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Role of ICT in promoting Adolescent Menstrual Health

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Abstract

Adolescent is an important phase in the life of both females and males. Menstruation is a critical phase in adolescent girl's life which needs special care and attention. However, one of the important challenges for adolescent girls in this phase seems to be the lack of information and awareness concerning the menstruation. Since the last two decades, the embedment of ICT's in our lives has been increasing including our health care. Adolescents are more attracted to the ICT's and their applications in different forms. Thus, over the past many years, many attempts have been made by different stakeholders like government, NGO's and community to promote adolescent menstrual health through the application of such technologies. These technologies can actively involve adolescent girls through different platforms and provide valuable information on menstruation. This paper examines the utility of many ICT's and other associated technologies that can foster adolescent well being during menstruation and also promote their health during this phase. This paper has highlighted some of these platforms like internet, social media networks, augmented reality, mobile applications, and gaming modules etc. that have a significant role in promoting adolescents' menstrual well-being.

Keyword: adolescents, menstrual health, menstruation, ICT, technology.

Introduction

The adolescence stage in a person's life is in essence a changeover from a childhood purity and unawareness into self-determination and societal approval (Judi et al., 2013). Adolescent for girls is different than boys due to different physiological and biological functions. Adolescence in girls is accompanied by menstruation which marks an important change in their lives. Menstruation is an important and vital natural function, which is masked in a custom of silence (Muralidharan, 2019). Information, feelings and the socio-cultural environment in which adolescent girls live have an effect on their access to the menstrual information and the support required (Muralidharan, 2019). Not only healthcare access, but information related to menstruation is essential for female adolescents to understand and

manage this phase. With the technological evolution over the past years, the embedment of ICT is becoming increasingly popular amongst adolescents. This is because adolescents adopt these technologies easily and use them more in comparison to other age groups (Giovanelli et al., 2020). In terms of promoting adolescents' menstrual health, role of ICT's can be vital to raise awareness and disseminate crucial information. WHO (World Health Organization) has been vocally advocating since 2005 that development of ICT related infrastructure is essential for providing health information to all the stakeholders (World Health Assembly, 2005). Many terms are used in exchange for ICT description such as e-Health, m-Health, telemedicine amongst others (Zonneveld et al., 2019). However, in this work ICT means the use of technologies that can raise awareness amongst adolescents concerning their menstrual health. The applicability of ICT particularly the tablets, laptops, smartphones etc. is quickly increasing (Zonneveld et al., 2019). The use of social media has also been increasing rapidly due to low internet costs and increasing market penetration. The employability of ICT is promoting adolescents' menstrual health in modern times is inevitable. In developed regions, more than 90% of adolescents have access to the internet at their school and/or residence (Dobbins et al., 2009). Moreover, they also perceive internet as their principal source for searching health related information (Borzekowski, 2001). Furthermore, majority of them own a mobile phone, and use messaging services (Marcus et al., 2006). For instance, the use of ICT in the form of mobile health applications can be an effective way to disseminate information to adolescents concerning their menstrual health. The use of smartphones has also been considered as a sophisticated technological means to disseminate health information amongst adolescents (Anderson et al., 2018). In some countries some adolescents have also advocated on the use of social media (applications and networks) such as Instagram, Facebook, Snapchat amongst others for obtaining information about reproductive health (Smaldone et al., 2015). In comparison to males, female adolescents are more comfortable in obtaining information about their reproductive health online (Anderson et al., 2018; Brayboy et al., 2018).

This paper is an important attempt to examine different ICT's in the modern times and the role of such technologies in promoting adolescent girls menstrual health. This paper starts with an introduction section which provides a brief overview of adolescents' menstrual health and ICT's. Introduction section is followed by a section on literature review which discusses different ICT's and their role in raising menstrual awareness amongst adolescents. Different ICT's such as internet, social media, mobile applications, augmented reality, etc. are

discussed. It is followed by a section on research methodology which discusses the techniques used for retrieving the relevant studies needed in this work and the results thereof. Lastly, discussions and conclusion are at the end of this study.

Literature Review

Adolescence phase is a changeover time from childhood virtuousness and unawareness into liberation and societal recognition (Judi et al., 2013). This phase is also considered as a departure from the parental control that can lead to ICT (information and communication technology) usage amongst adolescents as a likely source for their information and personal engagement (Monetti et al., 2011). The comprehension of adolescent girls concerning menstruation is typified by meagre facts and flawed beliefs about its process (Kumar & Srivastava, 2011; Dipali et al., 2009). Menstruation in India is accompanied by many social taboos and myths (Dasgupta & Sarkar, 2008; Omidvar & Begum, 2010). Although, adolescent girls have less knowledge about menstruation, but in recent times it has changed (Kumar & Srivastava, 2011). This change is largely due to the information and increasing awareness about the issue.

Role of ICT

The ICT in the contemporary times have proved of immense value and help across diverse human problems. ICT's are considered as essential part of adolescents' everyday life (Punamaki wet al., 2007). In order to overcome menstrual problems amongst girls, use of different interactive audio-video visual aids has been recommended by many researchers (Rastogi et al., 2019). They constantly use such technologies for information seeking and communication. Other scholars have advocated the use of ICT's like content-based videos, visual presentations involving the use of projection tools and some have promoted the use of teaching using web-platforms (Tuli et al., 2018). Some of the essential ICT's that can play a vital role in providing menstrual information to adolescents and promote menstrual well being amongst them are extensively discussed below.

Internet

Internet is one of the mostly used ICT tools amongst adolescents across the world for obtaining information related to their health. Internet allows adolescents to obtain information discretely about their health issues in contrast to the conventional means. Adolescents are increasingly relying on the Internet as a clandestine source for obtaining health information

(Guse et al., 2012). It can also help adolescent girls to gain access to information about their menstrual issues directly and conveniently. There are a number of misconception and myths related to menstruation amongst girls which acts as a hindrance in living a healthy life. Internet provides a wide range of information about the practices to be adopted during this phase for achieving both physical and mental well-being. Adolescent girls can connect directly to the government websites which provide information on such issues including the use of medicines, sanitary napkins and diet to be followed during this phase. In India, girls can directly contact NHM (National Health Mission) with their queries on menstruation by directly linking with their website (https://nhm.gov.in). Similarly, they can make use of the internet to connect with different NGO's (Myna Mahila Foundation) who provide support and counselling services (https://mynamahila.com) on menstruation. Internet sources like emails, blogs, forums, chats can serve as an excellent and interactive platform for disseminating information to the adolescent girls about their menstrual health. Experts can write periodical reviews or blogs on various websites about menstruation and safe practices to be adopted during this phase. They can mostly try to target those websites which are frequented by female adolescents for maximum coverage and desired results in terms of promoting their menstrual health. Internet can also be directly used by the government and other agencies to reach all the stakeholders in the community through mobile internet conveniently. Mobile based applications are extremely popular in adolescents and thus, can serve as an important gateway to connect with adolescent girls. Saathiya is one such Android application developed in Hindi language in India that seeks to educate adolescent trainers on various health issues (Press Information Bureau, 2017). Government can also launch various mobile-based applications which chat features which can be used by adolescent girls to obtain information on menstruation.

Media

The digital media existing in current times is an excellent means to create public awareness, interact with people and cooperate on different issues (Rahman et al., 2018). The media is also one of the accepted and economical wellbeing support tool in the community (Wakefield et al., 2010). Even, in the developing nations, media has proved to be of paramount and a suitable medium for increasing understanding within the female population (Rahman et al., 2018). Media can help build awareness, provide education on sanitation, and support to the stakeholders. Traditional channels of media could also be exploited as a convenient medium to deliver the messages in contrast to the non-conventional medium. Females in urban

societies are less conservative than their counterparts from rural areas and hence, media can be used to deliver the information on menstrual health to the urban female folk. However, the same message may not be accepted by the rural female folk due to the taboos associated with menstruation in their environment (Rahman et al., 2018). Thus, educating rural adolescents is a challenge which can be addressed using different media channels like newspapers (local dailies), radio, television etc. Rural adolescents can also be targeted using technology at schools, via video content and toll-free services. The use of messages and content broadcasted through movies and television programs can also be employed for targeting adolescent girls about their menstrual hygiene. Bollywood is extremely popular amongst Indian adolescents and is an excellent source for providing information to adolescent girls and community in general in relation to the menstrual issues. Bollywood industry and some of the celebrities associated with it have been advocating and promoting adolescent menstrual health through their content in the recent times. For instance, the story of Arunachalam Muruganantham's (popularly called as the 'Pad Man of India') journey covered in a Bollywood movie (BBC News, 2018). Such initiatives are essential in expanding the awareness and bring acceptability on menstrual issues in the society. However, more efforts are needed to actively promote menstrual health amongst adolescents through the use of ICT's in varied forms of the media. The digital media in contemporary times can also prove to be an effective way to achieve the desired results in the form of storytelling, small videos, celebrity (movie stars and sports stars) endorsements etc.

Social media

The use of social media has grown rapidly across all segments of the population, but they are mostly popular amongst adolescents. Social media networks provide a lot of opportunities to provide healthcare information to adolescents and at the same time engage those (Wong et al., 2014). Social media allows adolescents to interact amongst them and allows them to seek and share information. Such platforms are also used by adolescents for seeking menstrual health information. In developing regions, social media can become an excellent platform for girls for seeking menstrual health knowledge. They can obtain menstrual information not only from experts, but also from their peers. Various platforms like Facebook, internet forums, online blogs, micro-blogs like Twitter, multi-media sharing applications (e.g, Instagram and YouTube), crowd-sourcing applications (Wikipedia), podcasts and even virtual games can be become excellent digital conduits for disseminating menstrual health information to adolescent girls discretely and economically. Various government agencies

(e.g NHM in India) can create their official pages on Facebook and Instagram and regularly update such pages with information on menstruation. Adolescent girls would find easy and convenient to gain knowledge on menstrual health on such social networks as they spend a considerable amount of time on them. Youtube is another excellent video-sharing social network which is extremely popular amongst adolescents. Video content on menstrual health can be posted regularly on various health channels on Youtube that can be viewed by adolescent girls.

Digital games and toys

In recent times, there has been an increasing focus on menstrual wellbeing, cleanliness, learning and tracking through different modes involving ICT's. Various online games have been devised that actively interact with girls and provide information on menstrual health in an entertaining manner. These games have become excellent and innovative tools to promote menstrual health amongst adolescent groups as online games are quite popular in such groups. Similarly, various digital toys that involve educators, adolescents and parents with respect to the imparting of menstrual education have been promoted in recent times (Tran & Choi, 2018). Menstrual Maze is one such digital game that has been developed and has been helpful in promoting adolescents' menstrual well-being (Tran & Choi, 2018).

AR (Augmented Reality) and tracking devices

Augmented reality can be illustrated as an interactive experience of actual environment in which actual entities present in real world are augmented by computer-aided perceptual information. This technology has been very useful in connecting with adolescents and providing useful information on menstruation in an engaging manner. Technology design for women's health, in particular, has recently received attention. Augmented Reality has also been used to deliver information and pelvic fitness (Almeida et al., 2014). Moreover, the use of tracking devices has also been used to monitor menstrual behaviour amongst adolescents (Epstein et al., 2017). This allows collecting important data on menstruation which can be used to deliver important information on menstrual health to adolescents. Various tracking projects, for instance, Ambient Cycle (Homewood, 2018) and Crimson Wave (Flemings et al., 2018) use innovative ways track menstrual data with the help of smart mirrors (luminous and colour producing devices) which leads to initiation of discussion on this topic.

Indian context

In India, menstruation amongst adolescent girls occurs at a younger age (Dambhare et al., 2012; Anjenaya et al., 2009) particularly amongst urban adolescent girls (Dambhare et al., 2012). Menstruation in India has long been considered as a conversational taboo which has resulted in scarce propagation of menstrual education (Tuli et al., 2018). Even, the Indian education system offers inadequate menstrual health information in its curriculum (Times of India, 2015). This limited information on an important health topic can affect the adolescent girls' health, well-being and overall development. To address such issues concerning the adolescent girls' health, various initiatives have been undertaken by the GOI (Government of India) which focus on educating the target population and raising awareness with required support (Ministry of Drinking Water and Sanitation, 2015). The use of ICT's across multiple platforms has been greatly advocated by the GOI to address such issues and promote adolescents' menstrual well-being. Apart from government, different NGO's (non-governmental organizations) such as Vikalp Design (Vikalpdesign, 2017), Sachhi Saheli (CSR Resources, 2013) and Tarshi (Tarshi, 2017) have been actively creating educational content using ICT's, and also frequently raising awareness through their operations. Even brands associated with selling menstrual sanitation goods have made use of the ICT's in launching their online campaigns (Stayfree and Whisper campaign) (Campaigns of The World, 2015; CSR Resources, 2013).

In India, NRHM (National Rural Health Mission) has also advocated the use of ICT platforms to target adolescent girls in order to promote their menstrual health, especially in the rural areas. This programme was started with a focus on communication strategies at both state as well as country level. This communication approach aims to induce behavioural changes amongst adolescent girls in relation to their menstruation hygiene practices. This programme promotes the use of flipcharts and leaflets for distributing menstrual health information to adolescent girls. Another essential example is the utilization of PDA (Personal Digital Assistants) by the government in a pilot project involving NRHM (National Rural Health Mission). This allows collecting important health information from the subjects, in rural areas where there is restricted internet connectivity. This can also allow collecting important data regarding adolescents' menstrual health in electronic form. The collected data can be used to create a database pertaining to information and facts on adolescent's menstruation.

Menstrupedia

It is one of the ICT tools used in the Indian context to raise awareness amongst girls with respect to their menstrual health (Tuli et al., 2018). It has been described as a digital platform to impart information about menstruation (Tuli et al., 2018). This platform provides information on menstruation through a web-platform, comic, a channel on YouTube and a page on Facebook page. The web-platform provides a speedy channel to menstruation, including a blog, and Q&A (Questions and Answers) discussion forum. Menstrupedia has been devised with the intent of supporting women in overseeing their menstrual wellbeing. This platform has also reached approximately hundreds of schools, various NGOs, and thousands of girls in India (Menstrupedia, 2017). This virtual platform delivers support and information in both online (web-platform) and offline modes (comic). As per one report prepared by the 'Internet and Mobile Association of India' females only account for 30 percent of the total population in India (Internet and Mobile Association of India (IAMAI), 2018). In order to provide information about menstrual health to girls without internet access, Menstrupedia developed its conventional platform in the form of comic as such as large group cannot remain unaware and bereft of knowledge on menstruation issues (Tuli et al., 2018). The offline information is accessible in different languages like Hindi and English and also nine local languages of India. Menstrupedia provides vital menstrual information (different colours of menstrual blood, information on vaginal discharge, PMS, nutritional habits, and much more). Designers of this platform have also tried to focus on generating empathy amongst males as well (Sputniko!, 2010). This platform also provides a space for Q&A (questions and answers) session which presents an important opportunity for user involvement where they can ask questions about menstrual health.

Methodology

The current research work considered the studies relating to the subject of concern from well renowned journals (Emerald, Elsevier, Wiley, Sage, Springer, Taylor & Francis etc) and databases like Google scholar, EBSCO, J-store, Scopus (Elsevier) and Clavariate's Web of Science. The topic under study was searched in May, 2021 and the papers were considered which were published from 2000 to 2021. However, most of the research on the topic of interest was published between 2010 and 2021. The studies were identified in the databases with keywords like 'adolescent menstrual health', 'adolescent menstruation practices' and "ICT and adolescent menstrual health'.

Gough et al. (2017) four step methodology (identification, screening, qualification, and lastly, the adoption) was applied in this work for reviewing the literature. These are demonstrated as:

i.   **Identification phase**: During the first stage of this process, search was carried out in the above mentioned sources and in total 1973 articles (full-access) was discovered.

ii. **Screening phase**: During the second phase, all the manuscripts were separated into three groups ('adolescent menstrual health', 'adolescent menstruation practices' and "ICT and adolescent menstrual health'). The manuscripts which didn't contain any of the keywords in their abstracts were removed from the consequent screening process. Following this, introduction section, conclusion segment and abstracts were checked for the content required in this work (ICT and adolescent menstrual health). During this step, 1328 papers were excluded as they didn't fit the required criterion.

iii. **Eligibility phase**: During the eligibility step, after further analysis of the keywords as well as the abstract sections of the papers, 59 full-text research papers were eligible and further, 567 papers were excluded from the list.

iv. **Inclusion phase**: During the final stage, 19 full-text manuscripts in English were ultimately selected for the complete research analysis.

Inclusion and elimination criterion

The following research articles were considered

1) Peer-reviewed manuscripts from well-reputed journals which were available in English only.

2) The focus of the search was on manuscripts which included the role of information and communication technologies including associated technologies or platforms in promoting the adolescents' menstrual health. Those research papers were also considered which include role of contemporary technologies in disseminating information on menstrual hygiene to the adolescent girls.

3) The papers considered in this study were published between 2000 and 2021. During this time, a substantial research has been conducted in promoting adolescents' menstrual health and the role of information technology concerning the same.

Some research papers which were not considered for the study had the following criterion:

1) The research manuscripts that didn't include the keywords of particular interest in this study, and

2) Journal editorials, journal's editorial reports, data sheets, journal' editorial letters, debates and reviews on books (online and offline) were excluded from the study.

Ethical concern

Throughout the systematic review of the studies, it was ensured that the precision and neutrality of the accessible scholarly facts and exactness of the study references. The superfluous or imitation research publications, non-evident findings and any kind of plagiarism were completely avoided (Wager & Wiffen, 2011). The ensuing steps describe this as:

(a) Research manuscripts were searched in Emerald journals, Elsevier (sciencedirect.com), Wiley journals, Sage journals, Springer journals, Taylor & Francis journals and also databases like Google scholar, EBSCO, J-store, Scopus and Clavariate (Web of Science). These resources (journals and databases) were formally accessed from the University of Kashmir, where they are available.

 (b) Only original manuscripts in English with full access were reviewed for the research objectives in perspective, and

(c) Only those manuscripts were considered for this work which had ethical consent, informed approval, and mention of 'no conflict of interest'.

Results

A systematic review of the studies showed that research on promotion of adolescents' menstrual health through ICT between 2000 and 2021. Numerous studies have been conducting on adolescents' menstrual health. However, research studies on the role of ICT in promoting adolescents' menstrual health are rare. In the early 2000's studies on adolescents' menstrual health and raising awareness amongst them concerning the same started to develop in the literature. However, since 2010, studies on the role of ICT in promoting adolescents' menstrual well-being began to emerge in the literature as well. There have been some attempts by researchers in conducting such studies especially in the last few years. Such studies spanned across multiple disciplines, for instance, in psychology, medical studies, medicine and interdisciplinary. However, the studies concerning the role of ICT in improving adolescents' health remain limited in the academic literature (Pinto et al., 2017). Such studies

are important to conduct, particularly in a developing country like India wherein menstruation is surrounded by many social taboos and myths.

Discussions

Maintaining menstrual hygiene is important for young adolescent girls for their overall development and well-being. In developed regions, a lot of effort has already been made to improve their health by raising awareness and providing timely information. The governments in western countries have considerably improved the reproductive and menstrual health of adolescent girls. This has been made possible by significant investments in ICT's over a period of time to raise awareness and promote menstrual health amongst adolescents. However, in the developing regions, menstrual hygiene amongst adolescent girls is an area of concern. There are a lot of challenges that still need to be addressed in terms of building awareness and capacity building in order to promote adolescent girls menstrual well-being. In this scenario, the role of ICT's can be of utmost importance. The use of internet, digital platforms, social networks and other media can go a long way in resolving the menstrual issues of adolescent girls. Government should make substantial investments in such technological platforms to raise awareness and build capacities for improving the hygiene practices of adolescent girls during menstruation phase. They can use ICT's to connect these girls to different experts discretely and economically. ICT's can also be use to transmit information to the community and other relevant stakeholders like schools, parents and NGO's in order to help adolescent girls during menstruation. ICT's also allow girls to discuss their menstrual issues and problems in private with their peers or experts.

Conclusion

The use of different health technologies involving the use of ICT's has been quite instrumental in delivering the required information to the different stakeholders. This is because such technologies are convenient to use and involve the adolescents. The applications of such technologies has picked up pace in last two decades, especially in disseminating health information. These technologies have also been effectively used to raise attentiveness concerning menstruation amongst adolescents and encouraging menstrual healthiness. ICT's have been popular amongst the adolescents because of their discrete nature which allows them to procure information on such a sensitive issue. In India, their use becomes more paramount due to the social myths associated with menstruation. Thus, there is an incredible scope in India for leveraging such technologies in promoting adolescent girls'

menstrual health. Such technologies can also help achieve behavioural intercession in adolescents required for achieving the desired results. However, more studies need to be conducted in the future to discover the role of different technologies in achieving the objective of promotion of adolescents' menstrual well-being. Future scholars can also discover the possible role of other ICT's which have not been utilized with respect to the current topic of interest. Future works can also search other databases (e.g, medicine, physiology etc.) to discover other ICT's that can possibly help in promoting adolescent's health during menstruation.

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