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Effect of Health Education Intervention on Knowledge Regarding Sexually Transmitted Infections among Rural Female School Going Adolescents

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Abstract

Introduction: *Adolescent girls, particularly in rural areas, are vulnerable to sexually transmitted infections (STIs) and often have limited or inaccurate knowledge. Health education interventions play a crucial role in improving awareness and promoting preventive behaviors.* ***Aims and Objectives:*** *To evaluate the effect of a structured health education intervention on STI-related knowledge among rural female school-going adolescents.* ***Materials and methods:*** *A quasi-experimental, one-group pre-test/post-test study was conducted among 140 Class 9 female students from two rural girls' high schools in Tangail, Bangladesh, between January and December 2023. Data were collected using a semi-structured, self-administered questionnaire covering socio-demographics and knowledge on STI types, causative agents, transmission, symptoms, complications, prevention, and treatment. The intervention comprised a classroom-based session and a handbook in Bangla. Knowledge was reassessed two weeks post-intervention.* ***Results:*** *The majority of respondents (72.9%) were aged 13–15 years; with a mean age of 15.1±0.8 years (range 13–17). Baseline knowledge was low, with widespread misconceptions about STI types, causative agents, transmission, symptoms, complications, and prevention. Post-intervention, significant improvements were observed across all domains ($p<0.001$). Total median knowledge scores increased substantially, and the proportion of participants with good knowledge rose markedly, demonstrating the intervention's effectiveness in enhancing STI-related awareness.* ***Conclusion:*** *Structured health education significantly improves knowledge of STIs among rural adolescent girls. Integrating comprehensive STI education into school curriculam can empower adolescents to adopt preventive behaviors and reduce the risk of STIs and related health issues.*

Keywords: *Adolescents, rural girls, STIs, health education, knowledge, prevention, Bangladesh.*

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Introduction:

Adolescence marks the transition from childhood to adulthood, characterized by rapid physical, emotional, and social changes[1]. The term originates from the Latin adolescere, meaning to grow up[2]. According to the World Health Organization, adolescents are individuals aged 10–19 years, categorized into early (10–13

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years), mid (14–15 years), and late adolescence (16–19 years). The broader term "youth" includes those aged 15–24 years[3]. Globally, 1.5 billion people, one in every five are adolescents, with 85% residing in developing countries[2,4]. In Bangladesh, adolescents aged 10–19 constitute a significant share of the population[5,6]. Sexually transmitted infections (STIs) are a major global public health concern and remain one of the leading causes of lost healthy life years in developing countries[7,8]. STIs spread through sexual contact, blood exposure, unsterilized needles, and vertical transmission[9]. Globally, adolescents carry a disproportionate burden, accounting for nearly half of all newly diagnosed STIs[10]. Lack of knowledge, limited access to services, social taboos, and gender-related vulnerabilities further heighten adolescent girls' risk[11]. Studies from multiple countries show varied but often inadequate awareness of STIs, especially in Sub-Saharan Africa and South Asia[8,12,13]. In Bangladesh, knowledge gaps are substantial among rural adolescent girls, increasing their susceptibility to HIV and other reproductive health consequences such as infertility and life-threatening pregnancies[11]. Social stigma surrounding sexual health discussions further limits awareness[14]. Globally, more than 1 million STIs occur daily, with 374 million new infections annually, including chlamydia, gonorrhoea, syphilis, and trichomoniasis[15]. Despite global strategies aiming to end STI epidemics, young people remain insufficiently informed about preventive measures[16]. Health education is a proven, cost-effective strategy to improve STI knowledge and reduce risky behaviours among adolescents[17,18]. Strengthening knowledge empowers young people to make informed decisions, promotes healthy attitudes, and reduces vulnerability to STIs[8,18]. Evidence from various interventions shows significant improvement in students' understanding of reproductive and sexual health following educational programs[19]. This quasi-experimental study aims to evaluate the effect of a Health Education Intervention on STI knowledge among rural female school-going adolescents. It is hypothesized that the intervention will significantly enhance their knowledge regarding transmission, prevention, and treatment of STIs, contributing to improved reproductive health outcomes and a more informed adolescent population in rural Bangladesh.

Materials & Methods:

This quasi-experimental study employed a one-group pre-test/post-test design to evaluate the impact of a structured health education intervention on knowledge regarding sexually transmitted infections (STIs) among rural female school-going adolescents. The study was conducted over one year, from January to December 2023, following a predefined work schedule that included protocol development, ethical approval, development and pretesting of research tools, field preparation, data collection, analysis, and report writing. The study was carried out in purposively seletected two rural girls' high schools in Tangail district named Basail Pilot Girls' High School and Sawali Bhatkura M.K.A.B. Girls' High School. A total 140 female student of Class 9 aged 10-19 years constituted the study population. Convenience sampling was used to select eligible students who met the inclusion criteria. A semi-structured, self-administered questionnaire was used as the data collection instrument, consisting of four sections covering socio-demographic characteristics and knowledge items related to types, transmission, symptoms, complications, prevention, and treatment of STIs. The tool underwent content validation and was pretested on 10% of the sample in a similar school. Prior to the intervention, baseline knowledge was assessed using the questionnaire. The health education intervention consisted of a Bangla-language, classroom-based session supported by a handbook containing basic STI-related information, including definition, types, causative agents, symptoms, complications, prevention, and treatment. Two weeks after the intervention, the same questionnaire was administered to evaluate changes in knowledge. Data were checked, cleaned, coded, and analyzed using IBM SPSS version 25. Knowledge scores were generated by assigning one point for each correct response. As the data were non-normally distributed (Shapiro–Wilk test), median and IQR were used for descriptive statistics, while Wilcoxon signed-rank test and McNemar's test were applied for inferential analysis. A p-value <0.05 was considered statistically significant. Quality control was ensured through rigorous pretesting, double-checking of collected data, and careful data entry procedures. Written permission was obtained from school authorities, along with informed consent from guardians and assent from each participant. Confidentiality, privacy, voluntariness, and the right to withdraw were strictly maintained throughout the study. Ethical approval was obtained from the Institutional Review Board (IRB) of the National Institute of Preventive and Social Medicine (NIPSOM), Dhaka, Bangladesh. (Reference: NIPSOM/IRB/2023/06)

Results:

Table I showa that the majority of respondents (72.9%) were aged 13–15 years; with a mean age of 15.1±0.8 years (range 13–17). Most participants were Muslim (76.4%). Regarding parental education, a high proportion of fathers (85.7%) and mothers (86.4%) had formal education. Fathers were primarily engaged in agriculture and small businesses (57.9%), while most mothers were homemakers (95.0%). Nearly all respondents (95.7%) lived with their parents, and the majority belonged to nuclear families (82.1%).

Table II demonstrates that before the intervention, respondents demonstrated limited knowledge of STIs, their causative agents, and modes of transmission, with low correct responses for Chlamydia (12.1%), Gonorrhoea (18.6%), Syphilis (12.9%), and Hepatitis B (20.7%), and common misconceptions such as all STIs being caused by the same organism (32.1%) or transmitted only through sex (12.9%). Following the health education intervention, knowledge improved significantly across most domains, with correct responses for specific STIs rising to 88.6–97.9%, and accurate identification of causative agents increasing to 92.9–93.6%. Misconceptions markedly decreased, except for a few areas such as "HIV patient can get other STIs," which showed no significant change ($p= 0.171$).

Table III demonstrates that before the intervention, respondents' knowledge of STI symptoms, complications, and preventive measures was limited, with correct responses ranging from 6.4% to 47.9% across different items.

Misconceptions were common, including low awareness that STIs may be asymptomatic (10.0%) and limited understanding of curability and vaccination options for STIs. Following the health education intervention, knowledge improved significantly across all domains, with correct responses increasing to 45.7–97.1% for symptoms, 45.7–95.7% for complications, and 37.9–93.6% for preventive measures. All improvements were statistically significant ($p<0.001$), indicating that the intervention effectively enhanced respondents' awareness of STI-related symptoms, complications, and preventive strategies.

Table IV demonstrates that the health education intervention had a substantial impact on respondents' overall STI knowledge. Mean scores increased significantly across all domains, including types of STIs (from 1.18±0.41 to 4.44±0.49), causative agents (1.36±0.50 to 3.96±0.45), modes of transmission (2.04±0.69 to 5.02±0.61), symptoms (1.44±0.58 to 4.71±0.55), complications (1.12±0.50 to 3.89±0.62), and prevention (2.01±0.72 to 5.32±0.67), with mean differences ranging from +2.60 to +3.31 (all $p<0.001$). The total knowledge score increased from 9.15±2.34 before the intervention to 27.34±3.12 after the intervention, a mean difference of +18.19 ($p<0.001$), indicating a highly significant improvement in STI-related knowledge among the respondents following the educational program.

Table V demonstrates that the health education intervention led to a marked improvement in overall STI knowledge among respondents. Median scores for knowledge of types, causative agents, and modes of transmission increased from 4.0 (IQR 2–7) to 14.0 (IQR 13–15), knowledge of symptoms and complications rose from 5.0 (IQR 2–8) to 15.0 (IQR 12–16), and knowledge of prevention and treatment improved from 1.0 (IQR 0–2) to 5.0 (IQR 3–6); all changes were highly significant ($Z = -9.69$ to -10.27, $p<0.001$). The total median knowledge score increased from 10.0 (IQR 4–17) to 33.0 (IQR 30–36), reflecting a substantial overall gain. Correspondingly, the proportion of respondents with good knowledge increased dramatically from 4.3% to 93.6% ($p<0.001$), demonstrating the effectiveness of the intervention in improving STI-related knowledge.

Table I: Socio-demographic characteristics of the respondents (n=140)

Variables	Categories	Frequency (n)	Percentage (%)
Age group (years)	13–15	102	72.9
	16–17	38	27.1
	Mean ± SD		15.1 ± 0.8
	Range		13 – 17
Religion	Muslim	107	76.4
	Hindu	33	23.6
Father's Education	No formal education	20	14.3
	Formal education	120	85.7
Mother's Education	No formal education	19	13.6
	Formal education	121	86.4
Father's Occupation	Agriculture & small business	81	57.9
	Working abroad	40	28.6
	Others	19	13.5
Mother's Occupation	Homemaker	133	95.0
	Others	7	5.0
Living status	Living with parents	134	95.7
	Others	6	4.3
Type of family	Nuclear	115	82.1
	Joint	25	17.9

Table II: Knowledge of respondents on types, causative agents, & modes of transmission of STIs (n= 140)

Variables	Before intervention Correct, n (%)	After intervention Correct, n (%)	p-value
Types of STIs known:			
Chlamydia	17 (12.1)	124 (88.6)	<0.001
Gonorrhoea	26 (18.6)	137 (97.9)	<0.001
AIDS	55 (39.3)	125 (89.3)	<0.001
Syphilis	18 (12.9)	129 (92.1)	<0.001
Hepatitis B	29 (20.7)	111 (79.3)	<0.001
Causative agents of STIs:			
Bacteria	58 (41.1)	130 (92.9)	<0.001
Virus	54 (38.6)	131 (93.6)	<0.001
Parasites	14 (10.0)	112 (80.0)	<0.001
Fungi	9 (6.4)	38 (27.1)	<0.001
All STIs caused by same organism (incorrect belief)	45 (32.1)	131 (93.6)	<0.001
Mode of transmission:			
Only through sex (misconception)	18 (12.9)	129 (92.1)	<0.001
Blood transfusion	79 (56.4)	140 (100.0)	-
Contaminated syringes	55 (39.3)	135 (96.4)	<0.001
Infected mother to child	52 (37.1)	131 (93.6)	<0.001
HIV patient can get other STIs	70 (50.0)	83 (59.3)	0.171
HIV transmitted only through sex (misconception)	33 (23.6)	109 (77.9)	<0.001
Hepatitis C transmitted only through blood	18 (12.9)	39 (27.9)	0.002

McNemar's test done, $p<0.05$ considered as a statistically significant value

Table III: Knowledge on symptoms, complications, & preventive measures of STIs (n= 140)

Variables	Before intervention Correct, n (%)	After intervention Correct, n (%)	p-value
Symptoms of STIs:			
Foul-smelling genital discharge/pus	38 (27.1)	136 (97.1)	<0.001
Burning sensation/pain during micturition	67 (47.9)	135 (96.4)	<0.001
Itching/rash around genitals	49 (36.0)	135 (96.4)	<0.001
Lower abdominal pain/dyspareunia	56 (40.0)	125 (89.3)	<0.001
STIs may occur without symptoms	14 (10.0)	76 (54.3)	<0.001
Early symptoms of HIV infection:			
Elevated body temperature	57 (40.7)	125 (89.3)	<0.001
Sore throat	35 (25.0)	84 (60.0)	<0.001
Headache	57 (40.7)	103 (73.6)	<0.001
Weight loss	43 (30.7)	97 (69.3)	<0.001
Complications of STIs:			
Infertility	52 (37.1)	133 (95.0)	<0.001
Abortion	24 (17.1)	109 (77.9)	<0.001
Stillbirth	41 (29.3)	134 (95.7)	<0.001
Blindness in children	20 (14.3)	121 (86.4)	<0.001
Cervical cancer	30 (21.4)	113 (80.7)	<0.001
Gonorrhoea can cause recurrent UTI	16 (11.4)	64 (45.7)	<0.001
STIs more serious in men than women	48 (34.3)	128 (91.4)	<0.001
STIs pose serious threat to pregnant women	67 (47.9)	124 (88.6)	<0.001
Preventive measures:			
Using condoms reduces STI risk	66 (47.1)	131 (93.6)	<0.001
Vaccine available for Hepatitis B	48 (34.3)	113 (80.7)	<0.001
Vaccine available for Hepatitis C	9 (6.4)	53 (37.9)	<0.001
Vaccine available for HIV	11 (7.9)	101 (72.1)	<0.001
Gonorrhoea is curable	17 (12.1)	86 (61.4)	<0.001
Chlamydia is curable	10 (7.1)	79 (56.4)	<0.001
Syphilis is curable	17 (12.1)	83 (59.3)	<0.001

McNemar's test done, $p<0.05$ considered as a statistically significant value

Table IV: Overall effect of health education intervention on STI knowledge score (n= 140)

Domains	Before intervention Correct, n (%)	After intervention Correct, n (%)	Mean Difference	p-value
Types of STIs	1.18 ± 0.41	4.44 ± 0.49	+3.26	<0.001
Causative agents	1.36 ± 0.50	3.96 ± 0.45	+2.60	<0.001
Transmission	2.04 ± 0.69	5.02 ± 0.61	+2.98	<0.001
Symptoms	1.44 ± 0.58	4.71 ± 0.55	+3.27	<0.001
Complications	1.12 ± 0.50	3.89 ± 0.62	+2.77	<0.001
Prevention	2.01 ± 0.72	5.32 ± 0.67	+3.31	<0.001
Total knowledge score	**9.15 ± 2.34**	**27.34 ± 3.12**	**+18.19**	**<0.001**

Paired t-test done, p<0.05 considered as a statistically significant value

Table V: Combined knowledge score comparison and changes before and after intervention (n= 140)

Variables	Before intervention Correct, n (%)	After intervention Correct, n (%)	Test of Significance	p-value
Knowledge on type, causative agent and mode of transmission of STIs	4.0 (2–7)	14.0 (13–15)	Z = –10.27[a]	0.000
Knowledge on symptoms and complications of STIs	5.0 (2–8)	15.0 (12–16)	Z = –10.09[a]	0.000
Knowledge on prevention and treatment of STIs	1.0 (0–2)	5.0 (3–6)	Z = –9.69[a]	0.000
Total knowledge score	10.0 (4–17)	33.0 (30–36)	Z = –10.26[a]	0.000
Level of knowledge (Poor / Good)	Poor: 134 (95.7%) Good: 6 (4.3%)	Poor: 9 (6.4%) Good: 131 (93.6%)	-	0.000[b]

[a]Wilcoxon Signed Ranks and bMcNemar's test done, p<0.05 considered as a statistically significant value

Discussion:

Adolescence is a transitional period marked by major physical, psychological, and social changes, making adolescents particularly vulnerable to STIs[8,20]. Knowledge about STIs is often limited, incomplete, or confusing, highlighting the need for effective health education. This quasi-experimental study assessed the effect of a health education intervention on rural female school-going adolescents' knowledge regarding STIs in Tangail, focusing on types, causative agents, and modes of transmission, symptoms, complications, prevention, and treatment. The respondents were aged 13–17 years (mean 15.09±0.77), mostly Muslim (76.4%), unmarried, and from nuclear families (82.1%). A majority of fathers (85.7%) and mothers (86.4%) had formal education, with fathers mainly engaged in agriculture or small business (57.9%) and mothers predominantly homemakers (95%). These characteristics are consistent with findings from studies in Egypt and India, though variations exist due to regional differences and cultural norms[18,21]. Before the intervention, awareness of STIs other than HIV/AIDS was low, with widespread misconceptions about transmission, symptoms, complications, and prevention[19,22]. Following the intervention, knowledge improved significantly across all domains. Correct identification of STIs rose to 88.6–97.9%, understanding of causative agents to 92.9–93.6%, and awareness of symptoms and complications to 89.3–97.1%. Knowledge of preventive measures, including condom use and vaccinations, also increased substantially, as did understanding of curability of common STIs[14,23]. (The total median knowledge score increased from 10.0 (IQR 4–17) to 33.0 (IQR 30–36), with good knowledge rising from 4.3% to 93.6% ($p < 0.001$). Knowledge scores were not significantly associated with age, religion, parents' occupation, or family type[21]. These findings indicate that structured health education is highly effective in improving STI-related knowledge among rural adolescent girls, aligning with results from similar studies[17,24]. Implementing targeted educational programs in schools can help adolescents adopt safer practices and prevent STIs. Despite the significant improvements in STI-related knowledge following the intervention, this study had some limitations. The follow-up period was short, limiting the ability to assess long-term retention of knowledge. Additionally, only a single follow-up was conducted, and self-administered responses may have introduced some reporting bias. These factors should be considered when interpreting the results and highlight the need for future studies with longer follow-up periods and multiple assessments to evaluate the sustainability of knowledge gains.

Conclusion:

Sexually transmitted infections (STIs) are a significant health concern for adolescents, particularly rural female adolescents in developing countries. This study demonstrated that a structured health education intervention markedly improved STI knowledge among respondents. The findings underscore the effectiveness of targeted educational programs in empowering adolescents to prevent and protect themselves from STIs, HIV/AIDS, and related health issues. Integration of comprehensive STI education into the school curriculum is recommended to sustain and broaden these benefits.

Recommendations:

Health education interventions should be widely implemented to improve STI knowledge among rural adolescents. Provision of IEC materials and guidance is recommended. Long-term follow-up studies can evaluate retention and impact on attitudes and practices. Comparative studies between rural and urban settings may provide further insights into intervention effectiveness.

Conflict Interests: None.

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