

Evaluation of a School-based Sexual and Reproductive Health Education Intervention among Adolescents in Rural Bangladesh

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Abstract

The adolescent population of Bangladesh has a generally poor understanding of sexual and reproductive health. This is associated with early marriage, adolescent pregnancy and the increasing occurrence of high-risk sexual practices. Findings of ICDDR,B study showed that adolescents desired to have reproductive health information and easy-to-read information materials, which were the most preferred sources. A school-based intervention was undertaken to improve knowledge about reproduction, fertility, and contraception among adolescents in Bangladesh. The objective of the study was to determine the effectiveness of school-based intervention which combined community sensitization with the distribution of three booklets addressing 1) puberty, 2) fertility and family planning, and 3) STDs/AIDS.

The study was quasi-experimental in design. The intervention effects were measured through pre- and post-intervention surveys. Students were assigned to one of three groups depending upon what school they attended: Group A received community sensitization, booklet distribution, and training of providers in the clinics of Ministry of Health and Family Welfare (MOHFW), Government of Bangladesh (GoB) for the provision of adolescent friendly services, Group B received community sensitization and the booklet distribution, and Group C served as controls.

Secondary schools located in two rural sub-districts, Abhoynagar and Mirsarai, were designated as intervention or controls based upon the union in which they were located. All attending students in Grades 8, 9 and 10 were included. Using a multi-staged sampling procedure 1,870 females and 1,880 male subjects were enrolled. Group meetings were held with parents, teachers and local decision makers. These groups participated in the development of the booklets. At approximately 3 month intervals, the 3 booklets were distributed to all students. Baseline and post intervention (18 months) interviews assessing knowledge and practices were completed in the subject's home. The study was carried out from February 2001 to September 2002.

There was no follow up data about the subjects of Grade 10 and have, therefore, limited the analysis to students in Grade 8 and 9. The pre- and post-intervention interviews were completed by 73% of the students. Seventy-six percent of girls and 75% of boys reported reading all three booklets and over 95% had read at least one. None of the control subjects had seen or read the booklets. Based upon both univariate and multivariate analyses, significant improvements in knowledge favouring students attending the intervention schools were found. Among girls this included methods of modern contraception ($p < 0.002$), what diseases can be transmitted sexually ($p < 0.001$) and how to prevent them ($p < 0.001$). Among boys this included methods of modern contraception ($p < 0.001$), knowledge about birth control pills ($p < 0.001$), the symptoms of sexually transmitted diseases ($p < 0.001$), what diseases can be transmitted sexually ($p < 0.001$) and how to prevent them ($p < 0.001$). With respect to practices, too few students reported high risk behaviours or attended health services to permit a statistical analysis of group differences.

An intervention that combines community sensitization with the distribution of booklets to school-attending teenagers can effectively improve knowledge about sexual and reproductive health. The impact was greater among boys than among girls; however, the absolute level of knowledge was higher in girls. Changes in practices could not be demonstrated and suggest the need for longer-term follow-up and more discrete and confidential methods of reporting.

The results of the study provide valuable information on the process of implementing a culturally-sensitive intervention. The observation identified the complexity of adolescent reproductive health interventions and the need to be flexible. Implementation of a booklet distribution system in schools across Bangladesh will require considerable preparatory work with communities, parents, and teachers. Thus it remains to be documented whether this approach can be scaled up. To do so, it will require large numbers of skilled professionals who are also able to work with community leaders and in schools.

Introduction

In Bangladesh, adolescents represent over 20% of the total population. Two of the leading adolescent health concerns in Bangladesh are early fertility and the emergence of the HIV/AIDS epidemic. Age-specific fertility is high among adolescents aged 15-19 years, i.e. 144 births per 1,000 females. Forty-seven percent of females aged 15-19 years are currently married. By the end of their teenage years, 35% of females will have begun childbearing [1]. The social context of Bangladesh disregards sexual relationships outside marriage, and this leaves the impression that premarital sexual relationships are uncommon among adolescents in Bangladesh. Information about premarital sex is limited. However, a survey of the Population Council, Bangladesh suggests that this assumption is incorrect. The survey showed that 88% of unmarried urban boys and 35% of unmarried urban girls had engaged in sexual activity by the age of 18 years. By this age, a smaller, but important proportion of unmarried boys and girls living in rural areas also reported having engaged in sexual activity (38% and 6% respectively) [2]. It has also been estimated that 55% of patients seen for sexually transmitted infections (STIs) are aged less than 24 years [3].

The recent surveys conducted by the ICDDR,B: Centre for Health and Population Research and other organizations in Bangladesh among adolescents have consistently documented their generally poor knowledge of sexual and reproductive health. Furthermore, what is 'known' is often incorrect and derived through communication with friends who are equally not knowledgeable [2,4-6]. A 'needs assessment' study carried out by ICDDR,B has also documented that adolescents in Bangladesh rarely discuss sexual and reproductive issues neither with their parents nor with their teachers. This study explored whether adolescents desired to have reproductive health information and from what source they preferred to have this information. Findings of the study showed that easy-to-read information materials were the most preferred sources. This study also found that there exist widely-varied opinions among parents, teachers, and decision-makers about the desirability of providing adolescents with sexual and reproductive health information [4].

Adolescents can easily be reached through schools. Thus, the appeal of school-based strategies is direct access to large number of subjects at a low cost. From an adolescent perspective, schools afford anonymity and allow for discussion among peers. Additionally, in Bangladesh, an increasing number of adolescents are entering school. Despite high drop-out rates, an increasing number of girls are continuing their education as a result of several recent initiatives taken by the Government of Bangladesh, for example, food for education, free schooling up to grade 12 for girls, and free distribution of textbooks. 'No education' among females aged six and above has declined from 44% to 38%. On the other, for males in the same age group, the proportion that have never attended school decreased from 33% to 28% between 1996 and 2000 [1].

In the developed and, to a lesser extent, developing world, a vast range of school-based interventions that aim at reducing high-risk sexual and reproductive health behaviours have been tried. In Bangladesh, several NGOs have begun to address reproductive health and other health needs of adolescents. Recently, adolescent health has become a priority concern in the national health and population programme. Nonetheless, most non-governmental organizations (NGOs) providing health services do not address reproductive health needs of adolescent. Because of the particularly conservative nature of Bangladeshi society with respect to sexual and reproductive health, reproductive and sexual health interventions have not been widely introduced among adolescents. One exception is the introduction of adolescent reproductive health topics to a limited extent in public secondary school curricula. Topics include 'reproductive system', 'HIV/AIDS', and 'adolescence period'. In the section on adolescence period, the textbook mainly highlights the mental changes, relationship with parents, nutrition, and personal hygiene, but very limited information on physical changes, especially on male physical changes is disseminated.

A school-based intervention seemed to be a logical step to improve knowledge about reproduction, fertility, and contraception among adolescents in Bangladesh. Bangladesh has only recently acknowledged the need of addressing adolescent health issues. Its inclusion in the essential service package (ESP) as a separate programme titled "Maternal Nutrition and Adolescent Health" indicates a commitment to move in this direction. One of the alternative strategies for the provision of preventive adolescent health is through schools, but this has not been objectively assessed through prospective, controlled studies.

For readers desiring additional references, a more detailed literature review is appended in the later part of this paper.

Study Objective

This study was carried out to determine the effectiveness of a school-based intervention that combined the distribution of educational booklets and sensitization of key players, i.e. parents, teachers, community leaders, and service providers, to the need of providing adolescent reproductive health education. Its effect was measured in terms of changes in knowledge and practices regarding reproductive and sexual health.

Hypothesis: A significant improvement in knowledge and practices relating to sexual and reproductive health will occur among students living in sensitized communities with distribution of school booklets.

Methods

Study design

The study was quasi-experimental in design. The intervention effects were measured through pre- and post-intervention surveys. Students were assigned to one of three groups depending upon what school they attended: Group A received community sensitization, booklet distribution, and training of providers in the clinics of Ministry of Health and Family Welfare (MOHFW), Government of Bangladesh (GoB) for the provision of adolescent friendly services, Group B received community sensitization and the booklet distribution, and Group C served as controls.

Study population

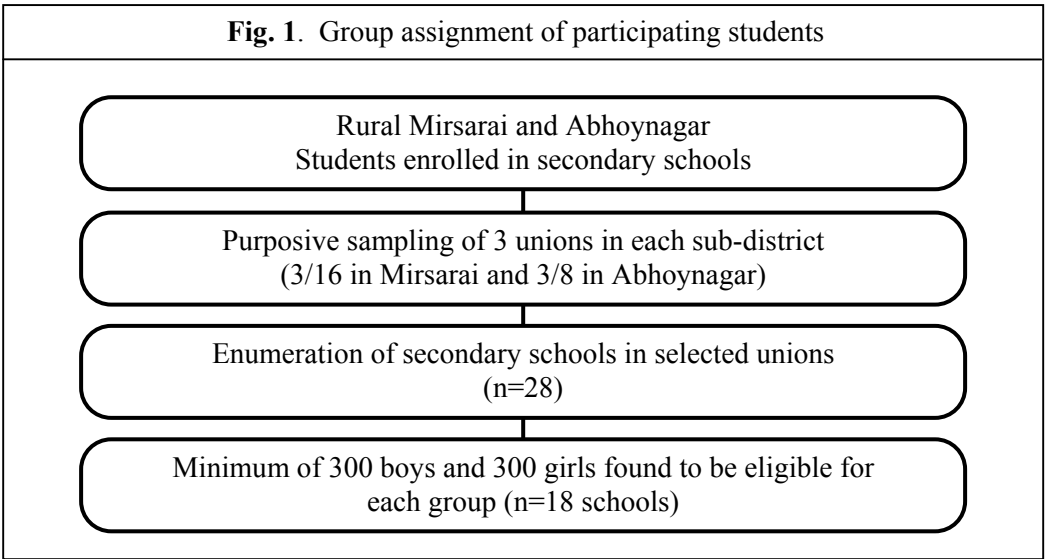
Source population

Adolescent boys and girls, aged 13-19 years, who were attending Class VIII, IX, and X, were included in this study.

Study population

The study was implemented in the two rural surveillance sites of the Health System and Infectious Diseases (HSID) Division of ICDDR,B, i.e. Mirsarai and Abhoynagar. There are 8 and 16 unions in Abhoynagar and Mirsarai respectively. Six unions--3 from each of these two sub-districts--were purposively selected based on easy access and previous work experience. One union for each sub-district was assigned to group A, B and C. In the selected unions, all 28 secondary schools were listed, and of these, 18 were selected. Beginning with the largest schools first, schools were selected until 300 girls and 300 boys were found to be eligible in each group (Fig. 1). The reason for selecting the schools in this manner was to reduce the number of schools required, thus facilitating the implementation of the interventions and the time required.

To fulfill the target sample size, i.e. 300 girls and 300 boys in each group, 5 secondary schools were assigned to group A, 6 schools to group B, and 7 schools to group C. Of these, 12 were co-educational, 5 were girls' schools, and 1 was boys' school.



Sample size

The following formula was used for calculating the sample size:

$$n/\text{group} = \frac{[(Z_{\alpha} + Z_{\beta})^2 P(1 - P) \times 2] \times 1.5}{d^2}$$

Here,

n = the desired sample size

$Z_{\alpha} = 1.645$, one tailed test

$Z_{\beta} = 0.84$

P = the proportion of adolescents not having knowledge or a specific practice relating to reproductive health

d = the minimal detectable difference in knowledge of adolescents about reproductive health between the intervention and the control group

If P is 60% and d is 10%, the desired sample size is:

$$n/\text{group} = \frac{[(1.645 + 0.84)^2 (0.6)(1 - 0.6) \times 2] \times 1.5}{(0.1)^2} = 295/\text{group}$$

Considering the clustered sampling, a design effect adjustment is required. This was set at 1.5.

Interventions

Community sensitization

Sensitization of the community to the proposed school-based adolescent reproductive health intervention was considered to be an essential intervention component. Orientation meetings were held with the parents, schoolteachers, and community elite to inform them the purpose of the intervention and acquaint them with the content of the booklets. These meetings were held once with the parents and community elite. The meetings needed to be repeated with school headmasters. These lasted for 1-2 hour(s). In these orientation meetings, officials from the Ministry of Health and Family Welfare (MOHFW), Government of Bangladesh (GoB) and health service providers participated. Headmasters of the schools were approached first, and following this, other schoolteachers, local elite, and parents were reached. The draft copies of the booklets, prepared by the adolescent reproductive health (ARH) working group, were reviewed by the teachers, parents and community elite. The working group, which addressed the issue of booklets, is described in the next section of this report.

Suggestions for modification of booklets were carefully considered to create a positive environment before their distribution. The parents and teachers strongly felt that a separate booklet on 'puberty' for boys and girls should be prepared, in which wet dream and menstruation would appear in a gender-relevant book only. Consequently, gender-specific versions of the first booklet that addressed puberty were prepared. With respect to the second booklet, 'Marriage and Family Health', there existed general disagreement regarding the provision of detailed information about contraception. The parents preferred selective information on this topic. For example, they advised us to exclude information on mechanism of action of family planning methods and their side-effects. Accordingly, the amount of information on family planning was reduced, and the title was changed from "*Marriage and Family Planning*" to "*Marriage and Family Health*". The community members (parents and elite) viewed that some words relating to sexuality and accompanied drawings, such as condom application in the STI/HIV/AIDS booklet no. 3, were unacceptable. Some of these were changed, and the sketch of condoms was excluded from the booklet. After modification, the booklets were again shared with the teachers before final printing. After printing of the STI/HIV/AIDS booklet in colour, the teachers informed the research team that a sketch of a bed scene used for conveying modes of transmission of HIV/AIDS was not acceptable. This necessitated shadowing out the sketch.

Distribution of booklets in schools

The *Puberty* booklet was distributed first, in September 2001, being the least controversial, followed by the booklets *Marriage and Family Health* and *STI/HIV/AIDS* distributed in March 2002 and June 2002 respectively. Assessment of the impact of the booklets was scheduled three months after the final distribution. Brief orientation meetings were held with students during distribution of the booklets. In the orientation

sessions, the topics covered in the booklets were highlighted, and their importance to adolescents was discussed. Usually, the length of these meetings did not exceed half an hour.

Each student received his/her own copy, and for the absentees the copies were given to the school authorities for later distribution, thus reaching every student in the selected classes. At the same time, the study team worked with teachers, officials of MOHFW, and health service providers during distribution of booklets. This was considered important to maintain community acceptance of the intervention. During the distribution of the first booklet, the headmaster of one school in Abhoynagar refused to participate in the intervention, and as a result, this school had to be dropped. After each and every distribution of the booklets, a meeting was conducted with the schoolteachers to address potential concerns. The booklets were distributed in the schools after a short orientation meeting with the students.

Development of booklets

Three booklets were tested to improve knowledge of adolescents about reproductive and sexual health issues. The booklets focused on (a) normal sexual maturation, (b) marriage and family planning, and (c) sexually transmitted diseases (STDs) and HIV/AIDS. The booklets are based on the frequently-asked questions (FAQ) databank developed by ICDDR,B. The FAQ study was a community-based, qualitative investigation of demographically heterogeneous adolescents. This included school attending and non-attending, married and unmarried, poor, low-middle and middle-class adolescents. Questions were compiled from the ICDDR,B's needs assessment and Rural Service Delivery Partnership (RSDP)/Pathfinder newlywed assessment data banks. The respondents in the ICDDR,B study were mainly unmarried adolescents, whereas the respondents of the RSDP study were married adolescent girls. The questions covered menstruation, wet dreams, reproductive tract infections (RTIs) and contraception. The FAQ study was undertaken to explore other topics of reproductive health and sexuality and thereby to develop a larger database covering several topics

Initially, 380 questions and responses were compiled. These were reduced to 165 unique questions for which answers were prepared in a clear and easy-to-understand language. Scientific jargon was kept to a minimum. The social, cultural and religious backgrounds of the adolescents were considered during construction of responses. To limit the chance of misunderstanding or inappropriate action, judgmental messages were avoided.

A panel, made up of academicians, a psychologist, a religious leader, social workers, programme managers from the GoB and NGO agencies, and researchers with experience in this field, reviewed the questions and answers. They reviewed the accuracy and relevancy of the answers. The databank was finalized after pre-testing the questions and answers among adolescents.

After finalization, the data bank was submitted to an adolescent reproductive health (ARH) working group. The group included representatives from ICDDR,B,

USAID, Bangladesh Center for Communication Programs (BCCP), the Behavior Change Communications (BCC) Unit of Directorate of Family Planning, NGO Service Delivery Program (NSDP), BRAC, Population Council, United Nations Population Fund (UNFPA), Marie Stopes, Social Marketing Company (SMC), and United Nations Children's Fund (UNICEF). The members of the working group first decided on the most important reproductive health (RH) questions for adolescents and again reviewed the answers and revised them in a standard format. To assist with the development of the booklets, they also added some text. The draft booklets were pre-tested among the parents to assess the acceptability and among the adolescents to assess comprehension.

The booklets were all grouped under the title '*Nijeka Jano*', meaning 'knowing yourself'. The topics of the first booklet, 'Puberty', covered nutrition, hygiene, reproductive anatomy, development (physical, mental, and social), teasing, and sexual harassment. The second booklet, "Marriage and Family Health", covered marriage, family planning, pregnancy, antenatal care, postnatal care, tetanus toxoid, abortion, infertility, and impotency. The third booklet "STI and HIV/AIDS" covered female and male reproductive anatomy, vaginal discharge, sexually transmitted diseases (STDs), HIV/AIDS, and advantage of condom use.

Adolescent friendly services

As planned, an attempt was made to make the government health facilities in the Group A union adolescent friendly. Personnel in the Upazilla Health Complex in Abhoynagar and in Union Health and Family Welfare Centre and Rural Dispensary in Mirsarai were provided with training and guidelines that strengthened the quality of adolescent services given in a more friendly and confidential manner.

Monthly meetings were held with the service providers to discuss problems relating to adolescent friendly care. The infrastructure of the MOHFW service system did not facilitate full implementation of the planned services. The major reported obstacles were heavy schedules and work hours during the time when adolescents are in school.

Measurement

Baseline survey

Knowledge and practices relating to reproductive and sexual health were assessed using a multi-item questionnaire developed and pre-tested by the research team. This baseline survey was conducted during January-March 2001. All students were interviewed inside or outside home, i.e. wherein confidentiality can be maintained. A verbal consent from the adolescents, their parents, or guardians was obtained prior to interview. Students were interviewed by same sex research assistants at a time and place that was convenient to them.

End line survey

The end-line survey was conducted during July-September 2002. The baseline questionnaire, with few modifications, was used in the end-line survey. The same procedure was followed for data collection.

Conduct of study

Prior to completing data analysis and during the conduct of the study, three revisions of the study protocol were made. First, approximately two months after the baseline interviews, one school in the intervention Group A dropped out of the study because of concerns about the sensitivity of the topics covered in the booklets. To make up for this loss, students who had completed the baseline questionnaire from one school in the control Group C were transferred to the intervention Group A. Second, at the conclusion of the study, it was observed that less than 5% of adolescents had visited a government clinic, which made it unfeasible to test the impact of user-friendly services. While this in itself provides valuable feedback for the MOHFW, it was decided to merge Group A and Group B for the comparison of the booklets and sensitization intervention with the control Group C. Third, students who were in Grade 10 at the time of the baseline interview were uniformly no longer in schools, because this is the last year offered by the schools. At the design phase, it was assumed that the study could be completed prior to the end of the school year, but it extended into the next year. We have no follow-up data about these subjects and have, therefore, limited the analysis to students in Grades 8 and 9 at baseline.

Analysis

Data were entered and analyzed using SPSS version 11.5. After verification and reduction of data, descriptive frequencies were completed. This was followed by univariate and multi-variate procedures to assess the impact of the interventions and to identify other predictors of change in knowledge or practices. Where distribution of scores was skewed, the Mann-Whitney U test was applied.

Results

Table 1 summarizes a between-group comparison of the intervention (Groups A and B) and control adolescent students. The study was carried out in rural sub-districts. The highest proportion of fathers were skilled workers, referred to as 'service holders' in Bangladesh. This encompasses a wide range of skills and does not necessarily correlate with income. Less than 30% were farmers, and more than 25% were engaged in small private enterprises.

Table 1. Between-group comparison of demographic characteristics of students at entry into study		
Characteristics	Intervention group	Control group
No. of subjects		
Females	1273	597
Males	1273	607
No. of subjects who completed the study (%)		
Females	622	245
Males	593	276
Occupation of father (%)		
Farmers	22.9	29.7
Unskilled workers	9.1	11.3
Skilled workers	41.6	30.7
Private business	26.3	28.3

An important initial inquiry was the determination of whether or not the booklets were read. When asked at the end-line interview, 95% and 99% of girls and boys respectively reported having read at least one booklet. Similarly, 76% and 75% reported reading all three. The booklets were frequently shared with friends (89% of girls and 79% of boys), but less so with parents (46% of girls and 27% of boys). No subjects of the comparison group reported having read any booklet.

Due to the very limited use of the government health services, we were unable to test for group differences. At the end-line interview, 39.3% of the intervention and 35.5% of the control group females reported having physical problems during menstruation, such as excessive bleeding, abdominal pain or cramps, nausea, and headaches. Of these, 9% in both the groups sought help either from a licensed provider or from an unlicensed provider, and in nearly all cases within the private sector, the government health services were rarely used.

The impact of the intervention programme was assessed separately for females and males. In Table 2, change in knowledge among females relating to puberty, which is covered in booklet no. 1, is summarized. Significant between-group differences, after adjusting for baseline knowledge, were found with regard to knowing when, in their menstrual cycle, they were most vulnerable to become pregnant ($p=0.016$). It should, however, be noted that, at the conclusion of the follow-up end-line survey, the large majority of the students in either group did not know the correct answer. The knowledge level for fertility-related issues other than menstrual cycle increased among the girls from baseline to end-line, but the pattern of improvement in knowledge was more or less similar in both the groups.

Table 2. Change in knowledge of females about fertility risks					
Question	% of correct answer				p value*
	Intervention Group		Control Group		
	Baseline	End-line	Baseline	End-line	
Can one become pregnant after having sex one time only?	33.3	59.6	27.8	53.3	NS
When in the menstrual cycle is one at greatest risk of becoming pregnant?	2.4	40.0	2.4	16.3	0.016
At what age does a female become fertile?	28.3	71.5	30.2	73.1	NS
At what age does a male become fertile?	13.0	52.9	19.6	44.1	0.024
* Multiple logistic regression for the prediction of end-line answer after adjusting for baseline answer and religion NS= Not significant					

Changes among girls in knowledge relating to family planning and STIs/HIV are summarized in Table 3. All results have been assessed in terms of change in summary, total knowledge scores by topic. Because of the skewed distribution of summary knowledge scores, the non-parametric Mann-Whitney U test was applied. Significant between-group differences, all favouring the intervention group, were identified for knowledge about alternative methods of modern contraception ($p < 0.002$). The questions relating to STDs and HIV/AIDS focused on knowledge of varied types of STDs, and methods of their prevention. Significant differences were found favouring adolescents of the intervention group in ability to recall types of sexually transmitted diseases and methods of prevention of STDs. The intervention did not appear to have had an impact on knowledge relating to HIV/AIDS among girls.

Table 3. Females: change in total knowledge scores relating to reproductive health and sexually transmitted infections					
Topic (range of score)	Mean Score				p value*
	Intervention group		Control group		
	Baseline	End-line	Baseline	End-line	
What methods of contraception do you know? (0-6)	1.07	2.62	1.01	2.27	<0.002
Correct knowledge about oral contraceptive pill (0-4)	1.43	2.86	1.46	2.70	NS
What infections can be sexually transmitted? (0-4)	0.60	1.02	0.69	0.43	<0.001
What can be done to prevent an STI? (0-4)	1.31	2.00	1.29	1.22	<0.001
How can an STD be transmitted? (0-4)	1.04	1.61	0.91	1.39	NS
How are HIV/AIDS transmitted? (0-7)	2.21	2.90	2.09	2.66	NS
How can one prevent HIV/AIDS? (0-5)	1.75	2.89	1.59	2.66	NS

* Mann-Whitney U test comparison of mean change score
NS=Not significant

It was found at the time of booklet development that a large proportion of boys considered wet dream to be abnormal, requiring treatment. Several national studies revealed that this notion among adolescent boys is reinforced by local, unlicensed providers, who provide traditional remedies and perpetuate the belief that wet dreams are pathological. For this reason, the booklet no. 1 which covered puberty placed particular emphasis on normal adolescent pubertal development and specifically discussed wet dreams. Table 4 summarizes between-group differences in correct knowledge about wet dreams. Correct knowledge significantly improved in the intervention group ($p < 0.001$, adjusted for baseline knowledge, religion, and father's income). Table 4 shows that there remains an important disconnection at end-line between knowing wet dreams are normal in the intervention (90.6%) and control (73.0%) groups, but still believing this requires treatment, 28.7% and 57.8%, respectively.

Table 4. Change in knowledge of males about wet dreams					
Topic	% of boys with the correct answer				p value*
	Intervention group		Control group		
	Baseline	End-line	Baseline	End-line	
Are wet dreams normal?					
Yes	56.3	90.6	58.3	73.0	
No	7.3	8.5	36.4	23.2	
Don't know	36.4	0.9	33.3	3.8	<0.001
Do wet dreams require treatment?					
Yes	43.8	28.7	49.6	57.8	
No	19.6	70.3	17.0	34.2	
Don't know	36.6	1.0	33.3	8.0	<0.001

* Multiple logistic regression for the prediction of the correct end-line answer after adjusting for the baseline answer and religion

In Table 5, knowledge among boys relating to family planning and STDs/HIV/AIDS are summarized. As with the girls, all results have been assessed in terms of change in summary, total knowledge scores by topic, and between-group differences tested for with the non-parametric Mann-Whitney U test. The boys in the intervention group were more knowledgeable about alternative methods of modern contraception and use of oral contraception than those of the control group; this change was significant ($p < 0.001$).

Table 5. Males: change in total knowledge scores relating to reproductive health					
Topic (range of score)	Mean Score				p value*
	Intervention group		Control group		
	Baseline	End-line	Baseline	End-line	
What methods of contraception do you know? (0-6)	1.32	2.38	1.32	1.98	<0.001
Correct knowledge about oral pill (0-4)	1.67	2.62	1.67	2.07	<0.001

* Multiple logistic regression for the prediction of the correct end-line answer after adjusting for the baseline answer and religion

A significant difference between the intervention and the control boys was observed for knowledge about STDs. This included recalling the name of STDs ($p<0.001$), symptoms of STDs ($p<0.001$), and how to prevent STDs ($p<0.001$). A significant improvement in knowledge about the routes of spreading of HIV/AIDS, favouring the intervention group was found. But no significant difference was found for the prevention of HIV/AIDS (Table 6).

For boys and girls, we summed all topic-specific scores and obtained an overall knowledge change score covering all three booklets. The mean overall change in knowledge among girls was 6.44 and 4.30 for the intervention and the control group, respectively ($p<0.001$). Among boys, the result was 3.65 in intervention vs 1.68 in control subjects ($p<0.001$, both adjusted for baseline score, religion, and occupation of father).

Table 6. Males: change in total knowledge scores relating sexually transmitted infections					
Topic (range of score)	Mean score				p value*
	Intervention group		Control group		
	Baseline	End-line	Baseline	End-line	
What infections can be sexually transmitted? (0-4)	0.82	1.09	0.73	0.55	<0.001
What are the symptoms of an STD? (0-4)	0.28	0.75	0.20	0.25	<0.001
What are high risk practices for transmitting an STD? (0-4)	2.00	2.82	1.72	1.61	<0.001
What can be done to prevent an STD? (0-4)	1.21	1.88	1.10	1.48	<0.001
How are HIV/AIDS transmitted? (0-7)	2.64	3.19	2.33	2.67	<0.001
How can one prevent HIV/AIDS? (0-5)	2.55	3.43	2.21	2.93	NS
* Multiple logistic regression for the prediction of the correct end-line answer after adjusting for the baseline answer and religion					
NS= Not significant					

Discussion

This report addresses the effectiveness of distribution of three booklets on reproductive and sexual health. The booklets were distributed to secondary school students following extensive community sensitization in support of adolescent reproductive health education. The booklets focused on normal sexual maturation, reproductive health, and STDs/HIV/AIDs and aimed at improving knowledge and practices among school-going adolescents. The results of the study indicated that considerable improvement in knowledge occurred, with each booklet having a greater impact on boys than on girls. It was also found that students in the comparison group had experienced significant improvements in knowledge and suggest there may have been important background factors that influenced the outcomes of interest in both the groups.

For the reasons already mentioned, this study did not have the capacity to assess behavioural changes and specific practices. Health services were poorly attended by adolescents, students rarely reported high risk behaviors, and females were too young to initiate their second tetanus toxoid injection.

Puberty

Normal physiological changes during the pubertal stage of life include menstruation and wet dreams. Both these phenomenon generally arise concerns and adolescents are subject to many incorrect, negative health consequences. Examples include food restriction during menstruation and management of wet dreams as a disease. The first booklet was designed to eliminate the negative practices that do occur at the time of puberty. Among females, we did not observe any differences in menstruation knowledge or practices. We, however, observed considerable correction in perceptions of boys regarding wet dreams, reducing their fear and feelings of guilt. Several reports in Bangladesh confirm the negative perceptions of boys in this regard and how these perceptions influence them to move towards harmful practices. The male adolescents, included in a UNICEF study, expressed strong feelings of guilt and anxiety due to wet dreams. The UNICEF study examined potential healthcare-seeking behaviour of boys. For reproductive health concerns, boys first visit pharmacies or village doctors. They use a doctor only when these fail [7]. A similar picture was observed in the needs assessment study of ICDDR,B [4]. Providing information on wet dreams reduces perception of the need to seek help from a health provider and other harmful practices.

Fertility and family planning

The negative health consequences of unplanned pregnancy equally affect married and unmarried young females. However, sexuality and fertility risk in unmarried girls are culturally sensitive and difficult to discuss. This intervention led to several improvements in knowledge, beginning with a more accurate understanding of fertility and its timing in the menstrual cycle. The pre-test scores for this topic were extremely low, and a substantial proportion continued to have a poor understanding through out. Additional inputs are clearly required.

The survey questionnaire also contained a set of questions about family-planning knowledge. Significant improvement in knowledge about alternative choices of modern family-planning methods was observed among boys in the intervention group in contrast to the comparison group. In a country like Bangladesh, with a relatively high level of contraceptive prevalence and where women take the major responsibility for contraception, it is to be expected that the intervention would have a greater impact on boys than on girls. The girls' results may reflect the widespread national campaign of family planning, which was tailored to the married females. In one study of the Population Council, it was found that fieldworkers of the national family-planning programme were a common source of information for family planning among unmarried adolescent females [2]. In the ICDDR,B needs assessment study, adolescents mentioned other sources of family-planning information, including friends, sisters-in-law, radio, and television. In addition, females are more likely to be exposed to information through observing their associates, for example, sisters-in-law, and aunts who use family-planning methods [4].

Based on our findings, prior to the intervention, it is evident that males are not exposed to information about fertility and risk for pregnancy. This is supported by other studies, with the contraception-knowledge level of male adolescents found to be limited in the UNICEF study as well. Also in the needs assessment study of ICDDR,B, very few boys could mention a family-planning method other than 'pill', a finding consistent with the findings of the Population Council study.

Sexually transmitted diseases and HIV/AIDS

The results further demonstrated that the school-based intervention led to a significant increase in knowledge about STDs among adolescents, but it also revealed that the booklets were probably not changing levels of knowledge about HIV/AIDS. Overall, the data suggest that there exist other sources of information that are helping improve knowledge regarding HIV/AIDS. Adolescents from both the groups might be benefiting from the national campaigning programme conducted mainly through mass media against HIV/AIDS. These findings further support the conclusion that it will be difficult to attribute changes in knowledge or behaviour to a single intervention. Adolescents are being exposed to multiple sources of information, which make the assessment of changes extremely complex.

Exposure to mass media

An important concurrent exposure during the conduct of this study was a mass media radio campaign in support of improved adolescent reproductive health. This was broadcasted weekly for one year and would explain the impressive improvement in knowledge among adolescents of the comparison group. Marketing research in Bangladesh has confirmed that both adults and adolescents are exposed to multiple media sources. Television and radio are two popular sources of information for adolescents, especially unmarried girls. Results of the national media survey of Bangladesh Centre for Communication Programs and Social Marketing Company

showed that 61% of population of Bangladesh watch TV, while 24% of urban and 34% of rural populations listen to radio [8]. The impact of concurrent radio messages is the topic of an additional analysis to be completed.

Creation of a supportive environment

Creation of a supportive environment in the community in support of reproductive health interventions was a major challenge. Initially, the hesitancy among the schoolteachers, parents, and community elite stemmed from the perception that sex education is immoral. They did not recognize that this type of education can protect and improve health. Nevertheless, they eventually reached a consensus that adolescence is an appropriate age to receive reproductive health messages.

The teachers' arguments for different messages and pictures again suggested that the teachers are concerned about social norms and values. Varied strategies over the course of working with the community needed to be considered. These included feedback, involving teachers at every stage, and also involving the intervention personnel whenever requested by the teachers or parents. Despite the different suggestions made by the teachers for each booklet, the intervention received full support from them, and as a result, the intervention was able to successfully distribute the booklets among students. This clearly defined that, before accomplishing any reproductive health programme for adolescents, the community needs to be informed and involved at every stage of its implementation.

Healthcare use

The intervention attempted to inform the adolescents about the availability of more adolescent-friendly services. Nevertheless, the use patterns showed no changes before and after the intervention. The extremely low use observed in the baseline survey and also in the end-line survey is consistent with generally low use rates among adolescents. Adolescents are a relatively more healthy population, at least in terms of severe illness and make it less likely that they will seek help from a health facility.

A related issue is confidentiality and privacy at the service level. This is not maintained in many government facilities. For many adolescent health problems, often associated with puberty, traditional healers are typically consulted. Adolescents are usually dissatisfied with the existing healthcare facilities, and dissatisfactions were expressed in terms of privacy and attitudes of providers [4]. Eventually, adolescents search for a source where they can have privacy for their taboo issues. The present intervention made some changes in the existing government health facilities to maintain privacy and confidentiality. Despite the low trend of use and considering the intervention effort to make a facility adolescent-friendly, some conclusions can be drawn. Right of adolescents to confidentiality remains a challenge. The providers at the government health facility were not able to maintain privacy at all levels of care because of patient-load. The dense caseloads are, in part, attributable to limited 2-3 hours per day during which they are available for walk-in services.

Limitations of the study

We attempted to assess a limited set of adolescent health behaviours, such as smoking, alcohol, drugs, and health-seeking practices. A very few positive responses were obtained and could not, therefore, be analyzed statistically. Given the relatively short length of follow-up, it was not likely that we would observe changes in reproductive or sexual health behaviours. Less is known about the behaviour of adolescents with respect to the reproductive health issues addressed by the interventions. The evidence from other studies suggests that education projects are effective in changing behaviour in school settings, particularly among those adopting a peer group strategy [9]. This includes delayed initiation of intercourse, an increase in abstinence, and an increase in condom use. These behaviours are also influenced by social marketing strategies, which include both a peer approach and print materials for education [10,11]. In a country like Bangladesh where unmarried adolescents face many barriers, including prejudice of health providers and limited access to information, booklets alone are not the answer. There is, thus, a need to adopt multiple strategies in the delivery of services and information to adolescents.

Conclusions

1. **Knowledge:** The assessed intervention of community sensitization and distribution of booklets in secondary schools has been shown to positively influence reproductive health knowledge among adolescents. The impact was greater among boys than among girls; however, the absolute level of knowledge was higher in girls.
2. **Practices:** This study could not confirm if there was any change in practices. This will require longer follow-up.
3. **Feasibility:** It remains to be documented whether this approach can be scaled up. To do so, it will require large numbers of skilled professionals who are also able to work with community leaders and in schools.
4. **Strategy:** It is not realistic to anticipate single strategies without follow-up and repetition of messages will be effective in raising knowledge or changing behaviour.
5. The impact of the intervention studied was influenced by the introduction of another adolescent reproductive health intervention unconnected to this study. This was the nation-wide radio broadcast of a weekly programme targeting adolescents and covering much of the same material found in the booklets (a separate analysis of this influence is being done).

The results of the study provide valuable information on the process of implementing a culturally sensitive intervention. Although the community recognized that reproductive health education is an important need, the efforts required in sensitizing the community indicate that adolescent reproductive health remains a sensitive issue and will face many barriers if not sensitively planned and implemented.

As described, many barriers were faced during the development of the three booklets. This included disagreement about information content, wording of information, and graphical presentation. Once the booklets were developed, additional problems were encountered at the time of their distribution. Whatever may be the explanation, the observation identified the complexity of adolescent reproductive health intervention and it needs to be flexible. Implementation of a booklet distribution system in schools across Bangladesh will require considerable preparatory work with communities, parents, and teachers.

Literature Review

During 1994-1997, a peer-education project was implemented in Nigeria and Ghana. The targeted population of this project was the youth, either attending secondary schools, post-secondary schools, or out of school settings. The intervention was a quasi-experimental operations research design, using pre-test and post-test design, having a control group. The trained peer educators provide information and counselling to the target group through several ways, for example one-to-one session, group talks, and presentation and also distributed print materials, which mainly focused on HIV/AIDS, contraception use. The study assessed the change in knowledge and also the behaviour regarding contraceptive use. The mean knowledge of the youths score was significantly different from that of the control group of youths. The mean contraceptive opinion score among intervention youths rose from 9.6 to 10.0 points from baseline to follow-up but in the neither point they were significantly higher than the control group. In terms of behaviour, a significant change was observed in the use of modern contraceptives among the project's youth. The use of modern contraception increased significantly from 47.2% at baseline to 56% at follow-up [9].

A pilot study focusing on sexual abstinence and risk reduction documented the fact that improvement in knowledge and change in behaviour are significantly pronounced in adolescents who were trained up as peer educators than their friends with whom they talked about sexual risk-reduction behaviour. The study, conducted in rural American communities, has one intervention group, and two comparison groups. In the intervention group, the peer educator is called STAND (Students Together Against Negative Decisions), and the other two groups also had peer educators, but one of them did not receive any training and the other received only a youth leadership training. The peer educators were used for instruction and influencing the teens of 9th and 10th graders. Two studies were conducted to evaluate the intervention--one is intervention study and the other one is the diffusion study. In the intervention study where evaluation was done among the peer educators, diffusion of information between the peer educators and their friends have been happened fully, i.e. 100%. The diffusion study included a separate sample of students of 9th and 10th graders. No significant difference was found in the increased risk-behaviour knowledge scale score between the intervention group and the comparison group. Also changes in HIV prevention and condom attitude scale scores, perceived norms towards abstinence, and use of condoms were not significant between the groups [12].

A comprehensive approach can be greatly used for strengthening a programme intended to change behaviour. Results of a study targeted drug abuse, a different issue other than reproductive health, conducted in Minnesota of United States showed that a Drug Abuse Resistance Education (D.A.R.E) plus programme has a greater impact on boys than on boys who received only D.A.R.E curriculum. The study design involved 24 middle and junior high schools in Minnesota, targeting the students of 7th and 8th grade. Eight schools received D.A.R.E. only, the middle and junior high school curriculum, eight schools received the D.A.R.E. curriculum and the D.A.R.E. plus programme and eight schools served as 'delayed programme' control schools, and had the opportunity to receive the D.A.R.E. plus programs after the final follow-up. At the final follow-up, 84% of the baseline sample could be followed up. The main role model of this programme was male, and compared to girls, boys had significantly higher rates of alcohol use, marijuana use, and violence at baseline, and these factors make the programme more appealing to boys than to girls by addressing a high-risk group. The D.A.R.E. plus program demonstrated that a multi-component programme is effective in behaviour change over a single component programme [13].

A classroom-based intervention was designed to increase knowledge and skills aimed at safe behaviour regarding sexuality and HIV/AIDS in a northeastern city of America. In this study, there were four groups--one group received health education by highly trained health educators; one group had health education by high school students; and the regular health teachers taught the students of the third intervention group. Beside the intervention group, there was a control group where health-education curriculum was taught by the classroom teacher. The targeted population was students of middle school and high school where improvement in knowledge was found in the intervention groups compared the control group. Also with this change in knowledge, this made a contribution to the behaviour change in the intervention group, which was assessed through self-reporting. This differences were particularly true for the peer educators group targeting the middle school students who had not yet enter into any sexual relationship [14].

The high rate of HIV infection among youths in Africa has drawn the attention both nationally and internationally. Education and prevention programmes are seen as the primary way of decreasing this rate. The paper written by Melanie Gallant, MA reviewed 10 published papers and evaluated school-based HIV/AIDS risk reduction programmes for youths in Africa. Most programmes were quasi-experimental designs with pre- and post-test assessments. The goals of programmes varied, with some targeting only knowledge, others attitudes, and others behaviour change. Nine of the 10 studies that assessed knowledge reported significant improvements. All seven that assessed attitudes reported some degree of change towards an increase in attitudes favourable to risk reduction. In two of four studies that targeted sexual behaviours, sexual debut was delayed, and in two, the number of sexual partners decreased. In one of the three studies that targeted condom use, condom-use behaviours improved. The results of this review suggest that knowledge and attitudes are easiest to change, but behaviours are much more challenging.

The schools of the African countries are controlled by government and by religious organizations, both of which are hesitant towards promoting condom use. In

Tanzania, for example, national guidelines from the Ministry of Education prohibited discussion of condoms, and in Uganda, teachers felt the community disapproved teaching about condoms and consequently chose not to include this optional section of the school curriculum.

All of the interventions used focus groups or surveys to inform and develop, or to adapt the content and style of the intervention to existing cultural and community norms. All programmes targeted youths aged 10-25 years. Four programmes focused on upper primary school students, while the remainder targeted secondary school students.

Although all programmes assessed changes in knowledge, only two programmes set their objectives towards improvement of knowledge. There was a great variation in how knowledge was assessed, with some studies using individual questions and others composite scales, all but one recorded statistically significant increases in knowledge from pre- to post-intervention. A Ugandan programme that targeted primary school students produced significant, desirable improvements in reports of sexual initiation; sexual initiations was reduced from 43% to 11% in the experimental group with no change in the control group. The South African primary school programme reported no change in sexual behaviours. The Namibian intervention did not report a change in sexual initiation, but did report a reduction in recent sexual activity at 12 months post-programme, but not any earlier. In the Nigerian intervention, it was reported a 9% reduction in pupils reporting that they were sexually active between pre and post-intervention and a reduction in the mean number of sexual partners.

The South African programme was the only one that resulted in an increase in the proportion of students who reported that they had ever used a condom. None of the evaluations found a change in students reporting that they always used condoms.

All but one programme that attempted to address condom use encountered resistance from communities and teachers in teaching about condoms as a method to reduce the risk of HIV transmission. Two points are of interest here. First, this was the only programme implemented by a physician, which suggests that there may be willingness to have medical professionals address condoms. Second, condoms were introduced at the request of the head teacher [15].

A study conducted among the Zambian secondary school students who were exposed to a peer sexual health intervention investigated whether there were any changes in knowledge and normative beliefs regarding abstinence and condoms and personal risk perception of acquiring HIV. Students in the intervention group were exposed for a 1-hour and 45-minute long in-class peer sexual health education. In contrast, the students of the control schools were exposed to a 1-hour long in-class peer water purification intervention. Knowledge was higher, and normative beliefs about abstinence and condoms were significantly more positive among students in the intervention schools [16].

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