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Adolescent demand for contraception and family planning services in low- and middle-income countries: A systematic review

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ABSTRACT

An estimated 23 million adolescent girls age 15–19 in low- and middle-income countries (LMICs) have an unmet need for contraception. Despite the recognised importance of expanding access to appropriate methods of contraceptives for adolescents in LMICs, the evidence base on their total demand for contraception is limited, and there is no consensus on how to measure this important phenomenon. The aim of this study was to review the published literature in order to better understand the level of adolescent demand for contraception in LMICs and to explore what demand-related indicators are being measured. A total of 1375 articles were identified and 18 met the inclusion criteria. Included studies reported findings from 29 LMICs, revealing high adolescent demand for contraception. The demand for contraception among adolescents and young women ranged from 22% among married adolescents in Azerbaijan to 98% in Peru. However, measures of this phenomenon were limited, with most studies only reporting current contraceptive use or unmet need. Most studies relied on cross-sectional data, and young, unmarried, and male adolescents were largely excluded. We make several recommendations for alternative approaches for a more comprehensive understanding of adolescent demand for contraception in LMICs.

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KEYWORDS

Adolescents; contraception; family planning; low- and middle-income countries

Background

With the growing recognition globally of the importance of investing in adolescents, there is also a stronger consensus and better understanding of how to best meet the needs and aspirations of young people (Chandra-Mouli, Lane, & Wong, 2015; Chandra-Mouli, Svanemyr, et al., 2015; Patton et al., 2016; UNFPA, 2014). Notably, the 2016 Lancet commission on adolescent health and wellbeing emphasises the high benefits-to-cost ratio of investing in adolescent health (Patton et al., 2016), and the Sustainable Development Goals (SDGs) acknowledge adolescents as a previously neglected group whose needs must be addressed in order to achieve sustainable development (United Nations General Assembly, 2017).

Sexual and reproductive health (SRH) accounts for a considerable proportion of the burden of disease among adolescents, particularly in low- and middle-income countries (LMICs) (Fatusi, 2016; Mokdad et al., 2016; Patton et al., 2016). Accordingly, over the past decades, there has been significant investment in designing and implementing adolescent sexual and reproductive health (ASRH) programmes, including efforts to promote access to appropriate methods of contraception (Bearinger, Sieving, Ferguson, & Sharma, 2007; Fatusi, 2016). Yet, an estimated 23 million

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adolescents age 15–19 have an unmet need for contraceptives (Darroch, Woog, Bankole, & Ashford, 2016; MacQuarrie, 2014), resulting in unintended pregnancy, unsafe abortion, and sexually transmitted infections, as well as other consequences such as dropping out of school, poverty, and intimate partner violence (UNFPA, 2013). Using contraceptives has many benefits beyond improving SRH; access to contraceptives for adolescents has been shown to promote autonomy and decision-making abilities, improve partner communication, and empower young women to lead healthy and productive lives (UNFPA, 2013).

Providing appropriate contraceptive methods to adolescents requires reducing both demand and supply-side barriers to service utilisation (Ensor & Cooper, 2004). Demand-side factors include a desire to use contraceptive methods to limit or space pregnancies and the autonomy to access and use appropriate contraceptive methods (ICRW 2014). The availability of adolescent-friendly services, defined by the World Health Organization (WHO) as accessible, acceptable, equitable, appropriate, and effective, are indeed necessary to change contraceptive behaviour, and can even increase demand for contraception (Darroch et al., 2016; World Health Organization, 2012). However, the existence of adolescent-friendly services is not sufficient should demand-side barriers persist. Further, understanding and reducing demand-side barriers, such as stigma surrounding adolescent sexuality, misconceptions of family planning, and limited decision-making power, may inform how services can best respond to adolescents' contraceptive needs (ICRW, 2014). Despite the importance of demand-side factors, existing research and ASRH programming focuses largely on the provision of adolescent-friendly services, and often misses the crucial step of understanding and addressing adolescent demand for contraception (Chandra-Mouli, Lane, et al., 2015; ICRW, 2014).

What constitutes demand for contraception is debated and complex, yet its definition and computation influences family planning programmes as well as research and development of contraceptive technologies (Harrison & Rosenfield, 1996; ICRW, 2014). The calculation of total demand as *current use + unmet need* is typically used in household surveys, including the Demographic and Health Surveys (DHS) (Bongaarts, 2014). However, this measure is largely related to access, and may overlook the unique demand-side factors that influence adolescents' decisions whether or not and when to use a contraceptive method (Darroch et al., 2016; ICRW, 2014). Furthermore, adolescents are not typically directly interviewed as part of household surveys, and fewer studies have looked specifically at adolescents, resulting in a weaker evidence base for their demand for contraception as compared to older women of reproductive age (Darroch et al., 2016; ICRW, 2014).

While there have been several syntheses of adolescent contraceptive use-related indicators from DHS data, as well as reviews of qualitative literature on barriers to adolescent use of contraception (Gottschalk & Ortayli, 2014; Williamson, 2009), there has not been a comprehensive summary of published literature on adolescent demand for contraception in LMICs. This systematic review aims to fill this gap in the literature by examining the level of adolescent demand for contraception in LMICs. Through an analysis of how demand for contraception has been conceptualised and operationalised, we explore what demand-related indicators are being measured, assess the level of demand based on these indicators, and discuss how future quantitative research may better capture the unique components of adolescent demand for contraception and family planning services.

Methods

Inclusion criteria and search terms

To assess adolescent demand for contraception in LMICs, we undertook a search of journal databases for recently published peer-reviewed articles, following the PRISMA standards (Liberati et al., 2009). Table 1 presents the inclusion and exclusion criteria used to determine whether or not each specific study was considered for review. We included studies published for the period

Table 1. Inclusion and exclusion criteria.

	Inclusion	Exclusion
Type of publication	Original, peer-reviewed research	Non peer-reviewed, programmatic report, or gray literature
Time period	Published between 1 January 2005 and 30 June 2017	Published before 2005
Language	Article published/available in English	Article is not available in English
Population	Intervention or research targeted to adolescents, age 10–19, or youth, age 15–24	Intervention or research is not specifically targeted to adolescents or youth
Geographic focus	Low or middle-income country, as classified by the World Bank	High income country, as classified by the World Bank
Research aim/objective	One of the primary aims or objectives is related to demand for contraception or FP services, including need, preferences, or choice of contraceptive methods.	The aims or objectives is related to supply of contraception or FP services, or supply/demand of other sexual and reproductive health services.
Methods	Study employed a quantitative assessment of demand for contraception or FP services.	Study employed a non-quantitative research method.
Findings	Study has a clear description of research findings in line with study aim/objective related to demand for contraception or FP services.	No description of findings, or the findings are unrelated to the original aim/objective of the study.

January 2005 to June 2017 (inclusive), as 2005 marks an increased focus globally on demand for contraception with the addition of the Millennium Development Goal (MDG) indicator on unmet need for family planning (Alkema, Kantorova, Menozzi, & Biddlecom, 2013). While we were primarily interested in adolescents, defined as ages 10–19 (World Health Organization, 2014), we also included studies that focused on young people, defined as ages 10–24, or youth, defined as ages 15–24 (United Nations Educational, Scientific, and Cultural Organization, 2017). Studies were included if they took place in LMIC settings, as defined by the World Bank income classification (The World Bank, 2017).

Only studies that employed a quantitative research design and corresponding analysis were included. For the outcome of interest, we applied the constructs of demand for contraception and family planning described by Harrison and Rosenfield (1996). While what constitutes demand is contested, the authors posit that most agree it includes needs and wants, which may also be termed as preferences or choices. To be included in our review, authors had to explicitly state that they were measuring adolescent demand, preference, or choice for contraception or family family planning. Studies that measured contraceptive prevalence or unmet need were excluded if they had no other demand-related outcome indicators.

Information sources and search strategy

We searched POPLINE, PubMed, Embase, and Scopus in July 2017 with the search terminology presented in Table 2. We also conducted hand searches of relevant journals and employed a ‘snowball’ sampling approach by searching reference lists of identified articles. Full search terms and results for all databases are presented in Annex 1.

Table 2. Search terms.

Adolescent terms
‘Adolescent*’ OR ‘Adolescence’ OR ‘Young people’ OR ‘Young adult*’ OR ‘Young woman’ OR ‘Young women’ OR ‘Young man’ OR ‘Young men’
LMIC setting terms
‘Developing countr*’ OR ‘Middle-income countr*’ OR ‘Low-income countr*’ OR ‘Lower-middle-income countr*’ OR ‘Upper-middle-income countr*’ OR ‘Global South’
Contraceptive terms
‘Family planning service*’ OR ‘Family planning’ OR ‘Contraception’ OR ‘Contraceptive*’ OR ‘Contraceptive Device*’ OR ‘Contraception behavior’ OR ‘Birth control’ OR ‘birth spacing’ OR ‘birth limiting’ OR ‘fertility control’
Demand terms
‘Demand’ OR ‘Need’ OR ‘Unmet need’ OR ‘Preference*’ OR ‘Choice’ OR ‘Choice’ OR ‘Uptake’ OR ‘Use’ OR ‘Usage’ OR ‘Non-use’ OR ‘Utilization’ OR ‘Continuation’ OR ‘Discontinuation’ OR ‘Decision making’ OR ‘Decision-making’

Study selection

Eligibility assessment was performed independently in a blinded standardised manner by two reviewers. Disagreements between reviewers were resolved after each round of screening by comparing reasons for exclusion and, after discussion, agreeing on whether to include or exclude the article in question. The first round of screening was done by article title and abstract, with reviewers excluding articles if they were clearly not about contraception or conducted in a high-income country setting. The second round of screening reviewed the full texts of studies, and excluded those that were not focused on adolescents or the outcome of interest. The third and final round of screening involved an in-depth reading of articles to ensure they truly fulfilled each inclusion criterion, in particular whether or not they measured or assessed demand for contraception or family planning services.

Additional analyses

In order to assess study quality, we drew from the Critical Appraisal Skills Programme (CASP) Checklist (Critical Appraisal Skills Programme, 2017) and adapted criteria based on approaches from published literature on similar systematic reviews, such as those employed by Williamson (2009). Table 3 presents a summary of quality assessment criteria. Each item was scored on a binary scale, with 1 indicating a study met the criteria and 0 that it did not. The total for each study was summed to yield a cumulative quality score ranging from 0 to 10. A study was considered high quality if it scored 8 or higher, medium quality if it scored between 5 and 7, and low quality if it scored lower than 5.

Results

The search of POPLINE, PubMed, Embase, and Scopus provided a total of 1344 citations, and hand searches provided an additional 31 citations, for a total of 1375 articles. After adjusting for duplicates, 1004 articles remained. Of these, 768 were excluded by title or abstract alone. The full text from the remaining 236 articles was reviewed and 198 articles were excluded for the following reasons: 52 were not targeted to adolescents; five were not conducted in LMICs; 33 were not about contraception; 101 were about contraception but did not measure or assess predefined components of demand; and seven were not original research or did not provide details of research methodology and/or findings. The full text of the remaining 38 citations was examined in more detail to decide whether or not the outcome of interest – demand for contraception or family planning services – was truly measured or assessed using quantitative methods. As a result of a more in-depth analysis, 20 additional articles were excluded, leaving 18 studies for the final analysis (see Figure 1).

Table 3. Quality assessment criteria.

Study aim or objective	Clear statement of the aim(s) or objective(s) of the study/intervention.
Definition of demand	Demand for contraceptives or family planning services is well defined and conceptualised, with a discussion or justification of how the study or interventions measure of demand.
Research design	Appropriate research design for the aim(s) of the study with justification.
Sampling/recruitment	Clear description of the recruitment strategy and justification for its appropriateness for the aim(s) of the study.
Data collection	Data collection methods were described and addressed the aim(s) of the study.
Methodology	Consideration of how tools and methodology is appropriate for use with an adolescent population.
Data analysis and interpretation	Clear description of the data analysis method and discussion of the research findings, with sufficient original data to support the findings.
Ethical considerations	Study considers ethical issues, including informed consent.
Cultural appropriateness	Study considers cultural context and reflects local understandings of adolescent needs and priorities.
Reliability	Evidence that reliability has been considered with measures providing a consistent, coherent, and trustworthy basis for drawing conclusions.

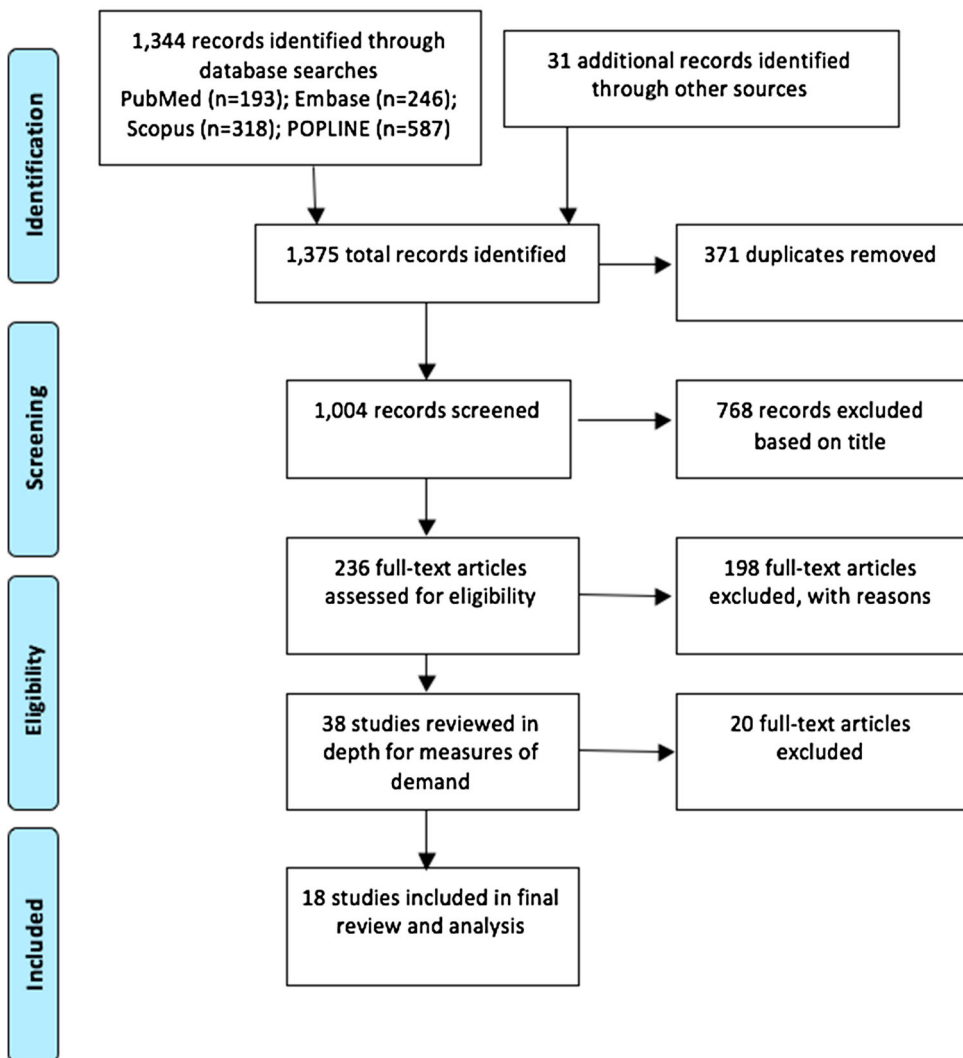


Figure 1. PRISMA flow diagram.

Study characteristics

The characteristics of the 18 included articles are shown in [Table 4](#). Of the final articles, findings were reported on from a total of 29 LMICs. Seven studies were from sub-Saharan Africa, four were from South Asia, and one each was from Latin America and the Caribbean, East Asia, and Europe/Central Asia. Two studies examined LMICs in general, one included six African countries, and one included 11 LMICs in East Asia and the Pacific. No studies were conducted in humanitarian settings.

The vast majority of studies ($n = 16$) included females only and no studies included males only. Six included only married adolescents, and three included only students. Two studies were targeted to specific at-risk populations (commercial sex workers and abortion clients). Ages ranged from 10 to 24 years, with different classifications of adolescents, youth, and young people that were not necessarily in line with standard age ranges of these categories (WHO, 2017). Nine studies included participants up to age 24 and four included young adolescents, defined as age 10–14 (World Health

Table 4. Summary of included studies.

Author(s)	Objective	Country(ies)	Age range	Sample characteristics	Methods	Findings	Study quality*
Abdul-Rahman, Marrone, and Johansson (2011)	To examine changes in contraceptive use	Ghana	15–19	Sexually active females	Secondary analysis of DHS data ($n = 360$)	Ever-use and current use of modern methods increased from 2003 to 2008.	Low
Babalola, Folda, and Babayaro (2008)	To assess effects of a communication campaign to encourage young people to use modern FP methods to avoid unwanted pregnancies	Nigeria	15–24	Sexually experienced females	Cross-sectional survey ($n = 819$)	Higher FP ideation associated with higher socioeconomic status, older age, secondary education and campaign exposure.	Medium
Chandra-Mouli, McCarraher, Phillips, Williamson, and Hainsworth (2014)	To present information on sexual activity and unmet need for contraception, barriers to access and use, and interventions that have successfully overcome barriers	16 LMICs	15–19	Females	Secondary analysis of DHS data	Current use and unmet need generally higher among unmarried women than married women in LMICs.	Medium
Dilbaz et al. (2008)	To identify differences, if any, in contraceptive choices of married adolescents attending a FP clinic from those of women of reproductive age and perimenopausal women	Turkey	<18	Married females	Review of hospital records ($n = 98$)	Absence of contraception most frequent in adolescent age group; distribution of methods used (IUD being most common method) similar across 3 age groups.	Medium
Islam, Mostofa, and Islam (2016)	To explore factors associated with unmet need for contraception	Bangladesh	<25	Married fecund females	Secondary analysis of DHS data ($n = 4982$)	Unmet need among females under 25 is higher than national level. Higher unmet need associated with younger age, illiteracy, younger age at first birth, rural, poorest wealth quintile	Medium
Iyoke et al. (2014)	To describe methods preferred for contraception, evaluate preferences and adherence to modern methods, and determine factors associated with contraceptive choices	Nigeria	N/A; mean age 22.5	Unmarried male and female tertiary students	Cross-sectional survey ($n = 313$)	Adherence to modern methods was low among both males and females, with a preference for traditional methods among females. Receiving information from Lowhealth personnel and a health science-related course of study increased likelihood of adherence to modern methods.	High
Jansen (2005)	To identify extent of demand for birth spacing, according to age and parity, among married women of reproductive age in developing countries	LMICs	10–24	Females of reproductive age; stratified by 10–14, 15–19, 20–24	Secondary analysis of DHS data	Use of contraception at zero parity ranges from 0.8% in Egypt to 38.2% in Ghana. Demand for birth spacing is most prevalent reason for an interest in family planning among 15–19 year olds.	Low
Jejeebhoy, Santhya, and Zavier (2014)	To assess demand for contraception to delay first pregnancy; extent to which this demand was satisfied; and explore factors likely to enable young women to satisfy demand	India	15–24	Females married for five or fewer years	Cross-sectional survey ($n = 9572$)	Higher demand among those who married later, were better educated and had decision-making agency. Higher use among those who married later, received SRH education, discussed growing up with parents, and had decision-making agency.	High

Jemmott et al. (2007)	To identify modifiable determinants of the intention to use condoms	South Africa	10–16	Male and female 6th grade students	Cross-sectional survey (<i>n</i> = 390)	Intention to use condoms was predicted by attitudes and perceived behavioural control, but not by subjective norms.	Medium
Kennedy, Gray, Azzopardi, and Creati (2011)	To determine what info. regarding adolescent fertility and FP is available for LMICs in East Asia and the Pacific and summarise key findings	11 LMICs in East Asia and the Pacific	15–19	Married females	Secondary analysis of DHS data	Significant proportion of women commence sexual activity and childbearing during adolescence, yet limited data for unmarried adolescents.	Medium
Lim et al. (2015)	To determine SRH needs of highly disadvantaged groups	China	15–20	Female CSWs	Cross-sectional survey (<i>n</i> = 310)	Unmet need was associated with having a current non-paying partner, regular alcohol use and poor SRH knowledge.	High
Meuwissen, Gorter, Segura, Kester, and Knottnerus (2006)	To identify the nature of existing, but largely unmet, needs for SRH care	Nicaragua	11–20	Females	Review of medical records (<i>n</i> = 3301)	Contraceptive use doubled among voucher redeemers but high discontinuation rates and method dissatisfaction was observed. Consultation with a female doctor under age 36 was associated with a higher chance of having contraceptives prescribed.	High
Michaels-Igbokwe et al. (2015)	To quantify the impact of service provider characteristics on young people's choice of FP service provider in order to identify strategies for increasing access and uptake of FP among youth	Malawi	15–24	Males and females	Cross-sectional survey (<i>n</i> = 540)	Young people were twice as likely to choose a friendly provider and more than 2–3 times more likely to choose a provider with adequate supply of commodities.	High
Prata, Weidert, and Sreenivas (2013)	To describe trends in youth fertility and childbearing, unmet need for FP options, and contraceptive prevalence among youth in SSA	6 African countries	15–24	Females	Secondary analysis of DHS data	Unmet need closely mirrors percentages of unwanted pregnancies.	High
Sengupta and Das (2012)	To examine unmet need and differentials in the practice of various methods; study reasons and differentials of unmet need; find out factors influencing unmet need for both spacing and limiting	India	15–24	Married females	Cross-sectional survey (<i>n</i> = 56,895)	Unmet need was associated with age, education level, number of sons ever born, child loss, religion and visits by community health workers.	Low
Worku, Tessema, Zeleke, and Räisänen (2015)	Analyze the trends and determinants in modern contraceptive use over time	Ethiopia	15–24	Married females	Secondary analysis of DHS data	Contraceptive prevalence increased from 2000 to 2005 to 2011, as did family size concordance and women wanting their next pregnancy later.	Medium
Yeboah and Appai (2015)	To explore sexual behavior in relation to knowledge about STIs and modern contraceptives, and determine whether knowledge of STIs affect the choice of modern contraceptives	Ghana	N/A	Female senior high school students	Cross-sectional survey (<i>n</i> = 180)	Statistically significant difference between preferred and used method, and between motivation and method use.	Low
Zavier and Jejeebhoy (2012)	To better understand the contraceptive practices of young abortion-seekers.	India	15–24	Female abortion clients	Cross-sectional survey (<i>n</i> = 795); IDIs (<i>n</i> = 26)	Married women more likely to intend to use contraception. Condom most common method at first and last sex.	High

*See Table 6.

Organization, 2017). Two studies did not specify an age group, but were targeted to students in secondary or tertiary school.

Eight studies employed cross-sectional surveys and seven conducted secondary analyses of DHS data. Two studies obtained data through a review of medical files and one used mixed-methods (cross-sectional survey and in-depth interviews).

Key outcome measures

The included studies reported on several different outcome measures of demand for contraception or family planning (see Table 5). The most common measures were current use of contraception and unmet need for family planning, defined as the percentage of sexually active respondents who do not wish to become pregnant yet are not currently using a method of contraception. Only two studies calculated total demand for contraception (Islam et al., 2016; Jejeebhoy et al., 2014), defined as current use plus unmet need. Several reported on ever use of contraception (Abdul-Rahman et al., 2011; Kennedy et al., 2011; Yeboah & Appai, 2015; Zavier & Jejeebhoy, 2012), two reported on intention to use contraception (Abdul-Rahman et al., 2011; Zavier & Jejeebhoy, 2012) and one reported contraceptive method adherence and preference (Iyoke et al., 2014).

Only two studies (Babalola et al., 2008; Meuwissen et al., 2006) employed measures of demand for contraception other than use or unmet need. The study in Nicaragua (Meuwissen et al., 2006) assessed demand by reporting the percentage of vouchers exchanged for contraception, as well as reporting the percentage of clients at service facilities that were currently using or requested to use a modern method of contraception. Babalola et al. (2008) measured contraceptive ideation in Nigeria using various attitudinal variables, such as: approval of contraceptive use for spacing pregnancies; approval of contraceptive use for limiting pregnancies; agreement that modern methods of contraception are safe and effective; and encouragement for a peer to use a modern method of contraception.

Findings on demand for contraception

Table 5 presents overall trends from studies that reported key outcome indicators for use, unmet need and/or total demand for contraception or family planning. The results reveal a generally high demand for contraception among adolescents and young women. Current use of modern methods of contraception ranged from 2.7% in Tuvalu (2007) (Kennedy et al., 2011) and 6% in Azerbaijan (2006) (Chandra-Mouli et al., 2014) to 64% among married women and 67% among unmarried women in Peru (2012) (Chandra-Mouli et al., 2014). Unmet need ranged from 7% in Egypt (2008) and 8% in Jordan (2009) to 64% in Zimbabwe (2010–11) and 67% in Haiti (2012) (Chandra-Mouli et al., 2014). Using the calculation employed by DHS, total demand for contraception (*current use + unmet need*) ranged from 22% among married adolescents in Azerbaijan (2006) to 95% among unmarried adolescents in Haiti (2012) and Ghana (2008) and 98% in Peru (2012) (Chandra-Mouli et al., 2014). In all seven countries with available data, demand for contraception is higher among unmarried adolescents than among married adolescents (Chandra-Mouli et al., 2014).

Alternative measures of demand in Nicaragua found that 34% of reproductive health vouchers were used for contraception and 62% of non-pregnant sexually active clients were currently using or requested to use a modern method of contraception (Meuwissen et al., 2006). In Nigeria, 56% of adolescents approved of using contraception for spacing pregnancies and 19.2% reported having encouraged someone to use a modern method of contraception (Babalola et al., 2008).

Additional reported indicators

Included studies often reported additional indicators, including fertility desires, defined as the percentage of women who wish to become pregnant in the next two years, to delay pregnancy by two or

Table 5. Summary of key reported findings.

Country	Year	Current use	Unmet need	Total demand	Ever use	Intention to use	Reference
<i>East Asia and Pacific</i>							
Cambodia	2005	13.7*	–	–	–	–	(Kennedy et al., 2011)
	2010	27	16	43	–	–	(Chandra-Mouli et al., 2014)
China	2012	43	35	78	99	–	(Lim et al., 2015)
Indonesia	2007	46.2*	–	–	–	–	(Kennedy et al., 2011)
Marshall Is.	2007	23.7*	–	–	–	–	(Kennedy et al., 2011)
Philippines	2003	13.2*	–	–	–	–	(Kennedy et al., 2011)
Samoa	2009	8.1*	–	–	–	–	(Kennedy et al., 2011)
Solomon Is.	2007	12.8*	–	–	–	–	(Kennedy et al., 2011)
Timor-Leste	2003	5.8*	–	–	–	–	(Kennedy et al., 2011)
Tuvalu	2007	2.7	–	–	–	–	(Kennedy et al., 2011)
Vietnam	2002	14.1*	–	–	–	–	(Kennedy et al., 2011)
<i>Europe & Central Asia</i>							
Azerbaijan	2006	6	16	22	–	–	(Chandra-Mouli et al., 2014)
Turkey	2008	55.8	–	–	–	–	(Dilbaz et al., 2008)
<i>Latin America & the Caribbean</i>							
Dominican Republic	2007	41 ⁺	47 ⁺	88 ⁺	–	–	(Chandra-Mouli et al., 2014)
		46*	27*	73*	–	–	
Haiti	2012	28 ⁺	67 ⁺	95 ⁺	–	–	(Chandra-Mouli et al., 2014)
		26*	57*	83*	–	–	
Peru	2012	64 ⁺	34 ⁺	98 ⁺	–	–	(Chandra-Mouli et al., 2014)
		67*	19*	86*	–	–	
<i>Middle East & North Africa</i>							
Egypt	2008	23*	7*	30*	–	–	(Chandra-Mouli et al., 2014)
Jordan	2009	27*	8*	35*	–	–	(Chandra-Mouli et al., 2014)
Morocco	2003–4	38*	10*	48*	–	–	(Chandra-Mouli et al., 2014)
<i>South Asia</i>							
Bangladesh	2011	47	17	71	–	–	(Chandra-Mouli et al., 2014; Islam et al., 2016)
India	2005–6	13*	27*	40*	–	–	(Chandra-Mouli et al., 2014)
	2006–8	–	46.3	51.1	–	–	(Sengupta & Das, 2012)
	2015	–	–	–	16.3–19	41.7 ⁺ 57.3*	(Zavier & Jejeebhoy, 2012) (Zavier & Jejeebhoy, 2012)
<i>Sub-Saharan Africa</i>							
Ethiopia	2000	5.8	–	–	–	–	(Worku et al., 2015)
	2005	15.9	–	–	–	–	(Worku et al., 2015)
	2011	35.6	–	–	–	–	(Worku et al., 2015)
Ghana	2003	20.2	–	–	41.4	66.4	(Abdul-Rahman et al., 2011)
		18.3	44.3	62.7	–	–	(Prata et al., 2013)
	2008	22.8	–	–	43.8	62	(Abdul-Rahman et al., 2011)
		42 ⁺	53 ⁺	95 ⁺	–	–	(Chandra-Mouli et al., 2014)
		14*	62*	76*	–	–	(Chandra-Mouli et al., 2014)
2015	19.4	45.5	64.9	–	–	(Prata et al., 2013)	
Kenya	2003	–	–	–	66.7	–	(Yeboah & Appai, 2015)
	2008–9	21.9	31.2	53.1	–	–	(Prata et al., 2013)
Mali	2001	29.7	30	59.7	–	–	(Prata et al., 2013)
	2006	5.8	30.2	36.0	–	–	(Prata et al., 2013)
Nigeria	2006	21 ⁺	63 ⁺	84 ⁺	–	–	(Chandra-Mouli et al., 2014)
		8*	35*	43*	–	–	(Chandra-Mouli et al., 2014)
	2000–1	7.0	30.7	37.7	–	–	(Prata et al., 2013)
		10.5	15.7	26.2	–	–	(Prata et al., 2013)
2014	11.7	20.6	32.3	–	–	(Prata et al., 2013)	
	35	–	–	–	–	–	(Iyoke et al., 2014)
Tanzania	2010	(female) 21.7	–	–	–	–	(Iyoke et al., 2014)
		(male) 40 ⁺	48 ⁺	88 ⁺	–	–	(Chandra-Mouli et al., 2014)
Zambia	2001–2	15*	16*	31*	–	–	(Chandra-Mouli et al., 2014)
		22.2	26.4	48.6	–	–	(Prata et al., 2013)
Zimbabwe	2010–11	32.8	24.3	57.1	–	–	(Prata et al., 2013)
		24 ⁺	64 ⁺	88 ⁺	–	–	(Chandra-Mouli et al., 2014)
		36*	19*	55*	–	–	(Chandra-Mouli et al., 2014)

⁺Unmarried women only.

*Married women only.

more years, or to have no more pregnancies (Dilbaz et al., 2008; Worku et al., 2015), and percentage of adolescents who felt pressure to become pregnant soon after marrying (Jejeebhoy et al., 2014). Almost half of the studies ($n = 8$) reported on contraceptive method mix, and the majority ($n = 13$) conducted additional analyses of factors associated with demand for contraception. Higher demand was generally associated with higher socioeconomic status and education level, contact with reproductive healthcare providers, later age of marriage, and greater autonomy or decision-making power.

Study quality

In addition to the results presented above, study quality was assessed using the criteria outlined in Table 3. The quality of included studies is presented in Table 6, with a check mark indicating that the study met the indicated criterion, and an 'X' indicating that it did not. Studies were split fairly evenly among the three categories of study quality: four were of low quality; seven were of medium quality; and seven were of high quality. While almost all studies had a clearly defined aim and outcome indicators related to demand with an appropriate research design, few described how the research methodology was appropriate for use with an adolescent population in a culturally appropriate manner.

Discussion

This systematic review retrieved information on demand for contraception among adolescents or young people in 29 LMICs from five regions of the world. To our knowledge, this is the most extensive summary of published studies on this topic and adds to the literature by assessing the level of adolescent demand for contraception as well as the ways in which it is measured and assessed. Findings were generally in line with existing information that unmet need and demand for contraception is high for adolescents, particularly for unmarried adolescents (Darroch et al., 2016; ICRW, 2014). For countries with more than one data point, demand for contraceptives increased over time. Demand was generally higher among more educated adolescents with a greater knowledge of SRH-related topics. These findings add to the evidence of a need for focused efforts to increase use of contraception among adolescents in LMICs in order to improve ASRH and meet the needs and aspirations of young people.

A key observation from the included studies is that standard quantitative measures of demand for contraception, i.e. use and unmet need, are the most commonly reported indicators. Yet these measures have several key limitations as proxies for adolescent demand for contraception that must be considered for related research, programming, and policies. The following discussion addresses some of these limitations and provides suggestions for more comprehensive understandings of adolescent demand for contraception in LMICs.

Employing alternative measures for adolescents who are not classified as sexually active

First, by definition, a woman cannot have an unmet need for contraception if she is not sexually active, which is typically defined as having had sexual intercourse in the past 30 days (Bradley & Casterline, 2014), thus leaving out those who have sex irregularly, which is common among adolescents. Similarly, women who do not report being sexually active may not be asked about current contraceptive use. In LMICs, adolescents with an unmet need report infrequent sex as one of the most common reasons for not using contraception (Woog, 2015). Several of the reviewed studies (Jemmott et al., 2007; Meuwissen et al., 2006; Michaels-Igbokwe et al., 2015; Zavier & Jejeebhoy, 2012) did include adolescents who were not sexually active, and employed alternate measures, such as intention to use a method or acceptance of modern methods of contraception as an appropriate means of delaying pregnancy. Other approaches may include adolescents who have ever had sex, or may ask about contraceptive use at last intercourse. Further research should consider such alternative means

Table 6. Study quality.

Authors met the criteria, and an 'X' is presented in Table 6, with a check mark indicating that the study met the criteria, and an 'X' indicating that the study did not meet the criteria.

	Study aim	Defined demand	Research design	Sampling / recruitment	Data collection	Methods	Data analysis	Ethical consider.	Culturally appropriate	Reliability	# of criteria (quality)
Abdul-Rahman	✓	✓	✓	X	✓	X	X	X	X	X	4 (low)
Babalola	✓	✓	X	X	X	✓	✓	✓	X	✓	6 (medium)
Chanda-Mouli	X	✓	✓	X	✓	✓	✓	X	X	X	5 (medium)
Dilbaz	✓	✓	✓	X	✓	X	X	X	X	✓	5 (medium)
Islam	✓	✓	✓	✓	X	X	✓	X	X	✓	6 (medium)
Iyoke	✓	✓	X	✓	✓	✓	✓	✓	✓	X	8 (high)
Jansen	✓	✓	✓	X	X	X	X	X	X	X	3 (low)
Jejeebhoy	✓	✓	✓	✓	✓	X	✓	X	✓	✓	8 (high)
Jemmott	✓	✓	✓	X	✓	✓	X	✓	✓	X	7 (medium)
Kennedy	✓	✓	✓	✓	X	✓	X	X	✓	✓	7 (medium)
Lim	✓	✓	✓	✓	✓	X	✓	✓	✓	✓	9 (high)
Meuwissen	✓	X	✓	✓	✓	✓	✓	X	✓	✓	8 (high)
Michaels-Igbokwe	✓	✓	✓	X	✓	✓	✓	✓	X	✓	8 (high)
Prata	✓	✓	✓	✓	✓	✓	X	X	✓	✓	8 (high)
Sengupta	✓	✓	✓	X	X	X	X	X	✓	X	4 (low)
Worku	✓	✓	✓	X	X	X	✓	X	X	✓	5 (medium)
Yeboah	✓	✓	✓	X	X	X	X	X	✓	X	4 (low)
Zavier	✓	✓	✓	X	✓	✓	X	✓	✓	✓	8 (high)
<i>Number of studies</i>	17	17	16	7	11	9	9	6	10	11	-

of assessing demand for contraception among adolescents who do not report being sexually active in the last 30 days, while also exploring the reliability of these measures.

Measuring demand satisfied by modern methods of contraception

Almost all the included studies differentiated between traditional and modern methods of contraception. However, the measure of unmet need typically includes women who are using neither traditional nor modern methods (Darroch et al., 2016). For adolescents, the distinction between traditional and modern methods is of particular concern as it determines method effectiveness. Traditional methods, such as periodic abstinence and withdrawal, are more commonly used by adolescents, and have much lower effectiveness (Woog, 2015). Adolescents may be more likely to have an unmet need for a modern method as they often face barriers to accessing SRH services that provide modern methods of contraception (Chandra-Mouli et al., 2014; Williamson, 2009).

Taking into consideration the importance of measuring unmet need for modern methods, more recent population-based surveys are designed to measure an additional indicator of demand for family planning satisfied by a modern method (Bradley & Casterline, 2014). This indicator is also used for SDG Target 3.7, which calls for ensuring universal access to sexual and reproductive health-care services, including family planning, information and education (United Nations Statistics Division, 2017). None of the included studies reported on percentage of demand for family planning satisfied by a modern method. Yet as this indicator is now a standardised part of DHS, MICS, and other household surveys, it will likely be more frequently measured and reported on, particularly as countries work towards achieving the SDGs.

Consideration of method adherence and effectiveness

Similar to the distinction between traditional and modern methods, the measures of use and unmet need do not consider method adherence or effectiveness. Adolescents in LMICs are more likely to experience failure of modern methods due to incorrect use or interrupted access and generally have higher contraceptive discontinuation rates, due either to side effects or lack of consistent access to appropriate methods (Blanc, Tsui, Croft, & Trevitt, 2009; Gottschalk & Ortayli, 2014; ICRW, 2014). Failure rates are far higher for modern methods more commonly used by adolescents, such as condoms or oral contraceptive pills, compared to long-acting reversible contraceptive (LARC) methods, which are less commonly used by adolescents (Gottschalk & Ortayli, 2014). Adolescents may therefore be more likely than adult women to have an unmet need for correct or consistent method use, or for a more effective contraceptive method. Only one of the included studies reported on method adherence, finding that 35% of females adhered to a modern method and 21.7% of males consistently used condoms (Iyoke et al., 2014). Considering method adherence and effectiveness is an essential part of contraceptive counseling for adolescents, and should also be reflected when measuring or reporting on contraceptive use and unmet need.

Inclusion of young, unmarried, and male adolescents

The findings from this review are somewhat limited due to the study populations. Only three studies included young adolescents aged 10–14 (Jansen, 2005; Jemmott et al., 2007; Meuwissen et al., 2006), with only one of these (Jansen, 2005) highlighting differences between 10–14 year olds and 15–19 year olds. Excluding adolescents aged 10–14 leaves out over half of the female adolescent population. The majority of girls will experience their first menstruation between ages 10 and 14, and, in some contexts, first menses serves as a symbol of a female's marital and sexual readiness (Ibitoye et al., 2017; Sommer, 2013). While the average age of sexual debut globally is above 15 years old, in countries with some of the highest rates of unmet need, a sizable proportion of women have sex before age 15 (ICRW, 2014). Further research is needed to understand contraceptive behaviours

of younger adolescents, and the unique barriers faced by this population in utilising contraception and other sexual and reproductive health services.

In addition to the age criteria, the included studies largely exclude unmarried adolescents and young women. Although DHS sample populations do include unmarried, sexually active women of reproductive age, this demographic usually constitutes a very small percentage of those surveyed. Of DHS completed in 2014 and 2015, the number of unmarried, sexually active 15–19 year olds in the sample population range from just 48 in total in Zimbabwe, where 66 percent of women have sex by age 20 (Zimbabwe National Statistics Agency & ICF International, 2015), to 189 in Tanzania, where the average age of first sex is 17.2 years old (Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC), Zanzibar Ministry of Health (MoH), National Bureau of Statistics (NBS), Office of the Chief Government Statistician (OCGS), & ICF International, 2016). Not only do unmarried adolescents have a higher demand for contraception than married adolescents, but they may also have different preferences and barriers, and programmes must take into consideration the unique needs of these populations.

Only three of the studies in this review include males (Iyoke et al., 2014; Jemmott et al., 2007; Michaels-Igbokwe et al., 2015) despite the fact that, in many settings, adolescent females, especially those who are married, may rely on the decision or approval of their partner to use a method of contraception (Capurchande, Coene, Schockaert, Macia, & Meulemans, 2016; Darroch et al., 2016; Williamson, 2009). Including males in research would provide a more comprehensive understanding of demand for contraception and may also assist in raising awareness on the importance of contraceptive use and could encourage couple communication for shared decision-making.

Appropriate modes of data collection for adolescent populations

Very few of the included studies mentioned the sensitivity of the topic of demand for contraception, and the modes of data collection were rarely adjusted to take this into account. Asking adolescents about sex, fertility and use of contraception can be challenging, particularly in cultures where such topics are taboo. Only two studies (Iyoke et al., 2014; Jemmott et al., 2007) administered anonymous surveys and two collected data from medical records (Dilbaz et al., 2008; Meuwissen et al., 2006); the rest were conducted via face-to-face interviews. Only one of the reviewed studies mentioned that researchers were specially trained to conduct research with adolescents (Zavier & Jejeebhoy, 2012).

Adolescents have been found to be more honest about sexual behaviour or other sensitive information when surveyed anonymously, particularly with an electronic device, such as Audio Computer-Assisted Self-Interview (ACASI) Software (Langhaug, Sherr, & Cowan, 2010). While self-administered surveys may pose challenges in LMICs due to lower levels of education, several studies demonstrate the feasibility of using ACASI with adolescents with limited literacy (Falb et al., 2016; Hewett, Mensch, & Erulkar, 2004). Obtaining information from medical records may be a more reliable way of collecting data on contraceptive behaviours, or may be used to test the reliability and validity of survey data. If face-to-face interviews are required, certain techniques can be used to build trust with and ensure privacy for the adolescent, for a more comfortable and transparent interview (Ingham & Stone, 2000).

Contextualization of demand for contraception

Demand for contraception is largely influenced by socio-cultural norms that may be difficult to measure using quantitative approaches (ICRW, 2014; Williamson, 2009). By limiting this review to quantitative studies, more contextualised assessments of adolescent demand for contraception were largely excluded. Only one study employed mixed methods (Zavier & Jejeebhoy, 2012), and another reported on findings from existing qualitative studies on adolescent demand for contraception (Chandra-Mouli et al., 2014). Existing reviews of qualitative literature reveal that adolescents

face many complex barriers to contraceptive use at the individual, microsystem, and macrosystem level (Chandra-Mouli et al., 2014; Williamson, 2009). While the findings included in this systematic review reveal very high demand for contraception, it is unknown whether this reflects only the desire to delay or avoid pregnancy, or takes into account the acceptance of and access to modern methods of contraception. Future research that employs quantitative measures of adolescent demand for contraception should consider the important distinctions between the desire to delay or avoid pregnancy, the desire to use modern contraceptive methods, and the ability to access appropriate services.

Limitations

This study has several limitations. First, our review includes quantitative studies solely from peer-reviewed literature, excluding programme reviews, evaluations or other quantitative findings published in grey literature. This study includes papers published in English only, which may have excluded studies in other languages. Results of individual studies are not one-to-one comparable due to different study populations and methodologies. Additionally, the inclusion of studies with young people up to age 24 may bias the results, as individuals aged 20–24 are likely to have different contraceptive needs than individuals aged 10–19. Two studies with at-risk adolescent populations were included and may have limited generalizability.

Conclusion

This paper has examined adolescent demand for contraception in LMICs based on a systematic review of published quantitative studies. The findings from this review reveal an overall high level of demand, yet a limited number of outcome indicators used to measure this phenomenon. Alternative measures, such as fertility desires, attitudes toward contraceptive use, method adherence or demand for family planning satisfied by a modern method, may be more appropriate than reporting solely on use or unmet need. Based on the limitations of indicators such as contraceptive use and unmet need, quantitative findings should be complemented by qualitative studies that seek to understand the nuances of adolescent demand for contraception. Programme evaluations and intervention studies can also greatly inform how to effectively increase use of modern contraceptive methods among adolescents in LMICs.

The world is at an opportune moment to strengthen programming and policies on ASRH. Increasing use of contraception is a key component of meeting the needs of young people, and has the potential to improve the health and well-being of adolescents, their communities and future generations. It is recognised that a one-size fits all approach is insufficient in addressing the numerous barriers that adolescents face in using contraceptives. A richer understanding of demand-side factors can greatly inform and improve ASRH programmes and policies in order to avoid the consequences of unintended pregnancy and early childbearing and realise the evidence-based benefits of investing in adolescent health.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Annex 1: Search terms and results

PubMed 3 July, 2017

Filters: Publication dates: From 2005/01/01 to 2017/06/30; Species: Human; Languages: English

Population

'Adolescent*' OR 'Adolescent'[Mesh] OR 'Adolescence' OR 'Young people' OR 'Young adult*' OR 'Young Adult'[-Mesh] OR 'Young woman' OR 'Young women' OR 'Young man' OR 'Young men' – **925,857 results**

Setting

'Developing countr*' OR 'Developing Countries'[Mesh] OR 'Middle-income countr*' OR 'Low-income countr*' OR 'Lower-middle-income countr*' OR 'Upper-middle-income countr*' OR 'Global South' – **30,231 results**

Intervention

'Family planning service*' OR 'Family Planning Services'[Mesh] OR 'Family planning' OR 'Contraception' OR 'Contraception'[Mesh] OR 'Contraceptive*' OR 'Contraceptive Devices'[Mesh] OR 'Contraceptive Device*' OR 'Contraception behavior' OR 'Contraception behavior' [Mesh] OR 'Birth control' OR 'birth spacing' OR 'birth limiting' OR 'fertility control' – **24,301 results**

Outcome

'Demand' OR 'Need' OR 'Preference*' OR 'Unmet need' OR 'Choice' OR 'Uptake' OR 'Use' OR 'Usage' OR 'Non-use' OR 'Utilization' OR 'Continuation' OR 'Discontinuation' OR 'Decision making' OR 'Decision-making' – **687,794 results**

RESULTS for Population AND Setting AND Intervention AND Outcome: 193 articles

Scopus 2 July, 2017

Filters: Publication year > 2004; Language: English

Population

'Adolescent*' OR 'adolescence' OR 'Young people' OR 'young adult*' OR 'Young woman' OR 'young women' OR 'young man' OR 'young men' – **1,122,535 results**

Setting

'Developing countr*' OR 'Middle-income countr*' OR 'Low-income countr*' OR 'Lower-middle-income countr*' OR 'Upper-middle-income countr*' OR 'Global South' – **121,869 results**

Intervention

'Family planning service*' OR 'Family planning' OR 'Contraception' OR 'Contraceptive*' OR 'Contraceptive Device*' OR 'Contraception behavior*' OR 'Birth control' OR 'birth spacing' OR 'birth limiting' OR 'fertility control' – **46,118 results**

Outcome

'Demand' OR 'Need' OR 'Preference*' OR 'Unmet need' OR 'Choice' OR 'Uptake' OR 'Use' OR 'Usage' OR 'Non-use' OR 'Utilization' OR 'Continuation' OR 'Discontinuation' OR 'Decision making' OR 'Decision-making' – **6,543,116 results**

RESULTS for Population AND Setting AND Intervention AND Outcome: 318 articles

Embase 2 July 2017

Filters: Publication dates: 2005–2017; Language: English

Population

'Adolescent*' OR 'adolescence' OR 'Young people' OR 'young adult*' OR 'Young woman' OR 'young women' OR 'young man' OR 'young men' – **835,730 results**

Setting

'Developing countr*' OR 'Middle-income countr*' OR 'Low-income countr*' OR 'Lower-middle-income countr*' OR 'Upper-middle-income countr*' OR 'Global South' – **69,716 results**

Intervention

'birth control'/exp OR 'family planning service*' OR 'family planning' OR 'contraception'/exp OR 'contraception' OR 'contraceptive*' OR 'contraceptive device*' OR 'contraception behavior' OR 'birth control' OR 'birth spacing' OR 'birth limiting' OR 'fertility control' – **99,483 results**

Outcome

'demand' OR 'need' OR 'preference' OR 'unmet need' OR 'choice' OR 'uptake' OR 'use' OR 'usage' OR 'non-use' OR 'utilization' OR 'continuation' OR 'discontinuation' OR 'decision making' OR 'decision-making' – **2,528,141 results**

RESULTS for Population AND Setting AND Intervention AND Outcome: 246 articles

POPLINE 3 July 2017

Filters: Publication dates: From 01/01/2005 to 06/30/2017; Languages: English

Population

'Adolescent' OR 'adolescents' OR 'adolescence' OR 'Young people' OR 'young adult' OR 'young adults' OR 'Young woman' OR 'young women' OR 'young man' OR 'young men' – **9,465 results**

Setting

'Developing country' OR 'Developing countries' OR 'Middle-income country' OR 'Middle-income countries' OR 'Low-income country' OR 'Low-income countries' OR 'Lower-middle-income country' OR 'Lower-middle-income countries' OR 'Upper-middle-income country' OR 'Upper-middle-income countries' OR 'Global South' – **58,624 results**

Intervention

'Family planning services' OR 'Family planning' OR Contraception OR Contraceptive OR Contraceptives OR 'Contraceptive Device' OR 'Contraception behavior' OR 'Birth control' OR 'birth spacing' OR 'birth limiting' – **20,792 results**

Outcome

'Demand' OR 'Need' OR 'Preference' OR 'Unmet need' OR 'Choice' OR 'Uptake' OR 'Use' OR 'Usage' OR 'Non-use' OR 'Utilization' OR 'Continuation' OR 'Discontinuation' OR 'Decision making' OR 'Decision-making' – **30,665 results**

RESULTS for Population AND Setting AND Intervention AND Outcome: 587 results