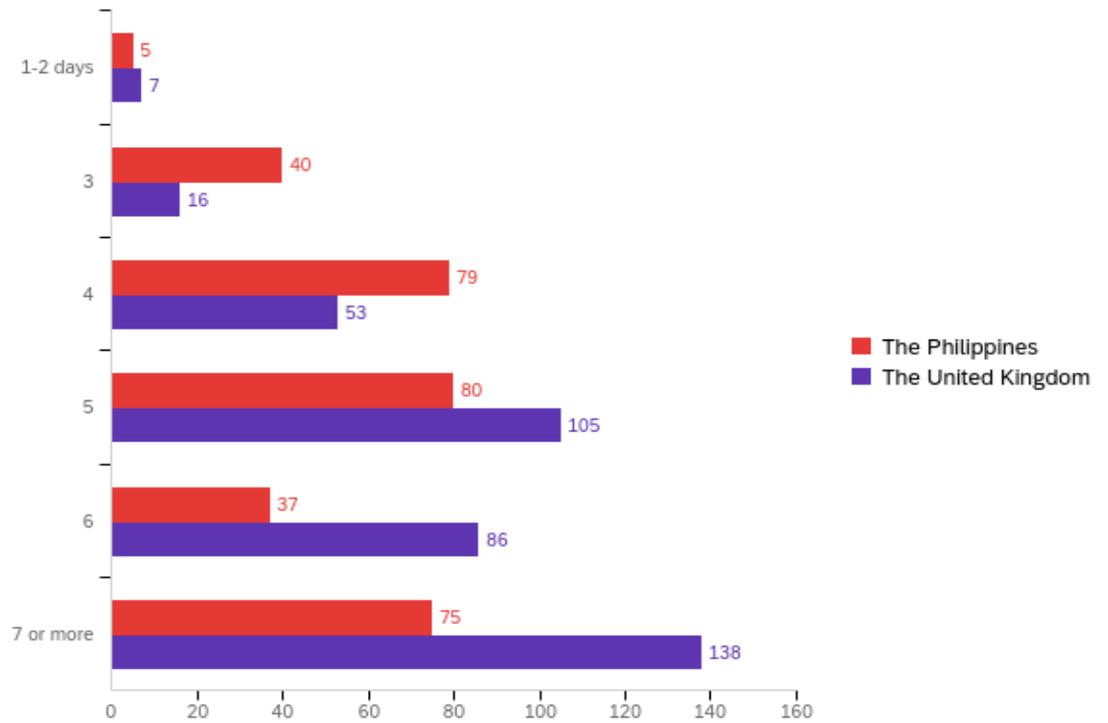
Q4.2 - How old were you when you started your periods?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Philippines	1.00	6.00	2.81	1.31	1.73	316
2	The United Kingdom	1.00	6.00	2.81	1.24	1.53	405

#	Question	The Philippines		The United Kingdom		Total
1	10 years old or younger	47.54%	58	52.46%	64	122
2	11 years old	38.71%	72	61.29%	114	186
3	12 years old	49.30%	105	50.70%	108	213
4	13 years old	37.01%	47	62.99%	80	127
5	14 years old	37.74%	20	62.26%	33	53
6	15 years old or over	70.00%	14	30.00%	6	20

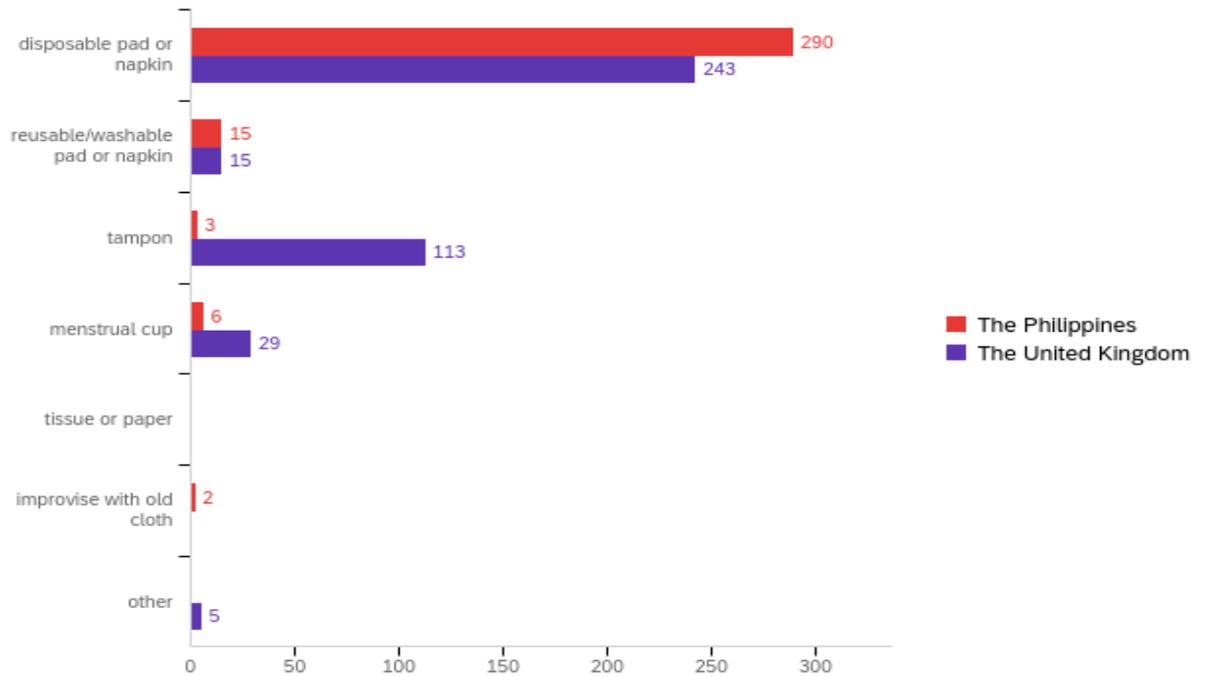
Q4.3 - How many days does the bleeding last?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Philippines	1.00	6.00	4.04	1.40	1.96	316
2	The United Kingdom	1.00	6.00	4.63	1.27	1.62	405

#	Question	The Philippines		The United Kingdom		Total
1	1-2 days	41.67%	5	58.33%	7	12
2	3	71.43%	40	28.57%	16	56
3	4	59.85%	79	40.15%	53	132
4	5	43.24%	80	56.76%	105	185
5	6	30.08%	37	69.92%	86	123
6	7 or more	35.21%	75	64.79%	138	213

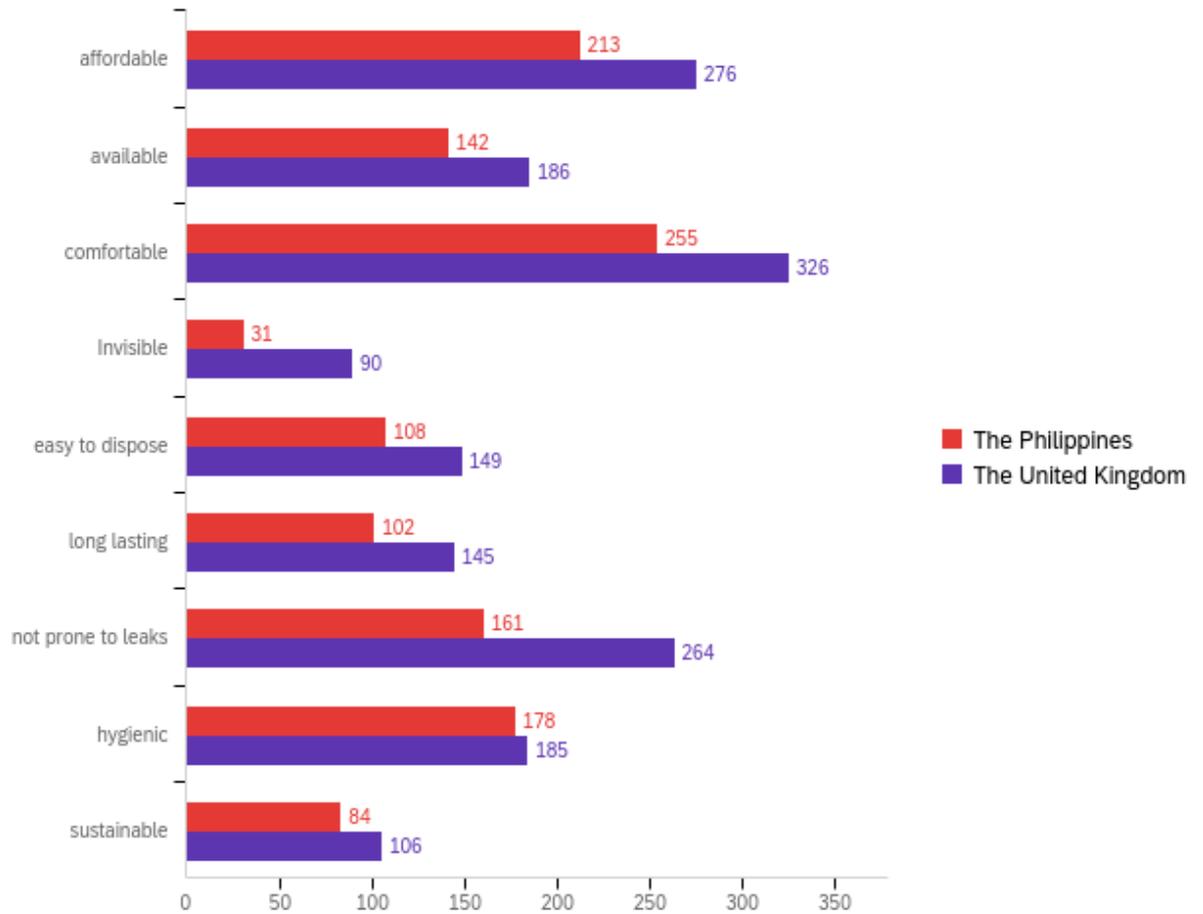
Q4.4 - What type of menstrual product do you usually use?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Philippines	1.00	6.00	1.16	0.62	0.39	316
2	The United Kingdom	1.00	7.00	1.88	1.21	1.46	405

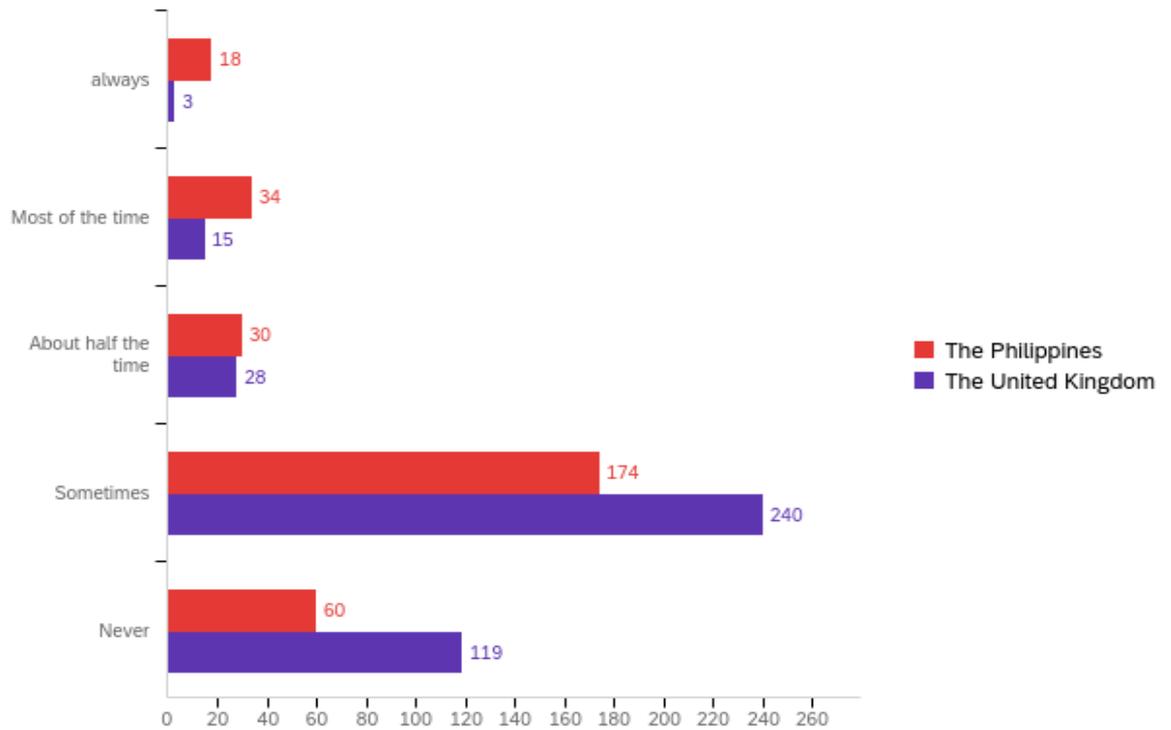
#	Question	The Philippines		The United Kingdom		Total
1	disposable pad or napkin	54.41%	290	45.59%	243	533
2	reusable/washable pad or napkin	50.00%	15	50.00%	15	30
3	tampon	2.59%	3	97.41%	113	116
4	menstrual cup	17.14%	6	82.86%	29	35
5	tissue or paper	0.00%	0	0.00%	0	0
6	improvise with old cloth	100.00%	2	0.00%	0	2
7	other	0.00%	0	100.00%	5	5

Q4.5 - What are the most important factors in your choice of menstrual product to collect the blood? (Check all that apply)



#	Question	The Philippines		The United Kingdom		Total
1	affordable	43.56%	213	56.44%	276	489
2	available	43.29%	142	56.71%	186	328
3	comfortable	43.89%	255	56.11%	326	581
4	Invisible	25.62%	31	74.38%	90	121
5	easy to dispose	42.02%	108	57.98%	149	257
6	long lasting	41.30%	102	58.70%	145	247
7	not prone to leaks	37.88%	161	62.12%	264	425
8	hygienic	49.04%	178	50.96%	185	363
9	sustainable	44.21%	84	55.79%	106	190

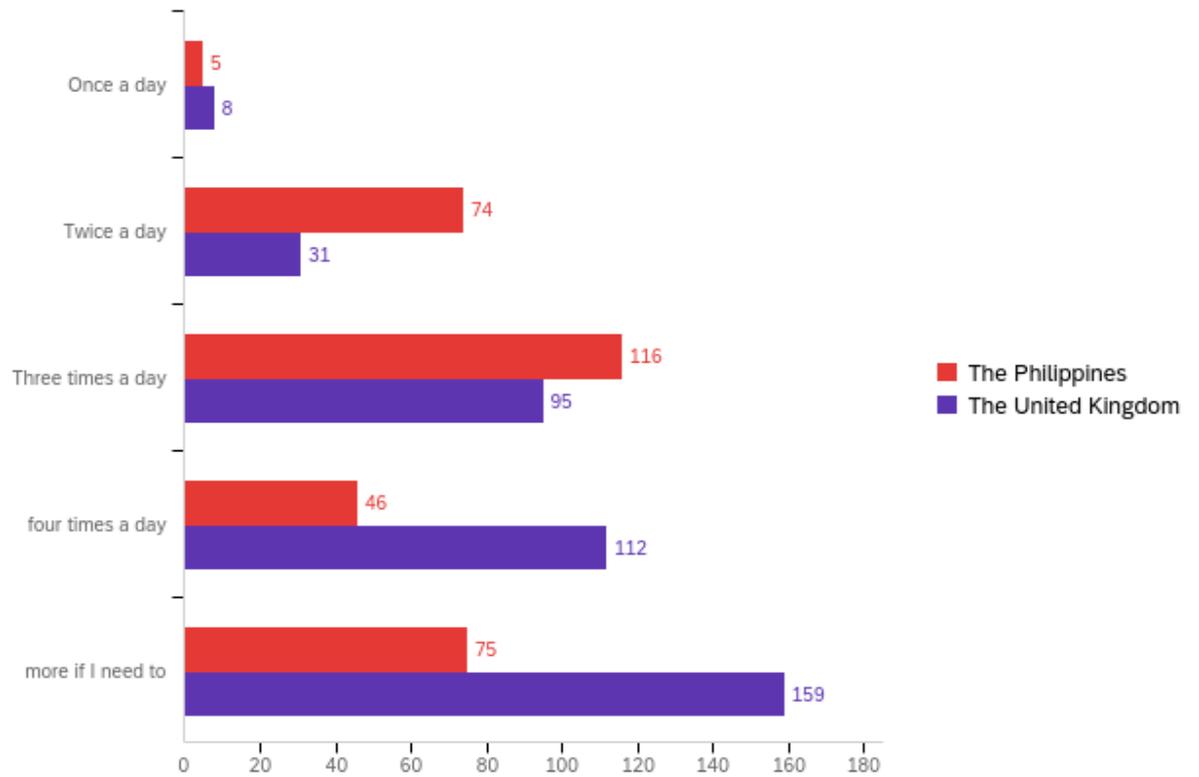
Q4.6 - Have there been times when you have not had not had sufficient menstrual product available?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Philippines	1.00	5.00	3.71	1.07	1.14	316
2	The United Kingdom	1.00	5.00	4.13	0.75	0.56	405

#	Question	The Philippines		The United Kingdom		Total
1	always	85.71%	18	14.29%	3	21
2	Most of the time	69.39%	34	30.61%	15	49
3	About half the time	51.72%	30	48.28%	28	58
4	Sometimes	42.03%	174	57.97%	240	414
5	Never	33.52%	60	66.48%	119	179

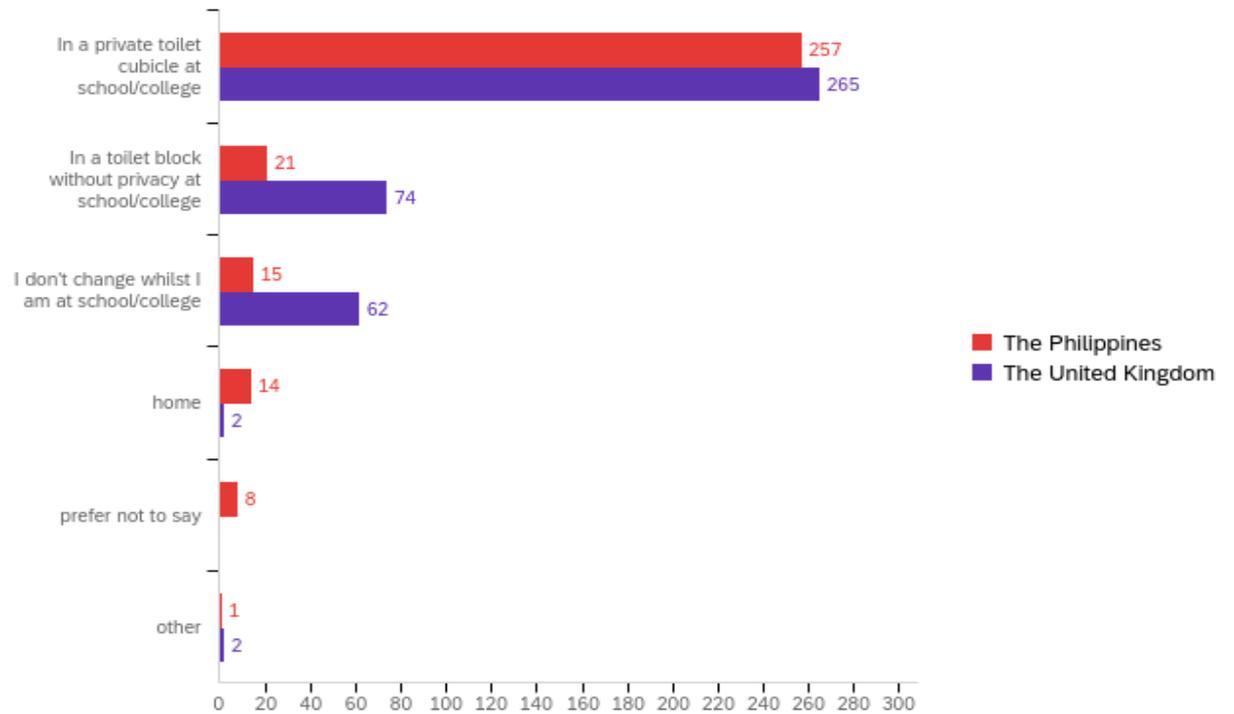
Q4.7 - In a 24 hour period, how often do you change your menstrual product when your flow is heaviest?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Philippines	1.00	5.00	3.35	1.13	1.27	316
2	The United Kingdom	1.00	5.00	3.95	1.05	1.11	405

#	Question	The Philippines		The United Kingdom		Total
1	Once a day	38.46%	5	61.54%	8	13
2	Twice a day	70.48%	74	29.52%	31	105
3	Three times a day	54.98%	116	45.02%	95	211
4	four times a day	29.11%	46	70.89%	112	158
5	more if I need to	32.05%	75	67.95%	159	234

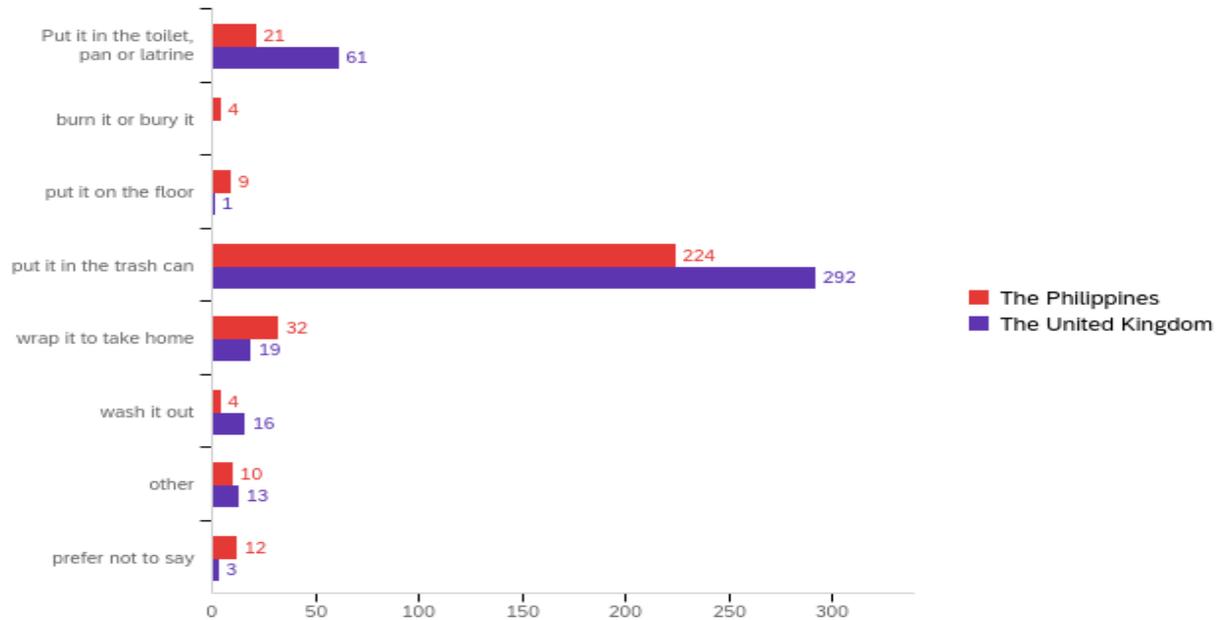
Q4.8 - During the school or college day, where do you go to change your used menstrual product?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Philippines	1.00	6.00	1.41	0.98	0.97	316
2	The United Kingdom	1.00	6.00	1.53	0.83	0.68	405

#	Question	The Philippines		The United Kingdom		Total
1	In a private toilet cubicle at school/college	49.23%	257	50.77%	265	522
2	In a toilet block without privacy at school/college	22.11%	21	77.89%	74	95
3	I don't change whilst I am at school/college	19.48%	15	80.52%	62	77
4	home	87.50%	14	12.50%	2	16
5	prefer not to say	100.00%	8	0.00%	0	8
6	other	33.33%	1	66.67%	2	3

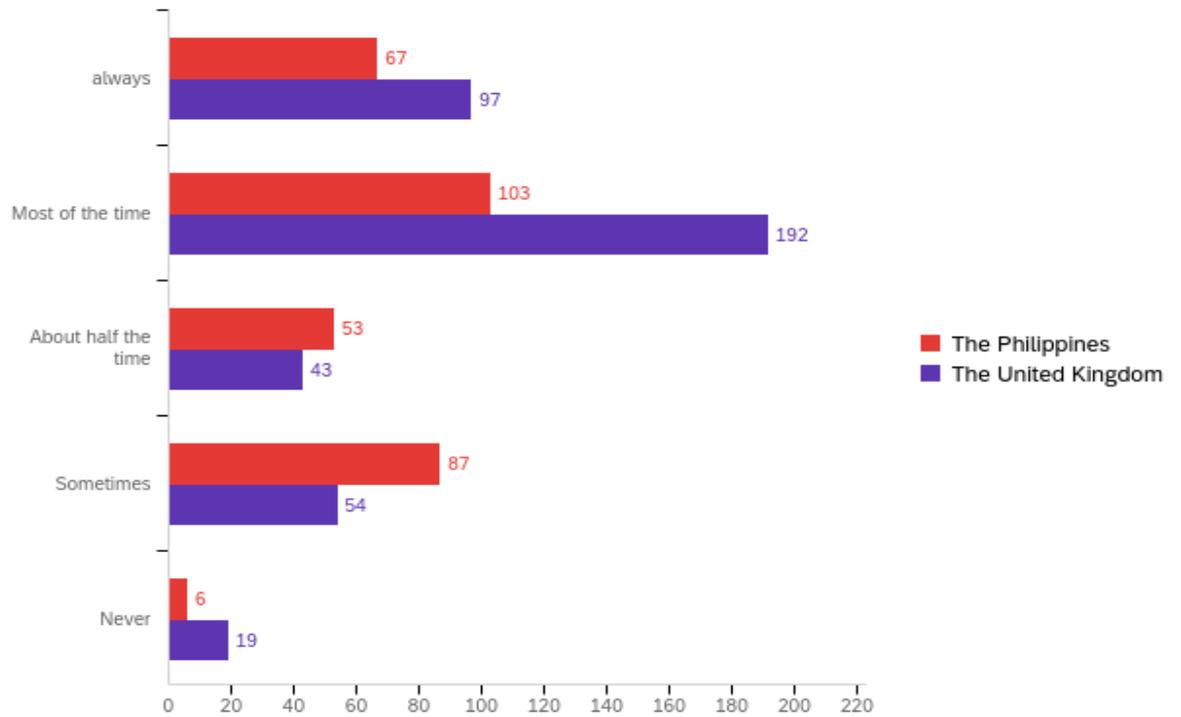
Q4.9 - During the school or college day, what do you do with the menstrual waste?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Philippines	1.00	8.00	4.12	1.31	1.71	316
2	The United Kingdom	1.00	8.00	3.80	1.39	1.93	405

#	Question	The Philippines		The United Kingdom		Total
1	Put it in the toilet, pan or latrine	25.61%	21	74.39%	61	82
2	burn it or bury it	100.00%	4	0.00%	0	4
3	put it on the floor	90.00%	9	10.00%	1	10
4	put it in the trash can	43.41%	224	56.59%	292	516
5	wrap it to take home	62.75%	32	37.25%	19	51
6	wash it out	20.00%	4	80.00%	16	20
7	other	43.48%	10	56.52%	13	23
8	prefer not to say	80.00%	12	20.00%	3	15

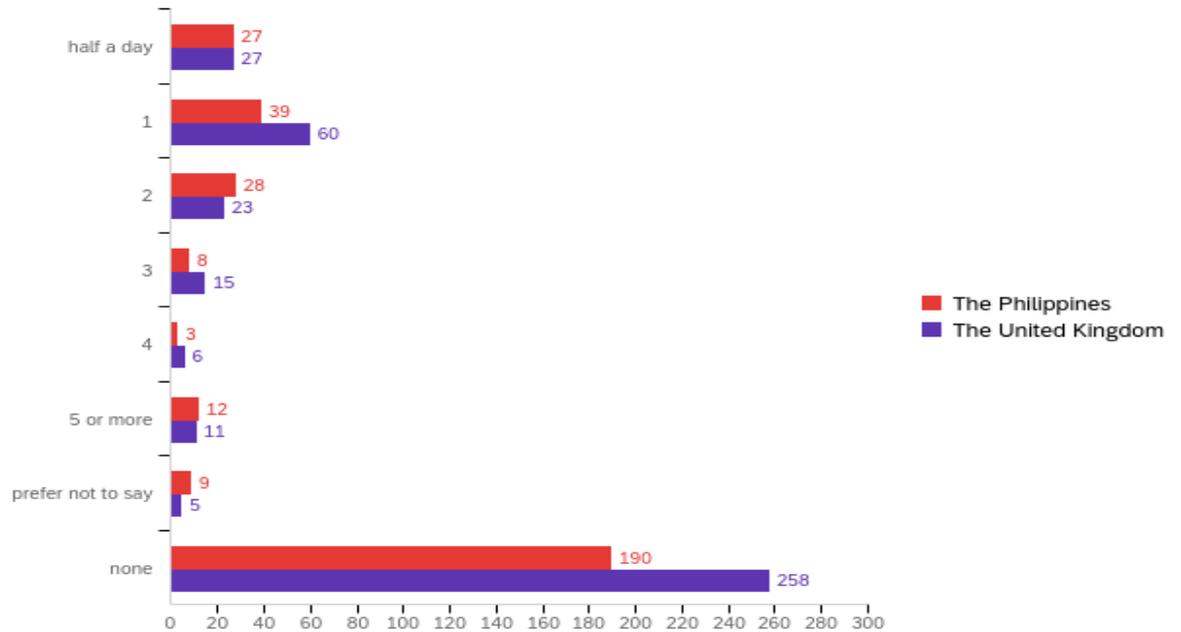
Q4.10 - During the school or college day, are you able to take part in all your usual activities whilst menstruating?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Philippines	1.00	5.00	2.56	1.16	1.33	316
2	The United Kingdom	1.00	5.00	2.27	1.11	1.23	405

#	Question	The Philippines		The United Kingdom		Total
1	always	40.85%	67	59.15%	97	164
2	Most of the time	34.92%	103	65.08%	192	295
3	About half the time	55.21%	53	44.79%	43	96
4	Sometimes	61.70%	87	38.30%	54	141
5	Never	24.00%	6	76.00%	19	25

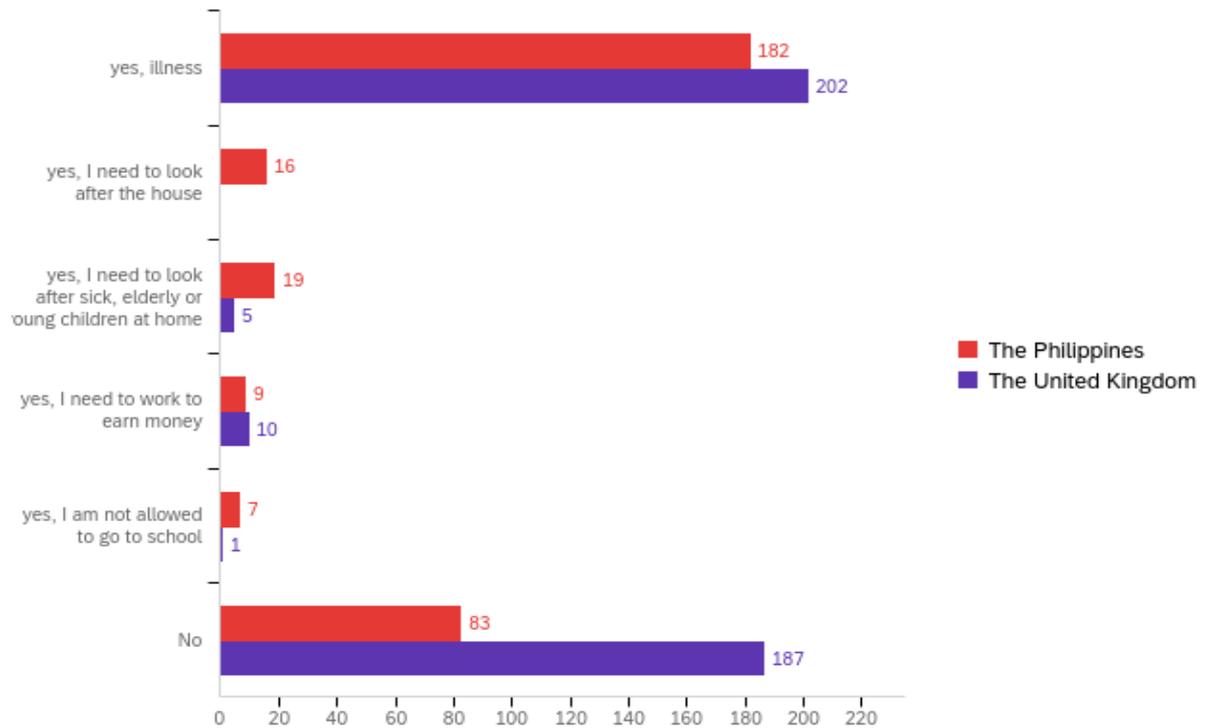
Q4.11 - In a normal month, how many days of schooling do you miss due to your menstruation?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Philippines	1.00	8.00	5.98	2.73	7.45	316
2	The United Kingdom	1.00	8.00	6.10	2.69	7.26	405

#	Question	The Philippines		The United Kingdom		Total
1	half a day	50.00%	27	50.00%	27	54
2	1	39.39%	39	60.61%	60	99
3	2	54.90%	28	45.10%	23	51
4	3	34.78%	8	65.22%	15	23
5	4	33.33%	3	66.67%	6	9
6	5 or more	52.17%	12	47.83%	11	23
7	prefer not to say	64.29%	9	35.71%	5	14
8	none	42.41%	190	57.59%	258	448

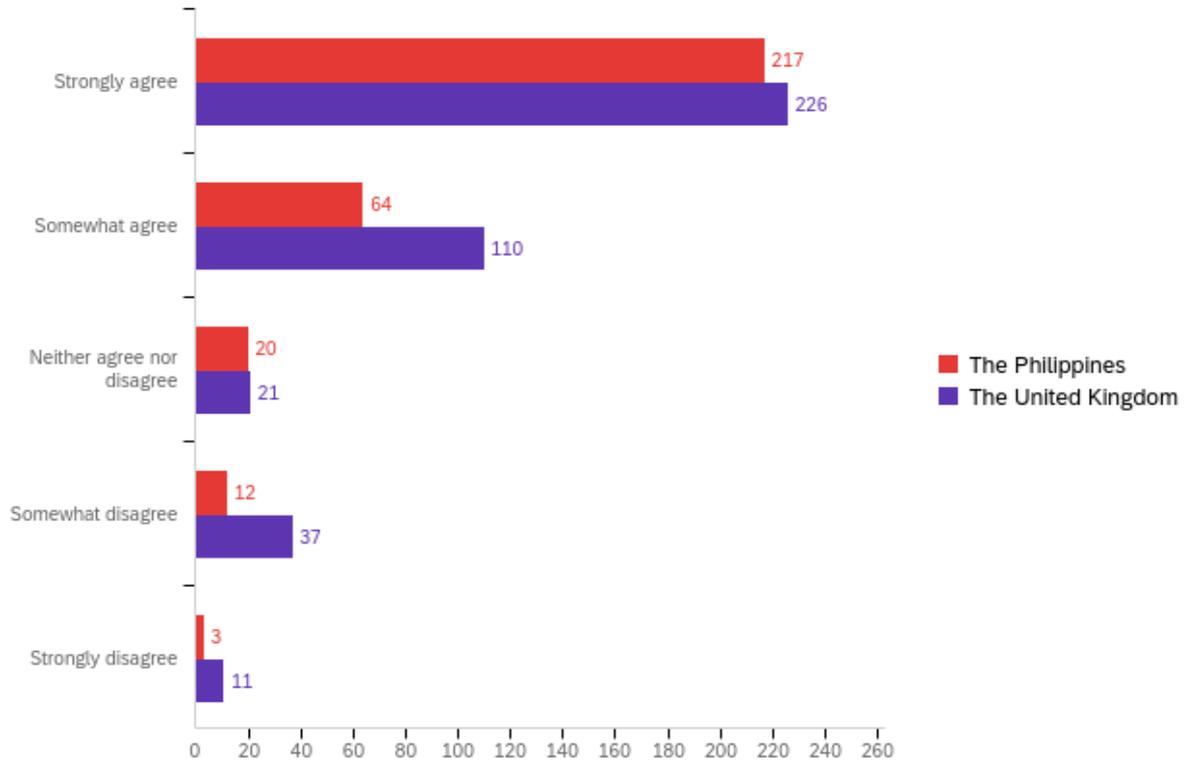
Q4.12 - Do you miss school/college for other reasons?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Philippines	1.00	6.00	2.66	2.17	4.72	316
2	The United Kingdom	1.00	6.00	3.42	2.45	6.01	405

#	Question	The Philippines		The United Kingdom		Total
1	yes, illness	47.40%	182	52.60%	202	384
2	yes, I need to look after the house	100.00%	16	0.00%	0	16
3	yes, I need to look after sick, elderly or young children at home	79.17%	19	20.83%	5	24
4	yes, I need to work to earn money	47.37%	9	52.63%	10	19
5	yes, I am not allowed to go to school	87.50%	7	12.50%	1	8
6	No	30.74%	83	69.26%	187	270

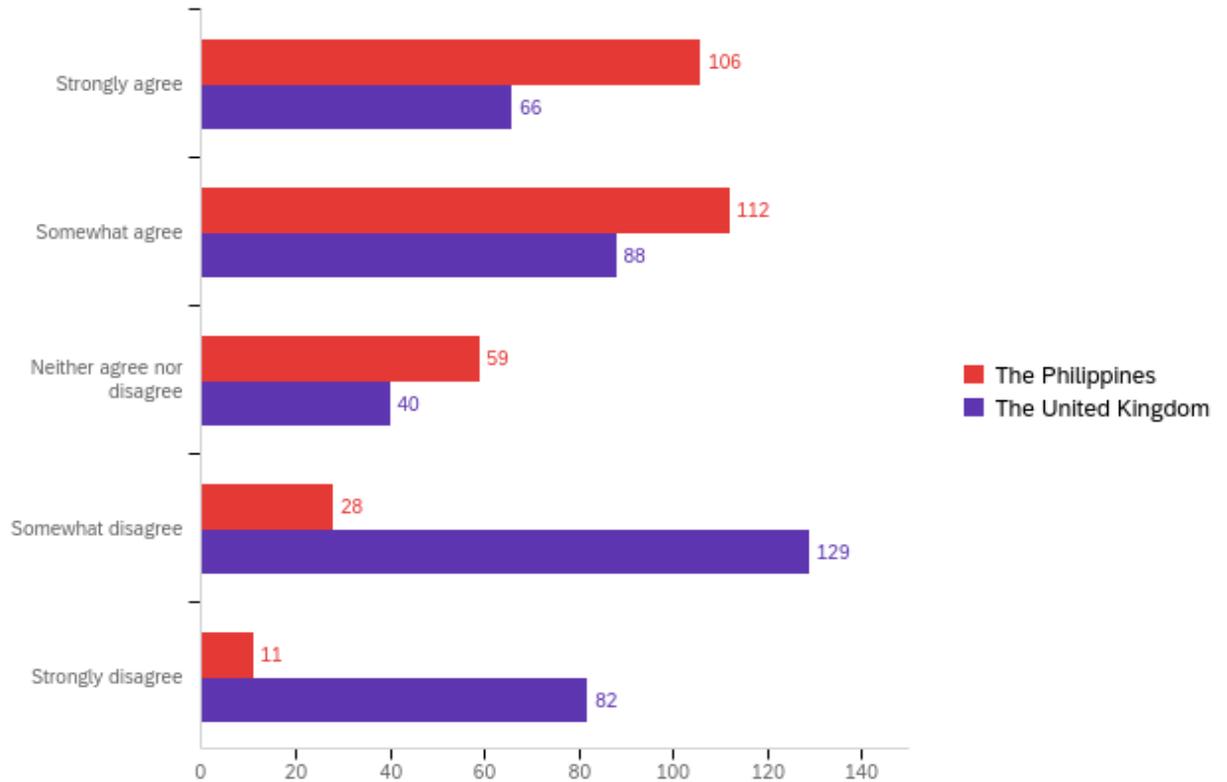
Q4.13 - At school or college, I always carry menstrual products with me, just in case



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Philippines	1.00	5.00	1.48	0.85	0.72	316
2	The United Kingdom	1.00	5.00	1.76	1.08	1.16	405

#	Question	The Philippines	The United Kingdom	Total
1	Strongly agree	48.98% 217	51.02% 226	443
2	Somewhat agree	36.78% 64	63.22% 110	174
3	Neither agree nor disagree	48.78% 20	51.22% 21	41
4	Somewhat disagree	24.49% 12	75.51% 37	49
5	Strongly disagree	21.43% 3	78.57% 11	14

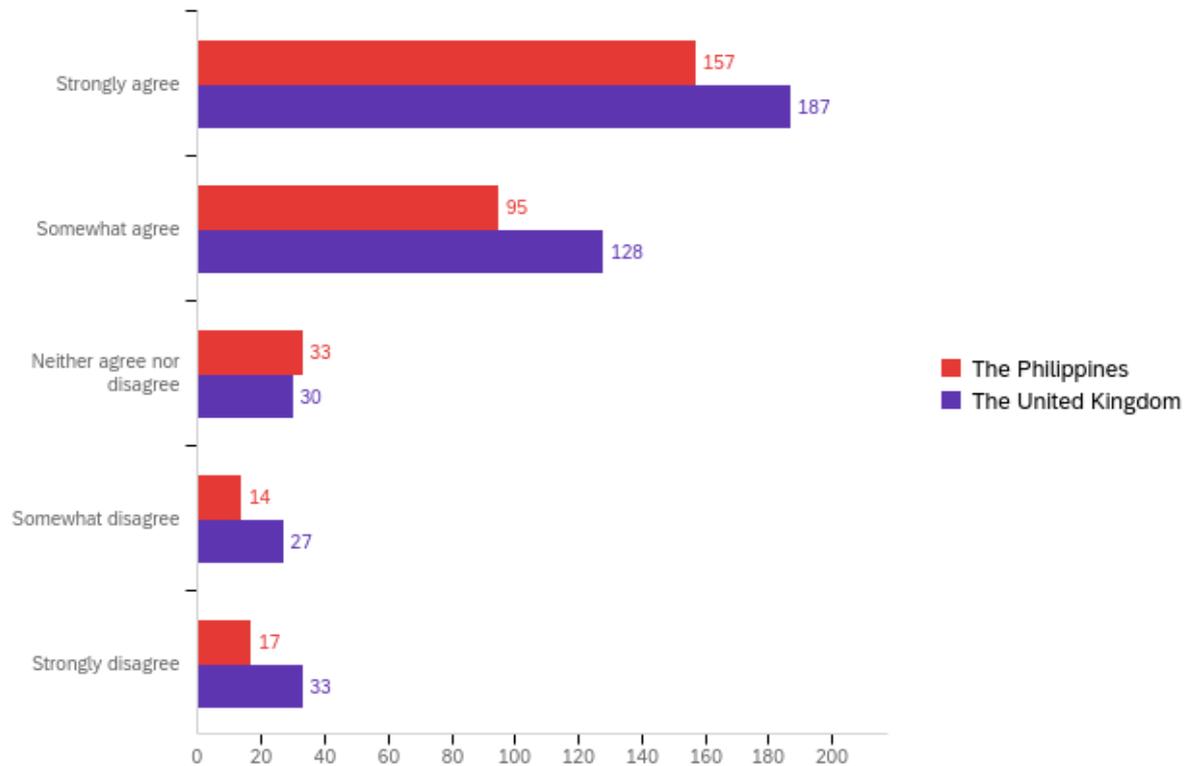
Q4.14 - At school or college, I can leave the classroom to manage my menstruation at any time



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Philippines	1.00	5.00	2.13	1.08	1.17	316
2	The United Kingdom	1.00	5.00	3.18	1.40	1.97	405

#	Question	The Philippines		The United Kingdom		Total
1	Strongly agree	61.63%	106	38.37%	66	172
2	Somewhat agree	56.00%	112	44.00%	88	200
3	Neither agree nor disagree	59.60%	59	40.40%	40	99
4	Somewhat disagree	17.83%	28	82.17%	129	157
5	Strongly disagree	11.83%	11	88.17%	82	93

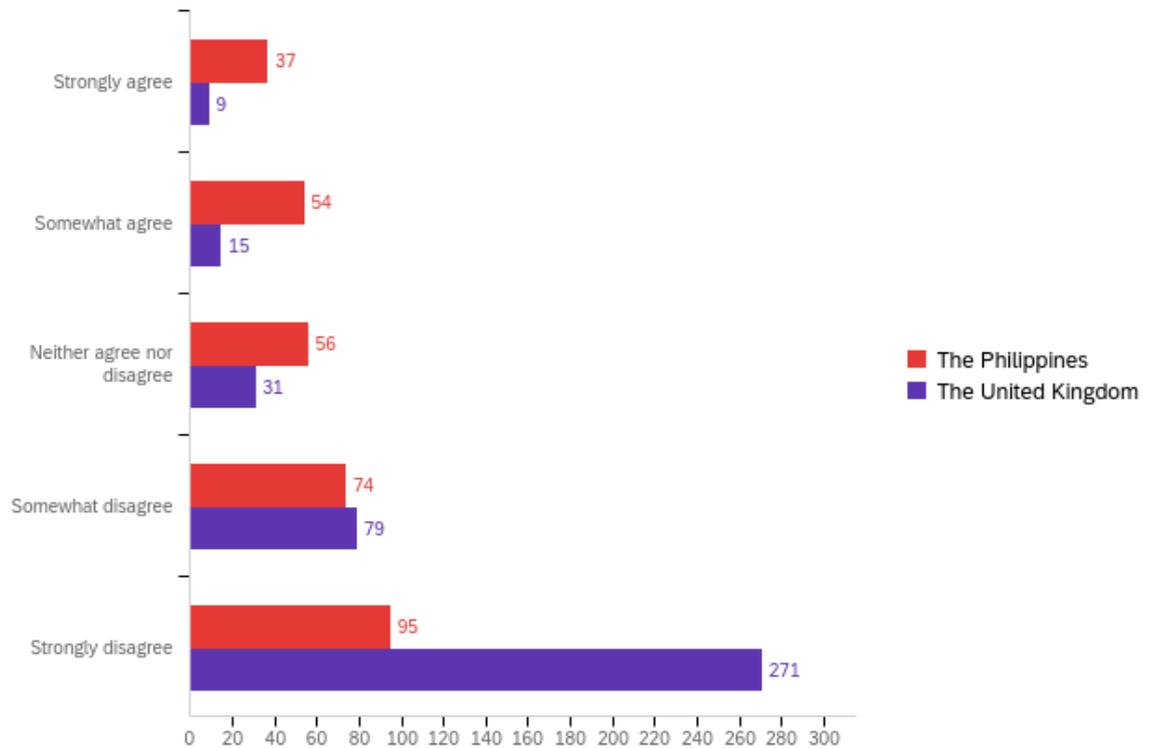
Q4.15 - I sometimes ask a friend to let me have some menstrual products if I am in need



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Philippines	1.00	5.00	1.86	1.11	1.24	316
2	The United Kingdom	1.00	5.00	1.99	1.24	1.54	405

#	Question	The Philippines		The United Kingdom		Total
1	Strongly agree	45.64%	157	54.36%	187	344
2	Somewhat agree	42.60%	95	57.40%	128	223
3	Neither agree nor disagree	52.38%	33	47.62%	30	63
4	Somewhat disagree	34.15%	14	65.85%	27	41
5	Strongly disagree	34.00%	17	66.00%	33	50

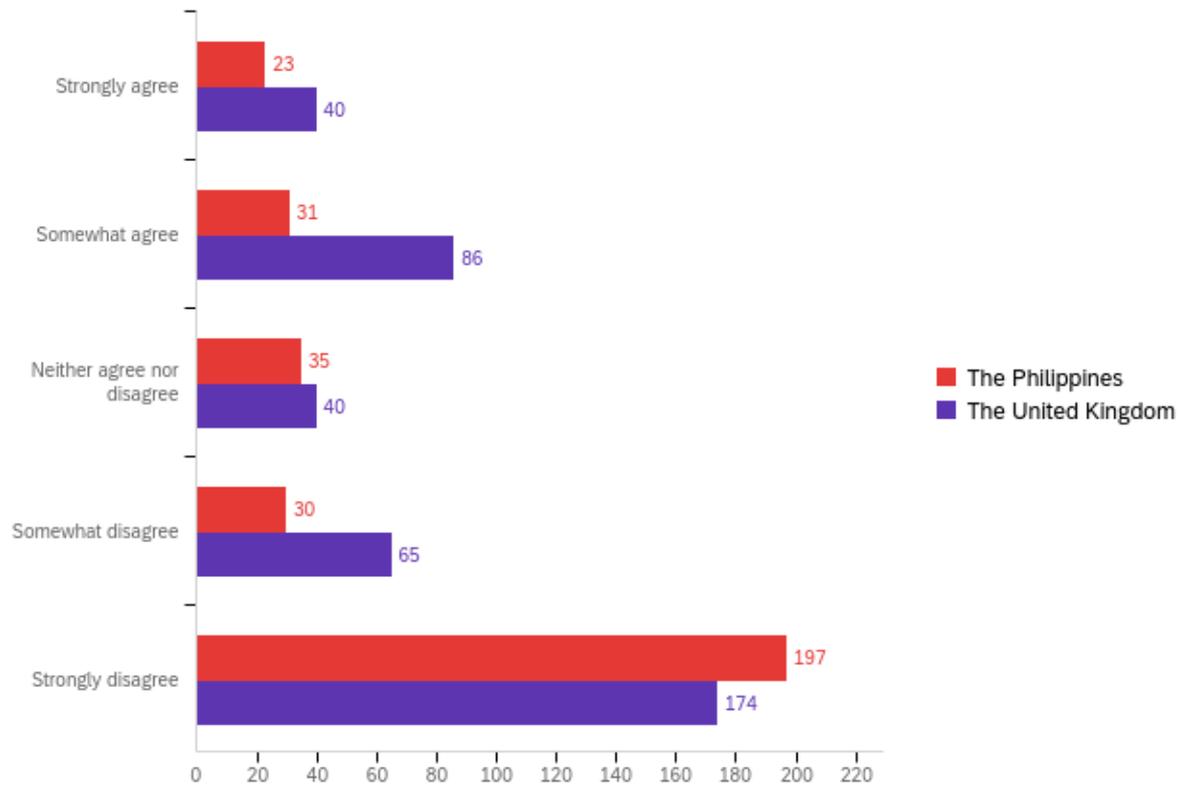
Q4.16 - If I start bleeding whilst I am at school or college, I go home straightaway



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Philippines	1.00	5.00	3.43	1.38	1.89	316
2	The United Kingdom	1.00	5.00	4.45	0.94	0.89	405

#	Question	The Philippines		The United Kingdom		Total
1	Strongly agree	80.43%	37	19.57%	9	46
2	Somewhat agree	78.26%	54	21.74%	15	69
3	Neither agree nor disagree	64.37%	56	35.63%	31	87
4	Somewhat disagree	48.37%	74	51.63%	79	153
5	Strongly disagree	25.96%	95	74.04%	271	366

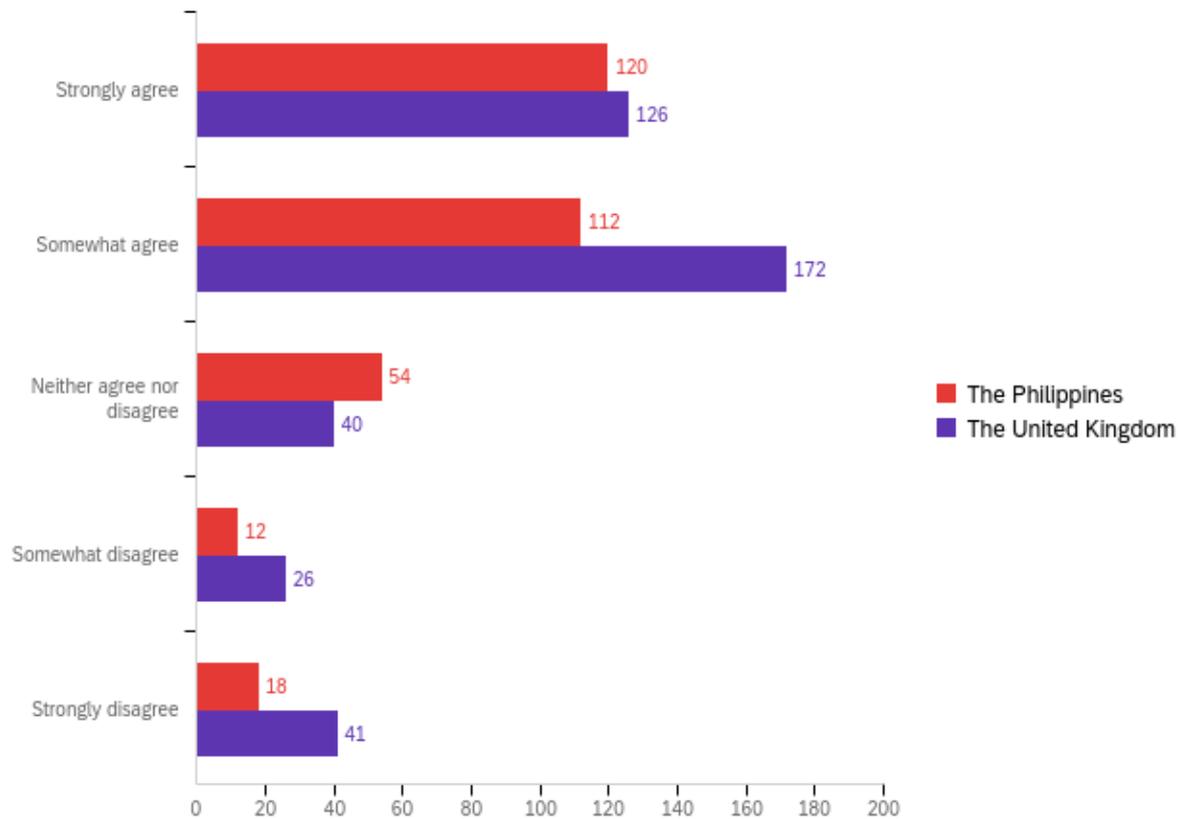
Q4.17 - I have been teased or bullied about menstruation



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Philippines	1.00	5.00	4.10	1.33	1.77	316
2	The United Kingdom	1.00	5.00	3.61	1.45	2.11	405

#	Question	The Philippines		The United Kingdom		Total
1	Strongly agree	36.51%	23	63.49%	40	63
2	Somewhat agree	26.50%	31	73.50%	86	117
3	Neither agree nor disagree	46.67%	35	53.33%	40	75
4	Somewhat disagree	31.58%	30	68.42%	65	95
5	Strongly disagree	53.10%	197	46.90%	174	371

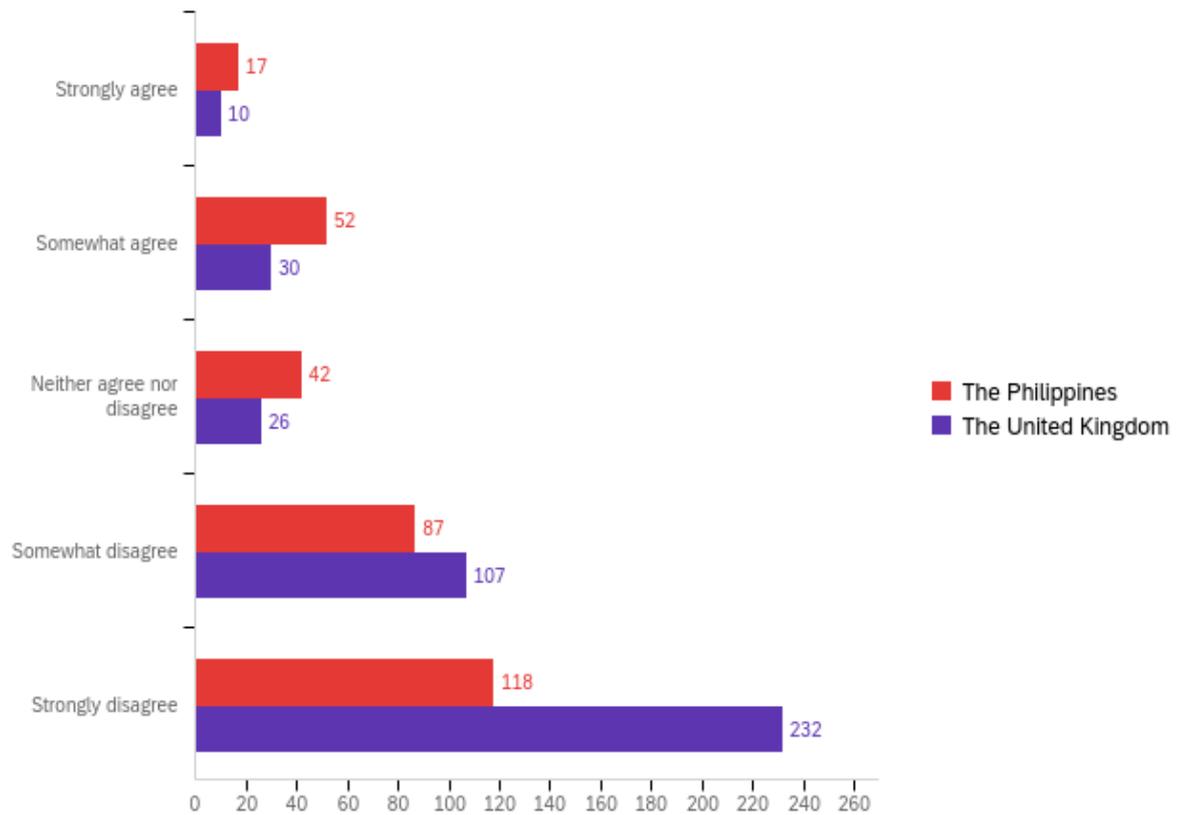
Q4.18 - When I am menstruating, I find it difficult to concentrate



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Philippines	1.00	5.00	2.04	1.10	1.21	316
2	The United Kingdom	1.00	5.00	2.22	1.24	1.53	405

#	Question	The Philippines		The United Kingdom		Total
1	Strongly agree	48.78%	120	51.22%	126	246
2	Somewhat agree	39.44%	112	60.56%	172	284
3	Neither agree nor disagree	57.45%	54	42.55%	40	94
4	Somewhat disagree	31.58%	12	68.42%	26	38
5	Strongly disagree	30.51%	18	69.49%	41	59

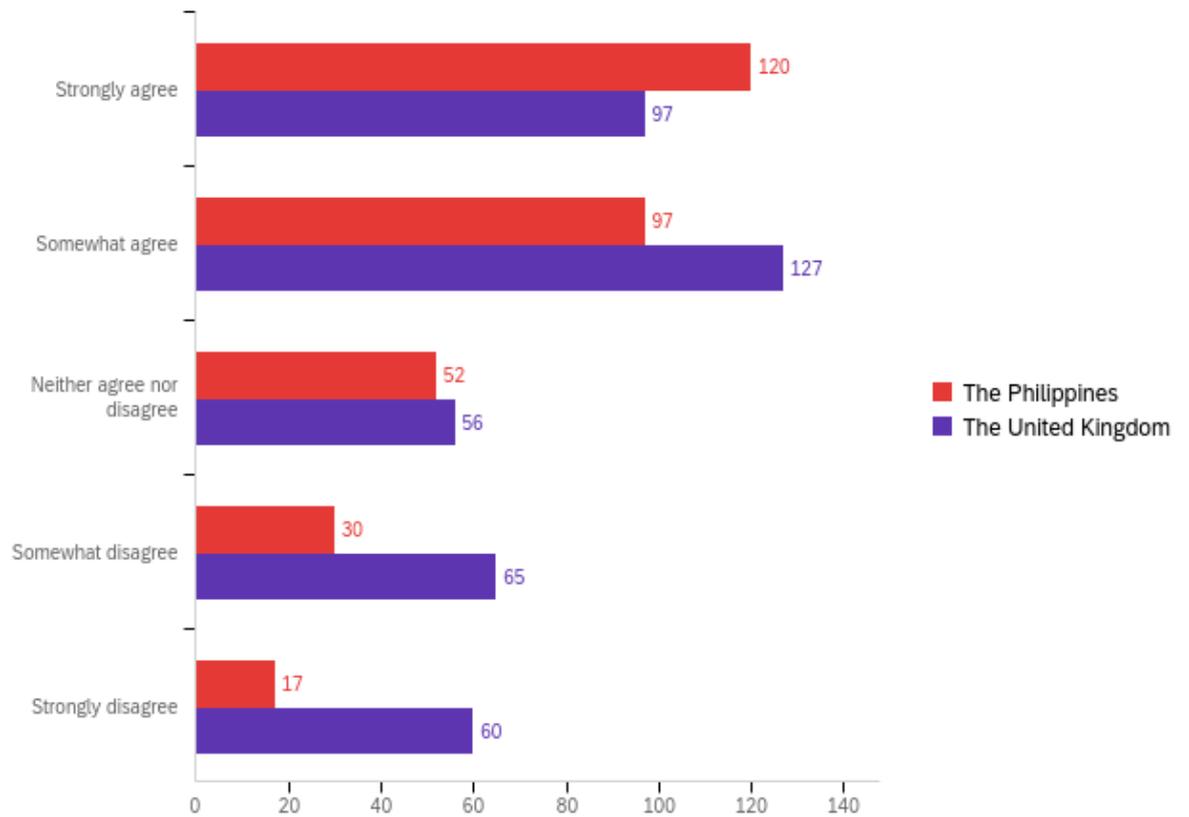
Q4.19 - Menstruation doesn't affect me



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Philippines	1.00	5.00	3.75	1.26	1.59	316
2	The United Kingdom	1.00	5.00	4.29	1.04	1.07	405

#	Question	The Philippines		The United Kingdom		Total
1	Strongly agree	62.96%	17	37.04%	10	27
2	Somewhat agree	63.41%	52	36.59%	30	82
3	Neither agree nor disagree	61.76%	42	38.24%	26	68
4	Somewhat disagree	44.85%	87	55.15%	107	194
5	Strongly disagree	33.71%	118	66.29%	232	350

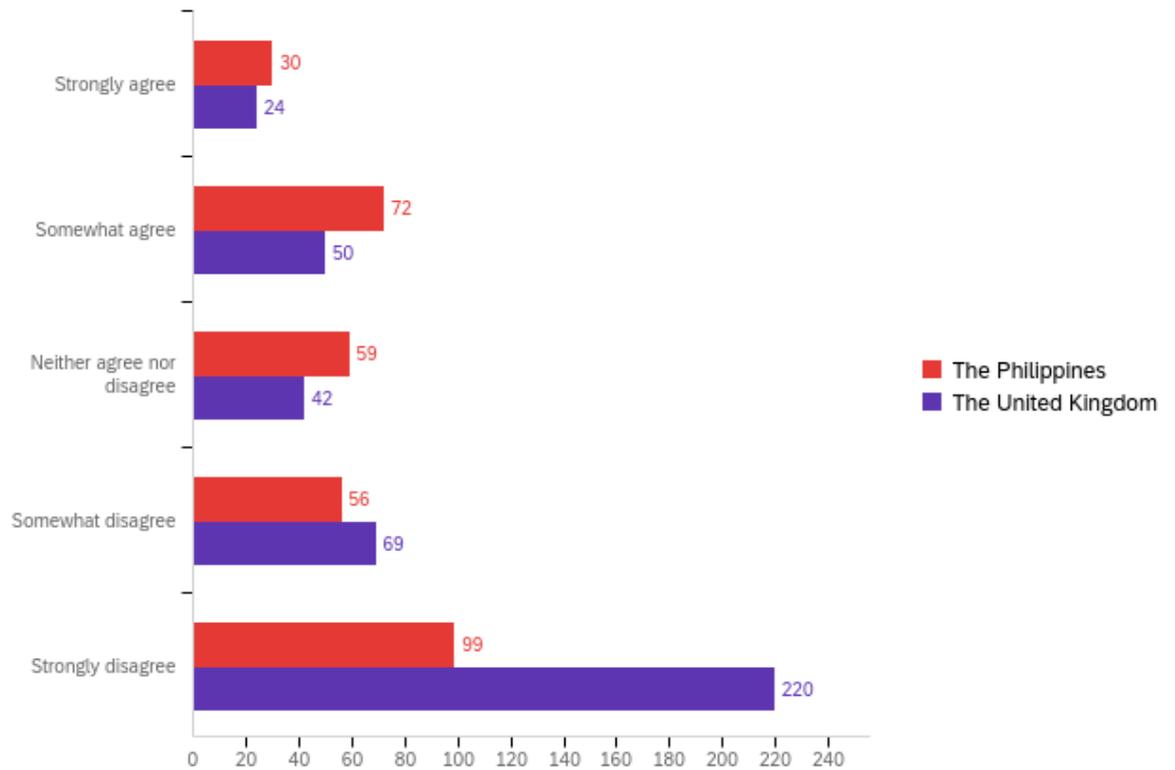
Q4.20 - If I am menstruating, I avoid running around or playing sports



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Philippines	1.00	5.00	2.14	1.18	1.39	316
2	The United Kingdom	1.00	5.00	2.66	1.38	1.91	405

#	Question	The Philippines		The United Kingdom		Total
1	Strongly agree	55.30%	120	44.70%	97	217
2	Somewhat agree	43.30%	97	56.70%	127	224
3	Neither agree nor disagree	48.15%	52	51.85%	56	108
4	Somewhat disagree	31.58%	30	68.42%	65	95
5	Strongly disagree	22.08%	17	77.92%	60	77

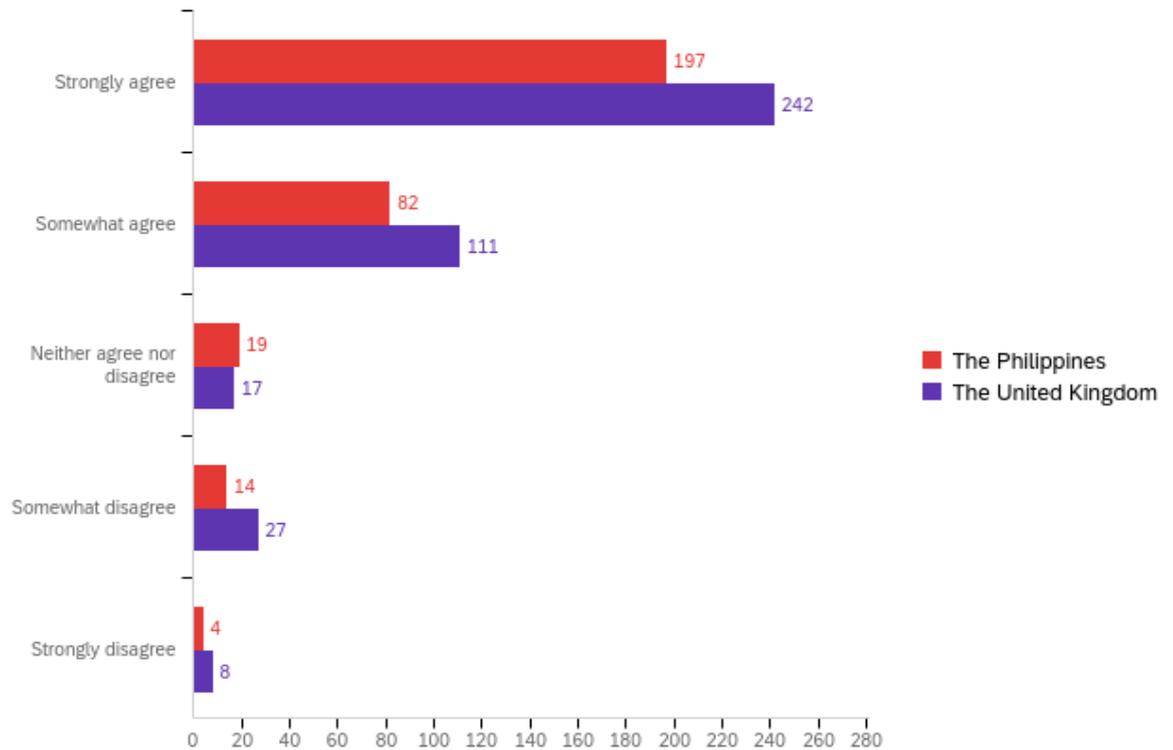
Q4.21 - Sometimes I have not got enough money for menstrual products



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Philippines	1.00	5.00	3.39	1.37	1.89	316
2	The United Kingdom	1.00	5.00	4.01	1.29	1.67	405

#	Question	The Philippines		The United Kingdom		Total
1	Strongly agree	55.56%	30	44.44%	24	54
2	Somewhat agree	59.02%	72	40.98%	50	122
3	Neither agree nor disagree	58.42%	59	41.58%	42	101
4	Somewhat disagree	44.80%	56	55.20%	69	125
5	Strongly disagree	31.03%	99	68.97%	220	319

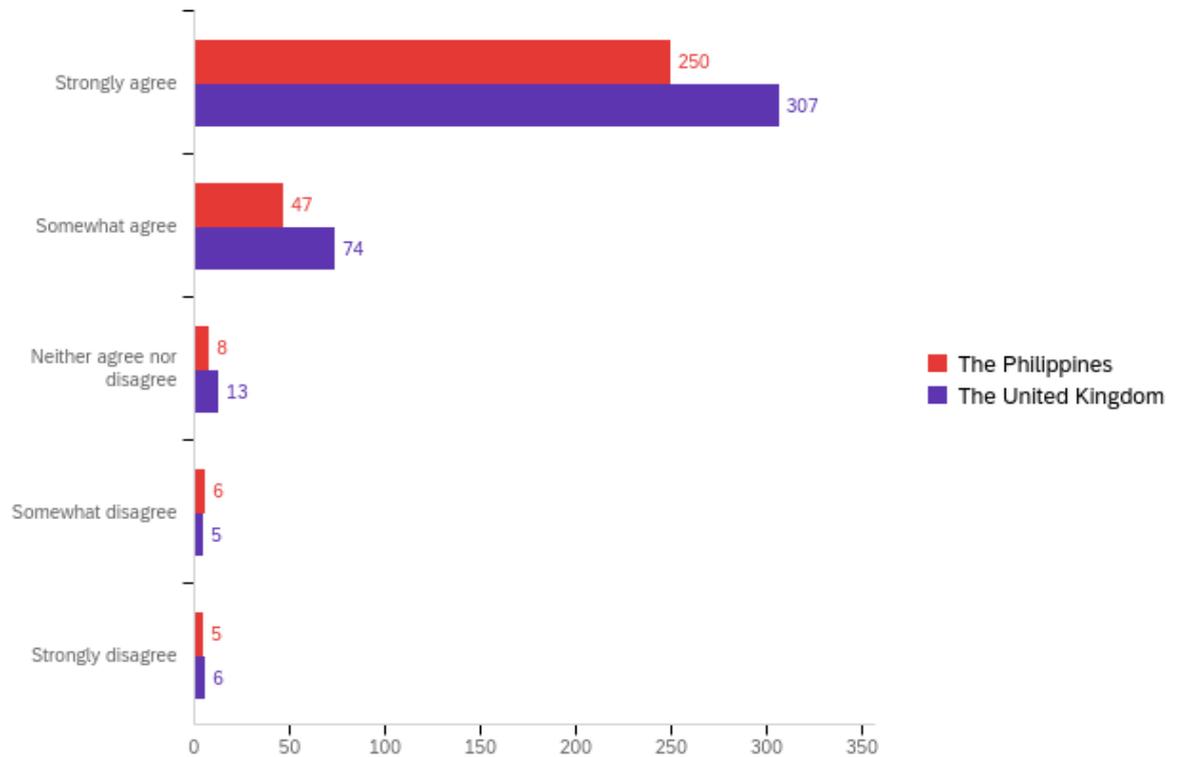
Q4.22 - I'm able to wash and maintain my personal hygiene whilst menstruating



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Philippines	1.00	5.00	1.56	0.89	0.78	316
2	The United Kingdom	1.00	5.00	1.64	0.98	0.95	405

#	Question	The Philippines		The United Kingdom		Total
1	Strongly agree	44.87%	197	55.13%	242	439
2	Somewhat agree	42.49%	82	57.51%	111	193
3	Neither agree nor disagree	52.78%	19	47.22%	17	36
4	Somewhat disagree	34.15%	14	65.85%	27	41
5	Strongly disagree	33.33%	4	66.67%	8	12

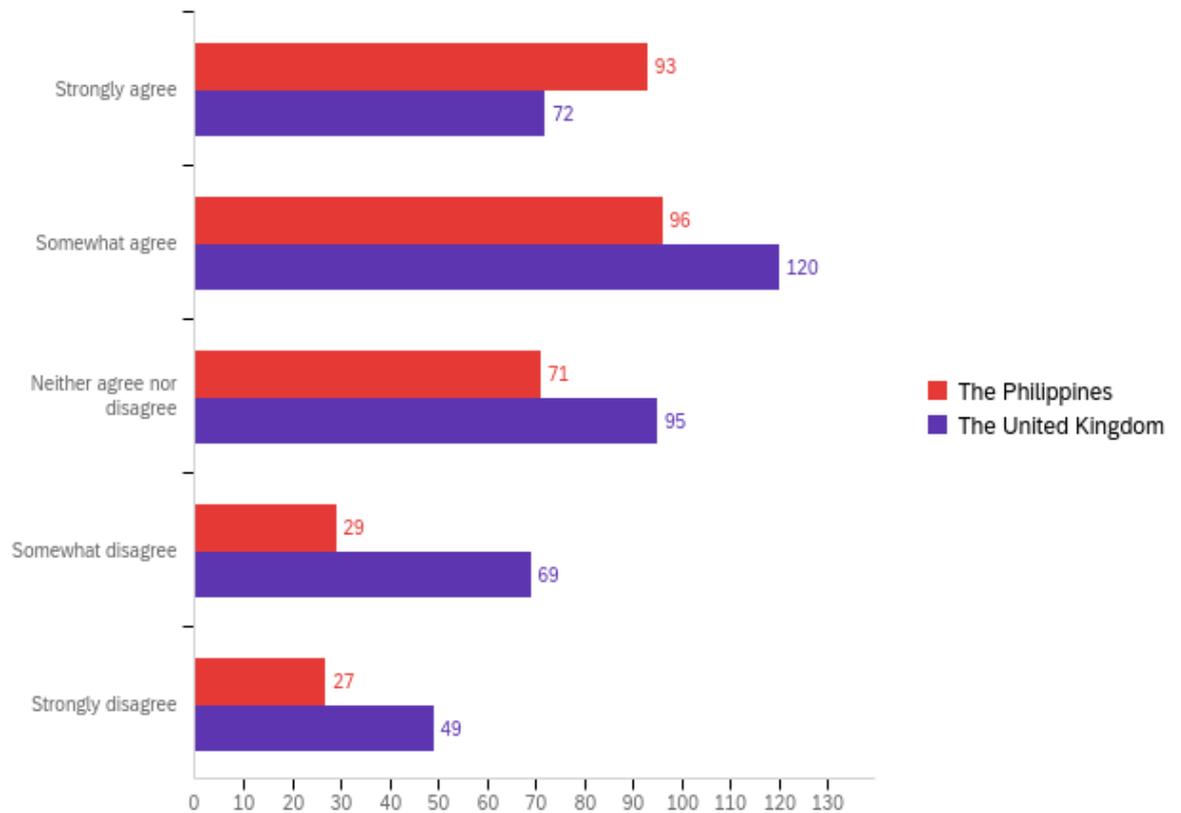
Q4.23 - I'm able to use clean menstrual products throughout the duration of my period



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Philippines	1.00	5.00	1.32	0.76	0.57	316
2	The United Kingdom	1.00	5.00	1.34	0.74	0.54	405

#	Question	The Philippines		The United Kingdom		Total
1	Strongly agree	44.88%	250	55.12%	307	557
2	Somewhat agree	38.84%	47	61.16%	74	121
3	Neither agree nor disagree	38.10%	8	61.90%	13	21
4	Somewhat disagree	54.55%	6	45.45%	5	11
5	Strongly disagree	45.45%	5	54.55%	6	11

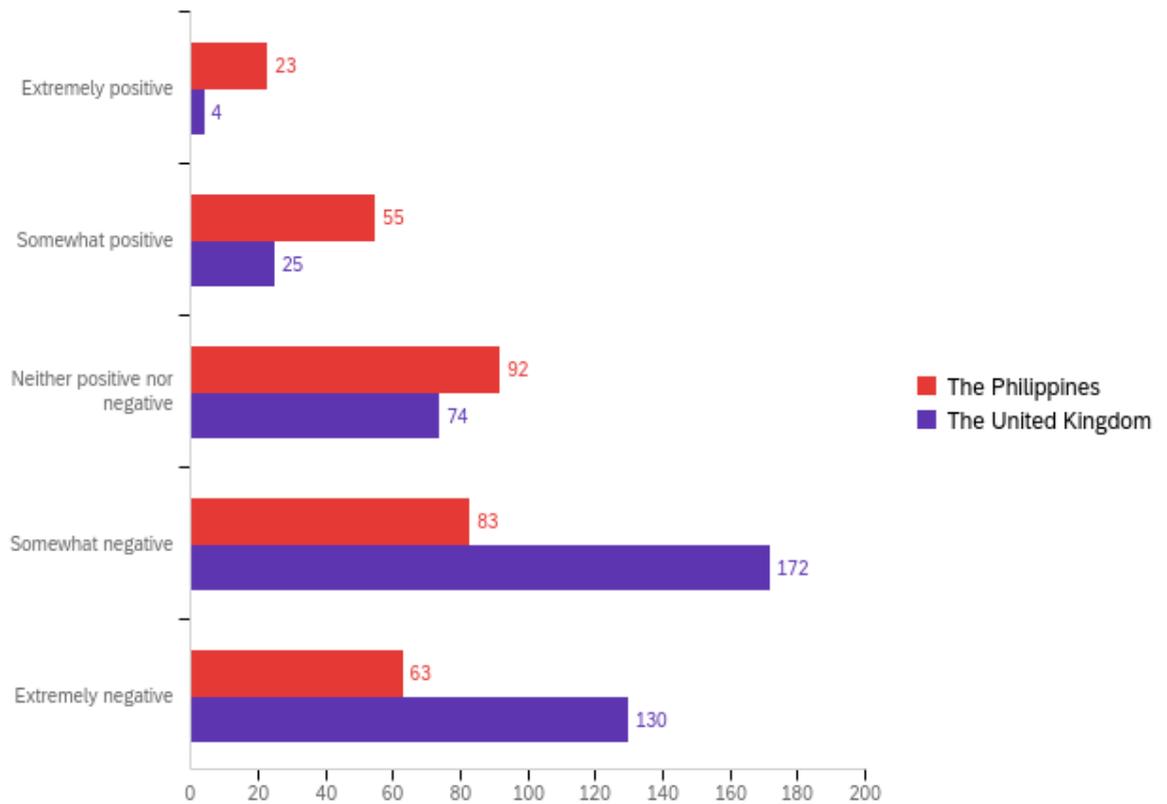
Q4.24 - I prefer to be alone and not socialise during my menstruation



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Philippines	1.00	5.00	2.37	1.23	1.52	316
2	The United Kingdom	1.00	5.00	2.76	1.27	1.60	405

#	Question	The Philippines		The United Kingdom		Total
1	Strongly agree	56.36%	93	43.64%	72	165
2	Somewhat agree	44.44%	96	55.56%	120	216
3	Neither agree nor disagree	42.77%	71	57.23%	95	166
4	Somewhat disagree	29.59%	29	70.41%	69	98
5	Strongly disagree	35.53%	27	64.47%	49	76

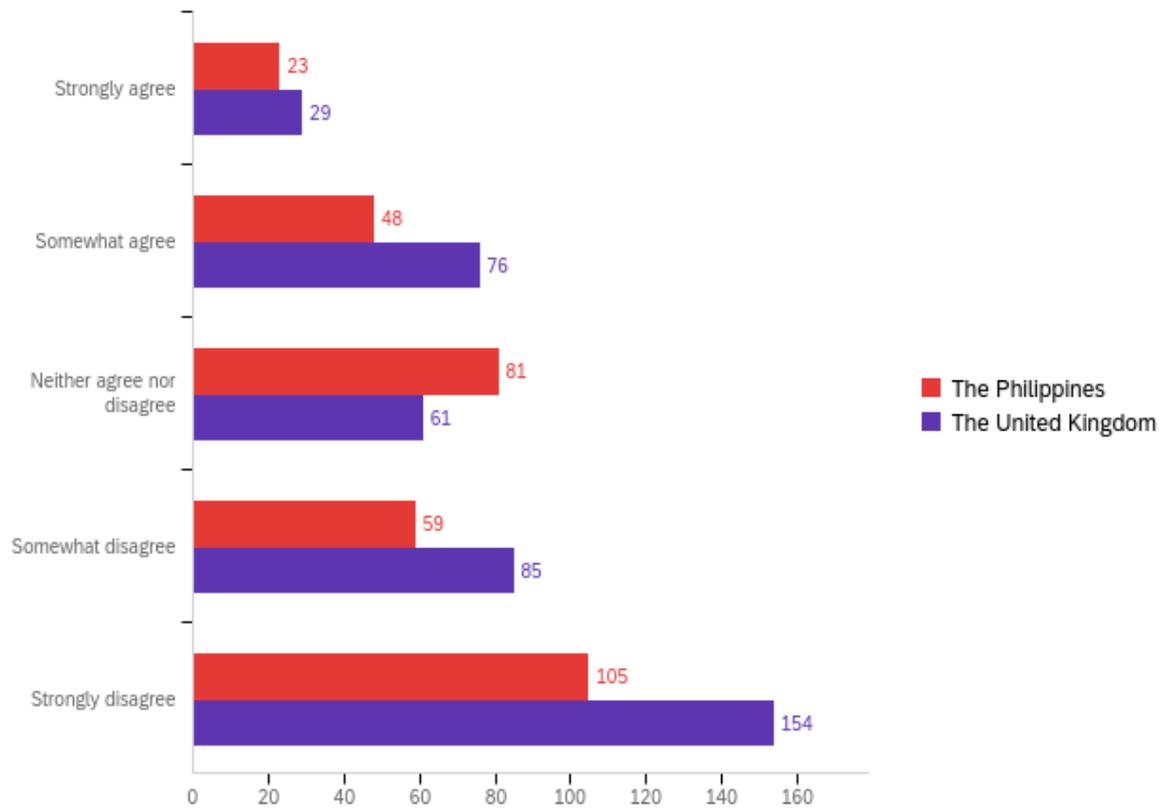
Q4.25 - I feel energetic and positive during my menstruation



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Philippines	1.00	5.00	3.34	1.19	1.41	316
2	The United Kingdom	1.00	5.00	3.99	0.92	0.84	405

#	Question	The Philippines		The United Kingdom		Total
1	Extremely positive	85.19%	23	14.81%	4	27
2	Somewhat positive	68.75%	55	31.25%	25	80
3	Neither positive nor negative	55.42%	92	44.58%	74	166
4	Somewhat negative	32.55%	83	67.45%	172	255
5	Extremely negative	32.64%	63	67.36%	130	193

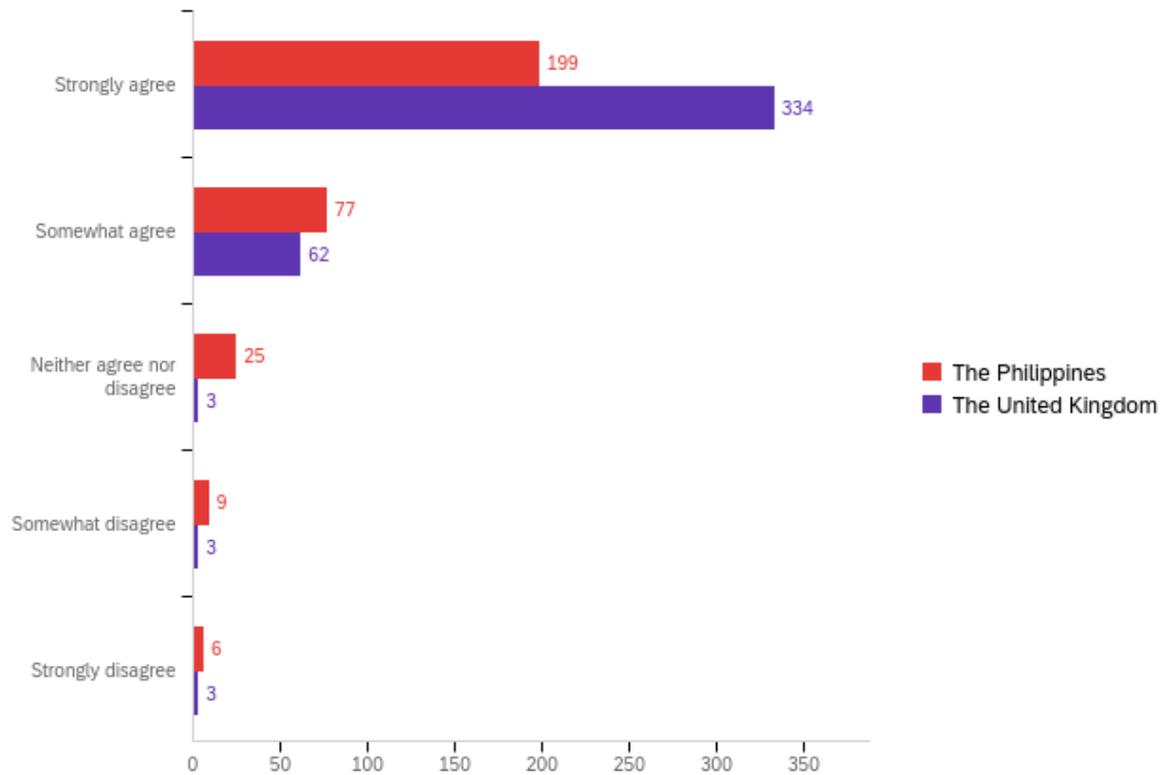
Q4.26 - I feel shame and embarrassment when I am menstruating



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Philippines	13.00	17.00	15.55	1.29	1.65	316
2	The United Kingdom	13.00	17.00	15.64	1.34	1.80	405

#	Question	The Philippines		The United Kingdom		Total
13	Strongly agree	44.23%	23	55.77%	29	52
14	Somewhat agree	38.71%	48	61.29%	76	124
15	Neither agree nor disagree	57.04%	81	42.96%	61	142
16	Somewhat disagree	40.97%	59	59.03%	85	144
17	Strongly disagree	40.54%	105	59.46%	154	259

Q4.27 - I sometimes suffer from discomfort during menstruation, such as cramps or bloating



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	The Philippines	13.00	17.00	13.56	0.90	0.80	316
2	The United Kingdom	13.00	17.00	13.22	0.57	0.32	405

#	Question	The Philippines		The United Kingdom		Total
13	Strongly agree	37.34%	199	62.66%	334	533
14	Somewhat agree	55.40%	77	44.60%	62	139
15	Neither agree nor disagree	89.29%	25	10.71%	3	28
16	Somewhat disagree	75.00%	9	25.00%	3	12
17	Strongly disagree	66.67%	6	33.33%	3	9

Appendix 9 Methods Pre-Covid

...This chapter presents the plan for the fieldwork pre-Covid, and was not executed. It has been included as it informed much of the subsequent work, even though the plan had to be substantially amended. As such it is presented in the present and future tense.

Setting

This is a mixed methods study that will collect quantitative and qualitative data on the menstrual knowledge, attitude, perceptions, experiences and practices of menarche and menstruation of girls aged 10-14 in low socio-economic localities across three countries; Pakistan, the Philippines and the UK. The three countries have been chosen to provide cultural and environmental diversity.

The following data were obtained from the CIA World Factbook (Central Intelligence Agency, 2019). Pakistan has a population of 207 million and it is the world's sixth most populous country. It has a growth rate of 1.41%. It is an Islamic state (96% Muslim) and religiously conservative. There are high levels of poverty. In urban areas, 17% of the population still have unimproved sanitation. 31% of the population are aged 0-14 years old. The number of girls in secondary school declines rapidly to 50% in some areas. 35% of girls are married before they are 18 years old and 8% of 15-19 year olds are pregnant (ibid). It is a patriarchal society that prioritises the education of boys over girls. There are many cultural myths and taboos around menarche and menstruation that contribute to poor menstrual hygiene (Mahon and Fernandes, 2010) The study site is a slum in Karachi and the collaborators are part of the Slum Health Group at Warwick University.

The second site is in the Philippines. The CIA World Factbook for the Philippines provided the following data (Central Intelligence Agency, 2021a). The population of the Philippines is 105 million with a growth rate of 1.55%. 95% of the population are Christian and 80 % of the population are adherent Roman Catholics. 22% of urban dwellers do not have access to improved sanitation (ibid). There is a growing middle class and schools in urban areas have made good progress to achieve gender parity. However, school is not free and slum dwellers cannot afford to send their children. Some out-of-school-youth participate in the Alternative Learning System (ALS) that NGOs run alongside schools. Menarche and

menstruation are the subject of cultural myths and pseudo-science (Ellis *et al.*, 2016; Evans, 2018). Girls who lack resources such as pads stay close to home to manage their menstruation (*ibid*). The study site is an Eskinita (a densely-packed informal settlement) in Manila, the academic partner at the Mary Johnston Hospital of Manila.

The third site is Coventry in the UK. The UK has a population of about 65 million, with 17% being aged 0-14 years. The population growth rate is 0.51% (Central Intelligence Agency, 2021b). Although the UK is a high-income country, Coventry is known for being one of the most deprived cities. It was bombed in WW2 and its industry did not recover. It ranks 36th on the Index of Multiple Deprivation (IMD) out of 326 Local Authorities in England (United Kingdom Government, 2019). According to the 2011 Census, about 60% of the population are of white British origin and nominally Christian, though only a few regularly attend Church. There is a higher percentage of BME than in other local authorities and a mix of other religions (Office for National Statistics UK, 2011). The University of Warwick is working with 12 schools in Coventry on Widening Participation in Higher Education and some of these schools will be approached to take part in this study.

Title, Research Aims, Questions and Objectives

A Comparative study of Menarche and Menstruation Knowledge and Experiences of girls aged 10-14 years old in low resource settings of Pakistan, the Philippines and the United Kingdom.

Research Aim

To describe the knowledge and experiences of menarche and menstruation in school girls aged 10 - 14 years in low resource settings of Pakistan, the Philippines and the UK and to explore the factors that affect the quality of the experience.

Research Questions

How do the experiences of menstruation differ between girls aged 10-14 years old in different low-resource settings and what influences them?

In different low-resource settings

1. a) What is the Knowledge, Attitude and Perceptions (KAP) of menarche and menstruation?

- b) What are the experiences and practices of menarche and menstruation?
- 2. What are the factors that influence menstrual experience?
- 3. What is the impact of education and hygiene promotion on Menstrual Health?

Research Objectives

1. In different low-resources settings :
 - a) To describe the knowledge, attitude and perceptions (KAP) of Menarche and Menstruation of girls aged 10-14 years old, and key informants such as mothers, school teachers, school nurses or other community leaders
 - b) To explore the experiences and practices of Menarche and Menstruation of girls aged 10-14 years old
2. To investigate the factors that influence Menstrual Health.
3. Through literature review, to evaluate the impact of policies and programmes designed to inform about puberty, and Menstrual Health in particular, and to make recommendations for supporting girls based upon the research results.

Hypotheses to be tested are that post-menarche girls have more menstrual KAP than pre-menarche girls, because of a need to know creating knowledge-seeking behaviour; those in education have more menstrual KAP than those who aren't, due to having access to more information, and that those in state-education have more than those in non-state education due to receiving specific information through the national curriculum.

Regarding the experience of menstruation, the hypothesis to be tested was that the experience was more negative where resources for dealing with menstruation were very limited.

Study Design

The research design is a mixed methods study with quantitative cross-sectional survey and qualitative workshop. It is an exploratory study in which the qualitative work is carried out before the quantitative work to allow for iteration.

Participants

Sample Selection

Access to the target population will be through schools and the sample will be selected through stratified cluster sampling.

Localities

The first stage is to delineate the localities to be sampled. They are low-resource urban areas in Pakistan, The Philippines and the UK.

1. The first is Jamshed Town, Pakistan

It is a densely packed community that resides roughly 200m either side of a main road that lies in a north-south direction and extends for about 1Km. Its boundaries to the east and west are smaller roads that run parallel to the main road. In the south there is another main road and in the north, there is a natural boundary where the main road ends.

Schools within 200m of its boundary are included in the sample frame as they are likely to be used by the residents.

2. The second is Tondo, Manila

One of the partners works at the Mary Johnston Hospital, which is in a densely populated area of Manila near the Port, called Tondo. It has 26 elementary public schools and 11 public high schools. Tondo incorporates two congressional districts and is the largest of Manila's 16 districts.

3. The third is the City of Coventry in the UK

It is a conurbation that covers 10000 hectares and follows the geographical boundaries assigned to postcodes CV1 – CV6.

Sampling Frame

In each area, a separate sampling frame will be constructed, whereby all the education providers (public-funded schools and non-publicly funded religious organisations or private schools) in the region are mapped and their populations (sizes) ascertained. Schools are a natural grouping of the target population.

Target Population

The target population for the first two sections of the questionnaire (Knowledge, Attitude and Perceptions of Menarche and Menstruation and Demographic information) is 'Girls ages 10 -14 years'.

The target population for the third section of the questionnaire (Experiences and Practices of Menarche and Menstruation) is 'Post-menarche Girls ages 10-14 years'.

Stratified Cluster Sampling

The population is clustered into schools and the schools can be divided into two strata; those that are publicly funded and those that are not. In urban Pakistan, 55% of pupils are in publicly funded schools, but 45% of pupils are in religious or private schools. Therefore, roughly half of the schools approached should be publicly funded schools and half should be religious or private schools. In Manila, about half of the children have had to drop out of publicly funded schools and are now in the alternative learning system run by Non-Government Organisations, for example, so similarly, 50% of each type of school will be sampled. In Coventry, private schools are not included in the study as they are fee-paying schools mostly attended by pupils of high socio-economic status from outside of the area and are not an 'alternative' education for the population of this locality.

The aim is to get a representative sample in an efficient way without bias. The schools are stratified by type of education provider (publicly funded and non-publicly funded), as they are expected to be different, and then the schools are clustered into small, medium, and large on size. The variation between the clusters is expected to be less, but each cluster is sampled to ensure that it is represented. The schools within the cluster are chosen randomly, and in the larger schools, which have more than one class, the classes are chosen randomly. All the girls in the classes either side of the mean age of menarche will be sampled, starting with the small schools, until the sample size has been reached.

Sample Size Calculation

The study is a nested one, with the post-menarche girls' group being part of a group of school girls, in different sizes of schools, in different types of school or education provider.

This study intends to measure Knowledge, Attitudes and Perceptions towards menarche and menstruation which will be binary questions that will produce a score. Less than 50% is deemed 'poor' knowledge, 51-70% is 'moderate' knowledge and 71-100% is 'good' knowledge (Afsari, 2017). It is then intended to analyse the difference in mean score by sub-group to discover whether there is a difference in KAP between girls in publicly-funded education and girls in non-publicly funded education, and between pre- and post-

menarche girls. In order to know whether the difference is meaningful, the margin of error (confidence interval) needs to be established. 5% is usually accepted, it can be increased slightly as long as it will allow discrimination between results. In this study, the margin of error should not be more than +/- 10%, because the difference in a score graded 'good' and one graded 'poor' is 20%.

Firstly, the parameters of the study were established:

Population: Girls aged 10-14 years

Sites: low-resource localities of Pakistan, the Philippines, and the United Kingdom

Timeframe: Jan – Dec 2020 (cross-sectional study)

Recruitment: through education providers (publicly funded and non-publicly funded)

Recruitment rate: 90% of girls attending class on the day of data collection. This is assumed to be high, as the questionnaire will be administered to pupils present and can be carried out *in situ*, and collected within a short time frame, thus avoiding many of the obstacles that result in a low recruitment rate (Testa and Coleman, 2006)

Response rate: 90% This is to allow for spoiling of papers (ibid).

A sample size calculator was used (Calculator.net, 2022) For the standard 5% margin of error (or confidence interval) and 95% confidence level, the suggested sample size in each locality is 384. This concurred with two similar studies which had sample sizes of 361 (Shah *et al.*, 2019) and 364 (Afsari, 2017).

This means that there needs to be 768 in each stratum, to have sufficient data to analyse 384 post-menarche girls (assumed to be half of the population of girls). If the recruitment rate is 90% and the response rate is 90%, this means that 948 girls need to be approached.

A further analysis is intended to look for differences in knowledge and experience between girls in different strata *ie* between the two strata. This would require twice as many in the total sample size, so it would be necessary to approach 1896 girls. Given the time constraints of the study, a second calculation was done to reduce the sample size to a feasible number. If the sample size was halved to 192 in each stratum, which is more feasible, the margin of error (confidence interval) is 7.07% which is considered reasonable.

Therefore approaching 948 girls in each locality should allow recruitment of 384 to the study, split between both strata (publicly funded schools and non-publicly funded.)

Given that the average school in the UK has an intake of 80 girls, this would require 12 schools to be approached to reach the required sample size. Schools vary in size, so more schools may be sampled in a stratum to ensure sufficient girls are included. See table appendix 5.1

Table appendix 5.1 Summary of number of schools to be sampled in each stratum.

Strata	Publicly funded schools			Non-publicly funded schools		
	Pakistan	The Philippines	UK	Pakistan	The Philippines	UK
Small	2	2	4	2	2	0
Medium	2	2	4	2	2	0
Large	2	2	4	2	2	0

The sample of schools will be taken as follows. Schools within the locality will be identified as publicly funded or not (in the UK publicly-funded only). The schools within each of the publicly/non-publicly funded strata will be sub-divided into sub-strata by relative size - small, medium, and large schools.

Once this has been done, schools will be chosen randomly from each sub-stratum until the population of girls in each sub-stratum is approximately equal. Each sub-stratum will have a minimum of two schools to ensure diversity of experience of the girls. The nested structure (two schools, in each of three school sizes, in each education type) will require twelve schools to be approached in each locality.

The target sample size is 384, which is an average of 32 individuals per school. Within each school, all the girls in the year group on either side of the mean age of menarche (AAM) will be consented to take part in the questionnaire. Starting with the smallest schools, recruitment will continue until the sample size is reached. For large schools this

may mean recruiting from less than the whole year group. In this case classes will be randomly selected.

In Pakistan, the mean AAM is 11.73, but in the lowest socio-economic group in Karachi, it is 12.3 years (Ahmed *et al.*, 2016). Thus grades 6 and 7 (age 11 - 13) need to be sampled.

In the Philippines, the mean AAM is 12.9 years, but rises to 13.3 years for the poorest quintile (Tey, Lai and Ng, 2019) so Grades 7 and 9 (age 12 - 14) need to be sampled. In the UK, the mean AAM is 12.7 years (Rubin *et al.*, 2009) so the school years to be sampled are year 8 and 9.

Inclusion Criteria

Girls aged 10, 11, 12, 13 and 14 years old between 01 Jan and 31 Dec 2020

Girls who have the cognitive ability to understand and answer questions about menarche and menstruation.

Girls who voluntarily choose to participate in the study.

Recruitment of Participants

A list of all the schools and other education providers in the area will be collated by researcher.

The schools will be randomly selected according to the sampling frame. Contact will be made with schools requesting their participation in the study. If the school declines, another school in the same sub-stratum will be chosen to replace it. Posters and Flyers will be distributed to the school/provider prior to the study, for use within the school buildings. When the researcher arrives in the country, the school will be asked if she can address the girls during an assembly to tell them about the study, and an information event will be arranged in the school/community for the parents and guardians.

Identification of Participants

The school will provide the registers of classes in the years/grades to be sampled. In the larger schools where there is more than one class per year group, one class from each year group will be selected randomly using 'names out of a hat' approach. The school will be asked to remove from the register any names that are on the SEN register or Safeguarding register or known to be vulnerable. Participant Information Sheets will be sent home to parents or guardians, explaining that they can 'opt-out' of the study if they wish by

returning an opt-out slip to the school. (Evans will be guided by the norms of the school in Pakistan and the Philippines as there may be alternative ways in which parents communicate with the school). At least a week will be given for parents to contact the school and opt-out before the data-collection.

Girls for the qualitative workshop/focus group will be purposively sampled on the first visit through the School Principal. All girls will be asked to give written assent.

The survey will take place on the second visit. All girls in the selected classes who are present on the day, who have not been identified by the school as being vulnerable, whose parents have not opted out, and who give their own assent will participate in the study by completing the questionnaire.

Recruitment of Key Informants will be purposive sampling through the information event. Mothers and Teachers that show interest in the study will be asked if they would like to take part in the focus group and be interviewed and will be given Participant Information Leaflets and Consent forms to sign.

Informed Consent

Informed consent will be written consent from the girls (or assent as they are under 18 years old). The ethical guidelines from the British Educational Research Association have been consulted (British Educational Research Association, 2018), and they endorse UNHCR8, which says that 'children who are capable of forming their own views should be granted the right to express those views freely in all matters affecting them, commensurate with their age and maturity' It goes on to say that the rights of parents and those that care for children should be considered and they should have the opportunity to have their say (ibid). It has been decided to seek the approval of School Principals who act 'in loco parentis' and ask for their consent to carry out the study in their classrooms. Parents will be fully informed and given the opportunity to request that their daughter is withdrawn. In most cases, this should be straightforward. However, should the girl be enthusiastic to be involved, against the parents' wishes, the school principal could overrule the parents to uphold the human rights of the girl. The study would follow the norms of the school in this respect. There are important methodological reasons for using opt-out, or passive consent,

rather than active consent, in a study conducted in deprived areas. Active consent (or 'opt-in') leads to bias in the sample, as higher levels of illiteracy, apathy, disorganisation and stress mean that forms for written consent are less likely to be returned to the school (Tigges, 2003). Passive consent will allow a much higher response rate and therefore ease of administration. It is envisaged that the questionnaire will be administered to a whole class at the same time. An alternative activity has been designed for non-participants to be completed at the same time, which will reduce any stigma and make the management easier for the classroom teacher. However, the teacher may wish to dismiss the boys and the non-participant girls. The researcher will be guided by the wishes of the teacher. Previous research in the Philippines found that obtaining written consent from slum dwellers was a problem as they did not have pens to write with, and found consent forms incomprehensible; it was not just the language, but the concept. If the Barangay captain, or a more learned trusted person from the NGO gave their consent, the slum dwellers were more likely to verbally agree (Evans, 2018). Tindana similarly found this with people putting their trust in the chief's opinion (Tindana, Kass and Patricia, 2006).

School Principals will be asked to provide their consent and the usual procedures of the school will be employed to receive 'opt-out' requests from parents. The researcher will be responsible for collecting written assent from the girls. The researcher holds a current DBS (Disclosure and Barring Service) certificate and a current Safeguarding in Education certificate. Consent Training for Field Researchers was undertaken at the University of Warwick on 27 June 2019.

Informed consent for this study will be obtained by sending Participant Information Leaflets home for the girls who have been selected and their parents/guardians to read, clearly explaining the objectives of the study and what it involves for them. It will be translated into the local language. The leaflet will set out the time commitment required of participants, and any advantages or disadvantages from taking part. It will detail how confidentiality will be maintained and the arrangements for keeping data securely. The leaflet will emphasise that the participants can withdraw at any time and there will be instructions given on how to do that.

Along with the leaflet, the potential participants and their families will be invited to an information event at which the researcher and field assistant/translator will be present so that the family can clarify their understanding or ask further questions. They will have at least three days in which to consider whether to take part in the study or not, so that they

have time to discuss it at home. If they do not wish to take part, they will not be contacted again.

Materials and Resources

Preparation

Questionnaire development

A questionnaire has been developed, which is in three parts. The first part is to collect data on the Knowledge, Attitude and Perceptions (KAP) of Menarche and Menstruation. The second part is to collect socio-demographic data. The third part is for post-menarche girls only and is to collect data on the practices and experiences of girls relating to menstruation, and the impact on daily life and schooling.

The questionnaire is based on KAP studies by Crofts and Fisher (2012), Wilson-Smith (2015) and Shah (2019) (Crofts and Fisher, 2012a; Wilson *et al.*, 2015; Shah *et al.*, 2019). They have been adapted to context based on the work of Evans in the Philippines (Evans 2018) and extensive reading and consultation. Further iteration may follow once the qualitative work is complete.

Pilot

The posters, leaflets and questionnaires will be prepared, translated, and back translated to check the veracity. The collaborators in Pakistan, the Philippines and in the UK will be asked to find two girls aged between 10 - 14 years old on whom to pilot the questionnaire, to make sure that it can be understood by that age group and that it is answered as intended. Any issues can then be remedied.

The researcher will liaise with the partners to establish contacts with school principals and community leaders. The study will be carried out in two separate visits; the first visit will be for qualitative data collection, and the second for quantitative data collection.

Researcher immersion

The researcher will be guided by the current political climate and the advice of the host organisations, but she will attempt to spend 3 to 4 days visiting the community, making

contact with community leaders and immersed as far as possible in the community activities. The purpose is to establish relationships with community members and gain trust. No formal interviews or note-taking will take place during this time. At the end of the day, observations will be noted in a journal and analysis of these will lead to further refinement of the tools. The approach is an iterative one and has been used by the Swachh Barat Mission in India (*Swachh Bharat Mission*, 2018).

Field Assistant Training

Field assistants will need to be employed to provide translation, conduct the semi-structured interviews, facilitate the Workshop and Questionnaire, and enter data. A written guide will be developed following publicly available guidelines (Shah *et al.*, 2019) but adapted to context by liaising with collaborators. Face-to-face training of field assistants with the researcher will allow the clarification of protocols. Safe-guarding practices and data management practices of the University of Warwick will be included.

Information about the study

School principals will be asked if the researcher can address the girls at an assembly to tell them about the study.

Participation Information Letters will be sent home to girls and to parents. A Parental opt-out form will also be sent home. The instructions about how to opt-out will follow the normal procedure of each school.

An information event for parents will be held at the school or another convenient location, in order to give them the opportunity to find out more about the study.

Triangulation

Permission will be sought from the school principal to carry out a 'transect walk' through the school. Evans will be guided by the usual practices of the school. Usually, a trusted pupil is given the job of showing visitors around. It is not necessary to go into classrooms and disturb classes. The purpose is to observe the layout of the school and verify the locations of facilities such as toilet blocks that the girls may mention in the mapping exercise. The researcher has a current DBS clearance (clearance from the Disclosure and Barring Service, UK, which was formerly the Criminal Records Bureau. This allows her to work in schools). A transect walk will be conducted through the school to verify locations.

Permission will be sought from the school principal to accompany a class for some of the school day. This is a common practice for trainee teachers to get a good understanding of the school experience from the pupil perspective. The researcher will be guided by the usual practices of the school. School principals will be asked if a class can be followed around for a school day in order to gain an understanding of their lived experiences, particularly timings of breaks, queues for bathrooms, etc.

Data Collection and Storage

Qualitative data collection

Workshop

Ten girls will be purposively sampled from each school, by asking the school principal for suitable candidates. They will be invited to take part in a workshop. (There will be one workshop per school, so there will be twelve per country). The workshop will have some participatory activities and a discussion about menarche and menstruation. There should be a minimum of 5 individuals in each group, and ideally an odd-number to avoid break-away pairs. Seven to ten girls is a manageable number for the facilitator and usually leads to data saturation on a very specific topic such as this. Mothers will also be invited to take part in the workshop.

The researcher and a fieldworker will be present at the Workshop. The aims of the workshop will be presented, and the participants will be informed that the discussion will be audio-recorded. They will be asked to sign their assent. They will be reminded that they can withdraw from the study at any time. The questions are pre-determined, and the fieldworker/facilitator will be asked to try to limit each question to ten minutes. This is to ensure breadth of coverage and avoid dominance by either one person or one topic, whilst still retaining the flexibility to explore areas that are important to the participants in due depth. The workshop will last about 2 hours, and not longer, to avoid participant fatigue.

Other participatory tools will be incorporated to encourage engagement and keep the momentum in the group, whilst providing data triangulation for the researcher.

- a) A mapping exercise will be used to investigate the planning required to carry out normal activities whilst menstruating, such as obtaining resources, finding a place to change, resting, doing laundry, etc.
- b) Pocket voting will be used to discover the answers to some questions that are particularly sensitive (such as personal experiences). This will capture the views of all whilst assuring anonymity in the group setting.
- c) Letter writing activity. Girls will be asked to write a letter for younger girls aged 8 - 10 years on 'How to cope with menstruation at school'.

Mothers and Teachers will be purposively sampled (one of each per school) and semi-structured interviews conducted as per the protocol. These will be audio-recorded for later translation and transcription.

The data will be collected directly from the participants. The researcher and a field assistant will be present. The participants will be assented and assigned a number by which they will be known. They will be instructed not to use personal identifiers such as names in the activities.

Quantitative data collection

The questionnaire will be distributed on the second visit. The girls and their parents will have received participant information leaflets on the first visit and have had the opportunity to opt-out.

Evans will liaise with the school principals to select the classes to be sampled and make arrangements for the completion of the questionnaire. Efforts will be made to inconvenience the school and teachers as little as possible. The questionnaire is designed to last 30 minutes and an alternative task has been provided for those that will not be taking part (boys, girls whose parents opt-out, girls who don't give their assent). This is to aid the teacher's management of the class. Evans and the fieldworker will ask the girls to give their written assent by completing the form, and then they will be given a numbered questionnaire. Prior to them starting the questionnaire, a secret vote will be taken to find out how many have heard of menstruation. Both the fieldworker and Evans will count

independently. Once they concur, the fieldworker will briefly explain to the girls what is meant by menstruation, so that they are able to answer the questions, and go through the rubric to ensure that it is completed as fully as possible.

The data will be collected directly from participants. Once they have been assented, they will be given a numbered paper questionnaire on which they will record their answers in pen. The socio-demographic data to be collected in the questionnaire will be age, school grade completed, self-reported school achievement, self-reported school attendance, number in household, main care-giver and time spent with care-giver, age and gender of siblings and other householders, household water supply, household sanitation, religion, food security, menarche status.

After 30 minutes, the questionnaires will be collected and taken to the field office for processing.

Data Transfer

Qualitative data

Audio-recordings and all paper documents used in the field will be taken directly to the field office. In Pakistan this is at the Aga Kahn University, in the Philippines it is at the Philippine Christian University and in the UK it's at the University of Warwick. The audio-recordings will be transcribed and translated by the field assistant onto a password protected University of Warwick laptop. Should there be any names or other identifiers on the paper documents (except the assent form), The researcher will redact them before the documents are scanned onto a University of Warwick laptop and the paper copies will be destroyed.

Quantitative data

The questionnaires will be returned to the field office on completion of data collection, and in Pakistan and the Philippines, the field assistant will enter the data onto a password-protected University of Warwick laptop. 10% of the data entry will be checked by the researcher. In the UK all of the data entry will be done by the researcher

Data Storage

The files will be encrypted and uploaded by the researcher onto secure University of Warwick servers which comply with strict information protection standards. For the analysis, the data will be accessed through the University of Warwick site and only by the researcher to ensure its security. The data will be stored according to University of Warwick protocols for a period of ten years.

Analysis Plan

Qualitative data

The data will be imported into Nvivo software for analysis. The researcher will carry out Content Analysis by line-by-line coding. Codes will be generated deductively (based on her previous experience) and also new codes may be generated inductively. This will be an iterative process.

Quantitative data

The software to be used for the analysis is SPSS. The analysis will be done separately by country and will use descriptive statistics, inferential statistics, bivariate regression, and multivariate regression, based on social theory and the literature. Finally, a comparative analysis will be made.

Likert-scale questions will be collapsed into binary answers and a score produced.

Descriptive statistics will describe the characteristics of the population. The Knowledge, and Attitude and Perceptions scores will be aggregated to produce an overall score for KAP, which will allow the calculation of parameters such as the mean. The Experiences and Practices data will be similarly aggregated to produce an overall score.

It is intended to analyse difference in mean score by sub-group to discover whether there is a difference between girls in publicly funded education and those not, and between pre- and post-menarche girls. T- tests and Chi-squared tests of difference will be used.

Hypotheses that are to be tested are that the type of education provider can have an effect on KAP and Experience, and that menarche status has an effect on KAP.

Bivariate regression analysis will be used to test for associations between education provider, demographic characteristics, KAP, and Experiences and Practices of Menstruation.

Those factors that are found to be significant in bivariate analysis will be selected for multivariate logistic regression analysis in order to model the relationship between educational provider, demographic factors, KAP, and Experiences and Practices. Should the data suggest it, the model will be refined in a comparative analysis of the three countries.

Synthesis and Conclusion

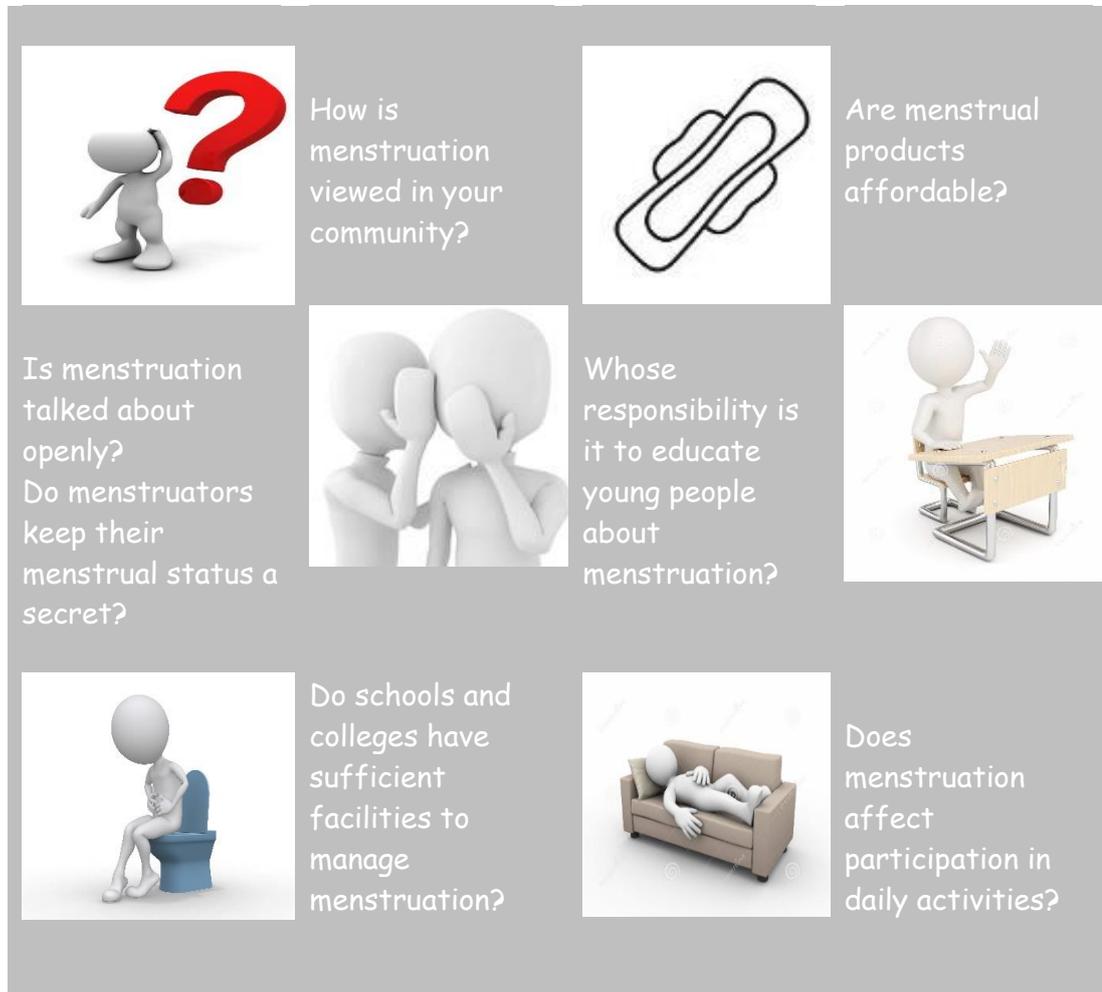
The significant associations from the quantitative data will be entered into Nvivo and tools such as the matrix function will be used to generate themes that link the qualitative and quantitative data (Barnett-Page and Thomas, 2009) A thematic synthesis, rooted in grounded theory (Strauss and Corbin, 1994) will develop lines of argument that explain the association between Education provider, Demographics, KAP and Experience and Practice.

This chapter discussed the setting, study design, development of the materials and plans for data collection pre-Covid. It was presented to the Ethics committee and received approval on 13th December 2019. It was never carried out, due to the Covid Pandemic which started in January 2020.

Appendix 10

Call for Male and Female Participants – Study into Menstrual Knowledge

September 2020



I am conducting a survey on Menstrual Knowledge for my PhD Research. I am looking for males and females aged 16- 19 years old who live in the UK or the Philippines. Participants who meet the criteria below will complete a 15 minute survey.

The outcome of the research is to understand more about the relationship between menstrual knowledge and experience.

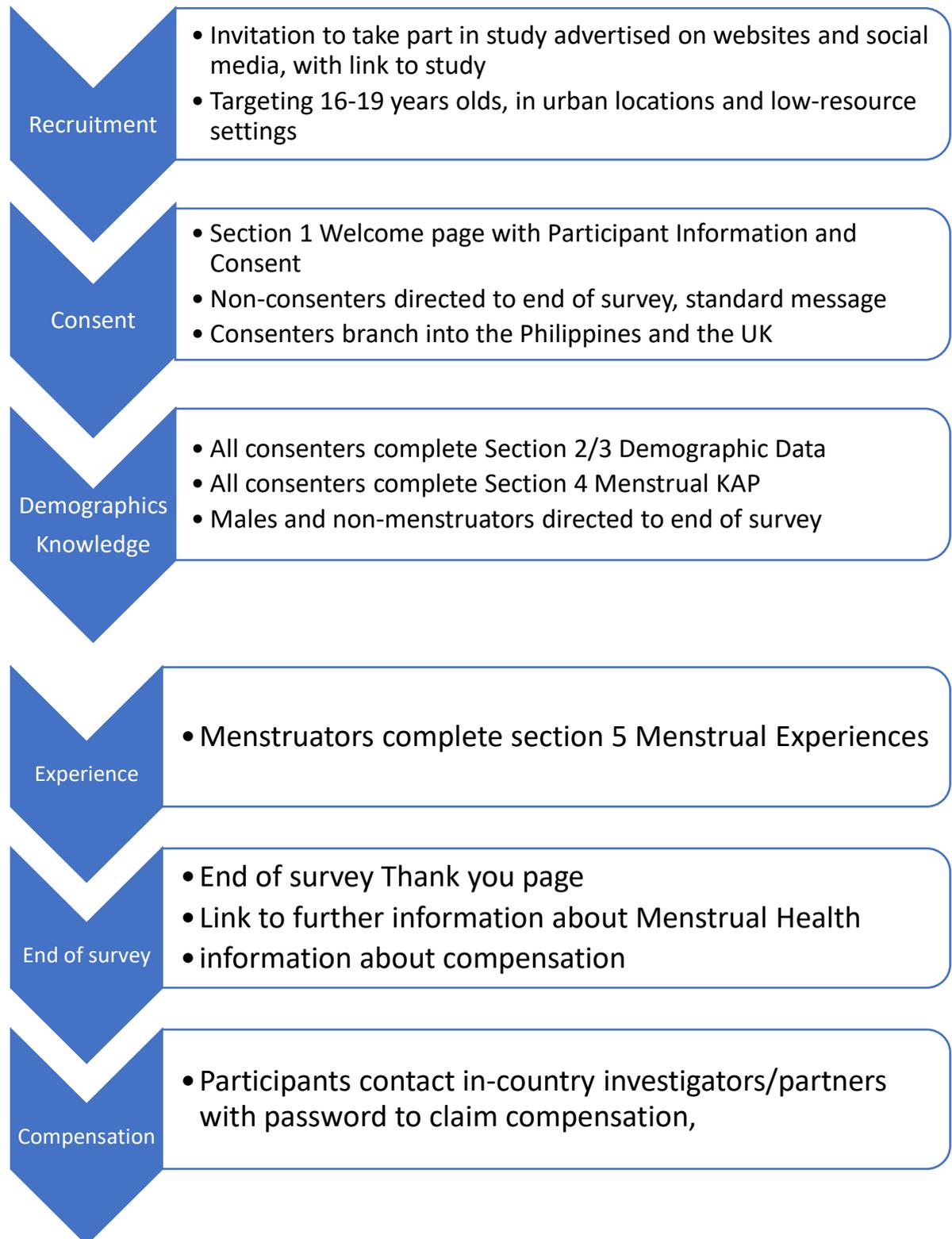
Requirements:

Age: 16-19 years old

Country: in the UK or in the Philippines for the past 2 years

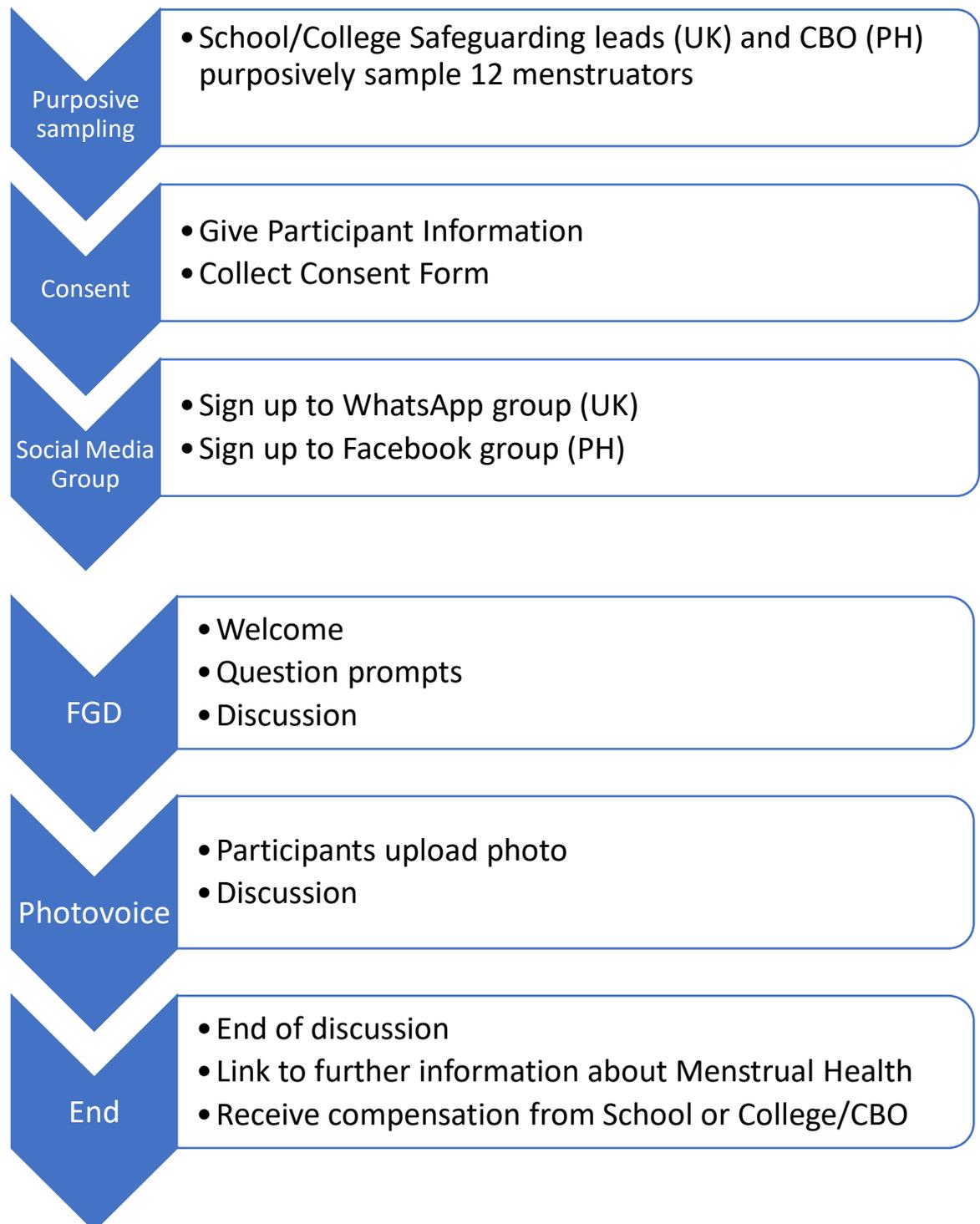
Appendix 11

Flow-diagram of Qualtrics Survey into Menstrual Health.



Appendix 12

Flow-diagram of Focus Group Discussion on Social Media



Appendix 13



CONSENT FORM Focus Group Discussion

Participant Identification Number for this study:

Study Title: A comparative study of Menstrual Literacy of Adolescents aged 16-19 years in Low Resource settings of the Philippines and the United Kingdom.

Investigators: Rebecca Evans, Lead Investigator, University of Warwick, UK
 Frances Griffiths, Project Supervisor, University of Warwick, UK
 Bronwyn Harris, Project Supervisor, University of Warwick, UK
 Edna Imperial, Project Lead in the Philippines, the Philippine Christian University, the Philippines

Please initial
all boxes

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.
 2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason.
 3. I understand that data collected during the study, may be looked at by individuals from The University of Warwick, from regulatory authorities, where it is relevant to my taking part in this study. I give permission for these individuals to have access to my data.
 4. I give my consent for my data to be used in the research
-

- 5. I give my consent to use (anonymised) verbatim quotations from the discussion
- 6. I give my consent for the photo I provide in the PhotoVoice activity to be used in any subsequent publications
- 7. I am happy for my data to be used in future research.
- 8. I agree to take part in the above study.

Name of Participant	Date	Signature

Name of Person taking consent	Date	Signature

Appendix 14



Participant Information Leaflet for Menstruators –Focus Group

Study Title:	A comparative study of Menstrual Literacy of Adolescents aged 16 – 19 years in Low Resource settings of the Philippines and the United Kingdom.
Investigators:	Rebecca Evans, Lead Investigator, University of Warwick, UK Frances Griffiths, Project Supervisor, University of Warwick, UK Bronwyn Harris, Project Supervisor, University of Warwick, UK Edna Imperial, Project Lead in the Philippines, the Philippine Christian University, the Philippines

Introduction

You are being invited to take part in a research study. Before you decide, you need to understand why the research is being done and what it would involve for you. Please take the time to read the following information carefully. Talk to others about the study if you wish.

Please ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Who is organising and funding the study?

The study is being organised by Rebecca Evans in order to collect information for a research project that will be submitted to the University of Warwick, United Kingdom, for the award of a PhD. The work is funded by the United Kingdom National Institute for Health Research Global Health Research Unit for Improving Health in Slums.

What is the study about?

The study is investigating menstruation (periods). We know that managing menstruation can be challenging for menstruators and can stop them from doing their normal activities. This study aims to find out about menstruators' knowledge and how it affects their experiences of menstruation. Being positive about periods

has the potential to empower girls and improve not only their access to education, but also to health, well-being, equity, and rights.

What would taking part involve?

You are being asked to join an online focus group discussion with a group of 11 other menstruators and 2 admins. The discussion is about menstrual experiences and will take place in a closed group using Facebook Group. Although there will be some question prompts, you can say what you like, or nothing at all. If you would like to upload a photo that expresses your experience of menstruation, you can do that (as long as there is nothing personally identifiable in it). The discussion group will be open for one month so that you can reflect and add things at a time convenient to you. If you don't want to take part, you can withdraw from the group at any time and your previous contributions will be deleted.

Do I have to take part?

No. Participation in this study is completely voluntary and choosing not to take part will not affect you in any way. You can also choose to withdraw your participation at any time, without giving a reason.

What are the possible benefits of taking part in this study?

You may learn more about menstruation and its management.

What are the possible disadvantages, side effects or risks, of taking part in this study?

This can be an embarrassing topic and thinking about it might make you feel ashamed or emotional.

At the end of the discussion group, you will be provided with information about where to get support if you need it.

Expenses and payments

Participating in the study is entirely voluntary. However, you will be eligible to claim a pre-paid (PHP300) SIM card for your time.

Will my taking part be kept confidential?

At the start of the focus group, all participants will be asked to keep everything that is discussed confidential and not to share it with anybody else.

Will my data be kept confidential?

Because the other participants will be able to see your profile, it is suggested that you make a new one especially for this research. You do not have to fill in any personal details.

The group will be a closed group, so everything you share will be seen by the 11 other participants and 2 admins.

The data will be collected by the lead investigator who has been trained in data

protection protocols.

Personal data will be pseudonymised. This means that you will be given a number which will be used instead of your name to protect your identity. Nobody other than the lead investigator will be able to link a piece of data to you.

Confidentiality will be maintained throughout the study, except in the case of disclosure of practices that could cause harm to yourself or to another. In that case, it is the duty of the investigators to report the concern to the relevant authorities.

The discussion will be transcribed and uploaded onto the secure University of Warwick servers which comply with strict information protection standards. The file that links your identification to the study number will be stored separately from the research data in a different area of the server. This is to protect your personal data from being identifiable.

What will happen to the data collected about me?

As a publicly-funded organisation, the University of Warwick has to ensure that it is in the public interest when we use personally-identifiable information from people who have agreed to take part in research. This means that when you agree to take part in a research study, such as this, we will use your data in the ways needed to conduct and analyse the research study.

We will be using information from you in order to undertake this study and will act as the data controller for this study. We are committed to protecting the rights of individuals in line with data protection legislation. The University of Warwick will keep identifiable information about you for ten years after the study has finished.

If you wish to withdraw your data from the study, you should withdraw yourself from the group discussion (it is an option – long press on the group name until it is selected, go to the 3 white dots in the right hand corner, and press 'Exit').

If you withdraw from the study after the close of the group on 30 October 2020, it will not be possible to withdraw your individual data, as it will have been processed with the rest. To safeguard your rights, we will use the minimum personally-identifiable information possible and keep the data secure in line with the University's Information and Data Compliance policies.

Data Sharing

Your rights to access, change or move your information are limited, as we need to manage your information in specific ways in order for the research to be reliable and accurate. The University of Warwick has in place policies and procedures to keep your data safe.

This data may also be used for future research, including impact activities following review and approval by an independent Research Ethics Committee and subject to your consent at the outset of this research project.

For further information, please refer to the University of Warwick Research Privacy Notice which is available here:

<https://warwick.ac.uk/services/idc/dataprotection/privacynotices/researchprivacynoti>

ce or by contacting the Information and Data Compliance Team at GDPR@warwick.ac.uk.

What will happen if I don't want to carry on being part of the study?

Participation in the study is voluntary and you may withdraw from the study at any time during the discussion if you change your mind. You do not have to give a reason, and it will not affect you in any way.

What will happen to the results of the study?

At the end of data collection, a newsletter will be sent to all participating Education Providers to inform them that the data collection phase is complete and thank them for their assistance. The data from the study participants will be grouped together and processed. A report will be made to the hosting institutions summarising the results. The work will form the basis of a PhD Thesis, and it is intended to publish the results in an academic journal. It will not be possible to identify individuals from any project reporting.

Who has reviewed the study?

This study has been reviewed and given favourable opinion by the University of Warwick's Biomedical & Scientific Research Ethics Committee (BSREC): **BSREC43, 19-20**

Who should I contact if I want further information?

Rebecca Evans Rebecca.R.Evans@warwick.ac.uk –lead investigator
Frances Griffiths f.e.griffiths@warwick.ac.uk – project supervisor

Who should I contact if I wish to make a complaint?

Any complaint about the way you have been dealt with during the study or any possible harm you might have suffered will be addressed. Please address your complaint to the person below, who is a senior University of Warwick official entirely independent of this study:

Head of Research Governance

Research & Impact Services
University House
University of Warwick
Coventry
CV4 8UW

Email: researchgovernance@warwick.ac.uk
Tel: +44 (0) 24 76 522746

If you wish to raise a complaint on how we have handled your personal data, you can contact our Data Protection Officer, Anjeli Bajaj, Information and Data Director who will investigate the matter: DPO@warwick.ac.uk.

If you are not satisfied with our response or believe we are processing your personal data in a way that is not lawful you can complain to the Information Commissioner's Office (ICO) in the United Kingdom. <http://ico.org.uk>

Thank you for taking the time to read this Participant Information Leaflet
Introduction

Appendix 15

Impacts of PhD

Winner of the University of Warwick 3M Thesis competition 2022

Winner of the PGR Symposium Warwick Medical School 2021

Winner of the poster competition Academy of Medical Sciences 2022

Poster presentation at University of North Carolina Water and Health Conference 2022

The MENLIT Study Facebook, Instagram and Twitter to recruit participants but also to create a community of practice and advocacy (Reach 62401 as of 10 Feb 2021)

The Red Tent Project: British Science Festival; Warwick University Students Union Women's Officer Event; Warwick Green Week; Girl Power Events; WEN Environmental Conference; Extinction Rebellion Festival; Sustainability Events, On-line Product demonstration and Pad-making workshop.

Warwick University Design Challenge 2021: Create a new design for a menstrual product waste bin for public toilets eg. The gender neutral cubicles in the library at Warwick – winning design

Warwick University Design Consultant for 3rd year project – Artificial Tampon testing machine.

Warwick University Design – Engineering Summer School Consultant

Register of Menstrual Educators

www.girlsused.com sharing research findings and connecting menstrual educators and sustainability champions

Curriculum for Girls' Clubs and ToT for Plan, Sierra Leone

Lecture for WEDC, Loughborough on Gender and Immersive Research

Lecture for MSF on Hygiene in Emergencies

Lecture for Mechanical Engineering Students at Imperial College

Ecofemme (India) ambassador

Regular Reviewer of papers for the Journal of Water, Sanitation and Hygiene for Development