



## ORIGINAL ARTICLE

### AIDS awareness and associated factors among men in Bangladesh: evidence from Bangladesh Demographic and Health Survey 2007

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#### Abstract

Awareness is the key to prevention of acquired immunodeficiency syndrome (AIDS). It is important to identify associated factors and the aim of the present paper was to explore AIDS awareness among the country representative male population in Bangladesh along with identifying the associated factors. To assess the AIDS awareness among ever-married men in Bangladesh, this study used data extracted from the Bangladesh Demographic and Health Survey 2007. Of the 3771 ever-married men included in the study, most were Muslims (89.8%) and from rural areas (61.7%). Of the respondents, 85.9% had ever heard of AIDS. More than 70% of the respondents reported that a healthy looking person can have HIV, a person can get AIDS by using unsterilized needle or syringe and a person can get AIDS through unsafe blood transfusions, but always using condoms during sex and having single sex partner who has no other partner might reduce chances of getting AIDS. Multivariate logistic regression analysis revealed that AIDS awareness was strongly and positively associated with education of the respondents, varied significantly across different parts of the country. AIDS awareness was higher among urban residents than rural, and among them who had access to newspaper or magazine, television and radio than those who had not. AIDS awareness may be further increased providing easy access to education, mass-media, and promotion of condom use for prevention of AIDS in Bangladesh.

**Key words:** Acquired Immunodeficiency Syndrome, Awareness, Associated Factors, Bangladesh

#### Introduction

The human immunodeficiency virus (HIV)/ acquired immunodeficiency syndrome (AIDS) has been among the most serious

disasters in recent centuries. It is a major public health concern today. AIDS does not discriminate between classes, castes or community people. It is caused by HIV,

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which is transmitted mainly through sexual intercourse. The most challenging task is how to prepare ourselves to be able to prevent HIV/ AIDS. The rapidly changing epidemiological patterns are alarming. The spread of transmission from urban and metropolitan areas to rural areas is a matter of great concern and the infection is spreading to the general population covering all segments of society.<sup>1</sup>

Globally, the number of people living with HIV in 2004 was estimated at about 40 million, which is the highest level ever. Approximately 4.9 million people were reported to have acquired HIV in 2004.<sup>2</sup> According to recent UNAIDS estimates, 33.3 million people were living with HIV at the end of 2009 increased by 27% from 26.2 million in 1999, and the number of newly infected with HIV was 2.6 million and deaths due to AIDS was 1.8 million.<sup>3</sup> However, it is seen that on the cusp of the fourth decade of the AIDS epidemic, it has halted and begun to reverse the spread of HIV. The annual number of new HIV infections has been steadily declining since 1990s and there are fewer AIDS-related deaths due to the significant scale up of antiretroviral therapy over the past few years.<sup>4</sup>

Asian AIDS epidemic is largely stable. In Asia, an estimated 4.9 million people were living with HIV in 2009, about the same as five years earlier.<sup>4</sup> Most national HIV epidemics appear to have stabilized. No country in the region has a generalized epidemic. Thailand is the only country in this region in which the prevalence is close to 1%, and its epidemic appears to be stable overall. But the HIV prevalence is increasing in such low-prevalence countries as Bangladesh, Pakistan (where drug injecting is the main mode of HIV transmission), and the Philippines. Incidence increased by 25% in Bangladesh and the Philippines between 2001 and 2009 even as the countries continue to have relatively low epidemic levels.<sup>4</sup> Asia's epidemics remain concentrated largely among people who inject drugs, sex workers and their clients, and men who have sex with men. Incidence

patterns can vary considerably in large countries such as India. About 90% of people newly infected with HIV in India are believed to have acquired it during unprotected sex, but the common use of contaminated syringe by two or more people on the same occasion is the main mode of HIV transmission in the country's north-eastern states.<sup>5</sup>

Bangladesh is one of the world's most densely populated countries, with a population of over 150 million<sup>6</sup>, situated in south Asia with the Bay of Bengal on the south and bordered by India on three sides and Myanmar on the south east. Bangladesh's proximity to India and Myanmar (countries with high HIV endemicity and a rapidly growing number of cases) increases possibility of an epidemic in Bangladesh. It may be a high-risk if frequent contacts occur between people of these countries. Whilst HIV/ AIDS is not yet one of the country's most pressing health priorities, it is still classified as a low prevalence country, infections have been steadily increasing year by year. Growing HIV/ AIDS rates amongst injectable drug users and high levels of cross border migration could signal that the country is on the brink of a much larger HIV/ AIDS epidemic.<sup>7</sup>

The first Bangladeshi HIV positive case (a returned migrant worker) and the first AIDS patient (a seaman) were detected in 1990.<sup>8</sup> By December 1998, 102 cases of HIV/ AIDS cases had been reported to the National AIDS Committee (NAC).<sup>9</sup> Of them, 84 were male and 18 were female. Only 6 of the 102 were foreigners. Eleven of the HIV-infected individuals had developed AIDS (all males), and 7 had died. Also data of 2009 showed that among the newly identified HIV cases (250), 67.6% (169) were male and 30.4% (76) were female.<sup>10</sup>

Migrant workers are an important group identified as a priority in the Bangladesh National Strategic Plan for HIV and AIDS 2005-2010. Approximately 250000 people leave Bangladesh for employment every year.<sup>11</sup> Many of them travel to various

Middle East countries, Malaysia, Singapore, South Korea, etc. Not only that, thousands of Bangladeshi travel to countries with known high HIV prevalence like India and Thailand, for tour, treatment, recreational and educational reasons also. It is not unrealistic to suspect that some of these travelers visit brothels abroad.<sup>12</sup> The risk is that they may get infected during their stay abroad and return to Bangladesh where they may transmit the virus to others especially their wives who could in turn transmit to their babies.

Most married men who have unprotected sex with sex workers continue to have unprotected sex with their wives, exposing them to infection with HIV and other sexually transmitted diseases.<sup>13</sup> Men having sex with men are largely hidden due to the stigma and discrimination they face in Bangladesh. Many men who have sex with men are bisexual and do not necessarily identify themselves as such.

Prevalence of high-risk behaviors like casual unprotected sex before and after marriage, intravenous use of illicit drugs, unsafe professional blood donation lead Bangladesh to a threat of HIV/ AIDS epidemic. So, lack of adequate and appropriate public HIV/ AIDS awareness, and misconceptions about the disease, may contribute to continued high-risk behaviours among the Bangladeshi population and, thus, to the spread of HIV.

In a country where poverty, illiteracy and poor health are prevalent, the spread of HIV might present a daunting challenge. In this regard from a public policy and public health perspective, knowledge is the key to battling HIV/ AIDS.<sup>14</sup> It is important to identify the reasons that associated with level of awareness, which will be helpful in strengthening capacity for program planning, implementation, monitoring and evaluation regarding AIDS awareness. A few national and international researchers have made steps to understand the reasons and come up with some explanations, but existing analysis didn't identify noticeably for which factors AIDS awareness increases

in the context of Bangladesh.<sup>15-17</sup>

On the above background, the aim of the present paper was to explore AIDS awareness among the country representative male population in Bangladesh along with identifying the factors associated with the AIDS awareness.

### Methods

The analysis was based on 'Male Recode' data set from Bangladesh Demographic and Health Survey 2007 (BDHS 2007). The BDHS 2007 employed a nationally-representative two-stage probability sample design that was selected from the master sample maintained by the Bangladesh Bureau of Statistics for the implementation of surveys before the 2001 census.<sup>18</sup> The BDHS 2007 was conducted under the authority of the National Institute for Population Research and Training (NIPORT) of the Ministry of Health and Family Welfare. The survey was implemented by Mitra and Associates, a Bangladeshi research firm in Dhaka. ORC (Opinion Research Company) Macro International Inc. of Calverton, MD, provided technical assistance for the project as part of its international Demographic and Health Surveys program and is responsible for 'Data Archive'; and financial assistance was provided by the United States Agency for International Development.

For the master sample area, Bangladesh was divided into 361 primary sample units (clusters). The units for the BDHS were sub-selected from the master sample with equal probability in order to make the BDHS selection equivalent to selection with a probability proportional size for making the survey nationally representative. A questionnaire-based interview was conducted to collect data and the respondents gave their consents to participate in the survey.

The questionnaire-based interview was completed for all the respondents (3771 men aged 15-54 years) derived from the 361 clusters used for BDHS 2007 (134 in urban and 227 in rural areas).<sup>19</sup> The present study

sample consisted of 3771 persons. The questionnaire contained questions on background characteristics (age, education, religion, etc.), fertility preferences, respondent's employment status, knowledge on and awareness of AIDS, source of knowledge, perceptions about the avoidance of the disease, and understanding of its consequences, etc.<sup>19</sup>

A written authorization from the proper responsible authority of the Demographic and Health Surveys' 'Data Archive' to use data sets from the BDHS 2007 was obtained. The main purpose of the BDHS is to generate comprehensive information instrumental in identifying new directions for the national health and family planning program in Bangladesh.<sup>20</sup> The analyses were done in the present study to explore AIDS awareness among the country representative male population in Bangladesh along with identifying the factors associated with the AIDS awareness. An approval for this study involving secondary analyses using the population-based generated data mentioned above was obtained from the Review Board of MH Samorita Medical College & Hospital, Dhaka, Bangladesh.

Because of exploratory nature of this study, the researcher did not want to rule out any variable that might have an effect on AIDS awareness of the respondents determined by the response of the respondents to ever heard of AIDS (dependent variable). Independent variables initially considered for analyses included: age of respondents, region (administrative divisions), type of place of residence (urban/ rural), education, religion, reading newspaper or magazine, listening to radio, watching television, wealth index, wife/ partner lives with respondent, marital duration, fertility preference and employment status.

AIDS awareness of the respondents was considered an outcome variable which was dichotomous, taking the value 1 for those who had ever heard of AIDS and 0 otherwise. Thirteen independent variables having potential association with AIDS awareness

were tested using Chi-square test. Only those variables that revealed statistically significance by Chi-square test were included in the initial univariate logistic regression analysis, and only those variables significant by the univariate model were included in the multivariate model. Multivariate logistic regression analysis was carried out to identify possible predictors of AIDS awareness. All analyses were performed using the SPSS statistical software for Windows.<sup>21</sup> A  $p$  value of  $<0.05$  was considered significant.

### Results

Table 1 shows the socio-demographic characteristics of the respondents of the present study. The mean ( $\pm$ SD) age of the respondents in the present study was 38.0 ( $\pm$ 9.4) years. Most of the respondents were Muslim (89.8%), had formal education (71.0%), from rural areas (61.7%), rich (45.4%) and living with wife or partner (96.9%). The source of information on AIDS for the respondents was newspaper or magazine (40.6%), radio (42.4%) and television (79.1%). The marital duration ranged 0-4, 5-9, 10-14, 15-19, 20-24, 25-29 and 30+ years for 20.2, 19.0, 16.0, 15.0, 12.5, 10.3 and 7.0% of the respondents, respectively.

Table 2 shows the percent distribution of the respondents who had ever heard of AIDS by some selected characteristics, BDHS 2007. The overall AIDS awareness as positive response by the respondents to the query on ever heard of AIDS was 85.9%. The respondents who had ever heard of AIDS were also asked whether a person looking healthy can have HIV. About 86% of them reported that a healthy looking person can have HIV. The responses to the queries that a person can 'Get AIDS by using unsterilized needle or syringe', 'Get AIDS through unsafe blood transfusions', 'Get AIDS from mosquito bites' and 'Get AIDS by sharing food with person who has AIDS' were 92.1%, 94.2%, 43.5% and 48.3%, respectively. The respondents who had ever heard of AIDS were also asked whether there is any way to reduce chances of getting AIDS. Always



**Table 1. Socio-demographic characteristics of the respondents, BDHS 2007, (n = 3771)**

Characteristics	Mean ( $\pm$ SD)/%	
Age	years	38.0 ( $\pm$ 9.4)
Muslim	%	89.8
No education	%	29.0
Rural residents	%	61.7
Source of information	Newspaper or magazine	% 40.6
	Radio	% 42.4
	Television	% 79.1
Socio-economic status	Poor	% 34.8
	Middle class	% 19.8
	Rich	% 45.4
Wife/ partner lives with the respondent	%	96.9
Marital duration	0-4 years	% 20.2
	5-9 years	% 19.0
	10-14 years	% 16.0
	15-19 years	% 15.0
	20-24 years	% 12.5
	25-29 years	% 10.3
	30+ years	% 7.0

BDHS, Bangladesh Demographic and Health Survey; n, number of respondents; SD, Standard deviation. The number of men for the variable 'wife/ partner lives with respondent' (n = 3731) differs because of answer-unavailability for the factor as some of the men did not answer to the specific question as they were allowed for a choice of not answering to specific questions if they wanted to do so during the questionnaire-based interviews.

**Table 2. Distribution of the respondents by some selected characteristics, BDHS 2007**

Characteristics	Number of respondents	Positive response,%
Awareness on AIDS	3771	85.9
A person looking healthy can have HIV	3238	85.8
Get AIDS by using unsterilized needle or syringe	3238	92.1
Get AIDS through unsafe blood transfusions	3237	94.2
Get AIDS from mosquito bites	3238	43.5
Get AIDS by sharing food with person who has AIDS	3232	48.3
Reduce chances of AIDS by always using condoms during sex	3236	75.9
Reduce chances of AIDS having single sex partner who has no other partner	3236	72.8
Reduce risk of getting AIDS by not having sex at all	3231	66.0

BDHS, Bangladesh Demographic and Health Survey. The number of men differs because of answer-unavailability for the factor as some of the men did not answer to the specific question as they were allowed for a choice of not answering to specific questions if they wanted to do so during the questionnaire-based interviews.

using condoms during sex may reduce chances of getting AIDS as reported by 75.9% of the respondents. Similarly, having single sex partner who has no other partner and not having sex at all can reduce chances of AIDS as said by 72.8% and 66.0% of the respondents, respectively.

Table 3 shows the distribution of the respondents and 10 independent variables from initially selected 13 independent variables had significant relationship with AIDS awareness identified using Chi-square test. The results suggest a significant relationship between age of the males and their AIDS awareness. The AIDS awareness among the young respondents was significantly higher than their aged counterparts ( $\chi^2 = 86.7$ ,  $df = 3$ ,  $p = 0.000$ ). It varied significantly among the respondents living in different regions of the country ( $\chi^2 = 99.3$ ,  $df = 5$ ,  $p = 0.000$ ). The urban males were more aware of AIDS compared to their rural counterparts ( $\chi^2 = 105.8$ ,  $df = 1$ ,  $p = 0.000$ ). Education of respondents had a linear and positive relationship with having AIDS awareness ( $\chi^2 = 442.1$ ,  $df = 2$ ,  $p = 0.000$ ). A significant role in having AIDS awareness was played by access to newspaper or magazine ( $\chi^2 = 307.3$ ,  $df = 1$ ,  $p = 0.000$ ), radio ( $\chi^2 = 26.9$ ,  $df = 1$ ,  $p = 0.000$ ) and television ( $\chi^2 = 350.5$ ,  $df = 1$ ,  $p = 0.000$ ). Wealth index was positively and significantly associated with having AIDS awareness ( $\chi^2 = 319.7$ ,  $df = 2$ ,  $p = 0.000$ ). The fact that wife/partner lives or does not live with respondent was positively associated with having AIDS awareness (*Fisher's Exact Test*,  $p = 0.02$ ). The results suggest a significant relationship between marital duration of the participants and their AIDS awareness. The AIDS awareness among the respondents with shorter marital duration was significantly higher than the counterparts with longer marital durations ( $\chi^2 = 134.0$ ,  $df = 6$ ,  $p = 0.000$ ).

#### **Univariate logistic regression analysis**

Logistic regression analysis was carried out to assess the independent effect of the variable on AIDS awareness after allowing for other variables that might have influences on

the underlying relationship. Of the 10 variables retained significant using Chi-square test considered in the model, all were significant and are presented in Table 4. The analysis revealed that the respondents aged 15-19 years were significantly more likely to know about AIDS than were the respondents aged 35-44 years (OR: 0.56; 95% CI: 0.35-0.88) and 45-54 years (OR: 0.32; 95% CI: 0.20-0.50). AIDS awareness varied significantly in different regions of the country and compared to the respondents of Sylhet division, the respondents of others divisions were likely to be more aware of AIDS; Rajshahi (OR: 1.59; 95% CI: 1.21-2.09), Barisal (OR: 1.72; 95% CI: 1.26-2.36), Dhaka (OR: 2.49; 95% CI: 1.85-3.36), Chittagong (OR: 3.44; 95% CI: 2.44-4.86) and Khulna (OR: 4.21; 95% CI: 2.93-6.05). Type of place of residence (urban/ rural) was another significant predictor of AIDS awareness and the urban respondents were three times more likely to be more aware of AIDS compared to their rural counterparts (OR: 3.20; 95% CI: 2.54-4.03). Education was another significant predictor of AIDS awareness. The respondents with secondary or above education were twenty three times more likely to be more aware of AIDS compared to their uneducated counterparts (OR: 23.35; 95% CI: 15.73-34.67). Source of information was another strong predictor of AIDS awareness; reading newspaper or magazine (OR: 13.46; 95% CI: 9.36-19.37), listening radio (OR: 1.67; 95% CI: 1.37-2.03) and watching television (OR: 5.62; 95% CI: 4.63-6.83). Wealth index was revealed significant association with having AIDS awareness; middle class (OR: 2.30; 95% CI: 1.81-2.92) and rich (OR: 8.35; 95% CI: 6.41-10.88). The respondents whose wives/partners lived elsewhere were three times more likely to be more aware of AIDS (OR: 3.04; 95% CI: 1.11-8.34). The univariate logistic regression results also show that AIDS awareness among the respondents with shorter marital duration was significantly higher than the counterparts with longer marital durations; 5-9 years (OR: 0.59; 95% CI: 0.40-0.87), 10-14 years (OR: 0.49; 95% CI: 0.33-0.72), 15-19 years (OR: 0.36; 95% CI: 0.25-0.52), 20-24 years (OR: 0.28; 95% CI: 0.19-

**Table 3. Distribution of the respondents ever married males and percentage of those who had heard of AIDS by some selected characteristics, BDHS 2007, (n = 3771)**

Characteristics	Category	Number of respondents	Awareness about AIDS (%)	$\chi^2$ , df, p value
Age	15-24 years	275	92.0	$\chi^2 = 86.7, df = 3, p = 0.000$
	25-34 years	1112	91.2	
	35-44 years	1271	86.5	
	45-54 years	1113	78.3	
Region	Sylhet	502	74.9	$\chi^2 = 99.3, df = 5, p = 0.000$
	Rajshahi	786	82.6	
	Barisal	491	83.7	
	Dhaka	759	88.1	
	Chittagong	609	91.1	
	Khulna	624	92.6	
Type of place of residence	Rural	2328	81.3	$\chi^2 = 105.8, df = 1, p = 0.000$
	Urban	1443	93.3	
Education	No education	1092	68.9	$\chi^2 = 442.1, df = 2, p = 0.000$
	Primary	1205	86.3	
	Secondary and above	1474	98.1	
Reading newspaper or magazine	No	2242	77.7	$\chi^2 = 307.3, df = 1, p = 0.000$
	Yes	1529	97.9	
Listening radio	No	2173	83.3	$\chi^2 = 26.9, df = 1, p = 0.000$
	Yes	1598	89.3	
Watching television	No	787	65.2	$\chi^2 = 350.5, df = 1, p = 0.000$
	Yes	2984	91.3	
Wealth index	Poor	1313	72.9	$\chi^2 = 319.7, df = 2, p = 0.000$
	Middle class	746	86.1	
	Rich	1712	95.7	
Wife/ partner lives with the respondent	Living with respondent	3654	85.7	<i>Fisher's Exact Test, p = 0.02</i>
	Staying elsewhere	77	94.8	
Marital duration	0-4 years	760	93.8	$\chi^2 = 134.0, df = 6, p = 0.000$
	5-9 years	717	90.0	
	10-14 years	604	88.1	
	15-19 years	566	84.5	
	20-24 years	472	80.9	
	25-29 years	390	77.7	
	30+ years	262	70.6	

AIDS, Acquired immunodeficiency syndrome; BDHS, Bangladesh Demographic and Health Survey; n, number of respondents. The number of men for the variable 'wife/ partner lives with the respondent' (n = 3731) differs because of answer-unavailability for the factor as some of the men did not answer to the specific question as they were allowed for a choice of not answering to specific questions if they wanted to do so during the questionnaire-based interviews.

**Table 4. Univariate logistic regression estimates of odds ratios and confidence intervals for association between knowledge of male on AIDS and their socio-demographic characteristics BDHS 2007, (n = 3771)**

Characteristics		Odds Ratio	95% CI	
			Lower	Upper
Age	15-24 years	1.00		
	25-34 years	0.90	0.56	1.46
	35-44 years	0.56	0.35	0.88
	45-54 years	0.32	0.20	0.50
Region	Sylhet	1.00		
	Rajshahi	1.59	1.21	2.09
	Barisal	1.72	1.26	2.36
	Dhaka	2.49	1.85	3.36
	Chittagong	3.44	2.44	4.86
	Khulna	4.21	2.93	6.05
Type of place of residence	Rural	1.00		
	Urban	3.20	2.54	4.03
Education	No education	1.00		
	Primary	2.85	2.31	3.51
	Secondary or above	23.35	15.73	34.67
Reading newspaper or magazine	No	1.00		
	Yes	13.46	9.36	19.37
Listening radio	No	1.00		
	Yes	1.67	1.37	2.03
Watching television	No	1.00		
	Yes	5.62	4.63	6.83
Wealth index	Poor	1.00		
	Middle class	2.30	1.81	2.92
	Rich	8.35	6.41	10.88
Wife/ partner lives with the respondent	Living with respondent	1.00		
	Staying elsewhere	3.04	1.11	8.34
Marital duration	0-4 years	1.00		
	5-9 years	0.59	0.40	0.87
	10-14 years	0.49	0.33	0.72
	15-19 years	0.36	0.25	0.52
	20-24 years	0.28	0.19	0.41
	25-29 years	0.23	0.16	0.34
	30+ years	0.16	0.11	0.24

BDHS, Bangladesh Demographic and Health Survey; n, number of respondents; CI, Confidence Interval. The number of men for the variable 'wife/ partner lives with the respondent' (n = 3731) differs because of answer-unavailability for the factor as some of the men did not answer to the specific question as they were allowed for a choice of not answering to specific questions if they wanted to do so during the questionnaire-based interviews.



0.41), 25-29 years (OR: 0.23; 95% CI: 0.16-0.34) and 30+ years (OR: 0.16; 95% CI: 0.11-0.24).

### **Multivariate logistic regression analysis**

Of the 10 variables revealed significant using univariate logistic regression analysis considered in the multivariate model, 8 were significant and are presented in Table 5. The results using multivariate logistic regression analysis were of similar trend of the results using univariate logistic regression analysis for the variables like region, type of place of residence, education, reading newspaper or magazine, listening radio, watching television and wealth index. For marital duration, the AIDS awareness among the respondents with 0-4 years of marital duration was significantly higher than the counterparts with 20-24 years (OR: 0.49; 95% CI: 0.26-0.91), 25-29 years (OR: 0.47; 95% CI: 0.24-0.91) and 30+ years (OR: 0.30; 95% CI: 0.15-0.60).

### **Discussion**

The prevalence of HIV/ AIDS in Bangladesh is still low, although infection rate is increasing since 1994, especially among heterosexual males and injecting drug users.<sup>22-24</sup> Published data indicate the prevalence of high-risk behaviours for transmission of HIV in segments of Bangladeshi population, which include casual unprotected sex, heterosexual and homosexual activities.<sup>25-27</sup> Since an accessible, affordable and complete cure for HIV/ AIDS and an effective vaccine to prevent HIV infection may not be available in the near future, primary prevention to control the spread of HIV infection can be achieved through awareness and changing behaviour remains at the highest priority for HIV control programmes. This study was conducted to explore AIDS awareness among the national representative male population in Bangladesh along with identifying the factors associated with the AIDS awareness which deserve special attention for the prevention of AIDS in Bangladesh.

Results of a knowledge, attitude and practice survey conducted on staff at hospitals in Pune, India, showed that 35% of the lower-level staff heard about AIDS.<sup>28</sup> About 96% of

the lower-level staff of International Centre for Diarrhoeal Disease Research, Bangladesh: Centre for Health and Population Research had heard of HIV/ AIDS.<sup>29</sup> However, it was reported in surveys conducted in 1990s that awareness about HIV/ AIDS among general population of Bangladesh was very low, from 19% to 40%.<sup>9,30,31</sup> The result of the present study using national representative male population in Bangladesh shows that 85.9% of the respondent who had heard of AIDS indicating the improved situation and to this a significant role was played by access to newspaper or magazine, radio and television. It was reported that mass-media exposure, such as radio and television, was positively associated with having AIDS awareness among the adolescents. The exposure to such media can communicate AIDS awareness in music, news reports, songs, dramas, documentaries, and advertising and can profoundly influence attitudes and behaviours of people even in areas as traditionally imbedded as those surrounding sexuality and reproduction.<sup>32</sup> A mass-media project using a television programme to teach adolescents in Zaire about AIDS issues resulted in more sexual abstinence, mutual fidelity and condom use.<sup>33</sup>

More than 70% of the respondents reported that a healthy looking person can have HIV, a person can get AIDS by using unsterilized needle or syringe and a person can get AIDS through unsafe blood transfusions, but always using condoms during sex and having single sex partner might reduce chances of getting AIDS.

In this study, education of respondents had a linear and positive relationship with having AIDS awareness indicating that education was a strong predictor of AIDS awareness. Not surprisingly, AIDS awareness was found to be positively related to literacy level.9 Literacy was the most significant predictor of AIDS awareness.<sup>34</sup>

The results of the present study show that the regional as well as urban-rural differences in AIDS awareness among the respondents.

**Table 5. Multivariate logistic regression estimates of odds ratios and confidence intervals for association between knowledge of male on AIDS and their socio-demographic characteristics BDHS 2007, (n = 3731)**

Characteristics		Odds Ratio	95% CI	
			Lower	Upper
Region	Sylhet	1.00		
	Rajshahi	1.45	1.04	2.03
	Barisal	1.57	1.08	2.30
	Dhaka	2.33	1.63	3.33
	Chittagong	2.85	1.91	4.24
	Khulna	4.84	3.19	7.35
Type of place of residence	Rural	1.00		
	Urban	1.77	1.33	2.36
Education	No education	1.00		
	Primary	2.07	1.63	2.63
	Secondary or above	7.13	4.39	11.60
Reading newspaper or magazine	No	1.00		
	Yes	2.45	1.57	3.83
Listening radio	No	1.00		
	Yes	1.54	1.22	1.94
Watching television	No	1.00		
	Yes	2.66	2.11	3.35
Wealth index	Poor	1.00		
	Middle class	1.56	1.18	2.05
	Rich	2.63	1.99	3.64
Marital duration	0-4 years	1.00		
	5-9 years	0.79	0.49	1.27
	10-14 years	0.74	0.44	1.25
	15-19 years	0.70	0.39	1.24
	20-24 years	0.49	0.26	0.91
	25-29 years	0.47	0.24	0.91
	30+ years	0.30	0.15	0.60

BDHS, Bangladesh Demographic and Health Survey; n, number of respondents; CI, Confidence Interval.

The literature indicates that the urban adolescents were more aware of AIDS than their rural counterparts.<sup>35</sup> The present study also reports a significant association of wealth index with AIDS awareness showing

that the middle class and rich were more aware of AIDS than their poor counterpart. This could be the consequence of a complex interplay of various factors. Limited access to sexual health information and unavailability of

adequate health care services, poor literacy, poverty and unemployment kept the rural respondents lagged behind AIDS awareness.

The respondents in the present study whose wives/partners lived elsewhere were likely to be more aware of AIDS. It is assumed that they had chances of unprotected sex with sex workers as well as with their wives, exposing them to infection with HIV/ AIDS, other sexually transmitted diseases and also about the related information making them more aware of AIDS. In this study, a significant relationship between marital duration of the respondents and their AIDS awareness showing that the respondents with shorter marital duration were significantly more aware of AIDS than their counterparts with longer marital durations. It was revealed by a correlation analysis that marital duration (short, long) significantly but negatively correlated with reading newspaper or magazine (yes, no), watching television (yes, no) and level of education of the respondents (no education, primary, secondary and above) (data not shown). It is also reasonable that the newly married respondents might be sexually more active. Therefore, it is justified that the respondents with shorter marital duration were more aware of AIDS.

The findings of the present study have some important policy implications. Behavioural Change Communication activities should be enhanced with extensive education on safe-sexual behaviours through culturally-appropriate messages. Improved access to education resources in conjunction with community-based peer education could also help to raise AIDS awareness. Use of mass-media could also be a successful strategy in reaching the population with information on AIDS, particularly those who are living in rural and remote areas. Programmes need to be strengthened for population of rural areas in Bangladesh. Comprehensive reproductive healthcare services, which include STIs/ HIV/ AIDS could be provided within the existing healthcare facilities. The healthcare providers should be oriented on the mechanisms of transmission and prevention of HIV/ AIDS, so that they can transfer their knowledge to their

clients and to the community people in order to raise AIDS awareness among them.

In Bangladesh, NAC is providing technical assistance in developing strategies for the control of HIV/ AIDS.<sup>36</sup> Nevertheless, the findings of the present study can help the healthcare providers in the successful implementation of the existing activities and in formulating appropriate interventions to increase awareness among the people for the prevention of HIV/ AIDS in Bangladesh.

### **Conclusion**

The findings of the present study show that 85.9% of the respondents had ever heard of AIDS. More than 70% of the respondents reported that a healthy looking person can have HIV, a person can get AIDS by using unsterilized needle or syringe and a person can get AIDS through unsafe blood transfusions, but always using condoms during sex and having single sex partner who has no other partner might reduce chances of getting AIDS. Multivariate logistic regression analysis revealed that AIDS awareness was strongly and positively associated with education of the respondents, varied significantly across different parts of the country. AIDS awareness was higher among urban residents than rural, and among them who had access to newspaper or magazine, television and radio than those who had not. AIDS awareness may be further increased providing easy access to education and mass-media in order to raise AIDS awareness, and promotion of condom use for prevention of AIDS in Bangladesh.

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### **Competing interests**

The authors declare that they have no

competing interests.

### Authors' contributions

MSL: was involved in getting authorization to use BDHS 2007 data sets from the authority of Demographic and Health Surveys' Data Archive, gave statistical advice, helped in the interpretation of the results and was involved in revising the manuscript critically. EAG, BKB and FA: drafted the manuscript and was involved in revising the manuscript critically. SM: performed the statistical analyses and was involved in revising the manuscript critically. All authors have read and approved the final manuscript.

### References

- Balk, D and Lahiri, S. Awareness and knowledge of AIDS among Indian women: evidence from 13 states. [abstract]. *Health Transition Review* 1997;7:485.
- World Health Organization (WHO). HIV/AIDS Epidemiological Surveillance Report for the WHO African Region, 2005 Update. Regional Office for Africa, Harare; 2005.
- UNAIDS. Global prevalence of HIV. 2009.
- UNAIDS. UNAIDS Report on the Global AIDS Epidemic. 2010.
- National AIDS Control Organisation. UNGASS country progress report 2008: India. New Delhi, Ministry of Health and Family Welfare; 2008.
- CIA World Factbook. [[http://www.theodora.com/wfbcurrent/bangladesh/Bangladesh\\_people.html](http://www.theodora.com/wfbcurrent/bangladesh/Bangladesh_people.html)]
- Elton Jhon AIDS Foundation. HIV/AIDS in Bangladesh. [<http://www.ejaf.com/Ourwork/Countries/Bangladesh>]
- Rahman MM. AIDS in Bangladesh and its prevention. *Int Conf AIDS* 1993;9:788.
- National AIDS Committee. KABP Survey in relation to AIDS in Bangladesh. Dhaka; 1990.
- National AIDS/ STD Programme, DGHS, MOHFW, Bangladesh. Bangladesh HIV Data 2009. [[http://www.bdnasp.net/images/bangladesh\\_hiv\\_data\\_2009.pdf](http://www.bdnasp.net/images/bangladesh_hiv_data_2009.pdf)]
- National AIDS/STD Program. HIV/AIDS-Situation and national response. DGHS, Dhaka. [[http://www.bdnasp.net/images/wad\\_2010\\_nasp\\_keynote\\_presentation.ppt](http://www.bdnasp.net/images/wad_2010_nasp_keynote_presentation.ppt)]
- Boland M. Overview of perinatally transmitted HIV infection. *Nurs Clin North Am* 1996;31(1):155-64.
- UNICEF. HIV and AIDS in Bangladesh. 2009.
- Blunch NH and Das MB. HIV/AIDS knowledge in Bangladesh across two cohorts of married women. [<http://paa2011.princeton.edu/download.aspx?submissionId=110777>]
- Kane TT and Ashraf A. Awareness of sexually transmitted diseases among women and service providers in rural Bangladesh. *Int J STD AIDS* 1997;8:688-96.
- Wolffers I. Culture, media and HIV/AIDS in Asia. *Lancet* 1997;349:52-4.
- Elkamel FM. Can mass media prevent AIDS: the need for well planned behavior change communication programmes. *East Mediterr Health J* 1996;2:449-58.
- National Institute of Population Research and Training (NIPORT) & ORC (Opinion Research Company), Macro International Inc.: Bangladesh Demographic and Health Survey 1999-2000. Mitra and Associates, Dhaka, Bangladesh & Calverton, MD, USA; 2001.
- National Institute of Population Research and Training (NIPORT) & ORC (Opinion Research Company), Macro International Inc.: Bangladesh Demographic and Health Survey 2007. 'Male Recode' Data Set. Mitra and Associates, Dhaka, Bangladesh & Calverton, MD, USA; 2009.
- Laskar MS, et al. Factors associated with contraceptive practices of married women in Bangladesh with respect to their employment status. *Eur J Contracept Reprod Health Care* 2006;11(3):220-7.
- SPSS Inc. SPSS for Windows (version SPSS 11.5) Computer software.

- Chicago, IL, USA; 2002.
22. Islam M, Mitra AK, Mian AH, Vermund SH. HIV/ AIDS in Bangladesh: a national surveillance. *Int J STD AIDS* 1999;10:471-4.
  23. Sarkar S, Islam N, Durandin F, Siddiqui N, Panda S, Jana S et al. Low HIV and high STD among commercial sex workers in a brothel in Bangladesh: scope for prevention of larger epidemic. *Int J STD AIDS* 1998;9:45-7.
  24. Azim T, Islam MN, Bogaerts J, Mian MAH, Sarker MS, Fattah KR et al. Prevalence of HIV and syphilis among high risk groups in Bangladesh. *AIDS* 2000;14:210-1.
  25. Islam MM, Karim E, Mian MAH, Kristensen S, Chowdhury MR, Vermund SH. An update on the prevalence of HIV/ AIDS in Bangladesh. *Southeast Asian J Trop Med Public Health* 1999;30:246-50.
  26. AIDS and STD Control Programme, Directorate General of Health Services, Ministry of Health and Family Welfare, Government of Bangladesh: Report on the Second National Expanded HIV Surveillance, 1999-2000. Dhaka; 2000.
  27. Gibney L, Choudhury P, Khawaja Z, et al. Behavioural risk factors for HIV/ AIDS in a low-HIV prevalence Muslim nation: Bangladesh. *Int J STD AIDS* 1999;10:186-94.
  28. Tuchinda S, Chotpitayasunondh T, Teeraratkul A. Knowledge, attitude and practices of senior high school students regarding human immunodeficiency virus infection. *J Med Assoc Thai* 1998;81:130-5.
  29. Islam MT, Mostafa G, Bhuiya AU, Hawkes S, Francisco A. Knowledge on, and attitude toward, HIV/ AIDS among staff of an international organization in Bangladesh. *J Health Popul Nutr* 2002;20(3):271-8.
  30. Bhuiya A, Hanifi SMA, Hossain M, Aziz A. Effects of an AIDS awareness campaign on knowledge about AIDS in a remote rural area of Bangladesh. *Int Q Commun Health Educ* 1999-2000;19:51-63.
  31. Hanifi MA, Hossain M, Aziz A, Bhuiya A. Impact of AIDS awareness activities in a rural area of Bangladesh. Proceedings of the ASCON VIth Conference: March 1997; Dhaka. International Centre for Diarrhoeal Disease Research Bangladesh; 1997 (Special Publication No. 57).
  32. Westhoff CF, Bankole A. Mass media and reproductive behaviour in Pakistan, India, and Bangladesh. Calverton, MD: Macro International Inc.; 1999 (Demographic and health surveys analytical report no. 10).
  33. Convisser J. The Zaire Mass Media Project: a model of AIDS prevention communications and motivation project. Washington, DC: Population Services International; 1992 (Population Services International special report no. 1).
  34. Fulton EL, Kama N, Ahmed SM, Khan MI. Determinants of AIDS awareness and knowledge among rural men and women in Bangladesh. Proceedings of the ASCON VIth Conference: March 1997; Dhaka. International Centre for Diarrhoeal Disease Research Bangladesh; 1997 (Special Publication No. 57).
  35. Khan MA. Knowledge on AIDS among female adolescents in Bangladesh: evidence from the Bangladesh Demographic and Health Survey Data. *J Health Popul Nutr* 2002;20(2):130-7.
  36. Akhter HH. Reproductive rights, reproductive health, morbidity and mortality. In *Population and development: national plan of action*. Edited by Barkat A, Howlader SR. Dhaka: Ministry of Health and Family Welfare, Government of Bangladesh; 1996:79-104.