

## Cost of Health Education to Increase STD Awareness in Female Garment Workers in Bangladesh

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### **Abstract**

*Risk of sexually transmitted diseases (STDs) and the need for health education in the female garment workers in Bangladesh have been emphasized in the past. Interventions were more acceptable when considered cost-effective. This preliminary study reported on the cost-effectiveness of a health education program that successfully improved knowledge and awareness of STDs among female garment factory workers in Dhaka, Bangladesh. Using cross-sectional study design, this preliminary study interviewed 41 workers (19 with exposure to health education and 22 without exposure) from six garment factories with a semi-structured open-ended questionnaire. Bivariate analysis associated the exposure to health education to women's knowledge and awareness of STDs. The chi-square test and 95% confidence interval were used for statistical assessments. Personnel, direct and indirect costs were used for calculating cost effectiveness of the program from the perspective of an agency that may wish to replicate the intervention. The study reported increased awareness of STDs with health education exposure ( $p < 0.05$ ). Incremental cost-effectiveness analysis showed that an additional cost of Taka 1,572.00 (US \$ 35.00 approx.) for health education was needed for making one additional worker aware of STDs.*

**Key words:** *Key words: Health Education, STDs, Cost-effectiveness, Female Garment Workers, Bangladesh .*

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## Introduction

Female garment workers in Bangladesh develop a social sub-group as they live away from their families, usually by themselves in a metropolitan city like Dhaka.<sup>1</sup> Consequently, they make decisions about their lives and daily activities that do not conform to traditional beliefs, e.g., choosing a sexual life style, marrying at an older age, working alongside and competing with men.<sup>1</sup> Most female workers start working at the garment industries while single during their adolescent years,<sup>2</sup> a time of transition that involves sexual development.<sup>3</sup> These workers grow into their adulthood as they work in the garment industry, a very different environment than what their mothers experienced at the same age.<sup>1</sup> The very adolescent characteristics with “formation of one’s individuality, expressions of intimacy, and the defining of experiences within a sexual and romantic framework”<sup>3</sup> make these female workers especially vulnerable to undue social consequences including risk of acquiring sexually transmitted diseases (STDs). Risk of STDs, e.g., multiple sex partners, lack of knowledge about safe sex practice and having an STD without the knowledge of having it, have been documented in Bangladeshi garment workers.<sup>4-5</sup> Social disapproval of sexual activity and limited access to information about safe sex in unmarried women in Bangladesh make it harder for the female workers to talk about sexuality related health problems.<sup>6</sup> The obvious need for health education to increase awareness with a goal of prevention of STDs in these workers has also been emphasized in the past.<sup>5</sup> However, no information on any formal health education program on STDs in the female garment workers in Bangladesh is available.

Bangladesh garment industry exports were US \$14110.8 million in fiscal year 2007-2008.<sup>7</sup> About ninety percent of the garment workers are women.<sup>1</sup> Personal, family and aggregate economic impacts of these garment industry jobs in Bangladesh are important and there is a need for addressing the health status of female garment workers at the comprehensive policy level. A healthy workforce is not only a step toward empowering a business, but also in empowering the economy by decreasing the burden of health care costs. Given limited available resources, cost-effectiveness evaluation helps inform public health decision makers to determine the health education programs with the greatest benefit.<sup>8-10</sup> Lack of information on STD awareness health education programs among garment workers prevents determination of cost-effectiveness for such a program in Bangladesh.

Peer group education among sex workers in Chad has been found to be very cost-effective in preventing STDs.<sup>11</sup> An intervention to prevent HIV/AIDS was more acceptable when demonstrated with its cost-effectiveness in decreasing “negative health outcomes”, e.g., reducing the incidence of new STD infection among the African American and Latino clients attending STD clinics in the USA.<sup>12</sup> This method may also work to motivate garment factory employers in Bangladesh to support groups of female workers in being educated to reduce preventable health problems, e.g., STDs.

## Purpose of Study

This study provided a cost-effectiveness analysis of a formal health education program and reported on differences in knowledge and awareness about STDs and their risk factors among the female garment factory workers with and without exposure to the health education program.

## Methods

### Health Education Program and Selection of Factories for Participation

A convenience sample of 41 female workers from six garment factories in Dhaka, Bangladesh was interviewed with a semi-structured open-ended questionnaire. Factories engaged in similar work were selected as they either did or did not offer health education classes. A physician at a local Family Planning and Reproductive Health clinic designed a curriculum addressing issues of personal and reproductive health with an emphasis on STDs. The clinic personnel convinced owners of a few factories to offer the health education program to their female employees, here called Clinic Users (CU) and considered the “exposed” group. The class was offered during the lunch break for one hour. The factories without a health education program for their workers were recruited through personal contacts by one of the investigators (NR) and participants in this group are termed Non Clinic Users (NU) and are the comparison unexposed group in this study.

Health education program was based on the health belief model that supports association of increased knowledge, awareness and perception of being at risk of a disease with positive health behavior, e.g., prevention and treatment.<sup>13</sup> The conceptual framework developed to improve knowledge and

prevention of STDs in the CU participants in our study is described below (Figure 1).<sup>13</sup>

Health education included teaching personal hygiene, reproductive health infectious diseases with a focus on STDs, specifically HIV/AIDS. Nature of the STDs, especially HIV/AIDS, method of spreading, describing population at risk and behaviors that put people at risk of getting the STDs as well as prevention and treatment upon getting a disease were main topics of discussion in the education classes. Educators were trained by the clinic physician who developed the curriculum based on health literature available in Dhaka, Bangladesh via various non-governmental organizations (NGO) and library resources on STDs, specifically, HIV/AIDS.

The educators were trained with the use of audio-visual aids during their training by the clinic physician. The actual health education classes in the garment factories were conducted using a paper board and colored posters demonstrating pictures and phrases focused on disease epidemiology, prevention and treatment. Individual questions were encouraged and answered after the group education. Each session had approximately 10-12 participants depending on their availability on a particular day. Participants were exposed to the program at least one year prior to data collection from the CU group.

### Recruitment of Participants

Female workers who were voluntarily willing and interested to participate in our study were eligible for participation. Workers in the health education program (CU) (N=19) were selected on the basis of their availability at the time of the interview. The health educator announced the study before the session and let the willing participants talk to the interviewer one by one instead of attending the scheduled health education class.

Non-clinic users (N=22) were recruited either while working at the factories or at their homes in the evening. Some factory owners permitted interviewing in the factory during working hours while others did not. In the factory setting, the interviewer approached participants based on their availability and interest. Availability was defined in terms of having a little time to talk while involved in an activity, e.g., cutting threads (soota kaataa), that allowed her to answer questions for the interview while working. Any other woman approaching the interviewer showing an interest to know about the study was recruited and a verbal voluntary consent was obtained. Privacy enforcement was difficult. Co-workers were offended if asked not to listen to the

conversation between their peer and the interviewer. But interview was conducted at a distant so the other co-workers would not be able to listen to the discussion. To further maximize the availability and privacy of these women, one evening an investigator (NR) visited one of the housing areas and explained the purpose of the study to a group in one of the worker's homes. Later the interviewer went to the home of volunteers to interview each participant.

The Bangladesh Medical Research Council, Dhaka, Bangladesh, approved the current study. All 41 participants voluntarily consented verbally to participate before the interview with the option to quit at any point after they had given their consent. Everyone approached agreed to the interview. No personal identifiers were used in order to maintain confidentiality.

A semi-structured survey questionnaire was used to interview the participants. The questionnaire gathered information on demographics, women's attitude on working outside their homes and on knowledge and awareness of infectious diseases focusing on STDs including HIV/AIDS. The survey included questions on knowledge about the diseases mentioned above, information source for knowledge about the diseases, and the participants' perception of being at risk for getting the diseases. The survey questions were related to the curriculum used for the health education program. And thus the responses to the survey questionnaire tested both validity and reliability of the health education program described above. The survey instrument was pretested with workers. One of the investigators (NR) interviewed the participants in person. It took about 20-25 minutes to complete the interview.

### Cost Related Data

The economic evaluation outcome data (Table 1) were gathered from the survey on participants' knowledge and awareness of STDs. Local (Dhaka) NGO clinic program managers and administrative personnel were contacted for information on salary ranges and time spent for clinic personnel, budget expenditures for supplies, equipment and communication for the health education program.

### Data Analysis

#### *The Survey*

The semi-structured questionnaire had many open-ended questions. A complete list of answers to open-ended questions was made. Similar responses were

grouped together. For example, to describe reasons for working outside home, if one woman said that she was told to work outside home by her brother and another said that she was told to work by some one in the family, both respondents were working due to an “imposed decision” upon them and were coded similarly. All closed ended questions had pre-coded answers.

Data were entered, edited, and analyzed using Epi-Info software version 6.0.<sup>14</sup> A bivariate analysis associated the exposure to health education to the women’s attitude towards working and knowledge about infectious diseases including STDs. The chi square ( $X^2$ ) test and 95% level of confidence were used for statistical assessments.

### *Cost Effectiveness Analysis*

The data used to develop the cost model for the health education program were divided into three types of cost sections: i) development and implementation cost (involving personnel), ii) direct cost and iii) indirect cost (Table 1). Incremental cost-effectiveness analysis was done from the perspectives of the agency<sup>15</sup> that may wish to replicate the health education intervention. Conversion rates for cost in our study were calculated using rates for the year 1998 in Bangladesh which was Taka 45.00 for each US \$1.00.

## **Results**

The female garment factory workers participating in the survey were characterized mostly by young age (mean $\pm$ SD = 21 $\pm$ 5 years) ranging between 15 and 35 years, low educational attainment, being unmarried (single) and living with the family (Table 2). Participants from both groups (CU and NU) had similar age and similar socio-economic status based on their housing and living standard. About 20 percent of participants had no schooling and only 14.5 percent had more than 6 years of school. Of the total 41 participants, 46% (19) were exposed to the health education program (CU) and 22 were not. The two groups of women differed somewhat in that, compared to NU women, CU women were more likely to have less formal education, have worked for a shorter time period, and be married, yet were not living with their family (Table 2).

Three questions regarding the women’s beliefs and attitude towards working outside home indicated their awareness of being independent and empowered in the society. The CUs reported they were more

likely to be working to support a family and the non-clinic users were more likely to have worked either to earn a living or because someone suggested it (Table 3), although none of the differences are statistically significant.

Being exposed to the health education program increased the percentage of women who had heard about infectious diseases by about 19% (Table 4). An infectious disease was defined by most of the women from both groups as a disease that spreads by living with or touching or sharing things with an infected person. Only CUs reported “having sex” as a mode of transmission of an infectious disease from one person to another. No one from the NU group could mention the name of any infectious disease while the clinic users mentioned STDs (specifically gonorrhoea, syphilis and HIV/AIDS) and skin diseases. Fewer NUs than CUs perceived themselves to be at risk of getting any infectious diseases (Table 4). Interestingly, among those perceiving to be at risk, the majority of the clinic users and 50 percent of the non-clinic users thought they would get an infectious disease because of their luck (pre-fixed fortune at birth), as nobody knows what the future has to offer. The rest of the women blamed it on their life situation; more particularly on the environment where they work or live with a lot of people they do not know (Table 4).

Only a few CUs heard about hepatitis from their health education classes. Two-thirds of them said they would go to a Kabiraj (a traditional healer who uses herbs or roots to cure diseases) if they had the disease (Table 5). However, about 50 percent more CUs would use a doctor for treatment than the NUs.

Significant differences ( $p < .05$ ) were observed between the two groups of women with respect to their knowledge of STDs and HIV/AIDS (Table 5). Almost 58 percent of the CUs reported knowing about STDs, where as only 9.1 percent of NUs reported the same. All of the NUs who knew of HIV/AIDS reported hearing about it from the television but did not categorize it as an STD. Most of these NUs thought nothing could be done for those who had HIV/AIDS and that they would simply “die”. On the contrary, a large percentage of the CUs who knew about STDs and HIV/AIDS, had heard about these diseases from the health education class and a few of these CU women mentioned that a person with any kind of STDs should abstain from sex to prevent its spread. All CUs mentioned that they would go to a doctor if they had HIV/AIDS, but less than 20 percent of NUs reported the same.

Cost model information on the clinic expenses, including personnel time is illustrated in Table 6. A total of Taka 14,150.00 per month was spent to educate 19 female garment factory workers; that is, a once a week health education class for four weeks. No discount rate was considered for this short-term period of the program.<sup>11</sup> The physicians, nurses and paramedics were involved in working with an already existing full time clinic run by NGO. Only twenty percent of the physician's time was utilized for developing this health education program and for training the health educators. The health educators (nurses and paramedics) spent about 15 percent of their working time on the health education program. About ten percent of their (nurses and paramedics) time was spent on training and five percent on the education session conducted in the garment factories. Recruitment cost was negligible because the participants were already in the factory where the education class was taking place. Prior permission from the factory owner made it easy for the health educators to access the factory premises. Handouts were typed in the clinic and copying was done outside. Supplies and equipments, e.g., cabinets, computers, papers that were used for the program were already available in the clinic, so no purchases were necessary. The expense for papers and other supplies were included in the cost calculations. Cost for local travel between the factories and the clinic, both for general communication (permission for class, utilization of the premises and logistics) and health education sessions, were calculated to determine the total travel and communication cost. Indirect cost of rent, utilities, and maintenance were negligible. No office space was rented for this health education program. This education program took place inside the factory while workers were working. The physicians, nurses and paramedics prepared the education materials as part of their regular job as all of them were full time workers of the clinic. Their efforts were included in the cost model as direct costs; however, their indirect costs were not included for this cost model. Work time lost was not included in the cost data as classes lasted only for one hour during lunch break.

Incremental cost-effectiveness was calculated using the agency perspective, comparing the CU and NU groups. The cost expenditure shown above is for the intervention group (CUs). There was no cost consideration for the comparison non-exposed group. Incremental cost of the intervention was compared to the incremental improvement in outcomes due to the intervention, relative to the comparison group. The incremental cost effectiveness was approximately Taka 1,572.00. This means Taka 1,572.00 is the

additional cost of health education efforts needed to make one additional woman aware of STDs as they have increased knowledge and understanding of risk factors for this preventable health problem.

## Discussion

Increased awareness about STDs in the health education class participants (CUs) supported the effectiveness of the health education model discussed in our study. More positive attitudes toward independence in terms of economic and decision making power may have heightened awareness of their health situations in the CUs, which also supported the benefit of health education in these women. An amount of Taka 1,572.00 (US \$ 35.00 approximately with an exchange rate of US \$1.00 = Taka 45.00) during our study period in 1998 was the additional cost of health education needed to make one additional woman aware of STDs.

Another study reported about US \$0.50 (approximately Taka 21.00) as expected annual health care cost for an adult slum dweller in Dhaka between the years 1995 – 1997.<sup>16</sup> Although this amount may seem lower than the cost of health education reported in our study, a proper treatment for an HIV patient per month in 2008 in Bangladesh is about Taka 6,000.00 to 10,000.00, or US \$ 133.00 to 222.00.<sup>17</sup> Although not all at risk of STDs may acquire HIV, given the expensive nature of this long-term non-curable chronic STD, we discuss our outcome based on the HIV/AIDS treatment cost in Bangladesh. Our one time cost of educating a person on awareness of STDs, including HIV infection, could be considered minimal compared to the current HIV treatment cost in Bangladesh.<sup>17</sup> Also, these costs will be reduced with broader implementation of this program, which may make the program far more cost-effective in the long run.

## Health Education Program Findings

More CU women expressed their awareness regarding economic independence and decision-making power than the NUs. Most perceived themselves to be at risk of acquiring an infectious disease. Failure of NUs to mention the name of any infectious diseases indicates the positive influence of health education on knowledge and awareness of STDs in the CUs. The responses reflect the health education program developed based on health belief model as described in the method section.<sup>13</sup>

Health education classes attended by the CUs taught about personal hygiene, reproductive health, STDs including HIV/AIDS, and the need to seek help from a trained health care professional for any kind of illness. A heavy emphasis on STDs made the women emphasize the same in response to any question relating to their health. The CU women were quite open in talking about the risk of STDs. Interestingly, the majority of CU women would seek a physician's help for all health problems listed except for hepatitis, where the kabiraj (traditional healer) is the provider of choice for both groups, which needs further investigation. Change of belief and building confidence about what is to be done for health needs is the greatest impact of health education on the CU women in our study.

### **Cost Effectiveness of the Health Education Program**

The preliminary results indicated a low-cost health education program on STDs awareness targeting a high-risk population group can be cost-effective in reducing the spread of STDs including HIV infections. While including societal indirect cost would be an important addition to our analysis, given the available information and the scope of the paper, it was not possible to measure it in monetary terms. However, where the data are available, these costs should be incorporated into such analyses.

More than half of our study participants were at or less than 20 years of age. About 60 percent of the participants were unmarried at the time of interview, indicating that these workers have decided to remain unmarried for longer than a traditional, non-working girl in Bangladesh.<sup>1</sup> This raises the question of unprotected premarital sex among these women. Feelings of pressure for sexual activity and unprotected pre-marital sex in these workers were reported in previous research.<sup>1</sup> In this community, young unmarried girls do not have much access to information about methods to protect them from getting STDs.<sup>6</sup> The situation places these female workers at risk of not only contracting STDs, but also increases the risk of spreading the diseases in the community. Health education was shown to be effective in preventing health problems including STDs.<sup>6, 18</sup> The finding of increasing knowledge of STDs, including the workers' perception of being at risk of getting STDs is consistent with the previous findings.<sup>6, 18</sup> It appears our analysis could illustrate how the current health education program has the potential to reduce the spread of STDs in a cost-effective manner.

To our knowledge, this is the first pilot study to evaluate health education targeted at prevention of STDs by increasing awareness in the female garment workers in Bangladesh. However, there are limitations need to be considered. The limitations include the fact that the findings are based on intermediate outcomes (i.e., no disease rates) from a small survey. Also, convenience sample and small sample size may have introduced bias by drawing participants who are more active with social activities and have higher health awareness. Same recruitment method and participants with similar demographics may have helped in avoiding potential differences in demographic and social perspectives between the two groups. This was a preliminary study that may bring attention to both government and non-government funding sources to improve STD awareness at a lesser cost compared to the actual treatment as discussed above. Support from national policy level may also encourage factory owners to provide access and thus promote health via programs similar to the one discussed in our study. The results of this study should only be used for the particular population described in the study. Implementation of similar health education programs may have different results in different cultures, communities or societies. The health education program used for this study was not tested in the past for validity purposes. Additionally, due to exploratory nature of the study no pre- or post-test evaluations of the CUs were done to evaluate the effectiveness of this program. Conversion rate in 1998 (during the study period) for US dollar to Bangladesh currency was used in our cost-effective analysis. Any interpretation of our results at a later time should consider differences of time.

### **Conclusion**

This preliminary study showed that health education can impact the knowledge and awareness of STDs in the female garment factory workers in Bangladesh. It is likely that the health education program may help to reduce the burden of health care costs to the community. Employee sick days, worker turnover due to long term illness, social alienation of the person with an STD, leading to potential destitution of a family, only exacerbate this already overburdened, poverty stricken society. Educating a woman about STDs prevention can help the community escape such social burdens. Moreover, the cost-effectiveness of such interventions would support public health decision-makers in their efforts to allocate limited prevention resources judiciously to maximize the benefit.

## Acknowledgments

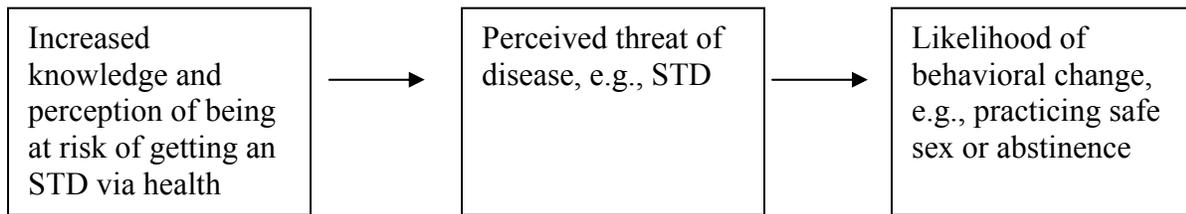
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**Figure 1.** Conceptual framework for health education to improve knowledge and prevention of STDs



**Table 1.** Factors Included in the Cost Calculation Model

Type of Cost	Activities	Involved Personnel
Development & Implementation Cost	Training	Physician
		Nurse
		Paramedic
	Handout preparation and other activities	Physician
	Education session	Nurse
Paramedic		
Direct Cost	Recruitment	Administrative
	Handouts	
	Supplies	
	Traveling and communication cost	
Indirect cost	Rent	
	Utilities	
	General administration	
	Maintenance	
	Work time lost for workers	

**Table 2.** Demographic Information of Participants by Exposure to Health Education

Name of the variable	Dividing parameters	Clinic Users (CU) (Exposed to Health Education) (n = 19) %	Non-clinic users (NU) (Not exposed to Health Education) (n = 22) %
	Percentage in each group	46.3	53.7
Age (median = 20 years)	≤ 20 years	57.9	54.5
	> 20 years	42.1	45.5
Education (median = 3 years)	≤ 3 years	52.6	36.4
	> 3 years	47.4	63.6
Length of work experience (median = 3 years)	≤ 3 years	63.2	50.0
	> 3 years	36.8	50.0
Marital Status	Married	42.1	36.4
	Single (Never married, Divorced and Separated)	57.9	63.6
Use of contraception (only married couples)	Yes	31.6	27.3
	No	68.4	72.7
Income ♦	≤ Tk.1000/month	52.6	50.0
	> Tk.1000/month	47.4	50.0
Living Situation	With family	52.6	72.7
	Without family/with roommate	47.4	27.3

Notes:

a) ♦ \$1.00 = about Taka 45.00 (Bangladeshi money) at the time of the study.

b) No statistically significant differences between the 2 groups based on the chi-square test with 95% confidence level.

**Table 3.** Women’s Attitude towards Working Outside Home by Health Education Exposure

Variables	Outcome	CU (Clinic users) % (n=19)	NU (Non-clinic users) % (n=22)
What are the reasons that brought you to work (outside home)?	For social safety	15.8	13.6
	To support family	63.2	40.9
	To earn a living	10.5	27.3
	Somebody suggested	10.5	18.25
What is your opinion about women working outside the home?	Good <sup>^</sup>	84.2	68.2
	Not good <sup>^^</sup>	15.8	31.8
What would be the reasons for a woman to work outside the home?	Monetary reason	88.2	100.0
	To become independent	11.8	0.0

Notes:

- a) No statistically significant differences between the two groups based on chi-square test and 95% confidence level.
- b) <sup>^</sup>For example, good because it brings extra money into a family, it brings economic freedom.
- c) <sup>^^</sup>For example, women should not have to work outside home; it is not right for a woman to work outside.

**Table 4.** Knowledge about Infectious Diseases and Perception of Being at Risk by Exposure to Health Education

Variables	Outcome	Clinic Users % (n=19)	Non-clinic User % (n=22)
Have you heard of infectious diseases?	Yes	89.5	72.7
	No	10.5	27.3
What do you mean by infectious disease?	The disease which spreads by		
	Living with the patient	31.3	58.3
	Touching the patient	25.0	33.3
	Sharing things like glass, clothing	12.5	8.3
Please name some of the infectious diseases prevalent among the women like you in your surroundings now.	Having sex	31.3	0.0
	Skin diseases	18.5	0.0
	Others: tetanus, jaundice, scabies, tuberculosis, & chicken pox	22.2	0.0
	STDs	59.3	0.0
Do you think you are at risk of getting an infectious disease?	Yes	87.5	76.9
Why (reason for being at risk)?	Luck	61.5	50.0
	Bad living or working situation	38.5	50.0

Notes:

- a) No statistically significant differences between the two groups based on chi-square and 95% confidence level.
- b) No statistical testing was done on the item asking women to name infectious diseases.

**Table 5.** Knowledge of Infectious Diseases (STDs) by Health Education Exposure

Name of the disease	Variable name	Outcome	Clinic users % (n=19)	Non-clinic users % (n=22)
Hepatitis	Have you heard of it	Yes	100.0	100.0
	How did you hear about it	From someone in the community	73.7	86.4
		She or someone had it	21.1	13.6
		Health education class	5.3	0.0
	What would you do if you have it	Go to a doctor	31.6	13.6
Go to a Kabiraj (traditional healer)		68.4	86.4	
STDs	Have you heard of it	Yes	57.9*	9.1
	How did you hear about it	Health Education class	90.9*	0.0
		From husband/friend	9.1	100.0
	What would you do if you have it	Abstain from sex	9.1	0.0
		Go to a doctor	90.9	100.0
HIV/AIDS	Have you heard of it	Yes	84.2*	27.3
	How did you hear about it	From Television	20.0*	100.0
		Health education class	80.0	0.0
	What would you do if you have it	Nothing can be done as they simply die if they have HIV/AIDS	0.0*	83.3
		Go to a doctor	100.0	16.7

Note: \*p<.05, & the rest are not statistically significant based on chi-square test with 95% confidence level.

**Table 6.** Cost of Health Education Program for Female Garment Factory Worker

Activity	Time spent	Cost per unit (in Taka)^	Total cost (in Taka)^
Physicians (2)	20 % time	15,000.00	6,000.00
Nurses/paramedics (3)	15 % time	7,000.00	3150.00
Recruitment cost			00
Handouts			500.00
Supplies & equipments			2,000.00
Traveling and communication cost			2,500.00
Total cost			14,150.00

Note: ^Taka (Bangladeshi currency) = exchange rate at the time of study in 1998 is

US \$1.00 = Taka 45.00