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Urban–Rural and Socioeconomic Variations in the Knowledge of STIs and AIDS Among Bangladeshi Adolescents

M. Showkat Gani, MPH[1], A. Mushtaque R. Chowdhury, PhD[2,3], and Lennarth Nyström, PhD[4]

Abstract

This study used data from the Bangladesh Adolescents Survey 2005 to identify socioeconomic and urban–rural determinants of knowledge regarding sexually transmitted infections (STIs) including HIV/AIDS transmission. A cluster sampling of 11 986 adolescents was conducted from April to August 2005. Data were analyzed using SPSS applying principle component analysis, multivariate logistic regression analysis, and prevalence ratios (PRs) with 95% confidence intervals (CIs). Overall knowledge of transmission of STIs was poor (4.5%), showing urban adolescents having twice the knowledge of rural adolescents (PR = 1.9; 95% CI = 1.6-2.2). HIV/AIDS knowledge level was high (68%), with a 40% higher knowledge among urban adolescents (PR = 1.4; 95% CI = 1.3-1.4). Probability of knowledge of STIs and HIV/AIDS transmission was lowest in 12- to 14-year-old uneducated female household workers of the poorest socioeconomic status in rural settings (0.0002 and 0.064, respectively). The urban–rural factor was more important than the socioeconomic factor. Health promotion and education programs can play an important role in improving the sexual reproductive health knowledge situation.

Keywords

STIs, HIV/AIDS, knowledge of transmission, urban–rural, adolescents, Bangladesh

Introduction

Sexually transmitted infections (STIs), including acquired immunodeficiency syndrome (AIDS), are influenced by a number of biological and medical factors, on one hand, and geographical, sociocultural, or political factors, on the other.[1,2] Internationalization, involving

[1]Chittagong Hill Tracts Development Facility, United Nations Development Programme, Rangamati, Bangladesh
[2]Columbia University, New York, NY, USA
[3]Rockefeller Foundation, Asia Office, Bangkok, Thailand
[4]Umeå University, Umeå, Sweden

Corresponding Author:
M. Showkat Gani, MPH, Health Cluster, Chittagong Hill Tracts Development Facility, United Nations Development Programme, Rajbari Road, Rangamati 4500, Bangladesh.
Email: showkat2001@yahoo.com.au

development of trade and movement of both goods and humans, is also being considered a major factor in the spread of infectious diseases worldwide.[3] In Bangladesh, nearly one third of the population is in the 10- to 24 years age group.[4] A vast majority of this section is unaware of the risk of STIs and human immunodeficiency virus (HIV) due to rapid urbanization as well as greater opportunities to socialize. The situation in Bangladesh, as elsewhere in the world, is getting critical as adolescents usually do not have access to knowledge of basic sexual reproductive health (SRH), skills in negotiating sexual relationships, and access to affordable SRH services.[5,6] Unfortunately, this issue has also not been recognized in the Bangladesh national education curriculum. Several studies have revealed that a section of adolescents tend to engage in high-risk activities, visiting commercial sex workers included, without using condoms, and thus suffer from STIs as a consequence.[7,8] It has been shown that HIV is significantly associated with STIs as a cofactor at the early stage of HIV occurrences.[1,9-11] However, this issue is, since recently, being given high priority in Bangladesh.[12,13]

Knowledge and behavior are interlinked, and the role of knowledge is reflected through behavior or practice. Inadequate knowledge leads to the practice of unsafe sex. Not being able to self-assess risk from HIV infection and not knowing where to get a confidential HIV test are both associated with the nonuse of condoms.[14] Knowledge is an important determinant, direct or indirect, for the practice of safe sex, particularly to prevent STIs and HIV/AIDS spread in Bangladesh and to design an effective intervention strategy in this regard. Many studies have focused on adolescents' SRH to gauge their knowledge,[7,15-17] but only few have studied both the knowledge and the seroprevalence of STIs and HIV/AIDS in the general population as well as in high-risk groups.[18-20] Hence, this study is aimed at identifying the sociodemographic and urban–rural determinants of knowledge of transmission of STIs (syphilis, gonorrhoea) and HIV/AIDS in the 12 to 24 years age group in Bangladesh.

Methods

Study Design

This is a cross-sectional study that draws on data from the Bangladesh Adolescents Survey 2005.

Study Area

Bangladesh, covering an area of 147 570 km^2, is one of the most densely populated countries (1114 people/km^2) in the world and ranks 129th in the human development index.[21] It is geographically almost surrounded by India, and it has a tropical climate.[4] For administrative purposes, Bangladesh is divided into 6 divisions, 64 districts, 507 subdistricts, 87 928 villages, and 8048 *mahallas* (the smallest identifiable administrative unit in rural or urban areas).[4]

Sampling Procedure

A 2-stage cluster sampling survey was performed in all 6 divisions in Bangladesh. Sample for each division was planned for sufficient precision in the estimates separately for the 10- to 24-year-old males and females on health, education, and livelihood aspects. Consequently, this sampling also achieved sufficient precision in the estimates in urban and rural areas.

The Bangladesh Bureau of Statistics (BBS) estimated that a total of 1000 primary sampling units (PSUs) would be sufficient to estimate the demographic indicators for Sample Vital Registration System at the district level, and thus formed a sampling frame known as the

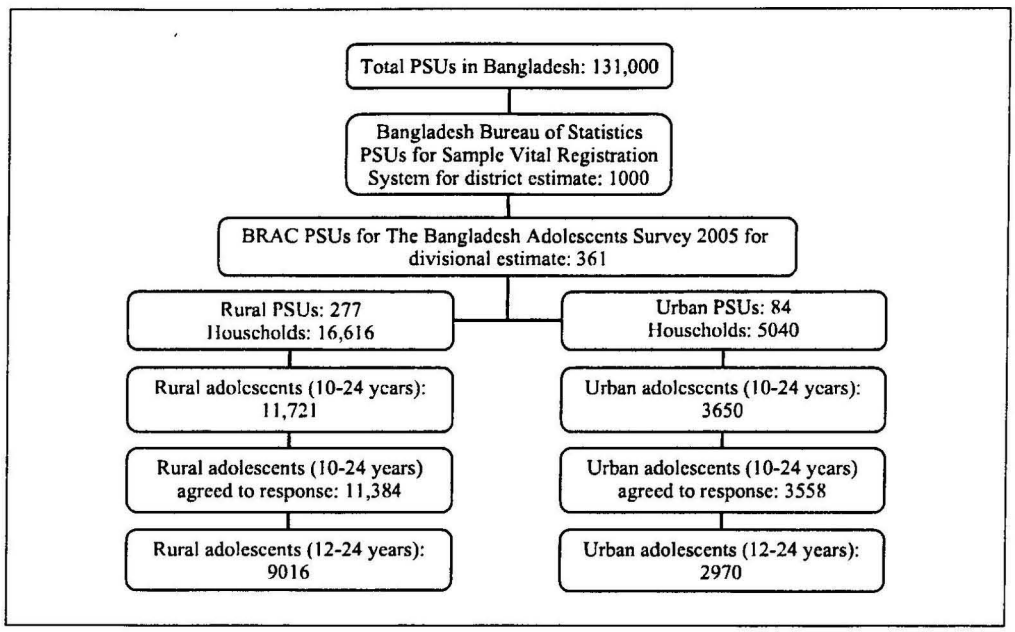

Figure 1. Sampling frame of the study.

Integrated Multi-Purpose Master Sample.[22,23] The survey technique mainly followed the Bangladesh Demographic and Health Survey (BDHS).[23] The BDHS actually uses the BBS sampling frame where a total of 1000 PSUs go through a systematic sampling procedure from a total of 131 000 PSUs/clusters in the whole country (Figure 1). Each PSU consists of 200 households. In rural areas, a village is used as a PSU, but in some parts of the country the big village or *mauza* (a geographical boundary consisting of ≥1 village) is used as a PSU. In urban areas, the PSU is on *mahalla* level. Figure 1 illustrates the sampling procedure.

Training of Interviewers

Some 500 graduate applied to be interviewers and 120 were invited to a 2-week training course in 2 batches in Dhaka. A training manual was developed for the trainees. Three experienced researchers facilitated the training sessions to provide theoretical and practical lessons on data collection, enabling the interviewers to collect data for the survey. Finally, 110 persons, 50% of them females, were selected, and they participated in the field work from April to August 2005.

Measure Instrument

We developed 2 questionnaires, one for households and one for individuals. The questionnaire for households contained information on residential status, household characteristics, household possessions and amenities, disability, and death. The questionnaire for individuals contained information on the characteristics of adolescents and their health, education and livelihood issues. The questionnaire was tested in a pilot study.

Knowledge of transmission of STIs (syphilis/gonorrhoea). A person was considered to have adequate knowledge if he/she could mention, without being prompted, at least 1 out of 3 identified

ways of STI transmission. Respondents' knowledge was based on their answers to interviewer's questions, such as "Have you ever heard of syphilis/gonorrhoea? In what ways can these diseases occur?" Sexual intercourse, use of unsterilized syringes/needles, unsafe blood transfusion, and during pregnancy/delivery were considered correct ways of transmission.

Knowledge of transmission of AIDS. An adolescent was considered to have adequate knowledge if he/she agreed with all of the following 4 statements of transmission of HIV/AIDS: "A person can have AIDS: (*a*) through sexual intercourse, (*b*) if someone uses a needle that is used by an AIDS patient, (*c*) receives blood of an AIDS patient, and (*d*) a child can be affected by an HIV-positive pregnant mother." To validate the answers, adolescents were also asked to express their views on 7 statements about HIV/AIDS NOT being transferred: "A person can never have AIDS (*a*) if he/she takes a meal or walks along with an AIDS patient, (*b*) sleeps in the same bed with an AIDS patient, (*c*) sneezes/coughs with an AIDS patient, (*d*) uses clothes of an AIDS patient, (*e*) touches/kisses an AIDS patient, (*f*) takes a shower in the same pond/bathroom with an AIDS patient, and (*g*) AIDS never spreads through fly/mosquito bites."

Data Collection

The interviewers worked in 20 teams consisting of 4 to 5 members (at least 2 females and 2 males) headed by a leader. To form a cluster, listing of 200 successive households started from the northwest corner of the selected village and moved anticlockwise. The list was used for selecting a systematic sample of 60 households. The survey teams drew the map for each cluster showing the location of households in the villages/*mahallas*. Household and individual information were collected in the *Bangla* language by same-sex interviewers. If more than 1 eligible adolescent was in the household, Kish method[24] was used for selecting a sample.

Five teams, each consisting of 1 woman and 1 man, monitored the data quality on a 7% subsample after the interviewers completed work in the villages in 2 phases. First, they reinterviewed the randomly selected subsamples and discussed dissimilarities regarding the methods and questionnaire parts with the survey teams. Second, they reinterviewed the subsamples and collected data, without sharing with survey teams, to check data quality of the main survey. Two quality controllers worked separately to communicate survey instructions from the principle investigator to interviewers and monitors as well as to ensure logistic support to the teams.

Data Generation Process

Data were computerized using FoxPro and analyzed using SPSS. Data cleaning and consistency check were performed simultaneously by the investigators and the data management team through checking the frequency distribution and the range for all variables and through cross-tabulations of linked questions to identify and correct the logical mistakes in the data set.

Statistical Analysis

Data were analyzed using SPSS. The household wealth index was calculated according to Filmer and Pritchett.[25] Thus applied was the principal component analysis to produce the factor scores named as household wealth scores, which were classified into quintiles. To compare the knowledge prevalence between urban and rural areas, the prevalence ratio (PR(U/R))[26] and corresponding 95% confidence intervals (CIs) were calculated by using the following formula:

$$e^{(\ln(PR)\pm 1.96\sqrt{\frac{N_1-A_1}{N_1A_1}+\frac{N_0-A_0}{N_0A_0}}},$$

where N_1 is the urban total, A_1 are urban cases, N_0 is the rural total, and A_0 are rural cases.[26] Multivariate logistic regression[27] was used to estimate the impact of age, sex, education, marriage, occupation, household assets, and the inhabitants' residential status (urban–rural) on the outcome variables knowledge of transmission of STIs and HIV/AIDS in terms of odds ratios (ORs) and 95% CI. The probability of knowledge was also calculated from the regression coefficients by using the following formula:

$$p = \frac{e^{(a+\sum b_i x_i)}}{[1+e^{(a+\sum b_i x_i)}]},$$

where p is the estimated probability of having knowledge, a is an intercept term, b is the regression coefficient, and x are explanatory variables.

Ethical Issues

Ethical approval was obtained from the scientific team of BRAC Research and Evaluation Division. Written, informed consent for participation was obtained from all participants before interviewing. Confidentiality of the personal identity was kept and utilitarianism issues with respondents and community people were maintained.

Results

During the 5-month survey, 16 620 rural households and 5040 urban households were visited (Figure 1). Of these, 11 721 (71%) rural adolescents (10-24 years old) were eligible, of whom 11 384 (97%) agreed to participate, and 3650 (72%) urban adolescents were eligible, of whom 3558 (98%) agreed to participate. Of the participating adolescents, 9016 from rural areas and 2970 from urban areas were allowed by their families to be interviewed over sexual issues, whereas for those below the age of 12 years, parents' permission was needed. In total, 5119 male (97.9%) and 6867 female (96.6%) adolescents agreed to participate in the survey.

Basic Characteristics

The mean age was 17.5 years, but the female adolescents and the urban adolescents were significantly older (sex: 17.9 vs 16.9, $P < .001$, and urban–rural: 17.9 vs 17.4, $P < .001$, respectively; Table 1). One third of the adolescents were married (34%). The urban adolescents had spent significantly more years in school than the rural adolescents (6.4 vs 5.4 years; $P < .001$), partly because they were older. Majority of them were students (36%) or were involved in domestic (36%) or money-earning works (24%). The urban adolescents were more engaged in money-earning works when compared with the rural adolescents (27% vs 23%; $P < .001$). The wealth index showed that a significantly higher proportion of nonpoor lived in urban areas compared with that in rural areas (50% vs 15%; $P < .001$; Table 1).

Knowledge of STIs and HIV/AIDS

Only 11% had heard about STIs (syphilis and gonorrhoea), with a significantly higher proportion among males than females (18% vs 5.9%; $P < .001$) and in urban areas when compared with rural areas (15% vs 9.4%; $P < .001$; Table 2). At least 1 identified way of transmission of STIs, mostly through sexual intercourse, was adequately identified by 4.5% (8.5% in males,

Table 1. Socioeconomic Characteristics of 12 to 24 Years Age Group by Residence.

Characteristics	Residence		All
	Urban	Rural	
Age in years (%)			
12-14	24.1	28.3	27.3
15-19	37.5	39.3	38.8
20-24	38.4	32.4	33.9
Mean age (years)	17.9	17.4	17.5
Male mean age (years)	17.6	16.7	16.9
Female mean age (years)	18.14	17.87	17.93
Sex ratio (male/female)	0.78	0.74	0.75
Married (%)	30.2	35.1	33.9
No schooling (%)	10.3	11.7	11.4
Mean years of education	6.4	5.4	5.7
Wealth index (%)			
Poorest	5.6	17.8	14.8
2	9.1	20.7	17.8
3	13.9	23.9	21.4
4	21.4	22.7	22.4
Nonpoor	50.0	15.0	24.0
Occupation (%)			
Student	38.3	35.4	36.1
Household work	30.5	37.8	36.0
Income-generation work[a]	27.1	22.6	23.7
Unemployed/others[b]	4.1	4.2	4.2
Total (n)	2970	9016	11 986

[a]All kinds of wage/self-employed workers including business.
[b]Beggars, disabled, and unemployed.

1.5% in females, $P < .001$, and 6.9% in urban areas, 3.7% in rural areas, $P < .001$). Fortunately, only 0.1% had some misconceptions of the ways of STI transmission, such as fly/mosquito bites and worm/dirtiness (Table 2). Adolescents aged 20 to 24 years were higher in number in identifying the correct ways of STIs transmission than adolescents aged 12 to 19 years (8.4% vs 2.4%; $P < .001$). Both the urban or rural males had significantly higher knowledge of STIs when compared with females (Urban: 12% vs 3.1%, $P < .001$, and Rural: 7.3% vs 1.0%, $P < .001$, respectively). Similarly, in both urban and rural areas, adolescents with secondary or higher school education had significantly higher knowledge of STI transmission when compared with those with primary or no schooling (Urban: 9.5% vs 2.9%, $P < .001$, and Rural: 5.9% vs 1.6%, $P < .001$, respectively). Moreover, in both urban and rural areas, the lowest knowledge level was observed among the household workers when compared with all other workers (Urban: 3.2% vs 8.5%, $P < .001$, and Rural: 0.9% vs 5.4%, $P < .001$, respectively). Finally in both urban and rural areas, adolescents with the poorest socioeconomic status (SES) had significantly lower knowledge than the nonpoor (Urban: 1.8% vs 7.9%, $P < .01$, and Rural: 1.1% vs 6.3%, $P < .001$, respectively).

A significantly higher proportion of adolescents had heard of HIV/AIDS in urban areas when compared with those in rural areas (91% vs 71%; $P < .001$). Two out of 3 (68%) knew the correct

Table 2. Knowledge of Transmission of STIs and HIV/AIDS in the 12 to 24 Years Age Group by Residence and Sex.[a]

Knowledge on STIs and HIV/AIDS	All	Residence		P Value[b] (Urban vs Rural)	Sex		P Value[b] (Males vs Females)
		Urban	Rural		Male	Female	
Heard about STIs (syphilis/ gonorrhoea) (%)	10.9	15.4	9.4	.00001	17.6	5.9	.00001
Correct ways of transmission of STIs (%)							
Sexual intercourse	3.8	6.2	3.1		7.3	1.2	
Used unsterilized needles/syringes	0.7	0.6	0.7		1.3	0.2	
Unsafe blood transfusion or during pregnancy/delivery	0.2	0.3	0.1		0.2	0.1	
Correct ways of STIs transmission (≥1 item)	4.5	6.9	3.7	.00001	8.5	1.5	.00001
Correct ways of STIs transmission (3 items)	0.03	0.10	0.01	.093	0.02	0.03	.743
Misconception of transmission of STIs (%)							
Through fly bites/mosquito bites, worm, dirtiness, etc	0.1	0.2	0.1	.238	0.2	0.1	.109
Heard about HIV/AIDS (%)	76.1	91.1	71.1	.00001	83.6	70.5	.00001
Correct ways of transmission of HIV/ AIDS (%)							
Sexual intercourse	71.9	87.6	66.8		80.0	65.9	
Used unsterilized needles/syringes	71.8	88.0	66.5		79.9	65.8	
Unsafe blood transfusion	72.0	87.9	66.8		80.2	65.9	
Pregnant mother to baby	69.5	86.0	64.0		76.6	64.2	
Correct ways of HIV transmission (≥1 item)	73.3	89.1	68.1	.00001	81.4	67.3	.00001
Correct ways of HIV transmission (4 items)	67.7	84.2	62.2	.00001	74.7	62.4	.00001
Misconception of transmission of HIV/ AIDS (%)							
Eat/go along together with HIV patients	12.0	12.4	11.9		12.6	11.5	
Sleep in the same bed with HIV patients	12.4	12.7	12.3		13.0	12.0	
Sneezing/coughing with HIV patients	13.7	13.3	13.8		14.1	13.4	
Use of cloths of HIV patients	12.8	12.6	12.8		13.3	12.4	
Touch/kiss with HIV patients	13.0	13.1	13.0		14.2	12.1	
Shower in same pond/bathroom with HIV patients	11.2	10.6	11.3		11.4	11.0	
Fly/mosquito bites	22.0	24.0	21.4		26.3	18.9	
Misconception of HIV transmission (7 items)	5.6	5.9	5.5	.462	4.8	6.2	.001
Total (n)	11986	2970	9016		5119	6867	

Abbreviation: STI, sexually transmitted infection.
[a]P value for test of differences in the knowledge by residence and sex.
[b]P value is the test of heterogeneity.

ways of transmission of HIV/AIDS. However, 5.6% had some misconceptions, such as eating/ walking, sleeping, sneezing/coughing, touching/kissing, bathing with AIDS patients, and fly/ mosquito bites (Table 2) as ways of HIV/AIDS transmission.

In urban or rural areas, 12- to 14-year-old female adolescents without schooling had significantly lower knowledge of HIV/AIDS than that of 15- to 24-year-old male adolescents with schooling: For Age (Urban: 70% vs 89%, $P < .001$, and Rural: 45% vs 69%, $P < .001$, respectively); for Sex (Urban: 82% vs 88%, $P < .001$, and Rural: 56% vs 70%, $P < .001$, respectively); and for Schooling (Urban: 66% vs 86%, $P < .001$, and Rural: 33% vs 66%, $P < .001$, respectively). Similarly, in both urban or rural areas, the adolescent household workers and those the poorest SES had significantly lower knowledge of HIV/AIDS than that of all other workers and from the nonpoor SES: For Occupation (Urban: 82% vs 85%, $P < .05$, and Rural: 54% vs 67%, $P < .001$, respectively); and for SES (Urban: 62% vs 90%, $P < .001$, and Rural: 35% vs 87%, $P < .001$, respectively).

Urban/Rural Ratio of Knowledge of Transmission of STIs and HIV/AIDS

The prevalence ratio for identifying 3 correct ways of STI transmission indicated that the urban adolescents had twice the knowledge of their rural counterparts (PR = 1.9; 95% CI = 1.6-2.2; Table 3). Although the overall knowledge level was poor, the urban/rural ratio was greater than 1 (PR(U/R) > 1) for all categories of socioeconomic and demographic characteristics, indicating that the urban adolescents had increased knowledge of STIs. In the 20 to 24 years age group, the urban adolescents had twice the knowledge of STIs than rural adolescents (PR = 2.0; 95% CI = 1.7-2.5; Table 3).

The prevalence ratio of knowledge of transmission of HIV/AIDS was 40% higher among urban adolescents than rural adolescents (PR = 1.4; 95% CI = 1.3-1.4; Table 3). The urban/rural ratio, greater than 1 (PR(U/R) > 1) for all categories of socioeconomic and demographic variables, also indicates that the urban adolescents had significantly increased knowledge of HIV/AIDS transmission.

Multivariate Analysis of Knowledge of Transmission of STIs and HIV/AIDS

The model's pseudo-R^2 indicates all independent variables explained separately only 8.0% for the STI transmission and 26% for the HIV/AIDS transmission (Table 4). Multicollinearity arose among explanatory variables of the model because of high correlation coefficients (r) of marriage with age and sex and occupation with age and years of schooling, $r = .56$, $r = .47$, $r = .37$, and $r = -.33$, respectively. Thus, another model was run excluding marriage and occupation, but the results did not change. Increasing age, male sex, living in urban areas, having longer education, not being in the poorest quintile all increased significantly the likelihood of knowing the correct ways of transmission of STIs. Being 20 to 24 and 15 to 19 years old increased the likelihood of knowledge by 31 and 10 times, respectively, when compared with the 12 to 14 years age group. The pattern for correct ways of transmission of AIDS was similar to that of STIs. The most important explanatory variable was education. Having secondary schooling or higher and having the primary schooling increased the likelihood of knowing the correct ways of transmission of AIDS 6.9 and 1.9 times, respectively, when compared with having no schooling.

Probability Estimation

The probabilities of knowledge of STIs and HIV/AIDS transmission as outcomes of the effect of various combinations of factors are shown in Figure 2. Probability of knowledge of STIs and HIV/AIDS transmission was very low for 12- to 14-year-old female adolescent household workers with no schooling, from the poorest SES living in rural settings (.0002 and .064, respectively). The highest knowledge of STIs and AIDS was for 20- to 24-year-old male students with

Table 3. Urban/Rural Knowledge Prevalence Ratio (PR(U/R)) With 95% Confidence Intervals of STIs and AIDS Transmission of 12 to 24 Years Age Group by Socioeconomic Factors.

	Know Ways for Transmission of	
Socioeconomic Characteristics	STIs (Syphilis/Gonorrhoea), PR(U/R)	HIV/AIDS, PR(U/R)
Age in years		
12-14	1.6 (0.49-5.1)	1.6 (1.5-1.7)
15-19	1.2 (0.85-1.6)	1.2 (1.2-1.3)
20-24	2.0 (1.7-2.5)	1.4 (1.3-1.4)
Sex		
Males	1.6 (1.3-1.9)	1.2 (1.2-1.3)
Females	3.2 (2.2-4.7)	1.5 (1.4-1.5)
Education		
No schooling	1.2 (0.55-2.7)	2.0 (1.8-2.3)
Primary	2.1 (1.3-3.4)	1.5 (1.4-1.6)
Secondary and higher	1.6 (1.3-1.9)	1.1 (1.1-1.2)
Marital status		
Single	1.6 (1.3-2.0)	1.3 (1.3-1.4)
Currently married	2.6 (1.9-3.6)	1.4 (1.4-1.5)
Separated/divorced/widowed	2.8 (0.18-43.4)	1.2 (0.83-1.6)
Occupation		
Student	1.7 (1.3-2.3)	1.3 (1.3-1.4)
Household work	3.6 (2.2-6.0)	1.5 (1.5-1.6)
Income-generation work	1.4 (1.1-1.9)	1.2 (1.1-1.3)
Unemployed/others	1.6 (0.72-3.4)	1.3 (1.2-1.5)
Wealth index		
Poorest	1.6 (0.48-5.4)	1.8 (1.6-2.1)
2	1.2 (0.65-2.3)	1.4 (1.3-1.6)
3	2.3 (1.5-3.5)	1.2 (1.1-1.3)
4	1.4 (0.99-2.0)	1.1 (1.1-1.2)
Nonpoor	1.3 (0.96-1.7)	1.04 (1.01-1.1)
All	1.9 (1.6-2.2)	1.4 (1.3-1.4)

Abbreviation: STI, sexually transmitted infection.

higher education, from the nonpoor SES living in urban settings (.36 and .98, respectively; Figure 2).

Discussion

This study, which will create awareness in Bangladeshi society, reports the knowledge of STIs including HIV/AIDS among adolescents. Furthermore, it contributes by identifying the patterns and determinants in the knowledge of sexual diseases using demographic, socioeconomic, and residence in terms of urban–rural factors. These are necessary information for implementing agencies and policy makers to develop strategies to prevent and control these diseases.

This study shows knowledge and misconceptions regarding transmission of STIs to be low, in contrast with the study by Mmbaga et al[28] in Tanzania, which also found STI transmission knowledge to be low as well as the "presence of misconceptions." But 2 other studies among a section of Bangladeshi married women and youth showed that knowledge and misconceptions about STIs was high compared with those found in this study.[8,29] Knowledge of this study was

Table 4. Multiple Logistic Regression Analysis of STIs and AIDS Knowledge of the 12 to 24 Years Age Group Odds Ratio and 95% Confidence Intervals.

	Know Ways for the Transmission of	
Factor	STIs	HIV/AIDS
Residence		
Rural	1	1
Urban	1.4 (1.1-1.7)	2.3 (2.0-2.6)
Age in years		
12-14	1	1
15-19	9.5 (5.4-17)	3.4 (3.0-3.9)
20-24	30.9 (17-56)	3.9 (3.3-4.6)
Sex		
Female	1	1
Male	5.0 (3.6-7.1)	1.9 (1.7-2.2)
Education		
No schooling	1	1
Primary	1.1 (0.73-1.7)	1.9 (1.7-2.2)
Secondary and higher	3.2 (2.1-4.8)	6.9 (5.9-8.1)
Marital status		
Single	1	1
Currently married	1.5 (1.2-2.1)	1.1 (0.90-1.24)
Separated/divorced/widowed	1.3 (0.29-5.6)	1.4 (0.82-2.3)
Occupation		
Student	1	1
Household work	0.29 (0.18-0.46)	0.67 (0.56-0.81)
Income-generation work	0.78 (0.61-1.01)	1.04 (0.89-1.23)
Unemployed/others	0.57 (0.37-0.89)	0.99 (0.77-1.3)
Wealth index		
Poorest	1	1
2	2.3 (1.4-3.8)	1.5 (1.3-1.7)
3	1.9 (1.1-3.1)	2.3 (2.0-2.7)
4	2.0 (1.2-3.3)	2.8 (2.4-3.2)
Nonpoor	2.2 (1.3-3.7)	4.5 (3.8-5.4)
−2 Log likelihood	3368.057	11477.627
Pseudo-R^2 (Cox and Snell R^2)	0.080	0.260

Abbreviation: STI, sexually transmitted infection.

quite low compared with a study by Raheel et al[30] among Pakistani 15- to 19-year-old adolescents (44%), and also lower than another study by Jaiswal et al[31] among Nepalee school students (42%). Several studies proved that knowledge (heard of) of STIs in Bangladeshi adolescents has increased gradually, yet the knowledge (with signs and symptoms) of STIs was low (4.5%).[8,23,30,31]

We found that 12- to 14-year-old females without schooling, involved in household work, from the lowest SES, and living in rural areas were especially disadvantaged due to low knowledge about the transmission of STIs. It could be anticipated that males are less shameful to hear about STI transmission compared to females, particularly in rural areas. Most stakeholders, including parents/elderly people in this society usually do not allow the youngest adolescents to participate in the discussion on sexual issues.[20] Thus, most adolescents grow up without having

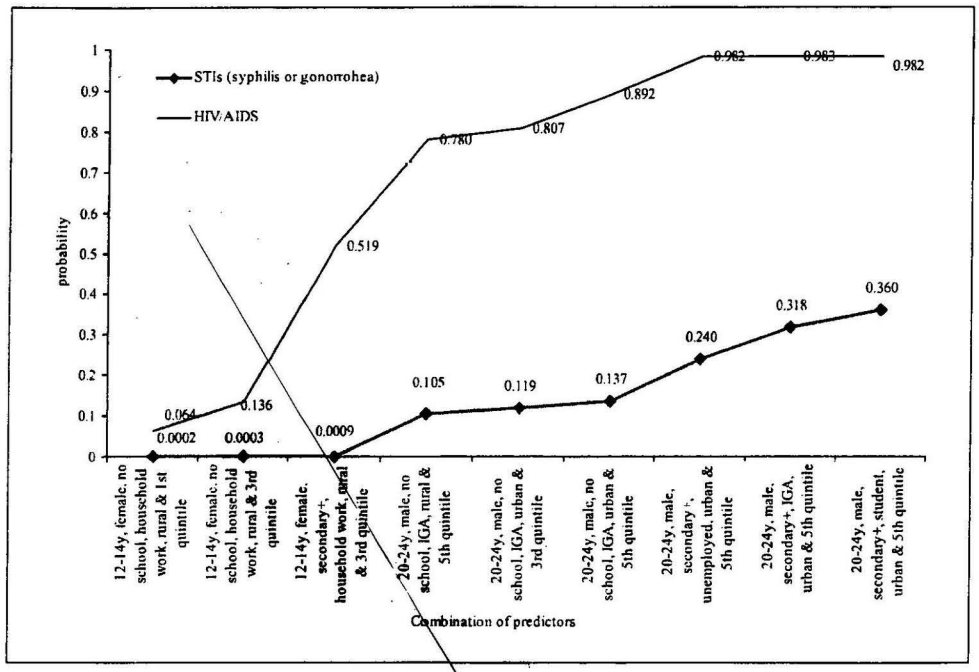

Figure 2. Estimated probabilities of adolescents' knowledge in STIs and HIV/AIDS transmission,

prior knowledge of sexual diseases or physical changes. This pattern was also reflected when the 2005 BRAC adolescents survey data set was preliminarily analyzed for the study of knowledge of reproductive health.[17]

In this study, more than three fourths of adolescents heard of HIV/AIDS in their lifetime. This coincides with the 2004 BDHS (15-24 years male 88%, female 70%),[23] but is about 10% lower than the 2007 BDHS and the 2005 baseline HIV/AIDS surveys among 15- to 24-year-old youth in Bangladesh.[8,32] The adequate knowledge of HIV/AIDS transmission of this sample was considerably much higher than that of national HIV/AIDS survey[28,33] and also much higher than a recently conducted study by Raheel et al[30] among Pakistani adolescents (15-19 years). These results, however, reflect the success of a countrywide campaigning program on access to SRH information and services by Marie Stopes International; a community-based HIV/AIDS education program by BRAC; a condom promotion program of a social marketing company; a collaborative project between the National AIDS/STD Program and the Save the Children–USA for improving access to life-skills-based SRH education and condom services for male youths; and the national AIDS campaigning program through mass media, which was also supported by the 2004 BDHS report.[23] In addition, the NGOs and international organizations had also played a significant role in spreading the HIV/AIDS knowledge throughout the country. The findings of this study confirmed that the knowledge of HIV transmission varied significantly according to socioeconomic status and urban–rural areas ($P < .01$). It is reasonable to say from the multivariate analysis that adolescents who had poor knowledge of HIV/AIDS transmission were females without education, engaged in household work, and lived in rural areas with lowest SES.

Limitations of this study include nonrespondent bias (3% for all selected adolescents) because it happened due to huge temporary migration of 15- to 24-year-old male respondents,

particularly for employment purposes. Determination of exact age was difficult for interviewers; although events calendar was used to obtain best estimates, some errors cannot be ruled out. The lowest rate of knowledge among females might be due to silent infections or any other unknown reasons.

Strengths of this first nationwide adolescents survey is that it permits conclusions regarding the whole country as well as by age, sex, and urban–rural areas. Furthermore, the size of the study facilitates precise point estimates with narrow confidence intervals. As the sampling design is similar to the 2004 BDHS,[23] it allows the comparison of some background indicators for testing the data reliability and validity of this study. For example, the male/female ratio is consistent with that of the national data set (0.80 in BAS 2005; 0.85 in BDHS 2004).[23]

Conclusion

The pattern of overall knowledge of STIs as well as HIV/AIDS among adolescents was similar. Knowledge of STIs including HIV/AIDS has been significantly associated with demographic factors as well as the urban–rural residences or socioeconomic factors. Urban–rural difference seems the most influential factor as against socioeconomic and demographic differences. Countrywide health promotion and education programs targeting this vulnerable group can play a vital role in improving the overall situation.

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Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Vision, Mission and Value of the Ministry of Public Health

Vision

To be the core agency in developing the health system with quality, efficiency and equality; with participation of the people, communities and all sectors for good health of all Thai people in order to achieve a good and sustainable society following the King's Sufficiency Economy philosophy.

Mission

1. Determine national and international health policy and strategy, concordantly with ongoing changes.
2. Develop efficient and equitable integrated health service system for both normal situation and emergency with emphasis on basic rights, specialized service and emergency medicine, surveillance system, disease prevention and control and health threats.
3. Promote participation of all sectors to raise health consciousness, promote health and improve health behaviors.
4. Develop health management system and mechanism to meet the quality standard, in line with Sufficiency Economy philosophy
5. Determine health research and knowledge management direction policy

Value

Stand for righteousness, honesty, responsibility, transparency, accountability and achievement without discrimination.

A STORY TO INSPIRE CONFIDENCE

HEALTHCARE IN THAILAND: A STORY TO INSPIRE CONFIDENCE

Thailand can be proud to have achieved most of the eight UN Millennium Development Goals (MDGs), in particular the three health-related goals.

In 1970, Thailand had an infant mortality rate of 68 per 1,000 live births, while today it is estimated at 13 per 1,000 live births. According to a 2008 study published in the medical journal Lancet, Thailand enjoyed the highest annual rate of reduction in child mortality among 30 low- and middle-income countries between 1990 and 2006. The maternal mortality ratio has also shown a similar decreasing trend. In addition, Thailand has been successful at curbing new HIV infection rates by 83 per cent since 1991, thanks to the arduous efforts made by governments and NGOs. Such impressive health outcomes did not occur in isolation from its socio-economic development context. From 1969 to 2009, its gross national income (GNI) grew from US$210 to $3,760 in current figures, or 17 times over 40 years. During the 1970s and 1980s, Thailand invested heavily in highways that connect the isolated and impoverished Northeast and North to Bangkok; electrification throughout the country; as well as expansion of school enrollment for both boys and girls. As a result, the positive spillover effects also benefited the public health sector. As economic growth accelerated in the mid-1980s and 1990s, the country continued to finance infrastructure projects which brought greater