School-Based Adolescent Reproductive Health Education in Afghanistan and other Muslim-majority Settings: A Systematic Review and Key Informant Interview Study of Knowledge, Attitudes and Barriers

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Scholarly Report submitted in partial fulfillment of the MD Degree at Harvard Medical School

Date: January 27\textsuperscript{th}, 2017

Student Name: Tiara Forsyth, B.S.

Scholarly Report Title: School-Based Adolescent Reproductive Health Education in Afghanistan and other Muslim-majority Settings: A Systematic Review and Key Informant Interview Study of Knowledge, Attitudes and Barriers

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*THIS IS A WORK IN PROGRESS*
For updated data and analysis, please contact the author at tiara.forsyth@gmail.com
Abstract

Title: School-Based Adolescent Reproductive Health Education in Afghanistan and other Islamic Settings: A Systematic Review and Key Informant Interview Study of Knowledge, Attitudes and Barriers

Importance: Poor access to, and knowledge of, reproductive health care in resource-limited, Muslim-majority settings is a significant barrier to economic development and women's advancement.

Objective: To explore (1) the state of young women’s knowledge of female sexual health; and (2) how best to increase women’s knowledge of their sexual health in Muslim-majority settings.

Methods:

Systematic Review: Systematic Search of EMBASE and MEDLINE for all articles published in English from January 1st 2002 to December 31st, 2016 that (1) surveyed adolescent women on knowledge and attitudes related to sexual and reproductive health in a Muslim-majority setting, or (2) presented an educational intervention for sexual and reproductive health for adolescent women in a Muslim-majority setting. Studies targeting adolescent or youth females in Muslim-majority settings were included. Studies targeting males, other age groups, non-Muslim majority environments, or specific populations such as postpartum women were excluded.

Key Informant Interviews: Eleven semi-structured interviews were conducted with experts in women's reproductive health in a Muslim-majority setting including public health officials, NGO leaders, medical providers, and health educators. Interviews covered topics including public knowledge and attitudes about reproductive health, school-based health education, and public initiatives to improve reproductive health knowledge. Informants were professionally fluent in English.

Results:

Systematic Review: Twenty-five studies surveyed adolescent females on sexual and reproductive health knowledge in Muslim-majority environments. Knowledge level was low across all surveyed topics, including understanding of reproductive anatomy, mechanism of pregnancy, and of sexually transmitted infections. In aggregate, 69.9% of students knew fecundity begins at menarche, but only 40% knew pregnancy could result from a single sexual encounter. Schools were rarely students' primary source of accurate information. Nine studies reported on reproductive health interventions for adolescent girls in Muslim-majority environments. Seven successful interventions oriented around peer educators that could interact with students without the presence of an adult. Three unsuccessful programs aimed to deliver sexual health knowledge through adult teachers.

Key Informant Interviews: Ten out of 11 experts felt sexual and reproductive health should be taught in schools in Muslim-majority settings. Experts differed widely in their opinions about which topics should be taught and the year in school to begin teaching. Four emergent themes summarized key issues associated with and barriers to school-based
reproductive health education in Muslim-majority settings: quality of educators, cultural sensitivity, community buy-in, and bureaucratic barriers.

**Conclusions:** Sexual and reproductive health knowledge among adolescent girls in Muslim-majority settings is low. Successful interventions to improve knowledge have utilized peer educators, whereas programs mediated by adult teachers alone have seen less success. Key informants feel schools are an under-utilized resource, and program success requires well-trained, highly motivated teachers delivering culturally-sensitive health information to youth with the support of communities.
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Section 1: Introduction

1.1 Problem Statement & Aims
Poor access to, and knowledge of, reproductive health care is a significant barrier to women’s advancement globally. Providing adolescent girls with basic education in reproductive and sexual health empowers women to make informed decisions and allows women to serve as educators in their communities. Afghanistan provides a case example of an environment where increased access to reproductive health knowledge and services may lead to economic and social empowerment for women, translating to broader development. While several researchers have published papers surveying young women about their reproductive health knowledge or attempting to educate young women in Muslim-majority settings about reproductive health, a systematic review and synthesis of findings has not been published in either of these domains. This Scholarly Project aims (1) to explore what young women in Islamic settings already know about reproductive health, (2) to extract common elements from existing successful reproductive health education programs, and (3) to gather expert opinions on effective ways to teach reproductive health topics in Islamic settings, with a focus on Afghanistan. A systematic literature review was conducted to accomplish aims 1 and 2, and 11 key informants were interviewed to accomplish aim 3.

1.2 The Case of Afghanistan

A. Situational context in Afghanistan and relevance to women’s health and reproductive health
Few countries have suffered as much halted progress toward comprehensive reproductive rights, education, and healthcare as Afghanistan. With the fall of the Taliban in 2001, a fledgling democracy emerged that was crippled by continuing conflict and insurgency. It grew dependent on foreign development assistance that was often prescriptive rather than empowering. As foreign involvement wanes today, Taliban and insurgent groups resurface and the government struggles to establish independence.

B. Past trends in maternal and reproductive health indices in Afghanistan
As of 2001, there was approximately one female doctor, nurse and midwife for every 50,000 individuals and Afghanistan had the highest maternal mortality rate in the world. The transitional government focused on training female midwives as the primary method of reducing this figure, and in a decade, the number of midwives practicing in Afghanistan increased more than seven-fold from 467 in 2002 to 3500 in 2012. The reported maternal mortality ratio also fell to 396 in 2015, from 1050 in 2001. Despite these apparent advances, a 2015 report calls attention to flaws in the research methods used to generate the more recent lower maternal mortality values and argued that improvements were much more modest than reported. Even if the best estimates are used, the maternal mortality ratio in the most developed countries in the world is 100 fold less than in Afghanistan today. Lack of female health professionals, cultural taboos around male physicians treating female patients, education about reproductive health topics, and
socioeconomic factors, among others, still present significant barriers to health access for Afghan women.\(^3\)

### C. Current maternal and reproductive health indices in Afghanistan

An Afghan woman currently has a 1 in 52 chance of dying in pregnancy in her lifetime.\(^4\) The infant mortality rate is the highest in the world\(^5\) and under-5 child mortality is second highest.\(^6\) Sixty-four percent of the current population is under 18 years old, and this number is only expected to rise.\(^3\) The average Afghan woman will bear more than 5 children, but will only survive to age 52; only 20% of women use modern contraceptive methods;\(^7\) in some of the most remote regions, only about 1% of women report using any method of contraception.\(^7\)

### D. The role of women in Afghanistan and the role of women in development

Women and girls under age 25 make up nearly a third of the population of Afghanistan,\(^8\) which makes it no surprise that 70% of loss in development (United Nations Inequality Index) is due to limitations on women’s workforce participation, education, and health care access.\(^8\) One of the most effective ways to advance the status of women and girls globally is through delayed marriage and reproduction, which has been shown to reduce maternal mortality and increase educational level attained, workforce participation, productivity and earnings, and household savings and assets, ultimately leading to GDP growth and reduction in poverty.\(^9\) Literacy and education are the most important determinants of both age at marriage and age at first birth in Islamic countries,\(^10\) yet the average Afghan girl stops attending school at age 8, compared to age 13 in her male peers.\(^9\) Less than a quarter of Afghan women are literate.\(^9\)

Women’s education and workforce participation are essential for development, especially Islamic settings like Afghanistan where women lag so far behind men. Reproductive autonomy is a prerequisite for this, and learning about reproductive health a prerequisite for autonomy.

### 1.3 Broader Significance

Recent research suggests that spending money on increasing women’s access to, and knowledge of, reproductive health is one of the most cost-effective ways to spur economic development globally\(^11\) and suggests that it has many other benefits for women, families, and societies.

While adolescents enjoy generally good health compared to other groups, they are exposed to a set of health risks that can shape their lives and the future economic and social development of the world at large.\(^12\) It is estimated that adolescents account for 23% of the global burden of disease (in disability-adjusted life-years) due to higher rates of

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* defined as the oral contraceptive pill, IUD, injectable, condom, emergency contraception, implants and male and female sterilization; about 3% of women use traditional methods including periodic abstinence, withdrawal and lactation amenorrhea.\(^7\) Central Statistics Organization (CSO), Ministry of Public Health (MoPH), International I. Afghanistan Demographic and Health Survey 2015: Key Indicators. Kabul, Afghanistan and Rockville, Maryland, USA: 2016.
maternal morbidity and mortality and unsafe abortion. A study that examined data from 14 Latin American countries between 1985 and 2003 found that girls under 16 have a four-times greater risk of dying in pregnancy or childbirth than women aged 20 to 24 years. Additionally, a 2014 review of data from 144 countries and territories found that maternal mortality ratio for adolescents aged 15 to 29 in the Eastern Mediterranean region to be about 50% greater than for young women aged 20 to 25. Pregnancy in adolescents also holds significant fetal risks, including low birth weight, preterm delivery, and neonatal death.

From a healthcare perspective, reproductive health education and service delivery leads to lower maternal mortality, lower infant mortality, healthier babies and children, fewer STI’s, and a lower burden of reproductive tract diseases. Economically, when women have greater control over their reproductive capacities, they are more likely to hold a job, get an education, and contribute to society more broadly. A 2015 Guttmacher study reports that for every dollar spent on contraceptive services in developing countries, $1.47 is saved in the costs of unintended pregnancies, pregnancy complications, and newborn care.

In the contemporary context, it is important to not dichotomize countries into ‘developed’ and ‘developing’. While it is certainly pragmatic to group countries together based on social, economic and political characteristics, and to learn from differential progress over time, we should avoid painting less developed countries with too broad a brush or making assumptions based on oversimplified generalities. Some offer drastically better access to female reproductive health education than others. Certainly in Afghanistan, expanding access, availability and quality of reproductive health education has the potential to generate substantial returns because current understanding of, and access to, reproductive health education is limited. Moreover, effective programs may offer the first and only chance many women are afforded to learn about these important topics.

On the one hand, investments in female reproductive health education might offer especially high returns in Muslim-majority communities. Yet, there are potential reasons to worry that Muslim-majority countries and communities might face unique challenges when it comes to improving female reproductive health education. Public resistance to female sexual expression is high. Other gender equality metrics are low including female labor force participation, education attainment rates, share of seats in governing structures, maternal mortality ratios, and adolescent birth rates. Even after the fall of Taliban control over much of Afghanistan, Taliban operatives continue to specifically target girl’s education with acid attacks, poison gas, and destruction of school buildings. One might reasonably raise concerns that the contextual situation in some Muslim-majority settings will make it difficult to educate young women about their reproductive health – at a minimum, programs will need to be innovative and strategic to overcome cultural challenges.

Scholars, physicians, and educators have published several papers that either survey young women in Muslim-majority settings on their knowledge of their reproductive health, or describe attempts to educate young women in Muslim-
majority settings about their reproductive health. However, to the authors’ knowledge, there has not been a systematic literature review that synthesizes the relevant conclusions and assesses the power of the research methods used in each study. In cultural contexts where teaching female reproductive health is especially challenging, practitioners and educators that develop and design new materials and curricula could benefit from a summative understanding of both: (1) the current state of young women’s knowledge of female sexual health; and (2) How best to achieve the important task of increasing women’s knowledge of their sexual health, in terms of both curricular content and organizational format for courses.

This paper systematically reviews the literature on two interlinked questions:

1. What do young women in Islamic settings already know about sexual and reproductive health, and from where do they currently get such information?
2. What are the common curricular and organizational elements of successful interventions in sexual health education in Islamic settings?

This paper also collects qualitative data from interviews with key informants to gain further insight into the elements of successful educational interventions and prompt paths forward.
Section 2: Student role

The student, Tiara Forsyth, independently completed all phases of this research, including project design, literature review, interviews, synthesis of results, drafting of the manuscript, editing and finalizing of the manuscript. She received feedback on project design and the manuscript by her faculty mentor and co-collaborator, and asked independent reviewers to provide feedback on the literature review methodology to ensure all relevant references were captured.
Section 3: Methods

3.1 Systematic Review

A. Overview of Search Strategy

A systematic review was conducted of published literature in MEDLINE and EMBASE to identify all interventional and observational studies of reproductive health education targeted at adolescents or youth in Muslim-majority settings. The period from January 1st, 2002 to December 31st, 2016 was chosen to capture the 15-year period between the fall of the Taliban in November 2001 through the present. Only studies published in English with an abstract were included. Studies in languages other than English, abstract-only publications, poster presentations, and conference proceedings were excluded. MEDLINE, EMBASE, PROSPERO, Joanna Briggs Institute Database of Systematic Reviews, Cochrane Database of Systematic Reviews, and Campbell Collaboration databases were searched to ensure no similar review had been completed or was in progress.

A three-step search strategy was utilized in this review. An initial limited search of MEDLINE was undertaken followed by analysis of the text words contained in the titles and abstracts and of the index terms used to describe articles. A second search using all identified keywords and index terms was then undertaken across MEDLINE and EMBASE. Thirdly, the reference lists of all identified reports and articles were searched for additional studies.

B. Inclusion and Exclusion Criteria

For purposes of the review “adolescents” were defined as individuals aged 11 to 19 years and “youths” were defined as individuals aged 15 to 24 years, which were the two most common age groupings among studies screened. Studies were excluded if they targeted age groups other than adolescents and youths or did not report data that specifically related to the age groups of interest. Studies were included if they examined populations in Muslim-majority countries, or Muslim-minority countries where the total number of Muslims exceeded 10 million people (Table 1). Within the five identified Muslim-minority countries with minorities exceeding 10 million, only regions with dense Muslim populations (>50%) or regions where Sharia law applies in the Judicial system were included. For example, India has an 11.7% Muslim minority that exceeds 100 million people, but Muslims only account for a majority of the population in Lakshadweep and Jammu & Kashmir, so only studies from these provinces were eligible for inclusion.

C. Description of the Search Process

The full search of MEDLINE, EMBASE, and reference lists identified 1845 articles for title and abstract screen after removing duplicates. Search terms were left intentionally broad to identify survey and interventional studies together
and allow for discovery of potentially relevant study methods that had not been considered in advance.† After screening, 286 studies were retrieved in full text and evaluated for relevance and methodological quality prior to inclusion. The appropriate standardized critical appraisal instrument from the Joanna Briggs Institute was used to assess each study type (Appendix 1).

The systematic review included survey studies that examined female or mixed-sex youth or adolescents in Muslim-majority communities, as described above, on knowledge and/or attitudes related to reproductive anatomy, sexual function, contraception, STIs, pregnancy, reproductive rights, and/or sexual violence. Excluded studies targeted specific populations including male-only students, postpartum patients, married youth, or out-of-school youth.

The systematic review included interventional studies examining school-based educational interventions aimed at female or mixed-sex youth or adolescents in Muslim-majority populations, as described above. Interventions for university students were included if most participants were adolescents or youth. Excluded studies described interventions for only male students or non-school based interventions.

After application of inclusion and exclusion criteria during full-text review, 25 survey studies and 9 interventional studies were selected for inclusion in this review.

### D. Data Extraction

Data was extracted from each article by the primary author using a form that included the following variables: study design; geographic location; years of survey or intervention; sample size; average age of participants; and number and percentage of female participants. For survey studies, survey questions and raw data for responses relevant to the review questions were collected when available. For interventional studies, specific details about interventions, populations, and outcomes of significance to the review questions were extracted when available. Author findings and conclusions were extracted for all studies. Limitations due to missing or incomplete reporting of information are addressed in the analysis.

### 3.2 Key Informant Interviews

Eleven interviews were conducted with key informants in late 2016 and early 2017. Informants were government officials, NGO and international organization officials, health care providers, and health educators who have been involved in policy making, program implementation, or patient care related to reproductive health in Afghanistan or with Afghan populations for a minimum of 3 years. Several informants overlapped across multiple categories, and many

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provided personal anecdotal experiences about reproductive health education in Muslim-majority, resource-limited settings in addition to insights gleaned from their professional roles. Informants were professionally fluent in English.

Informants were identified through a dual sampling method whereby a snowballing technique was employed alongside internet and publication searches to identify key professionals. Participants were initially contacted through email and all interviews were conducted in English via Skype video conference or audio phone call.

The interview protocol was prepared after a literature review including an early phase of the above described review and discussion with the project advisors. Interview guides followed a semi-structured model with several open-ended questions regarding personal and professional experiences with reproductive health education, knowledge about reproductive health programs, and speculation about community members’ knowledge and perspectives (Appendix II).

Ethics approval was obtained through the Harvard University IRB (Protocol #IRB16-1571). Participants were given informed consent documents detailing the scope of the research and how information they provided would be used prior to each interview, and verbal informed consent was obtained at the beginning of each interview. All questions were answered at that time, and participants were given contact information for the study team and Harvard University IRB should further questions or comments arise. All interviews except one were recorded. One interviewee preferred not to be recorded, so detailed paper notes were maintained. Interview transcripts and notes were reviewed to identify common, recurrent, or emergent themes. Responses were then coded based on themes and analyzed for patterns and trends.
Section 4: Systematic Review: Results and Discussion

4.1 What do young women in Islamic settings already know about sexual and reproductive health, and from where do they currently get such information?

25 papers report survey, focus group, or interview results (using a variety of methods, addressed below) on how much young women in Islamic settings know about sexual and reproductive health and/or from where they currently receive information about these topics. This section will summarize the main results according to key questions, as well as discuss the extent to which the results are consistent across different Islamic populations.

A. How Many Young People Know the Basic Facts of Sexual and Reproductive Health?

The 25 papers report results on a range of topics in sexual and reproductive health. This review will report results for topics on which multiple papers offer data to make comparisons across populations.

Puberty and Menstruation

Al Quaiz et al. (2012) found that 92.1% of female adolescents in Riyadh City, Saudi Arabia had basic knowledge about the existence of puberty and 70.7% understood the physiologic and anatomic changes. In a nationally representative sample of Omani youth (Jaffer et al. 2005), about 47% could explain basic changes accompanying puberty in their own sex and 33% could explain basic changes in the opposite sex. Only 19% of girls knew pubertal changes were normal, and 23% did not know about them before puberty. In a study of female adolescents in Northwestern Nigeria (Lawan et al. 2010), 6.5% knew the normal onset and symptoms of puberty in early adolescence, such as menstruation. Shaikh et al. (2006) surveyed adolescents in 20 the same for 77% rural Bangladeshi adolescent girls. Yazici et al. found that 79.1% of female Turkish students aged 11 to 15 were aware of the changes in their own bodies and 50.8% felt disturbed by these changes.

Ali et al. (2006) found that 58% of female adolescents in Karachi, Pakistan understood the basic mechanisms of menstruation (regular monthly bleeding); Lawan et al. (2010) found similarly for 58.8% of adolescent school girls in Northwestern Nigeria, and Shaikh & Rahim (2006) found the same for 60% of teenage girls.

Adeokun et al. (2010) found that 3.1% of secondary school adolescents in North-Eastern Nigeria knew when ovulation occurs during the menstrual cycle, and Uddin et al. (2008) found similarly for 7% of rural Bangladeshi adolescent girls.
Among adolescent girls in Kanto, Northwestern Nigeria (Lawan et al. 2010), 57% were aware of the basics of menstrual hygiene and that appropriate menstrual hygiene can prevent infection. Shaikh et al. found similarly for 67% of adolescent girls in Lahore, Pakistan.

Ali et al. (2006) found that of female adolescents in Karachi, Pakistan, 74% found their first menstrual experience shocking or fearful. A large, nationally representative sample of Egyptian youth (Krafft et al. 2010) found similarly for 67.0% of girls.

Knowledge of Reproductive Anatomy and Functions

Ab Rahman et al. (2011) found that 37.7%, 55.3%, and 57.7% of Malaysian high school students understood the reproductive function of the vagina, uterus, and penis, respectively. Ali et al. (2006) found that 66% of Karachi-based teenage girls were aware of the names of reproductive organs, and Yazici et al. (2011) found 64% of 11-15-year-old girls in Turkey knew the location of reproductive organs (vs 74.3% of boys) and 45.8% knew the functions (vs 59.7% of boys).

Al Quaiz et al. (2012) found that 64% of female adolescents in Riyadh City, Saudi Arabia knew how intercourse occurs, whereas Shaikh & Rahim (2006) found that 35% of female adolescents in Lahore, Pakistan knew about sexual intercourse (55% of males).

Ab Rahman et al. (2011) report that only 57.7% of high-schoolers in Kelantan, Malaysia understood the basic mechanics of pregnancy, i.e., a male inseminates a female, whereas Shaikh & Rahim (2006) found that only 49% of Lahore, Pakistan-based teenagers understood the same (43% of girls, 55% of boys). In a study of adolescent and adult women of reproductive age in Kabul, Afghanistan (van Egmond et al. 2004), 16% reported they understood the mechanics of pregnancy when they were 15 years old.

Ab Rahman et al. (2011) reports that 70.9% of young people in Malaysia understand that they can become pregnant from the time of menarche. Ali et al. (2006) found that 80% of female teenagers in Karachi, Pakistan understood this fact, and Shaikh & Rahim (2006) reports that 60% of teenage girls in Lahore, Pakistan (vs. 36% of boys) did as well.

Ab Rahman et al. (2011) found that only 30.4% of high-school students in Kelantan, Malaysia knew that a woman could get pregnant from a single act of intercourse, while Adeokun et al. (2009) found that 47% of high schoolers in northern Nigeria knew the same fact, and Khalaj et al. (2012) found that 70% of female university students in Tehran, Iran also knew this. Uddin et al. (2008) found that among rural Bangladeshi adolescent girls, only 24% believed one could become pregnant after a single act of sexual intercourse.
HIV/AIDS

Existence of HIV
Knowledge about HIV among adolescents in the included studies ranged from 4% to 98.3%. Four percent, 40%, 53%, 70.5%, 87.1%, 98.3% of adolescent girls in Karichi, Pakistan (Ali et al. 2006), Lahore, Pakistan (Shaikh et al. 2006), rural Bangladesh (Uddin et al. 2008), Bangladesh (Gani et al. 2014), Northwestern Nigeria (Adeokun et al. 2009), and Oman (Jaffer et al. 2005), respectively, had ever heard of HIV/AIDS. Among male and female adolescents in rural Niger State, Nigeria (Sunmola et al. 2003), a nationally representative sample of Egyptian youth (Krafft et al. 2010), and university students in Tekirdağ, Turkey, 91.9%, 71.5%, and 96.5%, respectively, had heard of HIV/AIDS. Among women of reproductive age (15-49) in Kabul (van Egmond et al. 2004), 36% had heard of HIV/AIDS.

HIV Transmission
Knowledge that HIV could be transmitted through sexual intercourse varied from 67% to 85.8%. Ab Rahman et al. (2011) found that 83% of high-schoolers in Kelantan, Malaysia were aware that HIV was transmitted by sexual intercourse. Gani et al. (2011) found similarly for 67% of a nationally-representative sample of Bangladeshi young women, and Al Quaiz et al. (2012) found the same for 95.8% of female adolescents in Riyadh City, Saudi Arabia. Sunmola et al. (2003) found that among adolescents in rural Niger State, Nigeria 77% were aware of this fact, while Shokioohi et al. (2013) found the same for 87.6% of youth in 13 provinces of Iran. In a large, nationally representative sample of Egyptian youth (Krafft et al. 2010), among respondents who had heard about HIV, 82.4% knew that it can be transmitted sexually.

In studies that did not explicitly ask about sexual transmission, awareness of any mode of transmission ranged from 19 to 80%. In a nationally representative sample of Omani youth (Jaffer et al. 2005) 80% knew at least one mode of HIV transmission. Shaikh et al. (2006) and Uddin et al. (2008) found the same for 46% and 52% of adolescent females in Lahore, Pakistan and rural Bangladesh. Among women of reproductive age (15-49) in Kabul (van Egmond et al. 2004), 19% could correctly identify a route of transmission of HIV/AIDS. In focus group discussions with youth in Karachi, Pakistan, Farid-ul-Hasnain et al. (2013) found that most young people were unaware of any modes of transmission for HIV.

In a survey of youth in 13 provinces in Iran 51.5% knew it could be transmitted through breastfeeding,

HIV Signs and Symptoms
Khalaj et al. (2012) found that 92.6% of female university students in Tehran, Iran were aware that HIV infected people could look healthy. Shokoohi et al. (2013) found the same for 73.5% of Iranian youth. Shaikh et al. (2006) found that 13% of adolescent girls in Lahore, Pakistan could accurately identify the signs and symptoms of HIV.

**Other Sexually Transmitted Infections**

**Existence of Other STIs**

In four studies in Lahore, Pakistan (Shaikh et al. 2006), Bangladesh (Gani et al. 2011), rural Bangladesh (Uddin et al. 2008), and Karachi, Pakistan (Ali et al. 2006), 12.4%, 5.9%, 31%, and 44% of adolescent girls were aware of the existence of sexually transmitted infections other than HIV. Ab Rahman et al. (2011) found the same for 12.4% of male and female high-schoolers in Kelantan, Malaysia and van Egmond et al. (2004) for 24% of reproductive-age women in Kabul, Afghanistan. About a third of adolescent girls in Northwestern Nigeria (Adeokun et al. 2009) identified gonorrhea as a sexually transmitted disease, an 5% identified syphilis as such. Al Quaiz et (2012) found that among female adolescents in Riyadh City, Saudi Arabia, 38.3, 37.9% and 14.6% respectively knew that syphilis, gonorrhea, and hepatitis B are sexually transmitted diseases. Sunmola et al. (2003) found that among adolescents in rural Niger State, Nigeria, 76.6% knew about gonorrhoea, 25.7% syphilis, 7% herpes, 21.3% pubic lice, and 3% chlamydia.

**HIV & STI Prevention**

Shaikh et al. (2006) found that 32% of adolescent girls in Lahore, Pakistan had knowledge about ways to prevent HIV, and Uddin et al. (2008) found that 52% of rural Bangladeshi adolescent girls knew prevention of HIV was possible. Focus group discussions with youth in Karachi, Pakistan (Farid-ul-Hasnain et al. 2013) revealed that most participants could not name a single way to prevent HIV.

Findings about condoms for STI prevention are presented in the section on “Condoms and Contraceptive Knowledge”

**Misconceptions about STIs**

Several studies revealed misconceptions about HIV and STI transmission. In four studies, 61%, 47.1%, 20%, and 3% of adolescents in Niger State, Nigeria (Sunmola et al. 2003), Iran (Shokoohi et al. 2013), Bangladesh (Gani et al. 2011), and Egypt (Krafft et al. 2010), respectively, held one or more misconceptions about HIV or STI transmission, such as the belief that they are transmissible through mosquitoes or toilet seats. Van Egmond et al. (2004) found similarly among 30% of women aged 15 to 49 in Kabul, Afghanistan.

In two studies, 55% and 36% of youth in Iran (Shokoohi et al. 2013) and Niger State, Nigeria (Sunmola et al. 2003), respectively, thought HIV was curable.
Condoms and Contraceptive Knowledge

Knowledge of the existence of contraception and/or family planning methods ranged from 50% to 94.5% across studies reporting data. In Northeastern Nigeria (Adeokun et al. 2009), 56% of secondary school students were aware that any form of contraception exists, with 43.5% mentioning condoms. In Lahore, Pakistan, (Shaikh et al. 2006) 50% of female adolescents had any knowledge of family planning. Sunmola et al. (2003) found that among adolescents in rural Niger State, Nigeria, 63.8% had heard of condoms, 51% pills, 59.5% injections, and 53.9% withdrawal method. Fewer respondents had knowledge of IUDs (47.9%), diaphragms (42.4%), female sterilization (48.8%), male sterilization (41.9%) and rhythm methods (49.3%). Uddin et al. (2008) found that among rural Bangladeshi adolescent girls, 68% had heard of a family planning method. Among women of reproductive age (15-49) in Kabul (van Egmond et al. 2004) 54% reported knowing what a condom was. In a large, nationally representative sample of Turkish youth (Yazici et al. 2011), 94.5% knew about contraception. In focus groups with Pakistani youth in Karachi, (Farid-ul-Hasnain et al. 2013) nearly all participants had heard of at least one contraceptive method.

Bazarganipour et al. (2013) found 67.2% of university students in Qom, Iran understood that condoms could prevent STIs and HIV. Khalaj et al. (2012) found the same for 69% of female university students in Tehran, and Ab Rahman et al. (2011) for 59.8% of Malaysian adolescents. Twenty-seven percent of adolescents in rural Niger State, Nigeria (Sunmola et al. 2003), reported condoms could prevent HIV. In a survey of youth in 13 provinces in Iran (Shokoohi et al. 2013), 70% knew condom use could reduce risk of infection.

Sunmola et al. (2003) surveyed 896 11-25-year-old men and women across Niger State, Nigeria and found that only 6.7% of respondents used condoms during intercourse. Shohooki et al. (2016), found the same for 21.8% of Iranian adolescents.

B. From Where Do Young People Currently Learn about Reproductive Health?

Thirteen papers addressed the sources of young women’s knowledge about sexual and reproductive health topics. The findings are summarized below.

Mothers were a primary source of information for 57.3% (Riyadh City, Saudi Arabia, Al Quiaz et al. 2012), 35.6% (Qom, Iran, Bazarganipour et al. 2013), 36.7% (Oman, Jaffer et al. 2005), 82.8% (Turkey, Yazici et al. 2011), and 24.6% (Turkey, Yazici et al. 2012) of adolescents, respectively, in five studies reporting data. Farid-ul-Hasain et al (2013) and found that female focus group participants in Karachi, Pakistan discussed sexual and reproductive health topic most with mothers. Ali et al. (2006) also found that the majority female adolescent study participants in Karachi, Pakistan received information related to sexuality from their mothers, but reported information was incomplete or inaccurate. Uddin et
al. (2008) found that among rural Bangladeshi adolescent girls, mother’s education level was a significant predictor of adolescent girls’ knowledge about reproductive health.

Both parents were a primary source of information for 6.6% (Kelantan, Malaysia, Ab Rahman et al. 2011), 57% (Northeastern Nigeria, Adeokun et al. 2010), 25.4% (Riyadh City, Saudi Arabia, Al Quaiz et al. 2012), 18.3% (Niger State, Nigeria, Sunmola et al. 2003), 60.4% (Egypt, Krafft et al. 2010), and 27% (Turkey, Yazici et al. 2012), of adolescents, respectively, in six studies reporting this information.

Friends were a primary source of information for 64.4% (Kelantan, Malaysia, Ab Rahman et al. 2011), 39% (Northeastern Nigeria, Adeokun et al. 2010), 18.8% (Riyadh City, Saudi Arabia, Al Quaiz et al. 2012), 23% (Niger State, Nigeria, Sunmola et al. 2003), and 36.3% (Turkey, Yazici et al. 2012) of adolescents in five studies reporting this value. Mosavi et al. (2014) also found that friends were the primary source of information for most adolescent female focus group participants in three Iranian cities, and these friends had an important role in providing insufficient and false information.

Mass media, television, or internet was a primary source of information for 60.2% (Kelantan, Malaysia, Ab Rahman et al. 2011), 45% (Northeastern Nigeria, Adeokun et al. 2010), 13.6% (Riyadh City, Saudi Arabia, Al Quaiz et al. 2012), 37.3% (Qom, Iran, Bazarganipour et al. 2013), and 41.1% (Turkey, Yazici et al. 2012) of adolescents for five studies reporting this value. Krafft et al. (2010) found that 88.8% and 78.5% of Egyptian adolescents received information about HIV/AIDS and contraception, respectively, from media sources. Uddin et al. (2008) found that among rural Bangladeshi adolescent girls, exposure to mass media was a significant predictor of adolescent girls’ knowledge about reproductive health.

Teachers or schools were a primary source of information for 17.2% (Kelantan, Malaysia, Ab Rahman et al. 2011), 58% (Northeastern Nigeria, Adeokun et al. 2010), 25.6% (Niger State, Nigeria, Sunmola et al. 2003), and 14.7% (Turkey, Yazici et al. 2012) of adolescents in four studies reporting this value.

Health care providers or health clinics were a primary source of information for 53% (Northeastern Nigeria, Adeokun et al. 2010), 42% (Qom, Iran, Bazarganipour et al. 2013), and 23.4% (Niger State, Nigeria, Sunmola et al. 2003) of adolescents in three studies reporting this value.

Other sources included sexual partners, siblings, housekeepers, and print sources.

4.2 Discussion: Knowledge Levels, Sources of Knowledge, and Comparisons across Populations

A. Knowledge Levels
The results presented above suggest female youth in Muslim-majority settings have insufficient knowledge about sexual and reproductive health.

Although around half of young people examined in the studies knew that pregnancy requires vaginal penetration and a majority seem to understand the point from which pregnancy can occur, a lower proportion of youth understood that pregnancy can occur from a single incident of vaginal intercourse or that sexually transmitted infections are acquired through sexual intercourse.

One interesting finding is that, on any of the major sexual health subjects, knowledge rarely exceeded 65%. An average of 56.2% of respondents understood the health benefits of condoms, 61.8% understood the function of male and female genitalia in the reproductive process, and 53.4% understood that pregnancy occurs through vaginal intercourse and insemination. The only major exception above the 50-65% range was the high average understanding of the onset of fertility at menarche (69.6%). Unfortunately, only around 40% of young people understood that pregnancy could result from a single sexual encounter.

While several studies reported that more than 50% understood that condoms could prevent pregnancy and STI transmission, a much lower proportion of reported using condoms. The wide discrepancy between knowledge of the health benefits of condoms and actual condom use likely reflects multiple factors, including limited access to condoms, and a social stigma against condom possession, especially for unmarried men or women.

One paper presented encouraging data about the effectiveness of sexual education programs. In a cross-sectional sample of more than 1300 university students in Turkey, Varol Saraçoğlu et al. (2014) found that rate of contraceptive use was 58.7% in “sexually educated” students, vs 43.9% in those not educated (p=0.004). Sexually educated students also gave higher rates of correct answers about STI transmission, prevention, and treatment (p<0.05).

B. Knowledge Sources

Based on the papers reviewed, friends and mothers are the two primary knowledge sources for young women in Muslim-majority settings.

Notably sparse in the literature on knowledge sources for reproductive health are schools or government. Uddin & Choudhury (2008) found that, in rural Bangladesh, school attendance was not at all correlated with young women’s knowledge of reproductive health. A common lament in discussion sections was that there was either no sexual health education in schools, or education of low quality. Alquaiz et al. (2012) reports that, in Riyadh, 61% of young women stated that they were uncomfortable approaching a school teacher with questions about sexual health; Javadnoori et al. (2012) surveyed young women aged 14-18 in Iran and found that, to the extent sexual health education occurred in
schools, it was primarily aimed at fearmongering young women into remaining virgins, and, if any discussion of contraception or sexual health occurred, much of the information shared was incorrect. This stilted atmosphere around sexual health education in schools might help explain a striking result in Alquaiz et al. (2013), namely, that young women who attend school above the age of 15 years old are more likely to show low levels of accurate sexual health knowledge than young women who do not attend school above the age of fifteen.

In a sample of girls aged 13 to 18 in Riyadh City, Saudi Arabia (Al Quaiz et al. 2013) students were stratified into groups with “poor” and “adequate” sexual health knowledge based on a test of several key sexual health topics. Those found to have poor sexual health knowledge were more likely to receive sexual health information from parents and schools, whereas students with appropriate knowledge were more likely to receive information from friends and media sources. This trend was stronger in the over 15 age group than under 25. Girls over aged 15 with appropriate sexual health knowledge were about 20% less likely to characterize parents as playing a major role in their sexual health knowledge, but felt more comfortable discussing sexual matters with their parents. Further, they were about 7% less likely to attend a school with a curriculum in sexual health.

Overall, the papers reviewed suggest that mothers and friends are the most frequent sources of accurate sexual health knowledge for most youth in Islamic settings. Schools are rarely students’ primary source of accurate information—or, in many settings, any information at all—about sexual health.

C. Are the Results Consistent Across Islamic Populations?

Although similar in many important ways, the Muslim-majority populations surveyed in the literature differ in many other respects. One major potential difference is between Islamic communities in rural, as opposed to urban, areas. Life in urban areas is correlated with greater wealth, internet access, travel opportunities, etc., and therefore likely more opportunity to learn about elements of sexual health.¹

One of the challenges in teasing out insights based on the different Islamic populations surveyed is that, while most of the observational studies looked at generally the same topics, there are too few studies from each surveyed community to be very confident that a study(ies) are truly representative of that community.¹ For example, it is hard to draw full confidence in one’s impression of sexual health knowledge in northern Nigeria based on three surveys. Nevertheless, with appropriate caution, cross-population comparisons reveal some interesting insights.

¹ The 29 observational studies surveyed communities in the following regions/areas (papers for which the described region is a country were nationally-representative samples): Istanbul, Turkey (1 study), Turkey (2), Egypt (1), Bangladesh (4), Kabul, Afghanistan (1), northern Nigeria (3), Iran (5), Mashhad, Iran (1), Qom, Iran (1), Lahore, Pakistan (1), Karachi, Pakistan (2), Malaysia (1), Klang-Valley, Malaysia (1), Kelantan, Malaysia (1), Oman (1), Riyadh, Saudi Arabia (2).
Perhaps the most interesting finding of a cross-population comparison is, in general, how little variation there is across the Muslim-majority communities surveyed. With only a few exceptions, young women’s and/or young men’s knowledge of sexual health topics stands at low levels between approximately 40-60% of respondents knowing basic facts about pregnancy, STI’s, the function of male and female genitalia, and contraception. This consistency may reflect the fact that, in all the Muslim-majority communities for which the literature has data, sexual health education is considered taboo and is thus not an important part of the public education system (and thus the fact that northern Nigeria and Iran, say, have public education systems of vastly different quality does not lead to very different rates of sexual health knowledge amongst Iranian vs. northern Nigerian students).

One important outlier from this clustering in the 40-60% range is Riyadh, Saudi Arabia, where young women’s knowledge of STI’s and pregnancy hover between 20-30%. This may reflect the pronounced influence of very conservative Wahhabist Islam on Saudi culture and education, or reflect a sampling bias.49

Is there any difference between the average knowledge levels of youth in urban communities compared to rural communities? The literature suggests not. Of the 9 studies that asked sufficiently similar questions to offer grounds for comparison, the average percentage of young people who understood basic questions about pregnancy, STIs, genitalia, and contraception was 48.7% in rural areas and 46.65% in urban areas. If one removes the outlying poor results from Riyadh (discussed immediately above), the average for urban areas increases to 52.7%. This revised figure does not represent a striking difference between the rural average.

4.3 What can we learn from studies of educational interventions in sexual health in Muslim-majority settings?

This review identified nine published studies of attempted educational interventions in Muslim-majority communities that aimed to increase young persons’ knowledge of sexual and reproductive health.50-58 This section will first analyze the successful interventions, followed by unsuccessful interventions. It will conclude with an analysis of which features of educational interventions appeared to be most associated with successful outcomes, and which features seemed to not be associated with effective outcomes.

A. Successful Interventions: What Works?

Seven interventions reported successful results, meaning positive measured learning gains.50, 51, 53, 54, 56, 57 One paper reported on 2 interventions, one successful and one unsuccessful.52 One common denominator amongst all seven of the successful programs was that they leveraged the network effect, identifying smart, well-liked students in different communities, teaching those students the basics of sexual health, and then teaching those students how to share this
information with their peers. In each of these studies, the authors assessed learning gains by giving subject students a
diagnostic test of their sexual health knowledge before their encounters with peer educators, and then giving a similar
test of sexual health knowledge to the subjects after their encounters with peer educators. This approach succeeded in
communities as diverse as 14-18-year-old girls in Isfahan, Iran (Hatami et al., 2015), 12-19 year olds in Dhaka, Bangladesh
(Kabir et al., 2015), university students in Kuala Lumpur, Malaysia (Low, 2004); college students in Izmir, Turkey
(Mevsim et al., 2008); 15-24-year-old rural villagers in Turkey (Ozcebe, 2003); and 15-20 year olds in Mersin, Turkey
(Polat, 2012); 15-19 year olds in East Java, Indonesia (Hull et al. 2004).

Five of the six studies relied exclusively upon pre- and post-test exams to measure success. Encouragingly, one of the
studies—Ozcebe 2003—compared pre- and post-test sexual health exam results for students who spent time with peer
educators to the pre- and post-test results of a control group of students with similar demographics who did not spend
time with the peer educators. The study found that the control group showed no sexual health learning gains, whereas
the young women who received peer group education showed significant learning gains. Although no other study
mimicked this method, it nonetheless suggests that the studies are collectively capturing a successful intervention
format.

Another encouraging finding comes from Mevsim et al., 2008, which measured sexual health learning gains
immediately after the conclusion of the peer-to-peer education program (like all the other successful studies), but re-
examined the subjects six months after the program ended. The author found only a 1.8% deterioration in subjects' under-
standing of sexual health topics over the course of the 6 months. This suggests that, while deterioration in
learning gains is a concern long-term, good quality sexual health education endures for most students.

One pilot peer education program in East Java, Indonesia (Hull et al. 2004) failed to collect quantitative metrics of
student performance pre- and post-intervention. It did, however, collect extensive qualitative data on student,
educator, and community experiences in the program. Peer educators and students self-reported positive experiences.
Importantly, they felt the peer status of educators was essential success of the program. “Peers” were slightly older
than the students, having more life experience and knowledge about the world, but were not family members, religious
leaders, or other adults with superior social status. This “near peer” model was essential for students to engage in
discussion and ask questions without fear judgement or repercussion.

None of the studies required training peer educators for more than approximately forty hours of instructional time (i.e.,
one week full time, 2-4 weeks part time). For example, in the Mersin, Turkey study (Polat, 2012), peer educators sat for a
full five-day course on pregnancy, STI, contraception, and general reproductive health topics. This amount of training is
representative of the other five studies available, and suggests that peer educators need a strong—but far from
advanced—understanding of sexual health to teach their peers effectively.
B. Unsuccessful Interventions: What Doesn’t Work?

Three interventions reported unsuccessful results, meaning no or marginal (under 5%) learning gains.\textsuperscript{52, 55, 58} One of these interventions in East Java, Indonesia (Hull et al. 2004) aimed to increase young women’s sexual health knowledge by providing parents with some basic instruction and giving them access to written educational materials. This approach failed, in large part because parents continued to feel uncomfortable about talking to their children about sexual health. Another intervention in Ankara, Turkey (Ozcebe et al. 2004) provided young people with 1-on-1 sexual health seminars between a peer educator and a young person, with—crucially—an adult moderator present to oversee the discussions. This approach achieved only marginal learning gains. The third unsuccessful intervention in Dar es Salaam, Tanzania (Madeni et al. 2011) was a conventional month-long course in sexual health with boys and girls aged 11-16. The course produced only marginal learning gains.

The common denominator amongst all three unsuccessful studies is that sexual health education in each setting was primarily mediated by an adult. Regardless of whether the adult presided over a traditional classroom, a 1-on-1 seminar, or were merely encouraged to talk to their children, the adult-child dynamic does not seem nearly as promising a conduit for sexual health education than the peer-to-peer dynamic.

C. Key Insights from a Comparison of Successful and Unsuccessful Programs

Nine studies represent a limited amount of data on what makes for a successful or unsuccessful educational intervention of any kind, let alone an intervention that attempts to educate young people on a culturally sensitive subject, like sexual health. This is all the truer when only one of the studies assessed a subject group against a control group. However, the existing research offers some tentative insights into the conditions for success or failure of any educational intervention in sexual health in a Muslim-majority community.

For example, it is striking that all six successful interventions oriented around an educational theory of change by which the path to success was: a) selecting smart, popular students to be peer educators, b) educating those peer educators to attain a strong, but inexpert, understanding of sexual health; and c) providing a space within which the peer educators could convey the information to other students—without the presence of an adult.

The literature suggests that the last element—without the presence of an adult—might be crucial. All three unsuccessful programs aimed to deliver, or at least mediate, the transmission of sexual health knowledge through adults. Although further research is required to tease this insight out, it seems possible that the presence of an adult chills the transmission of knowledge on taboo subjects, like sexual health. When peer educators were free to communicate what they knew away from an adult’s earshot, the peer educators may have been able to speak more
openly and comprehensively than they could with an adult around. There may have been less embarrassment or fear of stigma, and thus more opportunity to be candid, take questions, and resolve confusions.
Section 5: Key Informant Interviews

Findings from 11 key informant interviews have been summarized below. This section begins with a discussion regarding experts’ opinions on school-based sexual and reproductive health teaching and lists the topics experts believed were important for adolescents in Muslim-majority settings. It then presents 4 emergent themes: quality of educators, cultural sensitivity, community buy-in, and bureaucratic barriers. These themes highlight important considerations and barriers related to establishing successful school-based sexual and reproductive health programs in Muslim-majority settings, with a focus on Afghanistan.

5.1 How did experts feel about teaching sexual and reproductive health in Afghan schools generally?

*If we do not provide health education now, if we do not provide access to reproductive services now, we will get more of the people who are burning clinics, killing doctors, and opposing these ideas.*

---Director of an NGO, Afghanistan

Ten out of eleven experts felt reproductive health education should be taught in schools in Afghanistan and other Islamic settings. The one dissenting expert felt the bureaucratic challenges in Afghanistan were too great. The 10 experts in favor of school-based reproductive health education differed widely in their ideas about what should be taught and the appropriate age to begin teaching reproductive health topics. Experts felt that geographic, cultural, ethnic, socioeconomic, and other factors contributed to the appropriate content of school-based sexual and reproductive health teaching. Generally, experts felt that, within Afghanistan, adolescents could receive more in-depth education in urban areas than rural ones.

There was a wide range in the appropriate age to begin teaching, with one expert recommending 3rd or 4th grade (age 8-9) and another recommending 12th grade (age 17-18). Most experts felt the beginning of high school (7th grade) was most appropriate, but many recognized at least teaching about puberty should begin before the onset of puberty for most students, around 6th grade.

Two experts questioned the effectiveness of school-based reproductive health for adolescent girls because many adolescent girls leave school by 6th grade in Afghanistan and other traditional Muslim communities. This is especially problematic if reproductive health education programs are designed to begin in 6th grade or later.
5.2 What did experts believe should be taught?

Experts converged on several key topic areas when asked what should be taught in schools: basic reproductive anatomy and physiology, pubertal changes, menstruation and menstrual hygiene, STI signs, symptoms, and prevention, contraception/ family planning, prenatal care, pregnancy and childbirth, nutrition in pregnancy, nutrition for infants, and childhood immunizations. Three experts felt that discussing contraception specifically with unmarried adolescent females would present overriding cultural challenges in all but a few urban areas. Another expert felt that issues related to contraception and STIs could be taught to unmarried males, not unmarried females. That same expert felt issues related to pregnancy and childrearing could be taught to unmarried females, but not unmarried males.

Three experts stressed the importance of coupling education about reproductive health with access to reproductive health care. For example, teaching about STIs while providing adolescents access to providers who can treat STIs, or teaching about contraceptive methods while providing adolescents access to contraceptives. (This is a controversial point, as several experts felt it would be culturally inappropriate to teach adolescents about contraception even in the context of preparing for future marriage.)

5.3 Emergent Themes

1. Quality and Training of Educators

Any curriculum is only as good as the person teaching it.

--Health educator and physician, cares for primarily Muslim women

Seven experts stressed the importance of either or both (1) quality teacher training and (2) dedicated teachers. One director of a health education program at an NGO in Afghanistan used both health educators hired and trained by the NGO and pre-existing high school teachers. Internal review indicated that teachers hired and trained for health education, who the expert felt were independently motivated to help adolescents learn these topics, fared far better at knowledge transmission and fostering positive attitudes than pre-existing school teachers who did not teach health in their primary role.

Three experts reported difficulties in recruiting female teachers, particularly in remote rural areas. Almost all felt that female students should be taught by a female educator, unless the educator is a religious leader. One educator felt that close supervision and feedback could help overcome some of the challenges from using pre-existing teachers to facilitate reproductive health discussions, which may be a helpful strategy in areas with shortages of female teachers.
Several experts reported on programs that utilize peer educators to teach reproductive health programs. Only one expert oversaw one of these programs himself. Every expert that reported on a peer education program felt it was an effective way to teach reproductive health, and may reduce the embarrassment, discomfort, and fear that can result when these topics are discussed with an older adult.

One expert had overseen a program using religious leaders exclusively to teach adolescents, but felt this program did not lead to effective knowledge transmission. Several educators utilize religious leaders alongside trained health educators and report positive experiences.

2. Cultural Sensitivity

But it’s also so important to teach that it is ok to talk about these things openly.

--Expert in education and policy, grew up female in Afghanistan

All eleven experts underlined the taboo nature of topics related to sex and reproduction in Afghan culture and Islamic culture broadly. They offered several ideas for to overcoming this taboo.

First, four experts recommended diluting taboo topics among those that are less taboo. They recommended teaching many health topics together, beginning with topics that are less taboo, and move slowly. For example, one could begin teaching handwashing and infection prevention to students in the first grade, teach basic nutrition to second graders, first aid to third graders, and then slowly work into puberty and menstruation. A general health course that teaches many useful life skills and safety measures but also includes some information about reproduction is more likely to be accepted by Afghan families than a course that deals exclusively with sexual and reproductive health.

Second, five experts recommended rebranding contraception or “family planning” as “birth spacing” or healthy families. Since many Muslim families do not believe in limiting the number of children one produces, reframing the discussion around having a healthier woman and healthier children can be persuasive. One expert uses a simple example of a farmer that cultivates his land too frequently resulting in poor crops to demonstrate the time needed between births to keep women and children healthy.

Third, five experts recommended engaging local religious leaders in reproductive health teaching. While, as addressed above, it was not felt that religious leaders would be the most effective primary teachers for these topics, they can serve as a valuable icebreaker, helping adolescents understand it is religiously acceptable to discuss sex and reproduction for learning about one’s own health. One expert suggested bringing religious leaders to the beginning of a teaching session to give remarks, and then completely the rest of the session in the absence of religious figures.
Experts felt religious leaders play a more important role in teaching these topics in more conservative and rural areas than urban ones.

3. Community Buy-in
You must listen to the community you are working with and build trust.

―Educator, grew up female in Afghanistan

Experts stressed the importance of obtaining buy-in from parents, non-parent adults, religious leaders, community leaders, and the adolescents themselves. They offered some ways to achieve this.

First, two experts felt that government-sanctioned teaching integrated into the national secondary school curriculum would be more likely to be trusted and accepted than teaching provided by an NGO or international organization.

Second, three experts approached religious leaders at mosques in the community prior to instituting a health education program. Support from religious leaders (1) reduces the likelihood of resistance from community leadership and (2) shows parents and families that health education is sanctioned by their religious leaders. One expert held an open discussion with all the community religious leaders to listen to their questions and concerns about health education, and forged a partnership in which they were free intervene in or ask the program to stop operations if they felt the education was not in line with Islamic values. Open communication was key to the success of this program, which continues to operate in a rural, highly conservative area.

Third, three experts astutely called attention to the importance of sexual and reproductive health education for boys as well. While this author recognizes the importance of health education for all adolescents, education for boys is beyond the scope of this research so the experts’ statements are briefly mentioned here. Several other experts mentioned parallel or coeducational programs for boys and girls, but most felt boys and girls should be taught separately to maintain cultural sensitivity and acceptance by communities.

4. Bureaucratic Barriers
When we go to the government, it takes months and months and months to do the smallest things.

―Educator, grew up female in Afghanistan

Six experts highlighted bureaucratic challenges to successful reproductive health programs in Afghanistan and similar resource-limited, Islamic states.
One health educator with a network of health and education centers that teach young women and families about reproductive health in Afghanistan has avoided addressing school-based education in his own work because there is “too much red tape.” He feels the schools are an important place to teach reproductive health, but progress is slow in the Afghan education system and adolescents need information on sexual and reproductive health now.

Another expert felt that conservative leaders of government agencies in charge of education had act as barriers. Another felt that NGOs and international groups have more flexibility to teach because they can begin operations more quickly and employ a more secular approach, while remaining sensitive to Islamic values. Still another expert cited lack of funding to print new resources and competition for time during the regular school day as barriers to implementation of reproductive health as part of the standard school curriculum in Afghanistan. Despite these barriers, several experts cited plans by government agencies to address this.

5.4 Summary of expert advice

In sum, experts felt that schools were an under-utilized resource and, with investment, could become a key venue for dissemination of reproductive health knowledge to adolescents. They differed widely on which topics the thought should be covered in a school-based curriculum, but generally agreed that puberty and menstrual hygiene were crucial for adolescent girls and that reproductive health topics should be folded into a larger health curriculum, which dilutes exposure to taboo topics and ensures adolescents learn how to stay healthy in all aspects of their lives.

Using well-trained teachers with prior experience dealing with reproductive health topics and who believe in the importance of reproductive health was also considered essential. Experts favored obtaining buy in from communities before initiating reproductive health in schools by approaching religious leaders to initiate dialogue and making sure health services are available in the community alongside education.

They stressed the importance of extreme caution regarding cultural sensitivity, including single-sex teaching, same-sex instructors, and teaching topics in ways that align with local religion and customs (for example, teaching family planning as birth spacing, and talking about it in the context of future marriage.)

Bureaucracy was a challenge to initiating a standardized health curriculum in public schools, but experts acknowledged progress is being made within governments to implement programs, and suggested teaching in private schools, community learning centers, or after school programs could be accomplished more quickly.
Section 6: Limitations and Conclusions

6.1 Limitations

Both the systematic review and interview portions focused only on the experience of female adolescents in Muslim majority settings. We did not include studies that focused on males. Since the treatment of and taboos associated with sexual and reproductive health topics may differ for female and male adolescents in Islamic settings, we deliberatively focused on female adolescents for this research study. Future systematic reviews and qualitative work should examine male adolescent knowledge, perspectives, and educational efforts. Work comparing the female and male experience will also be valuable.

A. Systematic Review

First, only articles published in English were included, which could omit valuable insights from the non-English language literature.

Another limitation is the small and incomplete published literature on this topic. Only 29 studies examined preexisting knowledge and attitudes about reproductive health among adolescent girls, and 9 evaluated an educational intervention.

Third, there were several limitations to the methods of the 9 papers reporting on educational interventions. The studies identified and reviewed all summarized educational interventions’ results inconsistently, which presented a challenge to synthesize thematic conclusions. Six of the papers rank different knowledge sources based on the percentage of respondents who received information from that source. Four papers instead rank sources ordinally, but do not provide any specific numerical figures. Eight of the papers provide no rankings.

Finally, all database searching, article selection, data extraction, coding, and manuscript writing was conducted by a single researcher. This leaves more room for human error and bias than if multiple authors collaborated on research methods, independently extracted data, and co-generated results and conclusions. To mitigate this, the primary author sought the advice of a medical research librarian for research strategy and methods, and recruited an independent reviewer to critically assess search strategy and the article selection process.

B. Key Informant Interviews

First, as specific questions are not predetermined and often depend on a previous answer, it depends on the skill of the interviewer to ask relevant questions. The interviewer can give out unconscious signals (body language, intonation, etc.) to guide the respondent toward responses. This is compounded by the fact that interviews in this study were
conducted by a single researcher. The interviewer in this study had prior experience and training in semi-structured interview methods, which mitigated some of these interviewer-dependent limitations.

Interviews were conducted exclusively over Skype video conference and audio calls. While this can help prevent the interviewer from leading the interview subject with body language and gestures, it may make it difficult to read such unspoken communication from interviewees. Whenever possible, I used video conferencing instead of audio.

Further, I only interviewed professionally fluent English speakers, which produces a potentially non-representative sample of highly educated individuals with greater exposure to Western ideas and greater acceptance of reproductive health interventions, such as school-based teaching and contraceptive use, than the average community member in a Muslim-majority setting. Nonetheless, this author believes the sample was representative of the physicians, educators, and policymakers who would implement a reproductive health program, and many of the informants currently reside in Islamic settings with many individuals who hold traditional ideals, and thus have a strong understanding of the behaviors and attitudes of other community members around this topic.

Small sample sizes, lack of standardized or validated questions, and the personal nature of interview interactions can make the results difficult to generalize. This limitation is a necessary part of the infancy of any new area of research. This project will lay the foundations for future projects to gather more precise and generalizable data.

A limitation of all qualitative research methods is that the depth of information collected can be difficult to analyze. Prior to seeking publication in the academic literature, I will seek out the guidance of mentors with experience in qualitative research methods to help me navigate this.

5.2 Conclusions

Poor access to, and knowledge of, reproductive health care in resource-limited, Muslim-majority settings is a significant barrier to economic development and women's advancement globally, and recent research suggests investment in this is one of the most cost-effective ways to spur economic development in developing countries."

A. Review of Studies Assessing Knowledge Levels

The above review of 25 studies assessing adolescent knowledge about sexual and reproductive health in Muslim-majority settings suggests knowledge levels are insufficient across most topic areas including puberty and menstruation, reproductive anatomy and functions, sexually transmitted infections, and contraception. Knowledge about condoms for prevention of pregnancy and sexually transmitted infections was much higher than reported use, suggesting limited access, stigma, or other barriers. Youth who had received prior education in sexual and reproductive
health reported higher rates of contraceptive use and provided more correct answers about STI prevention and treatment.42

In the studies reviewed, mothers, followed by both parents, friends, and media sources, were the primary knowledge sources for adolescents in Muslim-majority settings. Schools were rarely students’ primary source of accurate information—or, in many settings, any information at all—about sexual health.

Despite significant cultural and socioeconomic differences in the Muslim-majority populations examined, there was little variation in knowledge levels across the communities surveyed. This consistency may reflect the fact that, in all the Muslim-majority communities for which the literature has data, sexual health education is considered taboo and thus may not be an important part of the public education system.

B. Review of Studies Describing Educational Interventions
Nine studies offered tentative insights into the conditions for success or failure of any educational intervention in sexual health in a Muslim-majority community.

All six successful interventions oriented around an educational theory of change by which the path to success was: a) selecting smart, popular students to be peer educators, b) educating those peer educators to attain a strong, but inexpert, understanding of sexual health; and c) providing a space within which the peer educators could convey the information to other students—without the presence of an adult. It may be that the presence of an adult chills the transmission of knowledge on taboo subjects, like sexual health. When peer educators were free to communicate what they knew away from an adult’s earshot, the peer educators may have been able to speak more openly and comprehensively than they could with an adult around.

C. Key Informant Interviews
Interviews with 11 key informants with experience related to reproductive health education in Muslim majority settings revealed four emergent themes: quality of educators, cultural sensitivity, community buy-in, and bureaucratic barriers. Experts felt that schools were an under-utilized resource and, with investment, could become a key venue for dissemination of reproductive health knowledge to adolescents. They generally agreed that puberty and menstrual hygiene were crucial for adolescent girls and that reproductive health topics should be folded into a larger health curriculum, which dilutes exposure to taboo topics and ensures adolescents learn how to stay healthy in all aspects of their lives.
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References:


Tables and Figures

Figure 1.
Systematic review methods following PRISMA guidelines.\textsuperscript{59}
Table 1. Muslim Majority States

<table>
<thead>
<tr>
<th>Country</th>
<th>Estimated 2010 Muslim Population</th>
<th>Percentage of 2010 Population that is Muslim</th>
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<tr>
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</tr>
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<td>Morocco</td>
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<td>99.90%</td>
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<tr>
<td>Country</td>
<td>Population</td>
<td>Muslim Population</td>
</tr>
<tr>
<td>---------------------</td>
<td>------------</td>
<td>-------------------</td>
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<tr>
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<td>Pakistan</td>
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<td>96.40%</td>
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<td>Palestinian territories</td>
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<td>97.50%</td>
</tr>
<tr>
<td>Qatar</td>
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<tr>
<td>Russia*</td>
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<td>11.70%</td>
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<td>Saudi Arabia</td>
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<td>Senegal</td>
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<tr>
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<td>Tunisia</td>
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<td>Turkmenistan</td>
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<td>93.30%</td>
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<td>United Arab Emirates</td>
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<td>76.00%</td>
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<tr>
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<td>26,833,000</td>
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</tr>
<tr>
<td>Western Sahara</td>
<td>528,000</td>
<td>99.60%</td>
</tr>
<tr>
<td>Yemen</td>
<td>24,023,000</td>
<td>99.00%</td>
</tr>
</tbody>
</table>


*Muslim minority states with a Muslim population that exceeds 10 million. Only regions with high density of Muslim residents were included in analysis.
Appendix I: Joanna Briggs Institute Critical Appraisal Checklists

JBI Critical Appraisal Checklist for Analytical Cross Sectional Studies

Reviewer: ____________________ Date: ____________________

Author: ____________________ Year: ____________________ Record Number: ____________________

1. Were the criteria for inclusion in the sample clearly defined? [Yes] [No] [Unclear] [Not applicable]
2. Were the study subjects and the setting described in detail? [Yes] [No] [Unclear] [Not applicable]
3. Was the exposure measured in a valid and reliable way? [Yes] [No] [Unclear] [Not applicable]
4. Were objective, standard criteria used for measurement of the condition? [Yes] [No] [Unclear] [Not applicable]
5. Were confounding factors identified? [Yes] [No] [Unclear] [Not applicable]
6. Were strategies to deal with confounding factors stated? [Yes] [No] [Unclear] [Not applicable]
7. Were the outcomes measured in a valid and reliable way? [Yes] [No] [Unclear] [Not applicable]
8. Was appropriate statistical analysis used? [Yes] [No] [Unclear] [Not applicable]

Overall appraisal: Include [ ] Exclude [ ] Seek further info [ ]
Comments (including reason for exclusion):

JBI Critical Appraisal Checklist for Studies Reporting Prevalence Data

Reviewer: ____________________ Date: ____________________

Author: ____________________ Year: ____________________ Record Number: ____________________

1. Was the sample frame appropriate to address the target population? [Yes] [No] [Unclear] [Not applicable]
2. Were study participants sampled in an appropriate way? [Yes] [No] [Unclear] [Not applicable]
3. Was the sample size adequate? [Yes] [No] [Unclear] [Not applicable]
4. Were the study subjects and the setting described in detail? [Yes] [No] [Unclear] [Not applicable]
5. Was the data analysis conducted with sufficient coverage of the identified sample? [Yes] [No] [Unclear] [Not applicable]
6. Were valid methods used for the identification of the condition? [Yes] [No] [Unclear] [Not applicable]
7. Was the condition measured in a standard, reliable way for all participants? [Yes] [No] [Unclear] [Not applicable]
8. Was there appropriate statistical analysis? [Yes] [No] [Unclear] [Not applicable]
9. Was the response rate adequate, and if not, was the low response rate managed appropriately? [Yes] [No] [Unclear] [Not applicable]

Overall appraisal: Include [ ] Exclude [ ] Seek further info [ ]
Comments (including reason for exclusion):

JBI Critical Appraisal Checklist for Qualitative Research

Reviewer: ____________________ Date: ____________________

Author: ____________________ Year: ____________________ Record Number: ____________________

1. Is there congruity between the stated philosophical perspective and the research methodology? [Yes] [No] [Unclear] [Not applicable]
2. Is there congruity between the research methodology and the research question or objectives? [Yes] [No] [Unclear] [Not applicable]
3. Is there congruity between the research methodology and the methods used to collect data? [Yes] [No] [Unclear] [Not applicable]
4. Is there congruity between the research methodology and the representation and analysis of data? [Yes] [No] [Unclear] [Not applicable]
5. Is there congruity between the research methodology and the interpretation of results? [Yes] [No] [Unclear] [Not applicable]
6. Is there a statement locating the researcher culturally or theoretically? [Yes] [No] [Unclear] [Not applicable]
7. Is the influence of the researcher on the research and vice versa, addressed? [Yes] [No] [Unclear] [Not applicable]
8. Are participants, and their voices, adequately represented? [Yes] [No] [Unclear] [Not applicable]
9. Is the research ethical according to current criteria or, for recent studies, and there evidence of ethical approval by an appropriate body? [Yes] [No] [Unclear] [Not applicable]
10. Do the conclusions drawn in the research report flow from the data, the analysis, or interpretation, of the data? [Yes] [No] [Unclear] [Not applicable]

Overall appraisal: Include [ ] Exclude [ ] Seek further info [ ]
Comments (including reason for exclusion):

JBI Critical Appraisal Checklist for Randomized Controlled Trials

Reviewer: ____________________ Date: ____________________

Author: ____________________ Year: ____________________ Record Number: ____________________

1. Was true randomization used for assignment of participants to treatment groups? [Yes] [No] [Unclear] [Not applicable]
2. Was allocation to treatment groups concealed? [Yes] [No] [Unclear] [Not applicable]
3. Were treatment groups similar at the baseline? [Yes] [No] [Unclear] [Not applicable]
4. Were participants blind to treatment assignment? [Yes] [No] [Unclear] [Not applicable]
5. Were those delivering treatment blinded to treatment assignment? [Yes] [No] [Unclear] [Not applicable]
6. Were outcomes assessors blind to treatment assignment? [Yes] [No] [Unclear] [Not applicable]
7. Were treatments groups treated identically other than the intervention of interest? [Yes] [No] [Unclear] [Not applicable]
8. Was follow-up complete, and if not, were strategies to address incomplete follow-up utilized? [Yes] [No] [Unclear] [Not applicable]
9. Were participants analysed in the groups to which they were randomized? [Yes] [No] [Unclear] [Not applicable]
10. Were outcomes measured in the same way for treatment groups? [Yes] [No] [Unclear] [Not applicable]
11. Were outcomes measured in a reliable way? [Yes] [No] [Unclear] [Not applicable]
12. Was appropriate statistical analysis used? [Yes] [No] [Unclear] [Not applicable]
13. Was the trial design appropriate, and any deviations from the standard RCT design (individual randomization, parallel groups) accounted for in the analysis and analysis of the trial? [Yes] [No] [Unclear] [Not applicable]

Overall appraisal: Include [ ] Exclude [ ] Seek further info [ ]
Comments (including reason for exclusion):
Appendix II: Sample Semi-Structured Interview Questions

Demographic
1. What is your professional background? (probe: current work, responsibilities, populations accessed through work)
2. What topics do you consider to be included in women’s sexual and reproductive health?

In this interview, we consider women’s sexual and reproductive health as including, but not limited to, the following topics: puberty & menstruation, gender & sexual orientation, family planning, sexually transmitted infections, maternal & perinatal health, infertility, abortion, cervical cancer, and sexual violence. Given the sensitive nature of conversations related to sexual orientation, abortion, and sexual violence, we will not ask for your opinions on these topics. However, you are free to discuss any topics you wish during our conversation.

3. What is your experience related to women’s sexual and reproductive health?

General
1. How do you describe the understanding and attitudes on sexual and reproductive health topics of young women in your [community/country/city]? (probe: expected gender roles in sexual relationship, expected sexual behaviors, premarital sex, rational and irrational beliefs, sexual satisfaction, multi-partnership)
2. What is the status of intimate/sexual relationships for young people in your [community/country/city]? (Probe: Dating patterns, courting behaviors, male and female differences in dating and courting norms, pattern of sexual behaviors, premarital sex, sexual initiation age, etc)
3. Is there any sexuality education implemented in your [city/country/community] currently? What do you know about it?
4. Can you describe the pros and cons of having sexuality education in your community? (Probe: When should it be done, where and by whom? What effect will it have on the community? What effect will it have on adolescents?)
5. In your professional opinion, what sexual and reproductive health topics should be taught to women and girls in your [community/country/city]? (Probe: what are the most important topics? What topics should not be taught/may be unsafe to teach?)
6. What resources are you aware of for women and girls to learn about sexual and reproductive health in your community? (Probe: school and community based programs, hotlines, etc).

Questions for public health experts
1. What resources does your organization/government/program provide related to sexual & reproductive health education? (Probe: does it meet community needs? What else could be done?)

Questions for medical professionals

1. Describe your patient population. (Probe: Where do your patients live and work? What age groups do you care for?)
2. What problems related to sexual and reproductive health do you see most often in your practice? (i.e. sexually transmitted infections, undesired pregnancy, complications related to pregnancy, sexual violence) About how often do you see each of these problems?
3. How would you describe the attitudes of your adolescent patients surrounding sexual health and reproduction? …adult patients? …male vs. female patients?
4. How would you describe the level of knowledge about sexual health and reproduction among your adolescent patients? …adult patients? …male vs. female patients?

Questions for educators

1. Have you personally engaged in teaching and learning about reproductive health topics? (Probe: With whom? What topics were addressed?)
2. Did you use a curriculum? (Probe: how was it received by learners? …by [parents/ adults/ community members]? Where did you obtain it?)
3. If you designed your own curriculum, how did you go about it? Who helped you? What resources did you use? How did you verify the accuracy of the content?

Final Questions

1. Is there anything we have not covered today that you feel would be important for me to know on this topic?
2. What advice would you have for someone hoping to teach sexual and reproductive health topics to adolescents in your community?