

**Abstract:** *Impoverished adolescents in India, especially children of sex workers, are a highly vulnerable population that is at risk of being infected with HIV/AIDS. In order to protect their reproductive health status, their knowledge of sexual health must be investigated. This study analyzed the data from a survey of 106 men and women that attended ASSET/Swabhiman supplemental education classes in Delhi, India. Results indicated that reproductive health knowledge among this population is satisfactory but lacking in certain areas. Survey participants demonstrated adequate knowledge of sexually transmitted infections (STIs); however, they were much less knowledgeable about contraceptive measures. Among those surveyed, 78.2% thought that condoms were very effective or somewhat effective in preventing HIV/AIDS while 67.6% did not know what pulling out was or they thought it was a “safer” form of sex. Only 55.2% said they had learned about HIV/AIDS in school while 72.6% said they knew nothing at all, only a little, or some about STIs. The need for reproductive health education among this population is imperative and it must be made a focus of supplemental education programs.*

## I. Introduction

### A. Sex trafficking in India

Sex trafficking in India is a dangerous and significant problem. It has destroyed many lives and contributed to India’s extremely high rate of HIV/AIDS infection (Gupta, Raj, Decker, Reed & Silverman, 2009). Annually, around 1.2 million children are trafficked and forced into sex-slavery and many of them do not find out about HIV/AIDS until it is too late (*Child Trafficking*, 2010). Life as a sex-slave is extremely difficult and these young girls and sometimes boys are subject to abuse, slavery, exploitation, societal isolation, and high chances of being infected with sexually transmitted infections (STIs) (Huda, 2006; Beyrer, 2001). While there is very little research regarding children of sex workers, they also face difficult circumstances as they may be brought up in horrifying conditions rampant with corruption and violence. They too may be subject to abuse and seclusion in their communities which can contribute to severe psychological issues (Bletzer, 2005; Huda, 2006; Tsutsumi, Izutsu, Poudyal, Kato & Marui, 2008). The sex-slaves and their children become

stuck in a cycle of desperation and destitution that may lead to the sexual exploitation and slavery of the children as well (Bletzer, 2005). The sex-slaves and their children are effectively excluded from society and prevented from being able to live safe, happy, and healthy lives. Consequently, formal education, supplemental education and access to jobs are very limited for these individuals (Jana, Basu, Rotheram-Borus & Newman, 2004).

*B. The role of ASSET India Foundation in assisting youth in Delhi*

Achieving Sustainable Equality through Technology (ASSET) India Foundation is a non-profit organization that seeks to empower the children of women sex-slaves so that they may avoid this vicious cycle of subservience and slavery. ASSET provides supplemental education to these youth by teaching them skills in information technology (IT) and English and placing them in IT jobs with local companies. By establishing and maintaining relationships with local companies and ensuring that the youth have an avenue to earn revenue through their newfound education, ASSET helps the youth sustain new lives that are based on societal equality and healthy living. ASSET has centers in Delhi, Chennai, Hyderabad, Kolkata, Bangalore and Mumbai. ASSET centers are managed by SMILE Foundation, an Indian NGO that has a significant presence across India. ASSET provides funding and logistical support and SMILE Foundation oversees local NGOs that employ social workers to administer education and training. The education and training, under the program name Swabhiman, is approved by ASSET and SMILE. For the purpose of this study, the NGOs that administer ASSET and SMILE educational materials will be referred to as ASSET/Swabhiman centers. While ASSET and its partners attempt to target children of sex workers for its training, it can be extremely difficult to identify this group. Prostitution is looked down upon and it is challenging to recruit children of sex workers without subjecting them to further stigmatization and isolation. ASSET is a relatively new organization, and thus far they lack adequate manpower, resources, and

community presence to fully overcome this setback. As such, ASSET has been training underprivileged individuals between the ages of 15 and 25, many of whom may or may not be children of sex workers and some of whom may not have identified themselves in that category. In a survey of sex trafficking survivors in India, the majority of victims, 52.5%, were trafficked to Mumbai while only 26.2% were trafficked to Delhi (Gupta et al., 2009). Sexual slavery is more hidden and taboo in certain cities, such as Delhi, and this disparity makes it more difficult to target children of sex workers in these locations. Nevertheless, it is imperative that these at-risk youth also receive training in reproductive health because without it they may be more vulnerable to falling prey to a booming Indian sex trafficking industry and rising rate of HIV/AIDS infections.

### *C. Using English and technology to overcome exploitation*

Training students to use computers and speak English is a substantial aspect of empowering children of sex workers and other underprivileged children. With the growth of the information technology sector across the world, knowledge of computer programming and other computer skills gives ASSET/Swabhiman students the opportunity to compete with students from across the world. Having a computer and a broadband connection levels the playing field since creating and distributing software and software services does not depend on whether one is from the United States of America or from a small village in India. Also, because India has become a hub for creating software and providing software support, with adequate computer training the ASSET/Swabhiman students are able to take advantage of the wealth of jobs in these areas. The baseline computer training that ASSET/Swabhiman centers provide can serve as a springboard for more advanced training that could make these students competitive in India and beyond. Teaching English to underprivileged youth is important because English is a prime determinant of socioeconomic success across the world. In fact, Madhu Kishwar (2006), the Senior Fellow at Delhi's Centre for the

Study of Developing Societies, has said that mastery of English is the “single most influential factor that determines access to elite institutions, and hence to important avenues of economic and social advancement” (p. 4). As such, ASSET/Swabhiman centers employ English teachers and utilize English language instruction software to ensure that students are able to master the basics of communicating in English. These two areas of instruction are significant to the development of underprivileged children and children of sex workers in India; however, this may not be sufficient. It is of utmost importance that the students are educated in reproductive health issues so that they are empowered to take control of their health and protect against STIs.

*D. The need for reproductive health knowledge*

India is an extremely conservative country. The topics of sex, reproduction, contraception, and STIs are rarely discussed openly and they are rarely incorporated into formal education and other societal training (Menon, 2009). This poses a significant risk to the population that ASSET India targets because without adequate reproductive health knowledge, these poverty-stricken youth may have an increased likelihood of partaking in unsafe sex practices and getting infected by a dangerous disease. While ASSET/Swabhiman centers conduct some reproductive health training, a comprehensive reproductive health education course must be more heavily emphasized alongside computer skills and English language skills to help foster a knowledgeable population that can thrive and survive even after being trained. If this does not happen, precious resources may be being wasted on educating a population that could easily fall prey to debilitating diseases. This could rob them of their newfound lives and dash their hopes for a better future. In order to install an effective reproductive health education course that will better educate ASSET/Swabhiman students, it is vital that their current knowledge of reproductive health is thoroughly assessed.

## II. Purpose

### *A. Assessment of reproductive health knowledge*

The purpose of this study was to determine the reproductive health knowledge of 15 to 25 year old individuals that live in the slums of Delhi, India and are part of ASSET/Swabhiman supplemental education programs. It is expected that these individuals will have poor knowledge of reproductive health because they have low socio-economic status and access to resources.

### *B. Correlation between access to resources and reproductive health knowledge*

This study seeks to identify what variables, including age, gender, education level, access to technology and media, and access to health care, contribute most significantly to the population's reproductive health knowledge. With the exception of gender one would expect there is a positive correlation between the previously listed variables and reproductive health knowledge. The older an individual is the more likely he or she has had first-hand experience in dealing with reproductive health issues. Furthermore, he or she is more likely to be married and have engaged in sexual activity that might raise a need for contraception and protection against infection. The more educated an individual is the more likely he or she has thought about or been exposed to reproductive health issues. This applies to both formal education in school and supplemental education through participation in ASSET/Swabhiman programs. This study will explore whether formal education or supplemental education is more important for contributing to overall reproductive health knowledge.

Access to technology, media, and health care are measured by looking at one's access to computers, television and doctors. Like education and age these variables should raise the probability that one encounters topics such as sex and STIs.

In investigating gender, this study will help gauge the difference between what men and women know about reproductive health. Oftentimes, the woman bears the burden of responsibility when it comes to sex and its consequences. The most obvious example of this is that if a woman is impregnated, she is ultimately responsible for the health and well-being of the subsequent child because she is physically carrying the baby in her womb. On the other hand, the man can easily forgo any responsibility for he has no physical or emotional attachment to the child of a sex slave. Another example is that in India's sex trade men are known to pay more for sex slaves that do not require condom usage. According to a PBS Frontline Report by reporter Raney Aronson (2004), "women get the equivalent of US\$1.50 for sex, \$2 on a good night, less than a dollar on a bad night. To have sex without a condom, men will often pay more..." This demonstrates that not only is it the woman's job to ensure condom usage, the men are often against it. What makes this even worse is that many of these women have no idea what HIV/AIDS is and therefore they do not insist that males wear condoms. Determining the differences between what men and women know will allow one to examine issues of gender disparity given that females are typically relegated to a lower status in Indian society. Thus, it will aid in the creation of a reproductive health curriculum that takes gender disparity into account and is tailored differently for each sex depending on their knowledge level.

### *C. Supplementing curriculum to lower health risks*

This ultimate goal of this project is to help ensure that underprivileged adolescents in India are able to maintain healthy lives. While computer training and English instruction are important aspects of a well-rounded curriculum, without reproductive health education these children may still be at a high risk for health risks such as sexually transmitted diseases. This project seeks to determine the baseline knowledge these students have regarding reproductive health, and with this

information it will be possible to create a comprehensive curriculum for ASSET that will be most effective in curtailing sex trafficking and the spread of sexually transmitting diseases as a result.

*D. Summary of purpose:*

- Determine reproductive health knowledge of 15 to 25 year olds individuals living in slums of Delhi and receiving supplemental education at an ASSET/SMILE center
- Determine the major independent variables contributing to reproductive health knowledge

### **III. Literature Review**

*A. Sex trafficking in Delhi and broader India*

The United Nations has defined sex trafficking as “...the recruitment, transfer, harboring, or receipt of persons via threat, force, coercion, abduction, fraud, or deception and/or for the purpose of sexual exploitation, including prostitution” (United Nations, 2000). Sex trafficking is an egregious act that constitutes a gross violation of human rights. At a fundamental level, the presence of sex trafficking can be attributed to significant demand for subservient women and children and a buying power sufficient to support said demand (Huda, 2006). In fact, around 600,000 to 800,000 individuals are trafficked across all national borders each year and 80% of them are women and girls (U.S. Department of State, 2006). Men seek to exploit these women and children in order to “reinforce their masculinity and exercise power over the weak and vulnerable” (Huda, 2006). The problem of sex trafficking has been especially bad in South Asia where it is said that around 150,000 women and girls are trafficked across the region annually (Miko & Park, 2001). South Asia has been hit so hard for several reasons including high levels of poverty, civil and political conflict, globalization, and gender disparity (Beyrer, 2001; Huda, 2006). The prevalence of poverty in South

Asia leads some to leave their countries of origin to look for opportunities in others. This search can culminate in being lured or forced into the sex trade as a victim of trafficking. Furthermore, poverty can lead to some individuals entering the sex trade as traffickers and propagators of trafficking in an industry that brings in an estimated revenue of \$9.5 billion a year (U.S. Department of State, 2006). Civil and political conflict can lead to an increase in asylum seekers, refugees, and other displaced individuals (Beyrer, 2001). Violence against and trafficking of displaced women is often increased during periods of armed conflict and wars in Nepal and Afghanistan have resulted in women entering the sex trade in other parts of South Asia (Beyrer, 2001; Huda, 2006). Globalization has brought an increase in the sex trade in South Asia and across the world. People are able to easily travel across borders and participate in sex tourism which contributes greatly to the tourism industry and economy as a whole (Huda, 2006; Poulin, 2003). Gender disparity and various forms of discrimination in South Asia can lead to the relegation of women to a lower status. This can leave them vulnerable to exploitation and slavery in the sex trade (Huda, 2006).

India has been placed on the Tier 2 Watch List of the U.S. Department of State's 2009 Trafficking in Persons Report. It is characterized as being "a source, destination, and transit country for men, women, and children trafficked for the purposes of forced labor and commercial sexual exploitation" (p. 155). This has helped contribute to India's HIV/AIDS epidemic as studies have demonstrated that high percentages of sex-trafficked women are HIV-positive (Gupta et al., 2009). In a population of Nepalese survivors of human trafficking, 30% of the sex-trafficked women were HIV-positive (Tsutsumi et al., 2008). Within India, most sex-trafficked women end up in Mumbai (U.S. Department of State, 2005) while other primary destinations appear to be Pune City and Delhi (Gupta et al., 2009; Silverman et al., 2007). There appears to be little research regarding sex trafficking and prostitution in Delhi. A study of 61 survivors of sex trafficking in Mysore, India found

that 26.2% of them had been trafficked to Delhi (Gupta et al., 2009) and another study of 287 Nepalese survivors of sex trafficking found that 12.4% of them had been trafficked to Delhi (Silverman et al., 2007). According to Anjali Pathak, the Deputy Director at Apne Aap Women Worldwide, an NGO dedicated to ending sex trafficking of women and children, the most common areas for sex-slavery in Delhi are G.B. Road and Najafgarh (personal communication, July 9, 2009). Her organization and others seek to improve the education level of individuals vulnerable to the sex trafficking trade.

### *B. Reproductive health knowledge in India*

One very important aspect of education of vulnerable populations is reproductive health education. The United Nations Educational, Scientific and Cultural Organization (UNESCO) and the United Nations Population Fund (UNFPA) define reproductive health education as “an educational experience” that allows children to understand their sexuality and gives them the ability to make responsible reproductive health decisions (UNESCO & UNFPA, 1998, p. 13). By educating individuals in matters of reproductive health, the implication is that they will be able to make better decisions that will allow them to protect and preserve their reproductive health. Someone who understands that he/she can get a dangerous sexually transmitted infection by having unprotected sex would be less likely to engage in such action. It has been consistently demonstrated that such knowledge is lacking in many parts of India. The second National Family Health Survey, conducted in 1998 to 1999, surveyed approximately 90,000 ever-married women from all across India. It demonstrated that only 40% of these women had ever heard of AIDS (IIPS, 2000). A survey of husbands in Uttar Pradesh, India found that these men had minimal knowledge of STIs (Singh, Bloom & Tsui, 1998). It is evident that reproductive health knowledge is lacking significantly among both men and women in India. Pallikadavath et al. (2005) argued that women “consistently lag behind men” (p. 110) in HIV

awareness. This is due to gender disparity in India that results in women having more limited access to health-related knowledge than men. It is important to note that reproductive health education cannot alone be sufficient for protecting reproductive health; however, it is a key step towards it.

New research indicates that reproductive health knowledge, such as HIV awareness, is fast increasing in India and this is an extremely positive development (IIPS, 2007). The third National Family Health Survey, conducted in 2005 to 2006, found that 57% of ever-married women surveyed had heard of AIDS and that 80% of men had (IIPS, 2007). This is a marked 17% improvement over married women's knowledge of HIV during 1998 to 1999. This can be attributed to several factors including the Government of India's use of electronic media, such as television, and other programmatic targeted interventions employed to teach the population about AIDS. This comprehensive survey also indicated that knowledge of AIDS increases with both wealth and education. Almost all women who had completed 12 or more years of schooling, 99% of them, were aware of AIDS (IIPS, 2007). This reinforces the importance of education in ensuring that the population is knowledgeable about reproductive health issues.

### *C. Cultural perceptions of reproductive health in India*

Despite recent government efforts to increase knowledge of AIDS and other aspects of sexual health, India remains a conservative country. Until the 1980s sexuality was almost completely hidden from the public view; however, this has changed slightly since the start of the AIDS epidemic, and the opening of the Indian economy and subsequent influx of Western television channels to Indian television (Menon, 2009). The rise of AIDS in India forced the country to respond to this dangerous infection and this brought sex into the public discourse as it mobilized NGOs that worked to stop the spread of AIDS. Later, the arrival of Western television channels in India, which are much more liberal in their treatment and portrayal of sex than Indian channels, helped

challenge traditional Indian views of monogamous patriarchal marriage (Menon, 2009). India has a patriarchal society in which men are clearly defined as the dominant sex (Asthana & Oostvogels, 2001). Asthana and Oostvogels (2001) stated that this social hierarchy is so unmistakable in Indian society that Indian men, unlike Latin men, do not have to overtly establish their masculinity since it is ingrained within societal norms. Life in India is so contingent upon the traditional family that biological reproduction represents an assertion of the manhood of the father. Even acts such as adoption, which is believed to represent infertility, are highly maligned (Asthana & Oostvogels, 2001; Bharadwaj, 2003). Further evidence of India's conservatism is found in its penal code which is rooted in old British law and still punishes sodomy and "sexual acts against the order of nature." (Asthana & Oostvogels, 2001; Menon, 2009). In Western Europe and the United States homosexuality is often accepted as a social category and even an identity; however, in India such relations are forbidden and this same category is not recognized (Asthana & Oostvogels, 2001).

This conservatism and male dominated societal hierarchy is directly tied to sexual repression, especially of women, and an ignorance of important reproductive health issues (Menon, 2009). Even highly educated and privileged populations experience a dearth of training in reproductive health. A study of sexual knowledge and behavior among Indian medical students in Delhi found that only around 20% of them could discuss sex-related issues with their parents, teachers, and persons of the opposite sex. Additionally, this group had experienced almost no sex education at school, while most of them, 84.1%, felt that such training should be incorporated within the curriculum (Aggarwal, Sharma & Chhabra, 2000). While this latter number is a positive development, it is unrepresentative of the entire Indian population, most of whom do not have access to such a high level of education. It is abundantly clear that sexuality and reproductive health are severely under-addressed in Indian society. This has contributed to a lack of knowledge in

reproductive health issues, an inability to protect and preserve reproductive health, and a subsequent high prevalence of HIV/AIDS. An effort must be made to change cultural perceptions of reproductive health in India so that all populations, especially highly vulnerable sex workers and underprivileged youth, are empowered to take control of their own livelihood.

#### **IV. Methods**

##### *A. Study design and sample*

This study was a cross-sectional study and it targeted 106 men and women between the ages of 15 and 25 that completed a comprehensive reproductive health survey. All of these individuals were from different communities in Delhi, a metropolitan area that is the National Capital Territory of India. Delhi contains the capital of India, New Delhi, which is the third largest city in India (Government of India, 2003). Delhi has a population of over 13 million people and it is an eclectic mixture of various cultures and religions (Government of India, 2003). A majority of Delhi's population, 82%, is Hindu, while 11.7% of Delhiite's are Muslim and 4.0% are Sikh (Government of India, 2003). The literacy rate in Delhi is 82% and the per capita income is Rs 66,728 (US\$1,493) (Government of India, 2003; Mohan, 2008). The three different communities within Delhi that were the focus of this study were all served by ASSET/Swabhiman centers where the local population could receive supplemental services and education. The first site, run by the local NGO Health and Care Society, was in Dhaula Kuan, a neighborhood located in South West Delhi. The second site was run by the local NGO Sahyogita Samaj Vikas Santha. It was located in Chhatarpur, a community in close proximity to Chhatarpur Mandir, the second largest temple in India. The third site, run by the local NGO Prerana, was in Badarpur, a peri-urban location that was fast becoming a slum due to recent migration. The sites in Dhaula Kuan and Chhatarpur primarily served women while the site in

Badarpur catered to both men and women. At Dhaula Kuan, 40 women were surveyed. This project worked with social workers from the Health and Care Society and other community leaders to recruit women by word of mouth to complete the survey. Most women came to the Health and Care Society location while others came to a local community leader's home to fill out the survey.

Photo 1: Recruiting women to fill out surveys in their homes while on a field visit in Chhatarpus



At Chhatarpur, another 40 women were surveyed and this study worked with social workers from Sahyogita Samaj Vikas Santha who recruited women to fill out the survey. Most participants came to Sahyogita Samaj Vikas Santha to fill out the survey; however, others were stuck at home taking care of their young children or completing chores. The social workers from Sahyoita Samaj Vikas participated in a field visit to these homes where the women completed the surveys at their homes. At Badarpur, 26 men and women were surveyed as they attended class at the ASSET center run by Prerana.

## *B. Measurements*

### *1. Survey development*

The reproductive health survey was designed to determine respondents' knowledge of four major facets of reproductive health: condoms, birth control, emergency contraception and STIs (see Appendix I for survey questions). The survey also obtained detailed demographic information about each respondent, information about their first-hand experiences with reproductive health issues, sources from which they learned about reproductive health, and their level of access to technology and healthcare. Survey questions were modified and abstracted from various sources such as the National AIDS Control Organization (NACO) National Behavioral Surveillance Survey, the Kaiser Family Foundation National Survey about Sex, the Liberia Demographic and Health Survey, and the Tanzania HIV Indicator and Survey. The survey was revised and edited in conjunction with Dr. Douglas Taren, the Honors Thesis Advisor for this project, Priyanka Jain Vats, a Project Officer for SMILE Foundation's Swabhiman program, and Farha Naz, a social worker with Swabhiman.

### *2. Translation of survey from English to Hindi*

The translation of the survey was conducted with Ms. Jain Vats and Ms. Naz. Difficulties that arose with translating the survey were associated with some incompatibilities between English and Hindi. For example, English terms such as emergency contraception and oral sex did not have corresponding equivalents in Hindi. This was overcome by using language to more literally describe the concepts and actions these terms represented. Ms. Jain Vats and Ms. Naz are extremely skilled in Hindi and English and they were able to navigate the complexities of both languages. They provided valuable insight and adjusted the language of the survey in order to ensure it could be comprehended by its target audience.

### *C. Data collection*

As described in the Research Design and Sample section, the survey data were collected by individuals completing surveys when they were present at an ASSET/SMILE center or by completing them in their homes during field visits. Each survey took around 15 to 25 minutes to administer depending upon how literate the respondent was. Illiterate respondents required more time as someone was needed to read them the questions and record their answers. The surveys were provided to respondents on paper and they recorded their answers by circling them. The ASSET/Swabhiman social workers double-checked completed surveys in order to ensure that every question was answered. This was difficult to keep track of because we were somewhat undermanned for the task and the respondents were often in a hurry to finish. Prior to administering the surveys, participants were asked to provide verbal consent and they were reminded that participation in the study was completely voluntary. Furthermore, they were told they could stop filling out their survey at any time.

### *D. Data management*

After all 106 surveys were completed and collected; the data were input into the computer using the CDC's Epi Info software. At this stage, all answers were given a numerical value. For example, for questions that called for a yes or no response, an answer of "yes" was given a value of 1 and "no" was given a value of 0. Data were missing when individuals failed to answer questions and data were considered questionable when participants circled multiple answers or it was unclear as to which answer was being selected. In both of these cases, no data were entered and the questions were left unanswered in order to treat all data equally and allow as little bias as possible. After all survey data were inputted, they were outputted and converted into a Microsoft Excel file for export into data analysis software.

The software used for analyzing the survey data was Stata 9.1. Stata was used to recode existing variables, generate new variables and assign new values to answers. In order to do this, the survey was broken down into dependent and independent variables for reproductive health knowledge. The independent variable, total reproductive health knowledge, was determined to be the sum of knowledge of contraceptive measures and knowledge of sexually transmitted diseases. Applicable survey questions were then grouped according to whether they addressed contraception or STIs and all survey answers were given weighted numerical values depending upon whether they were determined to be the best answer. For example, question 30 on the survey asked if a person can become infected by sharing food with another person who has HIV/AIDS. In this case, “no” is the best answer and a person who answered it correctly was given a score of 1, while a person who said “yes” was given a score of 0. Each survey question was scored in this manner so that knowledge of contraceptive measures was given a score out of 35, knowledge of STIs was given a score out of 55, and total reproductive health knowledge was given an additive score out of 90 (being the sum of knowledge of contraceptive measures score and knowledge of STIs score).

#### *E. Statistical analysis*

Once all survey questions were properly coded and recoded, the data were output from Stata in order to create tables and charts in Microsoft Excel. Descriptive tables, also known as one-way tables, were created to summarize the profiles of all individuals surveyed and they included respondents’ demographic information, information about their access to technology and health care, and information about the sources from which they learned about reproductive health. Two-way tables were created to measure each respondent’s knowledge of certain aspects of reproductive health with respect to a particular independent variable such as their age, gender, or level of schooling. A correlation table was created to measure the relationships among all

independent variables: age, gender, level of formal schooling, level of supplemental schooling, level of access to television, level of access to computers, level of access to doctors, and whether they were taught about HIV/AIDS in school or not. Lastly, regression tables were created to determine which independent variables were most important to shaping an individual's total knowledge of reproductive health.

## **V. Results**

### *A. Demographics of participants*

Among the 106 individuals surveyed in this study, the ages were evenly distributed between 15 and 25 years old (see Appendix II for tables of results). One individual was aged 30 and her survey results were disqualified from being considered, therefore 105 respondents' answers were considered in this study (Table 1). The majority of the respondents, 82.9%, were female while only 17.1% were male (Table 2). The level of formal schooling was quite varied among the population; however, 58.1% of them had relatively low education level of 7<sup>th</sup> grade or less (Table 3). The entire population was recruited from three different ASSET/Swabhiman centers and 51% of them had spent 6 months or less in one of these supplemental education programs (Table 4). The data indicate that almost all of the population, 89.4%, had access to television while only 38.1% had access to computers (Tables 5 and 6). This suggests the ubiquity of television, even among underprivileged populations. Access to health care is shown to be lacking among the individuals surveyed as 41.3% had been to a doctor several times while the remaining had been to a doctor once or twice or never at all (Table 7). Slightly more than half of those surveyed, 55.2%, claimed to have been taught about HIV/AIDS in school (Table 8); however, only 12 individuals listed school as a source from which they learned about HIV/AIDS (Table 10). Most of those surveyed listed that they

had learned about relationships and sexual health and HIV/AIDS through supplemental education from ASSET/Swabhiman centers (Tables 9 and 10). Females had a significantly higher mean number of learning sources for HIV/AIDS infection than males (Table 11). Interestingly, those with access to doctors learned about relationships and sexual health and HIV/AIDS from significantly fewer sources than those without access to doctors (Table 11). With increasing age, individuals learned about relationships and sexual health from more sources while no such correlation existed for learning about HIV/AIDS. Lastly, survey participants with access to television learned about relationships and sexual health from more sources than those without access to television (Table 11).

*B. Knowledge of reproductive health with respect to demographic variables*

Males had significantly higher knowledge of birth control than females and higher overall knowledge of contraceptive measures. Those with access to computers had significantly higher knowledge of birth control than those without access. Those that had been taught about HIV/AIDS in school had significantly higher knowledge of emergency contraception than those who had not been taught in school. With increasing age, individuals had higher overall knowledge of contraceptive measures. This same trend was observed for individuals who had spent a longer time in supplemental schooling at an ASSET/Swabhiman center; however, there was no trend between level of formal schooling and knowledge of contraceptive measures (Table 12).

Males had significantly higher knowledge of the relationship between STIs and condoms than females and higher overall knowledge of STIs. Those with access to doctors had significantly higher knowledge of the effects of STIs on other conditions and higher overall knowledge of STIs than those without access to doctors (Table 13).

Older individuals had higher total knowledge of reproductive health, although interestingly, respondents aged 18 to 20 had slightly less knowledge than respondents that were 15 to 17. Males had higher total knowledge of reproductive health than females and they had the highest knowledge out of all groups. Those with a college education knew a great deal more about reproductive health than all other formal schooling levels and respondents that had received training in an ASSET/Swabhiman center for over 4 years had the second highest total knowledge of reproductive health (after males). Having access to television, computers, doctors, or having been taught about HIV/AIDS in school all contributed to higher total knowledge of reproductive health (Table 14).

### *C. Correlations between demographic variables*

There were several correlations between the various independent variables that were studied. There was a significant correlation between level of formal schooling and being female; level of formal schooling and access to television; having access to computers and being female; having access to computers and level of formal schooling; having access to doctors and the length of time spent in supplemental schooling at an ASSET/Swabhiman center; being taught about HIV/AIDS in school and access to television; between being taught about HIV/AIDS in school and level of formal schooling; and, being taught about HIV/AIDS in school and access to computers. There was a significant negative correlation between access to computers and length of time spent in supplemental schooling at an ASSET/SMILE center; length of time spent in supplemental schooling at an ASSET/Swabhiman center and being male; and, being taught about HIV/AIDS in school and age (Table 15).

#### *D. Regression analysis of most important factors contributing to reproductive health*

The best model that explained which factors were associated with knowledge of contraceptive measures included length of time spent in supplemental schooling at an ASSET/Swabhiman center and level of formal schooling (Table 16). Interestingly, having access to doctors was negatively associated with knowledge of contraceptive measures. The best model that explained which factors were associated with knowledge of STIs included age and if they were taught about HIV/AIDS in school (Table 17). The best model that explained which factors were associated with total knowledge of reproductive health included age, gender, and if they were taught about HIV/AIDS in school (Table 18).

## **VI. Discussion**

#### *A. Assessment of reproductive health knowledge and demographic variables*

The reproductive health knowledge of the population in question is deemed to be fair but lacking significantly in many areas. Knowledge of contraceptive measures was deficient, especially in the area of birth control where 67.6% either did not know what pulling out was or thought it was a “safer” form of sex. Furthermore, 65.7% said that sex during “safe” times of the month was a form of “safer” sex and 27.2% said that birth control pills could protect against HIV/AIDS. This data demonstrate many misconceptions regarding the value of various forms of birth control and might give insight into some of the practices employed by these individuals to protect against having children. The fact that males had significantly more knowledge about birth control than females illustrates the gender disparity in India that results in men having greater access to information than females.

Survey participants appeared to have much more knowledge of STIs than contraceptive measures, especially about the relationship between STIs and condoms. In fact, 78.2% thought that condoms were either very effective or somewhat effective in preventing HIV/AIDS and 87.2% thought that if a husband had an STI his wife would be justified in asking that they use a condom. This demonstrates adequate knowledge of the effectiveness of condoms in protecting against HIV/AIDS. Many of the individuals surveyed also demonstrated excellent knowledge about reproductive health resources. For example, 83.6% of the population knew where they could obtain condoms. This knowledge can likely be attributed to recent efforts made by the Indian Government to reduce the spread of HIV/AIDS through various educational initiatives. While the population demonstrated good practical knowledge of STIs, it is notable that when asked how much they knew about STIs, a staggering 72.6% answered nothing at all, only a little, or some while only 27.4% answered that they knew a lot. Furthermore, when asked if HIV/AIDS can be transferred by mosquito bites, 36.9% incorrectly answered that it could be. This highlights the strong emphasis placed on teaching about preventing STIs through condom use; however, it demonstrates a lack of in-depth knowledge of STIs. While the survey participants had good knowledge of certain aspects of reproductive health, major gaps in their understanding remain.

*B. Correlation between access to resources and reproductive health knowledge*

As predicted, the data suggest that the variables age, gender, education level, access to technology and media, and access to health care all contribute to greater knowledge of reproductive health. According to regression analysis, the variables that contributed most significantly to total knowledge of reproductive health included age, gender, and if they were taught about HIV/AIDS in school.

While there was a slight lapse in knowledge for 18 to 20 year olds, older individuals had more knowledge than younger ones. The fact that 18 to 20 years old persons possessed less knowledge than 15 to 17 year old persons is likely an anomaly and the product of the small sample size surveyed. Individuals aged 24 to 25 had significantly more knowledge than individuals aged 15 to 20 and this suggests the importance of experiences in early adulthood, such as marriage and childbirth, which would contribute to reproductive health knowledge. Unsurprisingly, males knew more about reproductive health than females. This further illustrates the problem of gender disparity in India as males often have more access to information and resources. Women lack knowledge about reproductive health and yet they bear the brunt of the burden for the consequences of sex. Thus, men can use this to their advantage by using sex as a tool for exerting more power and dominance over women. Only 55.2% of the population surveyed had been taught about HIV/AIDS in school. This is abysmal considering India's HIV/AIDS epidemic and given its importance in contributing to reproductive health knowledge this must be improved. Surprisingly, formal education level and length of time spent in an ASSET/Swabhiman center were not identified to have contributed most significantly to total reproductive health knowledge. This can be ascribed to an overall lack of instruction about reproductive health in school and ASSET/Swabhiman centers.

Despite this lack of instruction, long-term education was still an important factor in contributing to reproductive health knowledge. Formal schooling had little effect on knowledge of reproductive health for those below a college education; however, those with a college education or above knew the most about reproductive health out of all groups except males and persons that had spent over 4 years in an ASSET/Swabhiman center. All individuals without a college education had a similar knowledge of reproductive health and illiterate individuals actually possessed higher reproductive health knowledge than those who had a 5<sup>th</sup>, 6<sup>th</sup>, or 7<sup>th</sup> grade education. Clearly, reproductive health

instruction is lacking until the college level. Supplemental schooling in an ASSET/Swabhiman center had little impact on improving reproductive health knowledge for those who had attended these centers for fewer than 4 years. Individuals who had attended them for over 4 years had a much greater knowledge of reproductive health. This brings into question the caliber and thoroughness of the existing reproductive health training in ASSET/Swabhiman centers and might signify the importance of day to day interactions between the youth and the social workers at these centers. These informal interactions might include discussions about issues relating to reproductive health and over time this could culminate in a drastic improvement of reproductive health knowledge.

### *C. Limitations*

There were several limitations in this study and additional research and analysis is required to thoroughly understand the factors that contribute to reproductive health knowledge. First, the study was conducted over two months and was only able to survey a small population size of 106 people in Delhi. It would be advantageous to be able to survey more individuals at all ASSET/Swabhiman centers across the country to give a better picture of their knowledge of reproductive health. Second, this research is concentrated solely on individuals who attended ASSET/Swabhiman centers and did not compare this population to other groups of people including underprivileged youth who were unable to attend ASSET/Swabhiman centers and youth of varying socio-economic status. This type of data would be valuable because it would allow one to concretely determine how much more or less reproductive health knowledge a certain group possesses. Third, the various ASSET/Swabhiman centers in Delhi are different and this study did not account and control for these differences. Each center is managed and administered by local NGOs that have distinctive missions and diverse social workers in charge of furthering these missions. As a result, there can be differences in curriculum focuses and environment. For example, one location

might make reproductive health education more of a priority compared to another. With more time, this study would control for these variations so that the extent that differences in reproductive health knowledge are due to unique characteristics of each site could be known and minimized. Finally, more multi-factorial analysis and analysis of the interactions among variables should be conducted in this study. This would give a better understanding of how various factors affect each other and work together or against one another to formulate one's reproductive health knowledge.

## **VII. Conclusions**

- ASSET/Swabhiman students had adequate knowledge of STIs, especially about the relationship between STIs and condoms
- ASSET/Swabhiman students had inadequate knowledge of contraceptive measures, especially birth control
- Reproductive health instruction is severely lacking in school and in ASSET/Swabhiman centers
- Males are much more knowledgeable about reproductive health than females

## **VIII. Recommendations**

Individuals that attend ASSET/Swabhiman centers in Delhi, India are forgotten adolescents and young adults between the ages of 15 and 25. These people are of extremely low socio-economic status and some of their parents are sex workers who have been trafficked for the purpose of sexual exploitation. These underprivileged youth, especially those that are children of sex workers, are at the bottom of India's societal hierarchy and can be especially prone to sexual slavery or being

trafficked for the purpose of sexual exploitation. ASSET India Foundation works with various NGOs in India to provide these children with education and training in English and computers. These youth receive limited education in reproductive health; however, it is not a primary focus of ASSET's curriculum. India has a high rate of HIV/AIDS, which is propagated by the large amount of sex trafficking that occurs across its borders (Gupta et al., 2009). Without adequate reproductive health education, these youth could be especially vulnerable to HIV/AIDS and other STIs.

An individual's reproductive health knowledge is formed from a complex amalgamation of diverse learning sources. We learn from formal instruction, peers, health care providers, first-hand experience, and many others. This study surveyed 106 ASSET/Swabhiman students to determine their baseline knowledge of reproductive health and to determine which variables played the most significant role in formulating their reproductive health knowledge. This information can be used to supplement ASSET's curriculum with relevant and effective reproductive health education that will help ensure they can maintain healthy and happy lives. This study recommends that ASSET/Swabhiman centers incorporate reproductive health education into its curriculum as a third focus, along with computer and English instruction. This education should be especially sensitive to women's lack of understanding in this area by beginning at a more basic level for women than for men. With this knowledge, these individuals will have a greater chance to succeed and survive as they will be more effectively able to protect and preserve their sexual health.

## **IX. Synthesis of Experiences**

This study was an excellent learning experience for me. Through it, I uncovered much about cross-cultural research and India. Research is a time-consuming process that requires patience and persistence. Throughout the course of this study, several road blocks presented themselves. For

example, it was extremely difficult to have the survey translated from English to Hindi. I spoke to several individuals who knew Hindi; however, none of them knew how to translate any of the reproductive health related terminology. For some, they had been away from Hindi for too long and they had lost grasp of formal Hindi. Others had attended English school in India and knew English better than Hindi. I also tried to contact individuals that advertised themselves as English to Hindi translators; however, they charged exorbitant amounts of money for their services. While I never thought translation of a survey from English to Hindi while in a Hindi-speaking country would be a problem, it turned out to be a major issue. This was compounded by the fact that I do not possess very advanced skills in spoken and written Hindi and it was difficult to articulate exactly what I wanted. With only two weeks left in the trip to India, I did not have the survey translated and had thus not surveyed anyone. Fortunately, two individuals in SMILE Foundation stepped up and indicated they could translate the survey. We worked together as a group to translate the survey. Because I can understand Hindi, I was able to help ensure it was as accurate of a representation of the original English survey as possible. This was evidence of the difficulties associated with cross-cultural research. Had speaking Hindi not been a problem for me, it would have been much easier to speak with others, explain to them what I wanted, and ultimately connect with someone who could help me.

I have lived in Western society my entire life; however, at home I was raised in Indian culture. My parents were born and raised in India and although they engrossed me and my siblings in its culture, working and completing an internship there was a culture shock. In North America, communication between people is often direct and to the point; however, in India directness can be offensive. It was difficult for me to communicate effectively because I had to do so in a more round-about manner to be polite. Compared to Western society, Indian society is much more relaxed. This

made it tough for me to push forth my project and goals in a timely manner, given that I only had two months to spend in the country. Every country has rich and poor people and in India this contrast is unmistakable. The rich are extremely wealthy while the poor are destitute; and yet mansions sometimes surround shacks and lots where poor people reside. Despite this proximity, these two classes live in separate worlds and assimilation rarely occurs. India has been a poor country for quite a long time, and this “new rich” is not yet interested in philanthropy and giving. As such, even though NGOs are now beginning to spring up to help the impoverished, the class-divide between them and more wealthy social workers remains. There is often a patronizing attitude among social workers that was present at the ASSET/Swabhiman centers. These social workers work extremely hard and are very dedicated and this condescending attitude stems more from a lack of culture of giving rather than maliciousness. Regardless, this was still very difficult to reconcile. As described earlier, language was a barrier because of my inability to speak and write in Hindi. Beyond this, even though many of the social workers spoke some English their skill level was lacking and there was much lost in translation. There were a number of times when I thought I was on the same page as another individual; however, they actually had not understood what I was saying and they were hesitant to speak up. India is an extremely unique country; it has an untapped population of passionate youth. These individuals have a deep desire to succeed but have never had the opportunity; many have never even been able to attend school. If India can find away to tap this potential and harvest the talent of these young boys and girls they could have access to a huge resource and an extremely talented workforce. NGO’s like ASSET India Foundation and SMILE Foundation are at the forefront of this movement and with more support India has the ability to raise millions of people out of poverty and into a life that is rooted in equality.

## X. Appendix I

### Reproductive Health Survey

1. How old are you?
  - 16
  - 17
  - 18
  - 19
  - 20
  - 21
  - 22
  
2. What is your sex?
  - Male
  - Female
  
3. Are you currently attending school?
  - Yes
  - No
  
4. Have you attended school in the past?
  - Yes
  - No
  
5. If yes, what grades? Please check all that apply.
  - Kindergarten
  - Grade 1
  - Grade 2
  - Grade 3
  - Grade 4
  - Grade 5
  - Grade 6
  - Grade 7
  - Grade 8
  - Grade 9
  - Grade 10
  - Grade 11
  - Grade 12
  
6. Do you have access to television?
  - Yes
  - Yes, but very limited
  - No

7. Do you have access to computers?

- Yes
- Yes, but very limited
- No

8. Have you ever been to a doctor?

- Yes, several times
- Yes, once or twice
- No

9. How many months have you been at the ASSET center?

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

10. Which of the following have you learned from about relationships and sexual health?

- Parents
- Brothers or Sisters
- Friends
- Boyfriends, Girlfriends, Partners
- Doctors
- TV
- Movies
- Internet
- School
- Newspapers, Magazines, or Books
- I have not learned about relationships and sexual health

11. Have you ever been taught about the following topics in school or anywhere else?

Moral Values

- Yes
- No
- I Don't Know

Changes in Boys' Bodies During Puberty

- Yes
- No
- I Don't Know

Changes in Girls' Bodies During Puberty

- Yes
- No
- I Don't Know

Sex and Sexual Behavior

- Yes
- No
- I Don't Know

Contraception

- Yes
- No
- I Don't Know

HIV/AIDS

- Yes
- No
- I Don't Know

Condom Use to Avoid Sexually Transmitted Diseases

- Yes
- No
- I Don't Know

12. In your opinion, how effective are condoms at doing the following:

Preventing pregnancy

- Very Effective
- Somewhat Effective
- Not Too Effective
- Not at All Effective
- I Don't Know

Preventing HIV/AIDS

- Very Effective
- Somewhat Effective
- Not Too Effective
- Not at All Effective
- I Don't Know

Preventing other STDs

- Very Effective
- Somewhat Effective
- Not Too Effective
- Not at All Effective
- I Don't Know

13. Do you know where condoms can be obtained?

- Yes
- No
- Unsure

14. Please tell me whether you agree or disagree with each of these statements.

It is not that big of a deal to have sex without a condom once in awhile

- Strongly Agree
- Somewhat Agree
- Somewhat Disagree
- Strongly Disagree
- Don't Know

Unless you have a lot of sexual partners you don't need to use condoms

- Strongly Agree
- Somewhat Agree
- Somewhat Disagree
- Strongly Disagree
- Don't Know

Condoms break a lot

- Strongly Agree
- Somewhat Agree
- Somewhat Disagree
- Strongly Disagree
- Don't Know

It is hard to bring up the topic of condoms

- Strongly Agree
- Somewhat Agree
- Somewhat Disagree
- Strongly Disagree
- Don't Know

Sex without a condom isn't worth the risk

- Strongly Agree
- Somewhat Agree
- Somewhat Disagree
- Strongly Disagree
- Don't Know

15. Safer sex means different things to different people. Do you consider the following to be a form of "safer" sex?

Sex with a Condom

- Yes
- No
- I don't Understand

Sex Using Other Kinds of Birth Control

- Yes
- No
- I don't Understand

"Pulling Out"

- Yes
- No
- I don't Understand

Sex During "Safe" Times of the Month

- Yes
- No
- I don't Understand

Oral Sex

- Yes
- No
- I don't Understand

16. In your opinion, how effective are birth control pills at doing the following:

Preventing pregnancy

- Very Effective
- Somewhat Effective
- Not Too Effective
- Not at All Effective
- I Don't Know

Preventing HIV/AIDS

- Very Effective
- Somewhat Effective
- Not Too Effective
- Not at All Effective
- I Don't Know

Preventing other STDs

- Very Effective
- Somewhat Effective
- Not Too Effective
- Not at All Effective
- I Don't Know

17. As far as you know, if a girl has just had sex and thinks she might be pregnant, is there anything she can do in the next few days to prevent pregnancy?

- Yes
- No
- I Don't Know

18. Have you ever heard of emergency contraceptive pills, sometimes called morning after pills?

- Yes
- No

19. To the best of your knowledge what are emergency contraceptive pills (morning after pills) used for?

- To end pregnancy (to cause an abortion)
- To prevent pregnancy?
- I have never heard of them

20. How much do you know about sexually transmitted disease (STDs, such as gonorrhea, herpes, genital warts or syphilis) like how they're spread or how to know if you have one?

- A lot
- Some
- Only a little
- Nothing at all

21. Do you believe you can get an STD (Sexually Transmitted Disease) by:

Kissing

- Yes
- No
- I Don't Know

Oral Sex

- Yes
- No
- I Don't Know

Sexual Intercourse

- Yes
- No
- I Don't Know

22. Please tell me whether you agree or disagree with each of these statements about sexually transmitted diseases and sexual activity.

Unless you have sex with a lot of people, STDs are not something you have to worry about

- Strongly Agree
- Somewhat Agree
- Somewhat Disagree
- Strongly Disagree
- Don't Know

STDs can only be spread when symptoms are present

- Strongly Agree
- Somewhat Agree
- Somewhat Disagree
- Strongly Disagree
- Don't Know

STDs are a nuisance but they do not have any serious health effects

- Strongly Agree
- Somewhat Agree
- Somewhat Disagree
- Strongly Disagree
- Don't Know

If someone I was dating had an STD, I would know it

- Strongly Agree
- Somewhat Agree
- Somewhat Disagree
- Strongly Disagree
- Don't Know

It is hard to bring up the topic of STDs with a partner

- Strongly Agree
- Somewhat Agree
- Somewhat Disagree
- Strongly Disagree
- Don't Know

23. Do you believe STDs can cause the following?  
Some Kinds of Cancer

- Yes
- No
- I Don't Know

Problems with Fertility (Difficulty Having Children)

- Yes
- No
- I Don't Know

Increased Risk for HIV/AIDS

- Yes
- No
- I Don't Know

24. Please state whether you agree or disagree with the following statement.  
If a husband has a sexually transmitted disease:

his wife is justified in refusing to have sexual intercourse with him

- Strongly Agree
- Somewhat Agree
- Somewhat Disagree
- Strongly Disagree
- Don't Know
- Refused

his wife is justified in asking that they use a condom

- Strongly Agree
- Somewhat Agree
- Somewhat Disagree
- Strongly Disagree
- Don't Know

25. Have you ever been taught about AIDS or HIV infection in school?

- Yes
- No

26. From which of the following have you learned about AIDS or HIV infection?

- Parents
- Brothers or Sisters
- Friends
- Boyfriends, Girlfriends, Partners
- Doctors
- TV
- Movies
- Internet
- School
- Newspapers, Magazines, or Books
- I haven't learned about AIDS or HIV infection

27. Of all the new HIV infections that occur each year, how many do you think occur among people 25 and younger?

- About three quarters
- About half
- About a quarter
- Less than a quarter
- I don't know

28. Can HIV/AIDS can be prevented by:

using condoms

- Yes
- No
- Unsure

limiting sexual intercourse to one uninfected partner

- Yes
- No
- Unsure

abstaining from sexual intercourse

- Yes
- No
- Unsure

29. Can HIV/AIDS be transmitted by mosquito bites?

- Yes
- No
- Unsure

30. Can HIV/AIDS be transmitted by hugging someone?

- Yes
- No
- Unsure

31. Can a person become infected by sharing food with a person who has HIV/AIDS?

- Yes
- No
- Unsure

32. Can a healthy-looking person have HIV/AIDS?

- Yes
- No
- Unsure

33. Can HIV/AIDS be transmitted from a mother to her baby?

- Yes
- No
- Yes, but it can be reduced if the mother takes special medicines
- Unsure

34. Can HIV/AIDS be prevented by using condoms?

- Yes
- No
- Unsure

35. Would you:

be willing to care for a relative with HIV/AIDS in own home

- Yes
- No
- Unsure

buy fresh vegetables from a shopkeeper who has HIV/AIDS

- Yes
- No
- Unsure

Say that a female teacher who has HIV/AIDS but is not sick should be allowed to continue teaching

- Yes
- No
- Unsure

keep secret that a family member got infected with HIV/AIDS

- Yes
- No
- Unsure

36. Do you personally know anyone who has HIV or AIDS?

- Yes
- No
- I Don't Know

37. Do you personally know anyone who has had a sexually transmitted disease other than HIV/AIDS?

- Yes
- No
- I Don't Know

38. Do you know where people may be tested for HIV/AIDS?

- Yes
- No
- Unsure

39. Do you believe there are effective treatments for HIV/AIDS?

- Yes
- No
- I Don't Know

## XI. Appendix II

### A. Demographics of participants

**Table 1** Age distribution of survey participants

Age	Frequency	Percent
15-17 yrs	30	28.6
18-20 yrs	31	29.5
21-23 yrs	29	27.6
24-25 yrs	15	14.3
Total	105	

**Table 2** Gender distribution of survey participants

Gender	Frequency	Percent
Female	87	82.9
Male	18	17.1
Total	105	

**Table 3** Education—Level of formal schooling attained by survey participants

Formal Schooling	Frequency	Percent
Illiterate	6	5.7
≤ 4th Grade	10	9.5
5-7th Grade	45	42.9
8-12th Grade	29	27.6
College or above	15	14.3
Total	105	

**Table 4** Education—Length of time survey participants have received supplemental schooling in an ASSET/SMILE center

<b>Supplemental Schooling</b>	<b>Frequency</b>	<b>Percent</b>
≤ 6 months	51	51
1 year	20	20
2-4 years	24	24
> 4 years	5	5
Total	100	

**Table 5** Access to technology & media—Frequency and percentage of survey participants with access to television

<b>Access to Television</b>	<b>Frequency</b>	<b>Percent</b>
Yes	93	89.4
No	11	10.6
Total	104	

**Table 6** Access to technology & media—Frequency and percentage of survey participants with access to computers

<b>Access to Computers</b>	<b>Frequency</b>	<b>Percent</b>
Yes	40	38.1
No	65	61.9
Total	105	

**Table 7** Access to health care—Frequency and percentage of survey participants with access to doctors

<b>Access to Doctors</b>	<b>Frequency</b>	<b>Percent</b>
Yes	43	41.3
No	61	58.7
Total	104	

**Table 8** Reproductive Health Learning Sources—Frequency and percentage of survey participants that were taught about HIV/AIDS in school

<b>Taught about HIV/AIDS in school</b>	<b>Frequency</b>	<b>Percent</b>
Yes	53	55.2
No	43	44.8
Total	96	

**Table 9** Reproductive Health Learning Sources—Most common learning sources for relationships and sexual health among survey participants

<b>Learning Sources for relationships and sexual health</b>	<b>Frequency</b>
Swabhiman/ASSET	63
Boyfriends, Girlfriends, Partners	32
TV	15
School	10
Newspapers, Magazines, Books	7
Parents	6
Brothers or Sisters	6
Doctors	5
Have not learned reproductive health	4
Internet	0

**Table 10** Reproductive Health Learning Sources—Most common learning sources for HIV/AIDS Infection among survey participants

<b>Learning Sources for HIV/AIDS Infection</b>	<b>Frequency</b>
Swabhiman/ASSET	70
Friends	21
TV	19
School	12
Newspapers, Magazines, Books	9
Doctors	8
Movies	5
Brothers or Sisters	4
Boyfriends, Girlfriends, Partners	4
Have not learned about relationships and sexual health	3
Parents	2
Internet	1

B. Knowledge of reproductive health with respect to demographic variables

**Table 11** Reproductive Health Learning Sources—Mean number of learning sources for relationships and sexual health and HIV/AIDS infection among survey participants with varying characteristics

Characteristics	Number of Learning sources for relationships and sexual health Mean ± 1SD	Number of Learning sources for HIV/AIDS Mean ± 1SD
Age		
15-17 yrs	1.0±0.6 (30)	1.6±1.0 (30)
18-20 yrs	1.5±1.0 (31)	1.4±0.8 (30)
21-23 yrs	1.5±0.9 (28)	1.4±0.7 (28)
24-25 yrs	1.6±1.0 (15)	1.6±1.1 (15)
Gender		
Female	1.4±0.8 (86)	<b>1.6±0.9* (85)</b>
Male	1.4±1.0 (18)	<b>1.1±0.2 (18)</b>
Formal Schooling		
Illiterate	1.2±0.4 (6)	1.3±0.5 (6)
≤ 4th Grade	1.4±1.2 (9)	1.2±0.8 (10)
5-7th Grade	1.3±0.8 (45)	1.6±0.8 (43)
8-12th Grade	1.4±0.9 (29)	1.4±1.0 (29)
College or above	1.7±1.0 (15)	1.6±1.2 (15)
Supplemental Schooling		
≤ 6 months	1.3±0.9 (51)	1.5±0.9 (50)
1 year	1.3±0.4 (20)	1.6±1.1 (20)
2-4 years	1.8±1.1 (24)	1.5±0.8 (23)
> 4 years	1.0±0 (5)	1.2±0.4 (5)
Access to Television		
Yes	1.4±0.9 (93)	1.5±0.9 (92)

No	1.0±0.4 (11)	1.2±0.6 (10)
Access to Computers		
Yes	1.5±0.9 (39)	1.4±0.9 (40)
No	1.3±0.9 (65)	1.5±0.9 (63)
Access to Doctors		
Yes	<b>1.1±0.5† (42)</b>	<b>1.2±0.5* (41)</b>
No	<b>1.6±1.0 (61)</b>	<b>1.6±1.0 (61)</b>
Taught about HIV/AIDS in school		
Yes	1.5±0.9 (53)	1.5±0.9 (53)
No	1.3±0.8 (42)	1.5±0.9 (42)

A. n=sample size

B. p<0.05"; "† p<0.01"; "§ p<0.001

**Table 12** Knowledge of contraceptive measures among survey participants with varying characteristics

Characteristics	Condom Knowledge Mean $\pm$ 1SD (n)	Birth Control Knowledge Mean $\pm$ 1SD (n)	Emergency Contraception Knowledge Mean $\pm$ 1SD (n)	Total Knowledge of Contraceptive Measures Mean $\pm$ 1SD (n)
<b>Age</b>				
15-17 yrs	12.1 $\pm$ 3.0 (25)	5 $\pm$ 2.0 (22)	3.8 $\pm$ 1.6 (28)	20.7 $\pm$ 4.9 (21)
18-20 yrs	12.4 $\pm$ 2.4 (25)	4.8 $\pm$ 1.8 (20)	3.8 $\pm$ 1.4 (31)	21.1 $\pm$ 2.9 (19)
21-23 yrs	12.8 $\pm$ 4.0 (23)	5.5 $\pm$ 2.2 (19)	3.7 $\pm$ 1.0 (28)	21.6 $\pm$ 5.1 (16)
24-25 yrs	15.2 $\pm$ 3.4 (11)	5.3 $\pm$ 2.3 (14)	3.8 $\pm$ 1.4 (15)	24.8 $\pm$ 5.3 (10)
<b>Gender</b>				
Female	12.6 $\pm$ 3.3 (72)	<b>5.0<math>\pm</math>2.0* (67)</b>	3.8 $\pm$ 1.4 (84)	21.4 $\pm$ .6 (59)
Male	14.3 $\pm$ 3.0 (12)	<b>6.5<math>\pm</math>1.8 (8)</b>	3.6 $\pm$ 1.2 (18)	23.7 $\pm$ 4.8 (7)
<b>Formal Schooling</b>				
Illiterate	9.6 $\pm$ 4.8 (5)	4.3 $\pm$ 1.0 (6)	3.5 $\pm$ 1.4 (6)	17.8 $\pm$ 4.7 (5)
$\leq$ 4th Grade	13.2 $\pm$ 2.6 (6)	5.1 $\pm$ 2.6 (7)	3.2 $\pm$ 1.3 (9)	22.2 $\pm$ 5.0 (5)
5-7th Grade	12.5 $\pm$ 3.2 (36)	5.0 $\pm$ 1.9 (33)	3.8 $\pm$ 1.3 (43)	21.4 $\pm$ 4.3 (29)
8-12th Grade	13.1 $\pm$ 2.9 (24)	5.5 $\pm$ 2.1 (19)	3.7 $\pm$ 1.5 (29)	21.9 $\pm$ 4.2 (18)
College or above	14 $\pm$ 3.7 (13)	5.3 $\pm$ 2.5 (10)	4.2 $\pm$ 1.0 (15)	23.6 $\pm$ 5.7 (9)
<b>Supplemental Schooling</b>				
$\leq$ 6 months	12.3 $\pm$ 3.6 (41)	5.3 $\pm$ 1.8 (36)	3.6 $\pm$ 1.4 (50)	20.6 $\pm$ 4.9 (33)
1 year	12.7 $\pm$ 2.2 (17)	5.4 $\pm$ 2.4 (14)	3.8 $\pm$ 1.4 (20)	22.1 $\pm$ 4.9 (12)
2-4 years	13.3 $\pm$ 3.2 (20)	4.7 $\pm$ 2.3 (19)	3.9 $\pm$ 1.2 (23)	22.3 $\pm$ 3.9 (16)
> 4 years	15.3 $\pm$ 4.5 (3)	4 $\pm$ 2.8 (2)	4.3 $\pm$ 1.5 (4)	26.5 $\pm$ 0.7 (2)
<b>Access to Television</b>				
Yes	12.7 $\pm$ 3.2 (74)	5.1 $\pm$ 2.1 (68)	3.8 $\pm$ 1.3 (90)	21.6 $\pm$ 4.6 (60)
No	13.8 $\pm$ 4.4 (9)	4.5 $\pm$ 1.0 (6)	3.5 $\pm$ 1.4 (11)	20.8 $\pm$ 5.5 (5)

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Access to Computers				
Yes	13.7±3.4 (32)	<b>5.8±2.1* (28)</b>	3.9±1.2 (40)	23.2±4.2 (25)
No	12.3±3.2 (52)	<b>4.7±1.9 (47)</b>	3.7±1.4 (62)	20.7±4.6 (41)
Access to Doctors				
Yes	12.9±3.6 (30)	4.7±2.1 (26)	3.7±1.3 (43)	21.2±4.6 (20)
No	12.8±3.2 (54)	5.4±2.0 (49)	3.8±1.3 (59)	21.8±4.7 (46)
Taught about HIV/AIDS in school				
Yes	12.4±3.2 (45)	4.8±2.0 (37)	<b>4.1±1.2† (51)</b>	21.1±4.3 (34)
No	13.1±3.5 (34)	5.3±2.0 (32)	<b>3.3±1.4 (43)</b>	21.6±5.0 (28)

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- A. Condom Knowledge is scored out of 20; Birth Control Knowledge is scored out of 10; Emergency Contraception Knowledge is scored out of 5; Total Knowledge of Contraceptive Measures is scored out of 35
- B. n=sample size
- C. \* p<0.05"; "† p<0.01"; "§ p<0.001

**Table 13** Knowledge of sexually transmitted infections (STIs) among survey participants with varying characteristics

Characteristics	General knowledge and knowledge of how STIs are spread Mean ± 1SD (n)	Knowledge of the effects of STIs on other conditions Mean ± 1SD (n)	Knowledge of relationship between STIs and condoms Mean ± 1SD (n)	First-hand experience/knowledge of STIs Mean ± 1SD (n)	Total Knowledge of STIs Mean ± 1SD (n)
Age					
15-17 yrs	24.5 ± 6.4 (21)	3.8±0.9 (28)	7.9±2.4 (26)	1.0±0.7 (30)	37.9±9.1 (18)
18-20 yrs	26.14± 5.2 (21)	3.8±1.4 (28)	8.6±2.4 (23)	1.0±0.8 (31)	38.9±8.5 (18)
21-23 yrs	26.4 ± 3.8 (23)	4.2±1.6 (27)	9.2±1.4 (19)	0.8±0.6 (27)	42.7±4.4 (15)
24-25 yrs	26.3 ± 4.7 (12)	4±1.6 (15)	9.3±0.9 (10)	0.9±0.7 (15)	42.3±5.3 (8)
Gender					
Female	25.6±5.2 (67)	4.0±1.2 (81)	<b>8.4±2.2* (68)</b>	0.9±0.7 (86)	39.6±7.8 (53)
Male	27.3±4.2 (10)	4.0±1.9 (17)	<b>10±0 (10)</b>	0.9±0.7 (17)	44.2±3.1 (6)
Formal Schooling					
Illiterate	23.5±4.8 (6)	4.2±1.3 (5)	10.0±0 (3)	0.8±0.4 (6)	41.3±2.5 (3)
≤ 4th Grade	22.7±4.4 (9)	4.4±1.3 (10)	8.0±2.1 (8)	0.7±0.5 (9)	36.3±6.3 (6)
5-7th Grade	25.7±5.3 (29)	4.0±1.1 (40)	8.1±2.4 (34)	1.0±0.7 (45)	39.0±8.3 (23)
8-12th Grade	27.0±5.4 (22)	4.0±1.7 (28)	9.0±2.1 (23)	1.0±0.8 (28)	40.9±8.4 (19)
College or above	27.4±3.5 (11)	3.6±1.4 (15)	9.5±1.0 (10)	0.9±0.5 (15)	43.4±4.7 (8)
Supplemental Schooling					
≤ 6 months	25.2±5.3 (37)	3.8±1.4 (46)	8.6±2.3 (34)	0.9±0.6 (50)	39.5±7.8 (25)
1 year	26.9±5.1 (16)	4.0±1.3 (20)	8.6±1.7 (16)	1.0±0.8 (20)	41.1±7.4 (13)
2-4 years	25.2±5.3 (17)	4.1±1.4 (22)	8.5±2.3 (20)	0.8±0.5 (24)	38.7±8.2 (15)
> 4 years	27.0±4.8 (4)	5.2±1.1 (5)	9.0±2.0 (4)	1.4±0.9 (5)	43.0±7.4 (4)
Access to Television					

Yes	25.9±5.2 (67)	4.0±1.4 (87)	8.6±2.2 (69)	1.0±0.7 (92)	40.2±7.6 (53)
No	24.6±4.5 (9)	3.8±1.3 (10)	8.9±1.7 (8)	0.5±0.5 (11)	38.5±8.3 (6)
<b>Access to Computers</b>					
Yes	26.3±5.2 (28)	3.7±1.6 (39)	8.5±2.8 (28)	1.0±0.7 (38)	39.6±9.2 (21)
No	25.5±5.1 (49)	4.1±1.2 (59)	8.7±1.6 (50)	0.9±0.7 (65)	40.3±6.7 (38)
<b>Access to Doctors</b>					
Yes	26.5±3.8 (27)	<b>4.4±1.2† (39)</b>	9.0±1.4 (31)	1.0±0.8 (42)	41.6±5.0 (21)
No	25.5±5.7 (49)	<b>3.6±1.3 (58)</b>	8.4±2.5 (46)	0.9±0.6 (60)	39.4±8.7 (37)
<b>Taught about HIV/AIDS in school</b>					
Yes	26.6±5.1 (40)	4.0±1.3 (51)	8.5±2.4 (42)	1.0±0.6 (53)	40.5±7.8 (35)
No	24.5±4.9 (31)	3.9±1.2 (41)	8.8±1.7 (31)	0.8±0.8 (42)	38.6±7.6 (21)

- A. General knowledge and knowledge of how STIs are spread is scored out of 36; Knowledge of the effects of STIs on other conditions is scored out of 6; Knowledge of relationship between STIs and condoms is scored out of 10; First-hand experience/knowledge of STIs is scored out of 3; Total Knowledge of STIs is scored out of 55
- B. n=sample size
- C. \* p<0.05"; "† p<0.01"; "§ p<0.001

**Table 14** Total knowledge of reproductive health among survey participants with varying characteristics

Characteristics	Total Reproductive Health Knowledge Mean $\pm$ 1SD
Age	
15-17 yrs	59.4 $\pm$ 11.5 (14)
18-20 yrs	59.3 $\pm$ 11.3 (13)
21-23 yrs	66.1 $\pm$ 7.4 (10)
24-25 yrs	67.6 $\pm$ 7.5 (7)
Gender	
Female	61.6 $\pm$ 10.3 (42)
Male	74.0 $\pm$ 1.4 (2)
Formal Schooling	
Illiterate	60.7 $\pm$ 8.1 (3)
$\leq$ 4th Grade	61.5 $\pm$ 3.5 (2)
5-7th Grade	60.6 $\pm$ 10.2 (19)
8-12th Grade	61.3 $\pm$ 13.1 (13)
College or above	68.9 $\pm$ 5.9 (7)
Supplemental Schooling	
$\leq$ 6 months	61.3 $\pm$ 9.9 (18)
1 year	62.3 $\pm$ 12.0 (10)
2-4 years	61.0 $\pm$ 10.6 (13)
> 4 years	73.5 $\pm$ 2.1 (2)
Access to Television	
Yes	62.7 $\pm$ 10.0 (40)
No	56.8 $\pm$ 14.4 (4)

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Access to Computers	
Yes	62.3±12.3 (16)
No	62.1±9.4 (28)
Access to Doctors	
Yes	63.3±7.2 (13)
No	61.7±11.6 (31)
Taught about HIV/AIDS in school	
Yes	61.9±9.6 (25)
No	61.1±12.1 (16)

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- A. Total Reproductive Health Knowledge is scored out of 90
- B. n=sample size
- C. \* p<0.05"; "† p<0.01"; "§ p<0.001

C. Correlations between demographic variables

**Table 15** Correlation between independent variables contributing to reproductive health knowledge

	Age (n)	Gender (n)	educate2 (n)	Length (n)	Television (n)	Computers (n)	Doctor (n)	Taughtaids (n)
Age	1  (105)							
Gender	0.0187 0.8501 (105)	1  (105)						
educate2	-0.0033 0.973 (105)	<b>0.2879</b> <b>0.0029</b> (105)	1  (105)					
Length	0.1422 0.1582 (100)	<b>-0.2932</b> <b>0.0031</b> (100)	-0.1632 0.1046 (100)	1  (100)				
Television	-0.1774 0.0716 (104)	0.1573 0.1107 (104)	<b>0.1846</b> <b>0.0607</b> <b>(104)</b>	0.0646 0.523 (100)	1  (104)			
Computers	0.0279 0.7779 (105)	<b>0.4237</b> <b>0</b> <b>(105)</b>	<b>0.4581</b> <b>0</b> <b>(105)</b>	<b>-0.2578</b> <b>0.0096</b> <b>(100)</b>	0.1372 0.1648 (104)	1  (105)		
Doctor	0.1237 0.2109 (104)	-0.0744 0.4526 (104)	-0.0328 0.7412 (104)	<b>0.2391</b> <b>0.0171</b> <b>(99)</b>	-0.0969 0.3303 (103)	-0.0617 0.5335 (104)	1  (104)	
Taughtaids	<b>-0.336</b> <b>0.0008</b> <b>(96)</b>	-0.0433 0.6755 (96)	<b>0.1999</b> <b>0.0508</b> <b>(96)</b>	-0.016 0.8806 (91)	<b>0.2078</b> <b>0.0433</b> <b>(95)</b>	<b>0.3516</b> <b>0.0004</b> <b>(96)</b>	0.0473 0.6487 (95)	1  (96)

A. Top number is correlation value, second number is p value, n=sample size.

B. Age= age in years; Gender=0-female, 1-male, educate2=level of formal schooling; Length=length of time spent in supplemental schooling in an ASSET/SMILE center; Television=access to television; Computers=access to computers; Doctor=access to doctors; Taughtaids=taught about HIV/AIDS in school, 0-No, 1-Yes

D. Regression analysis of most important factors contributing to reproductive health

**Table 16** Stepwise Regression Model for Knowledge of Contraceptive Measures

contraceptivekn	Coefficient	Standard Error	P>  t
Length	0.28	0.1	0.01
Doctor	-1.34	0.61	0.03
educate2	1.83	0.53	0
Constant	16.28	1.48	0

A. F (3, 55): 6.17; Prob > F: 0.00; R-squared: 0.25; Adj R-squared: 0.21

B. contraceptivekn=knowledge of contraceptive measures; Length=length of time spent in supplemental schooling in an ASSET/SMILE center; Doctor=access to doctors; educate2=level of formal schooling

**Table 17** Stepwise Regression Model for Knowledge of Sexually Transmitted Infections (STIs)

stdkn	Coefficient	Standard Error	P>  t
Age	0.96	0.4	0.02
Taughtaids	4.23	2.26	0.07
Constant	18.73	8.19	0.03

A. F (2, 50): 3.56; Prob > F: 0.04; R-squared: 0.12; Adj R-squared: 0.09

B. stdkn=knowledge of STIs; Age=age in years; Taughtaids=taught about HIV/AIDS in school

**Table 18** Stepwise Regression Model for Total Knowledge of Reproductive Health

reprokn	Coefficient	Standard Error	P>  t
Age	1.58	0.63	0.02
Gender	15.05	7.31	0.05
Taughtaids	7.67	3.70	0.05
Constant	25.76	13.33	0.06

A. F (3, 36): 3.66; Prob > F: 0.02; R-squared: 0.23; Adj R-squared: 0.17

B. reprokn=total knowledge of reproductive health; Age=age in years; Gender=0-female, 1-male; Taughtaids=taught about HIV/AIDS in school

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