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Adolescents' Insight into STDs, HIV/AIDS and Family Welfare Methods: Current Status and Myths from School Based Study in Varanasi, India

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Abstract

Indian culture prohibits sexual interaction prior to marriage but realities are far from these restrictions. The scarcity of data on premarital sexual activity, awareness of contraceptives, HIV/AIDS and STDs among unmarried adolescents, encouraged us to conduct this study. The aim of this paper is to assess the level of comprehensive knowledge of school adolescents regarding transmission and prevention of HIV/AIDS and STDs and awareness about various contraceptives. The present study is school based cross-sectional study conducted in the urban area of Varanasi, India. It consists of 650 boys and 1022 girls of the 9th and 11th standard from a different background. Both boys and girls are interviewed through self-administered structured questionnaire maintaining a high level of confidentiality. Bivariate and multivariate analyses were performed to identify the factors associated with adolescents' knowledge and behavior. With regard to knowledge of contraceptives, the awareness of condom is highest among adolescents. Our study shows that adolescents are less aware of STDs (64 percent boys and 47 percent girls) as compared to HIV/AIDS. More than two third of adolescents were unaware that HIV could be transmitted from a mother to his child through breastfeeding. Knowledge is associated with age, medium of school, their involvement in sexual activity and whether they are getting coeducation. Adolescents' involvement in unsafe sexual activities and lack of knowledge regarding contraceptives, sexually transmitted diseases including HIV/AIDS pose a threat to adolescent sexual and reproductive health. Formal sex education and special intervention programs should be implemented at a school level and promote adolescent friendly health clinics for better counseling of adolescents on the aspects of contraceptives, abortion, STIs/RTIs and HIV.

Background

Globally 1.8 million adolescents aged 10–19 years are infected with HIV, of which the majority was girls and which accounts for 5 percent of all HIV infections (Idele et al., 2014). Around 830 adolescents were infected with HIV every day in 2012 (UNICEF, 2013; Idele et al., 2014). These alarming figures attract researchers to work especially for adolescents. Adolescence is one of life's most interesting and perhaps challenging phase of life, within which the individual gets sexual and physical maturity, growing levels of self-independence, self-confidence, autonomy and able to take social responsibilities. The beginning of this developmental period marked by the onset of puberty resulting into emerging of sexual feelings and at this point of time they start unsafe sexual practices. Early onset of unsafe sexual practice increases the chance of multiple partners and thus more chance of STIs. The UNICEF's report 'The State of the World's Children 2011: Adolescence – An Age of Opportunity' pointed out that there are an estimated 1.2 billion adolescents (individual of 10-19 years age group) in the world, which comprises around 18 percent of the global population (UNICEF, 2011). India has the largest adolescents (253.2 million) and one person in every five is an adolescent (Census of India, 2011). For getting the complete realization of the demographic dividend, India must have to pay heed towards the quality of adolescence as their reproductive health sets the stage for the health of the future generation.

Worldwide, age at puberty for adolescents is decreasing and adolescents are delaying their marriage thus having more time for premarital sex (Das & Ray, 2007; Walvoord, 2010). Their unprotected sexual experimentation without knowing the outcome of intercourse makes them most vulnerable to face sexually transmitted diseases (STDs), HIV/AIDS, unwanted adolescent pregnancies, and unsafe hazardous abortions (Das & Ray, 2007; Naswa & Marfatia 2010; Blum et al., 2012). For most of the adolescents, sexual relationship is often temporary character and sometimes, they have multiple partners. The use of contraceptive among them before the sexual union is either

not prevalent or its use is irregular. It is worthwhile to be noted that the sexual abuse among adolescents is commonly prevalent in India. Many adolescents have to face a variety of abuse from exposure to pornographic material, forced sex and kissing, rape, trafficking for sex work etc. at several places like school, home and on the streets. The rising level of unemployment, substance misuse, juvenile violence, early puberty & early entry into sexual union, rising age at marriage, non-consensual sexual encounters, unintentional pregnancy and stealthy abortions, etc. making young adolescents more prone to life-threatening diseases like HIV/AIDS and RTIs/STIs (Jaya & Hindin, 2007;Fatusi&Hindin, 2010; Cottingham, 2011; Sawyer et al., 2012; Blum et al., 2012;).

There are substantial efforts like Adolescent Reproductive and Sexual Health (ARSH) programme, and the Adolescent Education Programme (AEP) is implemented by Government of India for filling the gap of knowledge of sexual and reproductive health issues (Sivagurunathan et al., 2015). However, evaluation of implementation of these programmes suggests that these schemes are neither succeeded in increasing the services for the young socially excluded, dropout and poor adolescents nor improved the quality of facilities received by them (Jejeebhoym & Santhya, 2011; UNICEF, 2013a). In this direction government of India also launched a new programme "Rashtriya Kishor Swasthya Karyakram" in January 2014 as it is a comprehensive program for adolescents' sexual health. A study in Gujarat highlighted a fact that adolescents do not access to these services because of lack of privacy, hesitation in accessing public hospitals, service provider's unresponsive attitude (Kotecha & Patel, 2008; Kotecha et al., 2012).

Many global commitments with various goals and targets have been made by United Nations in response to HIV/AIDS epidemic but the implications are rarely specific to adolescent age group. HIV prevalence among adolescent females tends to be considerably higher than those of adolescent males and age-specific prevalence data shows this disparity clearly (Panchaud et al., 2000; Macro, 2008; Uganda, A.I.D.S. 2012; BAIS IV, 2013). While the lower use of contraception is found among female adolescents than male counterpart in their most recent sexual encounter (UNICEF Global Databases, 2013). About 25 percent patients who are attending government STI clinics are younger than eighteen years old and highly susceptible to HIV/AIDS and over 35 percent of all reported new cases of HIV in India, occur among young people age group 15-24 years (NACO, 2012).

Gonorrhoea, human papilloma virus (HPV), Chlamydia and Syphilis are some common STDs found among the general population. One way to protect adolescents from getting an infection of STI/HIV or getting pregnant is to use condom in consistent and appropriate manner (Rietmeijer et al., 1988; Carey et al., 1992;Ahmed et al., 2001; Warner et al., 2006; Gallo et al., 2007). Another way is to remain in abstinence condition from sexual activity or to be in a long-term monogamous relationship with a non-septic partner. Thus, it is necessary for young adolescents to have sufficient knowledge regarding different contraceptive methods, various form of STIs, causes for the transmission of different STDs & HIV/AIDS and how to prevent or complete treatment of STDs. All the above study concludes that it is crucial that school children need to the knowledge of safe motherhood and HIV/AIDS and they have the right to appropriate information. They need to learn the consequences of unsafe sex, STDs, early and un-spaced pregnancies, abortion and prevention of HIV/AIDS.

In India, mostly available data on reproductive health issues include pregnancy and abortion for married youth of 15-24 age groups. Limited data are available on premarital sexual activity (consensual/non-consensual), the burden of HIV/AIDS among adolescents, sexually transmitted diseases from unmarried adolescents and especially for 10-14 years age group. This limitation restraint us for designing programmes targeting young adolescents (10-14 years) as their needs differ from 15–19 year-olds. Further, Varanasi is a traditional city with prevalent old customs and taboos which restrict adolescents to talk on matters of sexual health openly. Though some previous researchers (Garg et al., 2005; Singh et al., 2014; Srivastava & Singh, 2017) investigated knowledge of school adolescents regarding pubertal changes, pregnancy, abortion and menstruation and perceptions about masturbation and sexual activities. Very fewer studies in India focus on comprehensive knowledge of HIV/AIDS/STDs among school going adolescents. Due to this fact, this study is conducted which addresses these issues. The objective of our study is to assess the level of comprehensive knowledge of school adolescents of Varanasi district regarding transmission and

prevention of HIV/AIDS and STDs and awareness regarding various family welfare methods or contraceptives.

Materials & Methods

The present study is a school-based cross-sectional analytical study, conducted in the urban area of Varanasi district, a holy and traditional city situated in Eastern Uttar Pradesh. For the selection of different schools, a simple random sampling technique is used and responses have been taken from all the students of class 9thand 11th of selected school. We recruited a total of 1800 (700 boys and 1100 girls). Of these, 1672 completed the questionnaire (650 boys and 1022 girls) have been received, yielding a response rate of 92.8 percent. The adolescents are aged between 12-19 years of class 9thand 11thstudying in Hindi/English medium government, private and semi-government schools.

Data have been collected during December 2015 by the postgraduate students of Department of Statistics, Banaras Hindu University, Varanasi, India. Both boys and girls are interviewed through a self-administered structured questionnaire in a confidential manner. A pilot study is also conducted to check the feasibility of the study and required changes in the questionnaire have been done. Before the start of the interview, consent has been received from students as well as their parents and school teachers for participating in the study with briefing them the need and purpose of the study. For maintaining confidentiality during the interview, teachers and parents are not allowed to present there. The questionnaire covered several aspects of adolescents' knowledge and perceptions related to reproductive health.

Knowledge of contraceptive methods: We assessed adolescents' familiarity with several contraceptives available in the market. We put a list of contraceptive methods in the questionnaire and asked whether they have heard of these and its gender-specific correspondence. The summary index, ranging from 0 to 6, assigned one point for each correct response. Based on total score lies between 0-2, 3-4 and 5-6, contraceptive knowledge level can be categorized into low, moderate and high respectively.

Knowledge of Sexually Transmitted Diseases (STDs): The school adolescents are asked whether they had heard about sexually transmitted diseases (STDs). If the response is positive, what is the source of information on STDs and whether they had the knowledge of various symptoms during the occurrence of STDs? Responses are coded '1' if it is correct otherwise '0'. Knowledge here means that respondents have the correct identification of symptoms of STDs. Based on total score lies between 0-2, 3-5 and 6-8, comprehensive knowledge level can be categorized into low, moderate and high respectively.

Comprehensive Knowledge of HIV/AIDS: Respondents were asked whether they had heard about HIV/AIDS. If the response is positive, they are asked to identify the various modes of transmission and prevention of HIV/AIDS. Responses are coded as '1' for the correct answer and '0' for the wrong answer. Further, they are questioned whether HIV/AIDS is curable and asked to distinguish among modes of transmission of HIV/AIDS which actually do not transmit HIV/AIDS. If they have a misconception regarding HIV transmission, '0' score is given otherwise '1' is given.

Comprehensive knowledge of HIV transmission can be categorized into low, moderate and high based on total score for the knowledge of HIV transmission (sum of the score for correct identification and having a misconception regarding the transmission of HIV). Similarly, based on total score for the knowledge of HIV prevention (sum of the score for accurately recognize how HIV could be prevented and whether it is curable), comprehensive knowledge of HIV prevention is classified into low, moderate and high categories.

Chi-square tests were employed for bivariate analysis and multiple logistic regression method is applied for multivariate analysis to assess the determinants of adolescents' knowledge level regarding contraceptive methods, STDs and HIV/AIDS. In each case knowledge level is taken as dependent variable and medium of school (Hindi/English), coeducation (Yes/No), age-group (12-15/16-19) and involvement in physical relationship (Yes/No) variables are considered as independent variables. Variables were entered in multivariate model if p-value<0.01 and p-value<0.05.

Results

Respondents Characteristics: Of the total respondents (650 boys and 1022 girls), 63.7 percent boys and 65.5 percent girls are from government schools, 18.4 percent boys and 20.4 percent girls are from private schools and rest from government aided schools. Majority of boys (53.4 percent) belong to English medium schools and remaining belong to Hindi medium schools. However, 60.1 percent girl respondents are from Hindi medium schools. More than three fourth boys and two third girls are in coeducation school. Among respondents, 47.5 and 54.1 percent boys and girls respectively are studying in class IX and rest in class XI. It is worthwhile to mention from the Table 1 that boys are more (23 percent) involved in any type of physical relationship than girls (9 percent).

Knowledge of contraceptive methods: Table 2 shows the awareness of adolescents about various contraceptive methods. Condom is the most familiar contraceptive among adolescents. Out of 650 boys, 72 percent boys and out of 1022 girls, 49 percent girls have given correct response about condom. Only 28 percent girls know that IUD/Copper-T and Oral pills are women specific contraceptive methods while 59 percent boys know IUD/Copper-T and 53 percent boys are familiar with Oral pills and they are women specific contraceptive method. Asking for permanent methods for family planning, the knowledge level of tubectomy among school adolescents is very much poor (43 percent boys and 22 percent girls) and knowledge of vasectomy is worrisome (19 percent boys and 16 percent girls). For promoting safe abortion and improve maternal health scenario, medical termination of pregnancy (MTP) is introduced in India. Notably, 42 percent boys and 28 percent girls have knowledge of medical termination of pregnancy (MTP). Overall we found that contraceptive knowledge level of female adolescents is lower as compared to male adolescents.

Knowledge of Sexually Transmitted Diseases (STDs): Table 3 represents the school adolescents' knowledge about STDs. Among 650 boys and 1022 girls, 64.2 percent boys and 47.2 percent girls have heard the name of STD. From those who have heard the name of STDs, we asked about the source of information on STDs and its symptoms on the occurrence of STDs. We found that TV (46 percent) and newspaper (44 percent) are the two most preferred sources of STDs among boys, whereas, TV (40 percent) and Teachers (39 percent) are the common sources of information on STDs among girls. However, it is worthwhile to mention that the proportion of parents as a source of information on STDs is extremely low (3.6 and 8.4 percent among boys and girls respectively). Out of those who are acquainted with STDs, 51.9 percent boys and 39.2 percent girls have the knowledge of symptoms of STDs. But a complete understanding of all symptoms is found to be very poor. Nearly 17 percent boys and 11 percent girls identified 'discharge from genitals' as one of the symptoms of STDs. 28 percent boys and 21 percent girls reported 'burning sensation in genitals', about 13 percent boys and 10 percent girls responded 'others like lethargy, white spots', almost 17 percent boys and 14 percent girls spotted 'bleeding from private parts' as one of the symptoms of observing STDs. However, just 10 percent boys and 6 percent girls identified 'enlargement of glands (lymph nodes)' as one of the major symptoms of STDs. Very less percentage of boys and girls responded 'Ulcer/sore formation. Almost equal percentage of adolescent boys and girls has said 'continuous fever' and weakness/headache as STD symptoms (about 22 percent).

Comprehensive Knowledge of HIV/AIDS: Findings of Table 4 describes the adolescents' comprehensive understanding of HIV/AIDS. The question was asked 'have you heard about HIV/AIDS' and it was observed that 80 percent boys and 65 percent girls have heard about HIV/AIDS, i.e., by the result boys are more aware than that of girls. Asking on identification of causes for the transmission of HIV/AIDS from school adolescents who have heard it, it has been noticed that more than 65 percent boys and 54 percent girls replied 'through sexual contact' which is the most prominent cause for the spread of HIV. About three-fifth boys and more than half of the girls (who have heard about HIV/AIDS) know that HIV/AIDS can be transmitted through transfusion of infected blood. 46 percent boys and 47 percent girls identified sharing needles as one of the cause for the transmission of HIV. Over half of the respondents know that a HIV infected pregnant woman can transmit HIV to her child. However merely 18 percent boys and 25 percent girls are aware of transmission of HIV among child though breastfeeding from HIV infected mother. The table also presents knowledge pattern of adolescents about HIV/AIDS prevention. More than two-third of the boys and less than half of the girls, who heard about HIV/AIDS, replied that it could be prevented by practicing safe sex or using condoms. About 48 percent boys and one fourth of the girls believe that having only one faithful sexual partner can prevent occurrence of HIV/AIDS. Further, 45 percent

boys and 47 percent have reported that HIV can be avoided by not sharing needles. Almost 48 percent boys and 40 percent girls are aware of taking tested and safe blood can prevent infection of HIV/AIDS. In spite of above, 27 percent girls know that infection of HIV/AIDS in a newborn baby from her infected mother can be avoided by giving antiretroviral medicine to both, whereas, only 11 percent boys know the same. Notably, just 1 in 10 boys and 3 in 10 girls identified that avoiding sexual practice with an unknown partner can reduce the occurrence of HIV/AIDS. Despite transmission and prevention, table also describes the misconceptions prevailing among school adolescents. More than 7 percent school adolescents perceive that sharing bathroom with HIV infected person can cause HIV/AIDS. Likewise, 9 percent boys and 7 percent girls suspect that shaking hands with HIV infected person can spread HIV/AIDS. Around 15 percent adolescents have wrong perception of HIV infection through bites of mosquito/fly. Some other common wrong believes include kissing HIV infected person (14 percent boys and 9 percent girls think so), sharing utensils of infected person (8 percent boys and 7 percent girls perceive this) and hugging HIV infected person (11 percent boys and 7 percent girls have this opinion) can cause infection of HIV/AIDS. Apart from these, over 18 percent boys and 13 percent girls feel that touching HIV infected blood can cause HIV/AIDS. It is worth to mention that a remarkable proportion of school adolescents (47 percent boys and 49 percent girls) consider HIV/AIDS as a curable disease.

Association between Adolescents' Knowledge and selected variables

Table 5 displays teenager's contraceptive knowledge level according to type of school in which they are presently studying (Government, Private, Government aided), medium of that school (Hindi, English), whether school give coeducation (Yes, No) and age group (12-15 years, 16-19 years). All these variables significantly affect the adolescents' contraceptive knowledge level. Overall among male adolescents, 43 percent, 27 percent and 30 percent have low, moderate and high knowledge respectively whereas among female adolescents, 69 percent have low knowledge, 24 percent have moderate and merely 7 percent have high familiarity with different contraceptives. 35 percent boys and about 8 percent girls of government school are having high knowledge while this proportion among private school adolescents is 14 percent (boys) and only 3 percent (girls). We found that the proportion of adolescents with high contraceptive knowledge is higher in English medium schools than that of Hindi medium schools for both boys and girls. About 55 percent boys, who are getting coeducation, have high familiarity of contraceptives. The proportion of adolescents with low (high) knowledge of contraceptives is decreasing (increasing) and as we move from age group 12-15 years to 16-19 years. It seems that girls feel shy in sharing answers on sexual subjects in traditional society, is the reason behind a wide disparity between proportion of boys and girls.

Table 5 also presents association of comprehensive knowledge of STDs with selected variables. It is found that only for females, the comprehensive knowledge on STDs is significantly associated with type of school in which they are studying at present. Table also gives the percentage distribution of comprehensive knowledge on STDs within the different categories of above mentioned variables. As a whole, 30 percent boys and 28 percent girls have lower familiarity of STDs, 60 percent boys and 67 percent girls are in moderate category and merely 10 percent boys and 5 percent girls have sufficiently high knowledge of STDs. Among all type of schools, the proportion of boys having high familiarity of STDs is found to be maximum in government schools (11 percent) while among girls, it is in private schools (7 percent). About 5 percent boys and nearly 2 percent girls of Hindi medium schools have high awareness regarding symptoms of STDs. However similar proportion in English medium schools is found to be higher than that found in Hindi medium schools (15 percent boys and 8 percent girls). Apart from above, no boys studying in schools with coeducation, is found with high knowledge on STDs but around 7 percent and 15 percent girls from the same background have high and low familiarity of STDs respectively. It can be seen from the table that 37 percent, 56 percent and 7 percent boys in the age group 12-15 years, have low, moderate and high knowledge of STDs respectively. On the other hand, in the age group 16-19 years, the same proportions are 26 percent, 63 percent and 11 percent respectively. Similarly girls having high knowledge of STDs have found more in higher age group.

Table 6 depicts the association between adolescents' knowledge level of HIV/AIDS transmission and various variables (Type of school, medium of school, coeducation and age-group). It also shows the percentage distribution of adolescents among low, moderate and high knowledge of

HIV/AIDS transmission. The result of chi-square independence of attributes shows that for male adolescents, type of school, medium of school, coeducation and age group are significantly associated with knowledge level of transmission. However, for female adolescents, only medium of school and coeducation variable are significantly associated with knowledge level. Overall 22 percent boys and 21 percent girls have high familiarity of various transmission modes of HIV. 44 percent boys and 49 percent girls have moderate knowledge and nearly 34 percent boys and 30 percent girls have low awareness of different transmission modes of HIV. It has been found among boys, the proportion of boys having high knowledge is highest for government schools (25 percent). On the other hand, among girls, proportion of girls having high knowledge of HIV transmission, is highest for Private schools (26 percent). When analyzing according to medium of school, around 51 percent and 5 percent boys (42 percent and 10 percent girls) from Hindi medium schools, have low and high familiarity of HIV transmission respectively while opposite scenario is observed for English medium schools. 20 percent, 35 percent boys (14 percent and 35 percent girls) from English medium background, have low and high knowledge respectively. Among adolescents receiving coeducation 20 percent boys and 17 percent girls have low, and 48 percent boys and 35 percent girls have high knowledge. Reverse condition is found for adolescents not receiving coeducation. We have observed more than 38 percent boys and 35 percent girls have low and only 13 percent boys and 15 percent girls have high familiarity with various modes of transmission of HIV.

Table 6 also gives a picture of the association between adolescents' knowledge level of HIV/AIDS prevention according to some selected variables. The findings of chi-square independence of attribute shows that type of school, medium of school, coeducation and age-group all are associated with male's knowledge about HIV prevention, whereas, only medium of school and coeducation variable significantly associated with female's knowledge regarding HIV prevention. Merely 17 percent boys, 12 percent girls of private school and 6 percent boys, almost 6 percent girls of government aided school have higher knowledge concerning different methods of HIV prevention. More than one third of the total respondents in various types of schools belong to low knowledge category. Approximately 3 percent adolescents from Hindi medium background have high familiarity of prevention of HIV. However 14 percent boys and 22 percent girls of English medium background have high knowledge of HIV prevention. Coeducation variable affects the knowledge level of school adolescents significantly. 11 percent boys and 15 percent girls who got coeducation facility have high knowledge concerning prevention of HIV and around 9 percent adolescents from non-coeducation school have fall in high knowledge category. Overall around one tenth of all adolescents have high, more than half have moderate and rest have low knowledge concerning prevention of HIV/AIDS.

Determinants of Adolescents' Knowledge regarding contraceptives, STDs and HIV transmission/Prevention

Table 7 examines odds of adolescents' knowledge level regarding contraceptives, STDs and HIV transmission and prevention with respect to some selected variables. It has been found that holding other factors constant, girls studying in English medium schools have 2.48 (1/0.403) times higher odds of having high knowledge of contraceptives as compare to low knowledge than those studying in Hindi medium schools and is highly statistically significant. Similarly, holding other factors constant, boys getting coeducation has 6.52 times higher odds of having high rather than low awareness of contraceptives than boys who are not in a coeducation system of schooling. Likewise, boys and girls in the age group 16-19 years have 2.06 (1/0.484), 5.18 (1/0.193) times respectively higher odds of possessing high rather than low awareness of contraceptives than adolescents in the age group 12-15 years. Further, girls getting coeducation have 2.1 times higher chances of having moderate knowledge of contraceptives instead of low knowledge than girls who are not getting coeducation. Keeping other factors constant, boys and girls of age group 12-15 years, have 0.424 and 0.626 times respectively lower chances to have moderate as compare to low knowledge of contraceptives than those adolescents in 16-19 years age group. It has been also found that girls studying in English medium schools have 2.27 (1/0.440) times higher odds of possessing high rather than moderate knowledge of various contraceptives than girls from Hindi medium schools. Boys and girls receiving coeducation have 4.73 and 2.25 times greater chance than adolescents not receiving coeducation of possessing higher instead of moderate knowledge of contraceptives. Further, it can be clearly seen from the Table 7 that boys who have never involved any type of physical relationship are

2.27 (1/0.439)times more likely to have high as compare to moderate knowledge of contraceptives than those who ever experienced intimate relationships. In addition to above, it is observed that girls from English medium schools are 3.22 (1/0.310) times higher odds than girls from Hindi medium schools of having high instead of moderate familiarity of STDs. No other odds ratios are found to be statistically significant.

It can be observed from Table 7 that holding other factors constant, English medium school male adolescents have 9.71 (1/0.103) times higher chance than Hindi medium male adolescents, of having high knowledge of HIV transmission as compare to low knowledge. Similar results are also found for girls but the value of odds ratio is 6.99 (1/0.143). The boys and girls who have never engaged in any kind of intimate relationships have 4.05 (1/0.247) and 3.51 (1/0.285) times higher odds of possessing high instead of low knowledge of HIV transmission than their counterpart. Further, boys in age group 16-19 years have 1.14 (1/0.877) times more likely to have high rather than low familiarity of HIV transmission than those in the lower age group 12-15 years. Keeping other factors constant, Hindi medium adolescents have 0.269 times (for boys) and 0.385 times (for girls) lower chance of having moderate instead of low knowledge of HIV transmission, than adolescents studying in English medium schools. Similarly, English medium boys and girls are 2.62 (1/0.382) and 2.72 (1/0.370) times respectively higher odds for having high compare to moderate knowledge of HIV transmission, than adolescents of Hindi medium schools. Boys receiving coeducation are 2.95 times more likely to have high rather than moderate knowledge of various modes of transmission of HIV than those who are not receiving coeducation. At the same time, boys in the age group 16-19 years have 1.81 (1/0.550) times greater odds than boys in the age group 12-15 years, of having high knowledge of transmission of HIV instead of low knowledge.

Furthermore, for the knowledge of HIV prevention, keeping other factors constant, English medium school male adolescents have 8.92 (1/0.112) times higher chance than Hindi medium male adolescents, of having high knowledge of HIV prevention as compare to having low knowledge. Similar findings are also found for girls but the value of odds ratio is 13.89 (1/0.072). Male adolescents from age-group 16-19 years have 4.63 (1/0.216) times higher probability of having high knowledge as compare to low knowledge of HIV prevention than those belong to age-group 12-15 years. Similarly Hindi medium school adolescents have higher chance (6.84 times for boys and 10 times for girls) of having high instead of moderate knowledge of HIV prevention than adolescents from English medium schools. Moreover, boys who are getting coeducation have 2.27 (1/0.440) times higher odds of possessing high rather than moderate familiarity of prevention methods of HIV/AIDS than their counterparts. All other odds are not statistically significant. Interpretations of other odds can be given similarly.

Discussion

This study provided crucial insights into school adolescents' knowledge on the subject of various family welfare methods, transmission and prevention of STDs and HIV/AIDS. With regard to knowledge of contraceptives, the awareness of condom is highest among adolescents followed by IUD/Copper T, oral pills, tubectomy, MTP and vasectomy. Over three fourth of female adolescents have not heard about tubectomy and knowledge of vasectomy is worrisome. A study in Gujarat also found the similar results (Kotecha & Patel, 2008).

Our study shows that adolescents are less aware about STDs (64 percent boys and 47 percent girls) as compare to HIV/AIDS (80percent boys and 65 percent girls).Our findings are supported by other past findings (Garg et al., 2005; Samkange-Zeeb et al., 2011;Tiwari et al., 2014; Subbarao & Akhilesh, 2017). Previous studies related to adolescents sexual and reproductive health issues uncovered some concerning realities (Jaya & Hindin, 2007;Fatusi&Hindin, 2010;Jejeebhoy&Santhya, 2011;Blum et al., 2012; Sivagurunathan et al., 2015). One study found that two third of adolescents have heard about HIV/AIDS and merely half of them are aware about various modes of transmission of HIV (Kotecha et al., 2012).

It is pointed out that 23 percent boys and 10 percent girls have ever experienced any type of intimate relationship and those who are not involved in such type of relationships, have more knowledge about contraceptives, STDs and HIV/AIDS. It is found that only 51.9 percent boys and 39.2 percent girls, who have heard about STDs, are aware of symptoms of STDs. Sexually Transmitted Infections (STIs) and Reproductive Tract Infections (RTIs) increases chances of getting

infection of HIV by 4 to 8 times; hence early detection and complete and appropriate treatment of STI/RTI is a key to avoid the chance of occurrence of HIV/AIDS (Cates, 1990;Wasserheit, 1992; Laga et al. 1993;).NACO and other NGOs have implemented a variety of interpersonal communication and mass media knowledge interventions on several aspects of STI/HIV/AIDS. Merely 21 percent adolescents aged between 15-19 years reported that they have faced an interpersonal communications in the last 12 months prior to interview and their participation in campaign on STI/HIV/AIDS is only 8 percent at national level (NACO, 2007). According to NACO, early detection, proper and complete treatment of STDs reduces the transmission rate of HIV/AIDS infection by more than 40 percent.This is to be noted that proportions of 15-24 year old youths living with STDs including HIV/AIDS accounts for 35 percent of total HIV/AIDS burden in India. Moreover, even less than 20 percent youths knew that RTI/STI increases the risk of HIV/AIDS (NACO, 2012).

Previous studies conducted in developing countries suggest that adolescents have substantial misconception related to their reproductive health issues, transmission of STDs/HIV/AIDS (Garg et al., 2005; Jaiswal et al. 2005;Mushi et al., 2007; Kotecha, & Patel, 2008;Anwar et al., 2010;Blum et al., 2012;Singh et al., 2014).In our study, more than half adolescents are ignorant that HIV/AIDS is curable. Furthermore, more than two third of adolescents were unaware that HIV could be transmitted from a mother to his child through breastfeeding. Some adolescents feel that by hugging, kissing, touching infected person, sharing same toilet and mosquito bite can cause HIV/AIDS.

Our study suggests that English medium school adolescents have more knowledge concerning several topics of reproductive health as compare to Hindi medium school adolescents. A recent study (Srivastava & Singh, 2017) conducted in Varanasi; India deduced that Hindi medium school adolescents are more unfamiliar than that of English medium school adolescents on sexual and reproductive health matters. It might be because Hindi medium school adolescents are reluctant in discussing and reporting their knowledge concerning sexual matters. It is found that adolescents' age at sexual debut lie between 14 to 16 years in Varanasi (Singh et al., 2014; Srivastava & Singh, 2017) thus, they start sexual experimentation at early age without knowing the consequences of unsafe sex and having multiple partners. Therefore adolescents are highly prone to face STDs and HIV/AIDS and unwanted pregnancy (Rani & Lule, 2004; Naswa & Marfatia, 2010; Wong, 2012).Our result shows that as age increases, awareness about reproductive issues also increases. It is obvious since as age increases, the physical, emotional, hormonal and intellectual changes during adolescence creates curiosity among adolescents thus, encouraging them to grab information on sexual subjects.

Television/Internet is the most preferred source of information on STDs/HIV/AIDS among adolescents followed by newspaper and teachers. It is worthwhile to mention that even one tenth of all respondents don't get information related to STDs from their parents/relative. This indicates the communication gap between parents and their children on sexual matters. Other findings strengthen our results (Jejeebhoy & Santhya, 2011; Ab Rahman et al., 2011; Idele et al., 2014). Most of the parents think that their children are not matured enough to be informing them regarding sexual issues and consider that it is duty of school teacher to give adequate and accurate knowledge on these issues. In developing country like India, sex education is not given in each school and where it is being given, teachers feel shy and uncomfortable while teaching on sexual matters. Some parents and teachers believe that providing education on sexual matters would promote sexual activities. With increasing age, the role of parents as a source of information vanishes and friends, media sources replace them (Langhaug et al., 2003; Pokharel et al., 2006; Kotecha et al., 2012). Therefore, there must be balance between media information and information acquired from teachers/parents because media always disseminate unfiltered information which may encourage sexual intercourse instead of cultivating knowledge on the subject of reproductive health.

Evidences are strong across world that intervention programs and formal sex education do not accelerate or increase sexual activity instead it improved the students' knowledge about sexuality, delay or decrease sexual debut & behaviours, unsafe abortion, unwanted pregnancy, low risk of STDs/HIV/AIDS and increase the practice of contraceptives (Dawson, 1986;Kirby et al. 1994; Kirby et al., 2007;Madeni, et al., 2011; Ab Rahman et al., 2011;Blum et al., 2012;Wong, 2012;).

It is clearly evident from our study that male adolescents have better awareness with regard to reproductive issues than their counterparts. The possible reasons for such results might be that in

Indian society, boys are given more freedom than girls thus getting more exposure to media gadgets and boys also feel comfortable in discussing sexual matters among their friend circle.

Many interventions have been proposed; policies are designed and implemented over the last two decade. Programs under Reproductive and Child Health II (RCH II) identify the need of the adolescents and provide them specific services including information, counseling related to sexual matters, pregnancy, abortion, contraception, menstrual problems, RTIs/STIs, HIV/AIDS and media campaigns for the promotion of utilization of adolescent reproductive and sexual health (ARSH) services to postpone the age at marriage and to get better health outcomes (UNICEF, 2013a;Sivagurunathan et al., 2015).An interesting study based on 23 school based intervention programs, deduced that not all HIV/AIDS intervention programs had significant on teenagers' sexual activities but some specific programs did reduce the number of sexual partners, lessen the frequency of intercourse, delay the commencement of intercourse, increase the use of contraceptives and bring down the exposure to unwanted pregnancy, STIs/RTIs including HIV/AIDS (Kirby et al., 1994;Lindberg & Maddow-Zimet, 2012).

The strength of this study is that in our knowledge very less number of studies on knowledge and awareness of contraceptives, sexually transmitted diseases and HIV/AIDS among school going adolescents in India have been conducted to date. One of the possible reason is that schools are not always agreeable and cooperative to be part of such studies because of the subject matter (Samkange-Zeeb et al., 2011). Our study confirms that there are substantial gap in the knowledge and awareness of sexual issues among adolescents of Varanasi, India. Our results emphasize that school adolescents must be informed and taught about all aspects of reproductive health. Our findings can be utilized effectively in formulating working strategies for better implementation of ARSH program.

There are certain limitations without which needs to be mentioned before giving conclusions. One limitation is that our study is limited to urban schools of Varanasi, India so results may not be generalized for all schools. There is a need to assimilate rural schools too in the study. Since premarital sex is customarily not allowed by Indian culture therefore second potential limitation is that all schools' adolescents might have under reported to questions about sexual experience, contraceptives, STDs and HIV/AIDS. Additionally, our study is cross-sectional, so results are exploratory in nature and not showing any directionality.

Conclusions and Recommendations

The knowledge and awareness of school adolescents both boys and girls is inadequate about various contraceptives, sexually transmitted diseases and its mode of transmission including prevention and transmission of HIV/AIDS. The acquaintance with STDs is extremely poor and some common misconceptions on transmission of HIV/AIDS are still prevalent among school's adolescents. What is needed is increasing awareness regarding risky consequences of sex during adolescence and to promote adolescent friendly health clinics for better counseling of adolescents on the aspects of contraceptives, abortion, STIs/RTIs and HIV. Beyond HIV/AIDS, we should campaign for other STDs. School has universal and comprehensive access to adolescents. There is need to implement formal health and sex education program in school curriculum. It can play an important role in disseminating sex education and addressing misconceptions especially for those adolescents who have no other source of information. Parents should have a healthy conversation with their children and children should be informed about reproductive health issues at a proper age. The teacher should play a connecting role between adolescent education program and students by explaining these topics within the course curriculum and by counseling them when they face any problem in a proper way. Since sexual subjects of boys and girls are different hence separate sessions for health education in schools should be promoted so that both sexes feel free to discuss openly. It is also recommended that there must keep a check on the means of information that are accessed by adolescents. Future studies should aim to do more representative qualitative research with focused group discussion to gain a better understanding of adolescents' sexual behaviour.

Abbreviations: HIV-Human Immuno Difficiency Virus; AIDS- Acquired ImmunoDifficiency Syndrome; STD- Sexually Transmitted Disease; RTI- Reproductive Tract Infection; STI- Sexually Tract Infection; ARSH-Adolescent Reproductive and Sexual Health; AEP-Adolescent Education Programme; MTP-Medical Termination of Pregnancy; NACO- National AIDS

control organization; RCH II-Reproductive and Child Health II; NGO- Non Government Organization.

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Table 1: Percent distribution of teenagers according to various characteristics

Characteristics	Percentage of Boys N=650	Percentage of Girls N=1022
Type of School		
Government	63.7	65.5
Private	18.4	20.4
Government Aided	17.9	14.1
Medium of School		
Hindi	46.6	60.1
English	53.4	39.9
Coeducation		
Yes	24.2	32.7
No	75.8	67.3
Class		
IX	47.5	54.1
XI	52.5	45.9
Have you ever involved in any physical relationship		
Yes	23.0	9.1
No	77.0	90.9

Table 2: Percent distribution of teenager's positive responses regarding various contraceptive methods

Knowledge of contraceptive methods	Boys	Girls
Condom	72.3	49.4
IUD/Copper T	58.9	27.9
Oral pills	52.5	28.1
Tubectomy	42.8	22.8
Vasectomy	19.2	16.1
Medical Termination of Pregnancy(MTP)	41.7	27.5
Total Count	**650**	**1022**

Table 3: Percent Distribution of Teenager's Responses Regarding STDs Knowledge

Knowledge regarding STDs	Boys	Girls
Have you heard the name of STDs		
yes	64.2	47.2
Source of information on STDs		
Newspaper	44.2	29.4
TV/Internet	46.3	40.4
Friends	31.2	22.6
Social Workers	18.5	5.6
Teachers	25.7	39.1
Mother/Father/Relations	3.6	8.4
Doctors	13.9	12.3
Have you known to symptoms of STDs		
yes	51.9	39.2
Discharge from genital	16.6	11.3
Burning sensation in genitals	28	20.8
Enlargement of glands(lymph nodes)	9.7	6
Others like lethargy, white spot	12.6	10.1
Bleeding from private parts	16.6	14.3
Ulcer and sores formation	15.9	8
Continuous fever	22.4	19.1
Weakness/headache	22.4	22.2
Total Count	**650**	**1022**

Table 4: Percent Distribution of Teenager's Responses Regarding HIV/AIDS Knowledge

Knowledge regarding HIV/AIDS	Boys	Girls
Have you heard about HIV/AIDS?		
Yes	80.0	64.5
How HIV/AIDS could be transmitted?		
Through sexual contact	65.5	54.4
Through transfusion of HIV infected blood	59.8	52.2
By sharing needles	46.3	47.1
From HIV infected pregnant mother to the child	50.3	52
Through breast feeding by HIV positive women	17.6	24.6
How HIV/AIDS could be prevented?		
Practice of safe sex/usage of condoms	76.3	48.2
Having only one faithful sexual partner	47.8	24.8
Not sharing needle	45.2	46.9
Taking tested/safe blood only	47.9	40.1
Giving antiretroviral medicine to the infected mother and newborn baby	11.4	26.5
Avoiding sex with unknown person	9.8	30.6
Misconceptions regarding HIV/AIDS		
sharing of same bathroom can cause HIV/AIDS	7.4	7.3
mosquito, fly or bedbug bites can cause HIV/AIDS	14.9	14.8
shaking hands with HIV infected person can cause HIV/AIDS	9.3	7.3
Kissing the HIV infected person can cause HIV/AIDS	13.5	8.6
sharing utensils with HIV infected person can cause HIV/AIDS	8.6	7.1
sharing public toilets can cause HIV/AIDS	6.8	8.2
Touching HIV infected blood can cause HIV/AIDS	18.3	13.1
Hugging the HIV infected person can cause HIV/AIDS	10.7	6.5
HIV/AIDS is curable disease	47.1	48.8
Total Count	**650**	**1022**

Table 5: Percent distribution of teenager's knowledge (contraceptive/STDs) according to selected variables

Variable	Teenager's contraceptive awareness								Teenager's knowledge of Sexually Transmitted Diseases (STDs)							
	Boys				Girls				Boys				Girls			
	Low	Moderate	High	p-value for χ^2	Low	Moderate	High	p-value for χ^2	Low	Moderate	High	p-value for χ^2	Low	Moderate	High	p-value for χ^2
Type of School																
Government	39.1	25.6	35.3	0.00*	72.2	20.2	7.6	0.00*	27.5	61.6	10.9	0.54	31.0	64.7	4.3	0.02**
Private	54.6	31.1	14.3		60.1	36.5	3.4		40.0	53.3	6.7		3.4	89.7	6.9	
Government Aided	49.0	27.5	23.5		64.6	24.3	11.1		42.9	57.1	0.0		43.5	52.2	4.3	
Medium of school																
Hindi	50.8	26.4	22.8	0.00*	72.1	22.0	5.9	0.01*	31.8	63.6	4.5	0.07	34.1	63.7	2.2	0.06
English	36.0	27.1	36.9		63.4	27.3	9.3		28.7	56.3	14.9		20.8	71.4	7.8	
Coeducation																
Yes	24.8	20.4	54.8	0.00*	61.4	31.7	6.9	0.00*	35.0	65.0		0.29	15.2	78.3	6.5	0.07
No	48.6	28.9	22.6		72.2	20.3	7.4		29.7	59.4	11.0		32.8	63.1	4.1	
Class																
IX	56.2	17.5	26.3	0.00*	76.1	21.7	2.2	0.00*	37.0	55.6	7.4	0.30	22.4	74.1	3.5	0.21
XI	31.1	34.9	34.0		59.9	26.9	13.2		25.9	62.9	11.2		32.0	61.3	6.7	
Total (count)	**42.9 (279)**	**26.8 (174)**	**30.3 (197)**		**68.7 (702)**	**24.1 (246)**	**7.2 (74)**		**30.3 (53)**	**60.0 (105)**	**9.7 (17)**		**28.0 (47)**	**67.2 (113)**	**4.8 (8)**	

* p-value<0.01, ** p-value<0.05

Table 6: Percent distribution of teenager's knowledge (HIV transmission and prevention) according to selected variables

Variable	Teenager's knowledge of HIV transmission								Teenager's knowledge of HIV prevention							
	Boys				Girls				Boys				Girls			
	Low	Moderate	High	p-value for χ^2	Low	Moderate	High	p-value for χ^2	Low	Moderate	High	p-value for χ^2	Low	Moderate	High	p-value for χ^2
Type of School																
Government	36.4	39.1	24.5	0.00*	30.6	48.0	21.3	0.42	33.4	58.5	8.1	0.01*	38.7	49.8	11.4	0.68
Private	21.4	61.4	17.1		28.0	46.3	25.6		41.4	41.4	17.1		40.2	47.6	12.2	
Government Aided	32.4	64.7	2.9		29.1	58.2	12.7		52.9	41.2	5.9		38.2	56.4	5.5	
Medium of school																
Hindi	51.3	44.0	4.7	0.00*	42.2	47.4	10.4	0.00*	45.5	51.8	2.6	0.00*	47.0	50.4	2.6	0.00*
English	20.2	44.4	35.3		13.8	51.2	35.0		29.0	56.7	14.3		28.6	49.8	21.7	
Coeducation																
Yes	20.3	31.4	48.3	0.00*	16.9	47.8	35.3	0.00*	26.3	62.7	11.0	0.03**	29.4	55.1	15.4	0.01*
No	38.6	48.8	12.7		35.2	49.6	15.2		39.8	51.5	8.6		43.0	48.1	9.0	
Class																
IX	41.6	48.3	10.1	0.00*	31.2	47.3	21.5	0.64	39.1	54.2	6.7	0.02**	40.5	46.0	8.5	0.14
XI	22.7	37.0	40.3		28.0	51.7	20.4		29.3	57.5	13.3		37.9	53.6	13.5	
Total (count)	**33.6 (149)**	**44.2 (196)**	**22.2 (98)**		**30.0 (141)**	**49.0 (231)**	**21.0 (99)**		**36.1 (160)**	**54.6 (242)**	**9.3 (41)**		**39.1 (184)**	**50.1 (236)**	**11.8 (51)**	

* p-value<0.01, ** p-value<0.05

Table 7: Odds ratios and 95% confidence interval (CI) showing determinants of Adolescent's knowledge level

Knowledge Level comparison	Determinants for Knowledge	Variables	OR and 95% CI for teenager's contraceptive awareness		OR and 95% CI for teenager's comprehensive knowledge of STDs		OR and 95% CI for teenager's knowledge of HIV/AIDS Transmission		OR and 95% CI for teenager's knowledge of HIV/AIDS prevention	
			Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
High relative to Low	Medium of School	Hindi	1.185 (0.687-2.045)	0.403* (0.221-0.732)	0.279 (0.068-1.151)	0.197 (0.031-1.277)	0.103* (0.040-0.262)	0.143* (0.069-0.295)	0.112* (0.034-0.368)	0.072* (0.028-0.184)
		English®								
	Coeducation	Yes	6.528* (3.495-12.192)	0.933 (0.487-1.789)	#	2.006 (0.313-12.880)	1.309 (0.580-2.951)	1.927 (0.884-4.202)	0.603 (0.246-1.480)	0.803 (0.365-1.767)
		No®								
	Have you ever involved in any physical relationship?	Yes	0.574 (0.326-1.012)	0.625 (0.214-1.827)	0.467 (0.103-2.123)	0.737 (0.074-7.285)	0.247* (0.091-0.673)	0.285** (0.089-0.916)	0.433 (0.117-1.595)	0.310 (0.038-2.493)
		No®								
	Age-group	12-15 years	0.484* (0.302-0.775)	0.193* (0.109-0.341)	0.357 (0.095-1.338)	0.737 (0.150-3.620)	0.877* (0.472-5.621)	0.842 (0.465-1.524)	0.216** (0.093-3.949)	1.256 (0.613-2.575)
		16-19 years®								
Moderate relative to Low	Medium of School	Hindi	0.765 (0.448-1.305)	0.916 (0.617-1.360)	1.289 (0.568-2.924)	0.636 (0.272-1.490)	0.269* (0.144-0.502)	0.385* (0.212-0.700)	0.770 (0.440-1.346)	0.718 (0.426-1.211)
		English®								
	Coeducation	Yes	1.38 (0.685-2.779)	2.106* (1.405-3.158)	#	2.387 (0.768-7.421)	0.444 (0.206-0.954)	1.314 (0.652-2.649)	1.371 (0.723-2.599)	1.534 (0.852-2.761)
		No®								
	Have you ever involved in any physical relationship?	Yes	1.308 (0.768-2.230)	0.621 (0.331-1.165)	0.499 (0.223-1.116)	1.149 (0.432-3.057)	0.640 (0.370-1.109)	0.589 (0.302-1.150)	0.723 (0.427-1.224)	1.548 (0.808-2.969)
		No®								
	Age-group	12-15 years	0.424* (0.262-0.687)	0.626* (0.452-0.867)	0.763 (0.355-1.641)	1.769 (0.841-3.718)	0.874 (0.605-2.346)	0.815 (0.518-1.284)	0.339 (0.127-1.167)	0.790 (0.523-1.193)
		16-19 years®								
High relative to Moderate	Medium of School	Hindi	1.551 (0.877-2.741)	0.440** (0.229-0.843)	0.217 (0.058-0.814)	0.310** (0.052-1.851)	0.382** (0.162-0.898)	0.370* (0.200-0.685)	0.146* (0.046-0.463)	0.100* (0.040-0.252)
		English®								
	Coeducation	Yes	4.731* (2.498-8.958)	0.443** (0.222-0.884)	#	0.840 (0.164-4.295)	2.951* (1.543-5.644)	1.467 (0.803-2.678)	0.440** (0.198-0.980)	0.523 (0.249-1.099)
		No®								
	Have you ever involved in any physical relationship?	Yes	0.439* (0.248-0.777)	1.006 (0.310-3.262)	0.936 (0.218-4.022)	0.641 (0.072-5.704)	0.386 (0.144-1.034)	0.484 (0.156-1.499)	0.599 (0.166-2.158)	0.200 (0.026-1.553)
		No®								

	Age-group	12-15 years	1.141 (0.694-1.874)	0.308 (0.168-0.565)	0.468 (0.135-1.626)	0.417 (0.093-1.864)	0.550* (0.239-4.497)	1.033 (0.614-1.737)	1.656 (0.780-3.516)	1.590 (0.794-3.185)
		16-19 years®								
# coeducation variable is dropped for boys since higher knowledge category of STDs has zero cell frequency, * p-value<0.01, ** p-value<0.05 , ® Reference category										

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