

TRENDS AND DETERMINANTS OF KNOWLEDGE AND AWARENESS OF HIV/AIDS AMONG MARRIED WOMEN IN BANGLADESH: AN URBAN–RURAL COMPARISON¹⁾

Mohammad S. Zahangir²⁾ – Mohammed Chowdhury³⁾ – Mosammat Z. Nahar⁴⁾ – Hafiz Khan⁵⁾ – Mohammad Masum⁶⁾

Abstract

The aim of this study was to examine the trends and determinants of knowledge and awareness of HIV/AIDS among women in urban and rural areas of Bangladesh. This study used data from the 2014 Bangladesh Demographic and Health Survey (BDHS). A binary logistic regression model was employed to detect potential risk factors (covariates) associated the outcome variable. While women's HIV/AIDS knowledge in rural areas has shown an increasing trend over the years in which the survey has been conducted, a narrow decline in HIV/AIDS knowledge was observed among women in urban areas in recent years. Education and mass media have played the major role in spreading knowledge about HIV/AIDS among women in both urban and rural areas. Since rural women's HIV/AIDS knowledge score was relatively lower than that of urban women, awareness raising through mass media should focus especially on rural areas.

Keywords: HIV/AIDS infection, knowledge score, logistic regression, odds ratio

Demografie, 2021, 63: 158–171

INTRODUCTION

Acquired Immune Deficiency Syndrome (AIDS) caused by the infection of Human Immunodeficiency Virus (HIV) is one of the most contagious diseases in the world. According to UNAIDS (2019a), in 2018 there were approximately 37.9 million people living with HIV/AIDS and 770,000 of them died that year. The number of deaths has been reduced by more

than 55% since the peak of 1.7 million in 2004. The number of new HIV infections in 2018 was 1.7 million, which was nearly half of the peak of 2.9 million new infections that occurred in 1997. However, the Joint United Nations Program on HIV/AIDS (UNAIDS) warned that the decline was not fast enough to reach the target of fewer than 500,000 by 2020 (UNAIDS, 2019a). In Asia and the Pacific

1) The authors would like to thank the NIPORT, Mitra and Associates, and IFC International for the collection and distribution of the BDHS data.

2) Department of Statistics, University of Chittagong, Chattogram-4331, Bangladesh, e-mail: salim.zahangir@cu.ac.bd.

3) Department of Statistics and Analytical Sciences, Kennesaw State University, Kennesaw, GA 30144, USA.

4) Department of Statistics, University of Chittagong, Chattogram-4331, Bangladesh.

5) Julia Jones Matthews Department of Public Health, Texas Tech University Health Sciences Center, Lubbock, TX, 79430, USA.

6) Department of Statistics and Analytical Sciences, Kennesaw State University, Kennesaw, GA 30144, USA.

regions, there were 5.9 million people living with HIV with a prevalence of 0.2% in 2018, and the number of new infections was 310,000 (UNAIDS, 2019b).

In Bangladesh, a South Asian country, the prevalence of HIV was low, at less than 0.1% (Nahar et al., 2009). However, it has gradually increased since 1989 (Islam – Conigrave, 2008). The estimated number of HIV-infected people in Bangladesh increased by more than 222% (from 6,300 in 2008 to 14,000 in 2018) in a decade (UNAIDS, 2019c). Therefore, Bangladesh possesses a high risk of the rapid spread of HIV even though it has a low frequency of reported HIV/AIDS cases with respect to its population size (Islam – Conigrave, 2008). The high risk of spreading HIV can be attributed to risk factors such as practising unprotected sex, receiving a contaminated professional blood transfusion, hypodermic needle use, poor medical facilities, and insufficient screening practices, and it can also be transmitted from a mother to a child during pregnancy (Khan, 2002; Rahman et al., 2009; Sarkar et al., 2006). It should be noted that the increase in the number of HIV patients is strongly associated with rapid urbanisation and substantial population movements in and out of the country, the growing number of sex workers, persistent gender disparities and inequities, rising unemployment and economic problems, and increasing violations of human rights in the recent decade (Rahman et al., 2008; Rahman et al., 2009; Sarkar et al., 2006). Researchers have found that people who are unaware of the potential means of transmission are at a higher risk of HIV infections (Aliyu et al., 2010; Appiah-Agyekum – Suapim, 2013). Because of the high prevalence of HIV infections in neighbouring countries, such as India, Myanmar, Nepal, Thailand, and the Philippines, Bangladesh is at an increased risk of further growth in the number of HIV patients. For example, in India 2.1 million people have been living with HIV and its prevalence among adults (15–49 years) was 0.2% in 2017 (USAIDS, 2019d).

Policymakers in Bangladesh should focus on these risk factors with a vision of reducing the risk of HIV infection and transmission so that a nation with a high-density population can control the exponential growth of this pandemic. However, controlling these risk factors is not that easy, because the quick spread of HIV mainly depends on people's personal choice

to use protection, something that policymakers have little control over except by creating awareness among the people about HIV/AIDS transmission. The main goal could therefore be 'how to increase people's HIV/AIDS-related knowledge', as public knowledge of the contagious nature of HIV/AIDS could be the best way for people to avoid contracting HIV/AIDS. According to the Bangladesh Demographic and Health Survey (BDHS) conducted in 2014, 70% of ever-married women were knowledgeable about HIV/AIDS (NIPORT, 2016; for details see the section titled 'levels of knowledge about HIV/AIDS from BDHS 1996/1997–2014'). Several studies reported that the level of knowledge about HIV/AIDS was lower among women compared to men in Bangladesh (Rahman – Rahman, 2007; Yaya et al., 2016). Women were more vulnerable to HIV infection and transmission owing to their being in less privileged social and economic positions and limited access to sex and reproductive health care (Garai, 2016). Additionally, Bangladeshi women's perception of HIV/AIDS is tainted by myths, erroneous information, and tales, which further contribute to the spread of HIV infection and transmission (Rahman et al., 2009). Indeed, a lack of knowledge about HIV/AIDS is positively associated with misunderstandings, social stigma, and poor decisions relating to sexual behaviour (Varni et al., 2012).

Earlier studies have found that an effective preventive measure towards controlling HIV infection and transmission among women is to increase their knowledge about HIV/AIDS. Some authors (Rahman – Rahman, 2007; Khan, 2002; Yaya et al., 2016) have claimed that better knowledge about HIV/AIDS among women can have a long-term positive effect on the HIV/AIDS pandemic in a society with limited or poor health-care facilities. HIV/AIDS awareness can be substantially increased by means of advertisements in electronic and print media and by conducting door-to-door campaigns among underprivileged people. Assessing the current scenario and identifying the factors associated with knowledge about HIV/AIDS among women in Bangladesh can contribute to the development of a more organised and specifically targeted programme of HIV/AIDS prevention backed by government and non-government organisations.

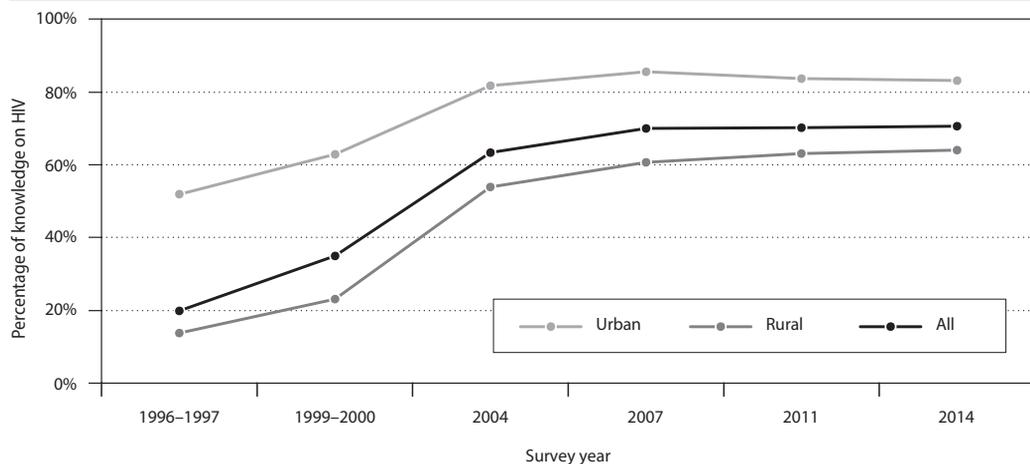
There is a considerably large body of literature on the issue of HIV/AIDS knowledge among women. Khan (2002) studied adolescent married women in Bangladesh and found an association between female education, exposure to mass media, and the use of contraception on the one hand and women's knowledge about HIV/AIDS on the other. Rahman and Rahman (2007) investigated married women of childbearing age and identified exposure to mass media as a strong factor that supports the spread of knowledge about HIV. They also found socioeconomic status to be an important factor connected to having knowledge about HIV. Sheikh et al. (2017) conducted a comprehensive analysis on married women in Bangladesh and found along with the above-mentioned factors that the women's age, region of residence, place of residence, religion, husband's education, and family planning knowledge were also significant for women's knowledge about HIV/AIDS. Haque et al. (2018) also worked on married women in Bangladesh and detected the effect of women's working status on their HIV/AIDS knowledge. All these notable research studies focused either on a particular group or an entire community. In addition, there are few studies available on women's HIV/AIDS knowledge in rural and urban Bangladesh (Rahman et al., 2008; Rahman, 2009). However, none of these studies analysed trends

by examining determinants associated with rural and urban women's HIV/AIDS knowledge. Moreover, there are no published works that discusses all these together. Therefore, this study aims to examine the trends and determinants of knowledge about HIV/AIDS among married women in urban and rural Bangladesh using data that cover a period of more than two decades.

LEVELS OF KNOWLEDGE ABOUT HIV/AIDS FROM BDHS 1996/1997–2014

The International Demographic and Health Surveys (DHS) programme funded by the United States Agency for International Development (USAID) is responsible for collecting, analysing, and distributing accurate and nationally representative data on demographic and health risk factors such as fertility, HIV/AIDS, nutrition status, and many other factors in more than 90 developing countries. The data on Bangladesh come from a project known as BDHS. These publicly available data can be accessed from <https://dhsprogram.com>. The DHS conducted seven surveys in Bangladesh in 1993/1994, 1996/1997, 1999/2000, 2004, 2007, 2011, and 2014. HIV/AIDS was excluded from the first survey as there was no related information available. Figure 1 shows the percentage of urban, rural, and total respondents

Figure 1: Knowledge about HIV/AIDS among ever-married women in urban and rural areas and across Bangladesh through the BDHS surveys conducted in 1997, 2000, 2004, 2007, 2011 and 2014



Note: HIV: Human Immunodeficiency Virus; AIDS: Acquired Immune Deficiency Syndrome.

Source: 1996–1997 Bangladesh Demographic and Health Survey (BDHS); 1999–2000 BDHS; 2004 BDHS; 2007 BDHS; 2011 BDHS; 2014 BDHS.

(ever-married women) who had heard of HIV/AIDS based on surveys from the other years. Where women are indicated to have ever heard of HIV/AIDS, this means that they have knowledge about HIV/AIDS. According to the 1996/1997 survey, 51.7% of women in urban areas had knowledge about HIV/AIDS, whereas the figure was only 13.4% in rural areas. The proportion of women who had knowledge about HIV/AIDS rose sharply in the next two surveys. In 2004, the proportion of women with knowledge about HIV/AIDS was 81.7% in urban and 53.7% in rural areas. The proportion of women with knowledge about HIV/AIDS grew again 2007 among both rural and urban women, with a slight faster rate of increase among rural woman. In 2011, the proportion of women with knowledge about HIV/AIDS declined to a small degree in urban areas, while it only increased in rural areas and only slightly. Finally, in 2014, nearly 81% and 64% of women had knowledge about HIV/AIDS in urban and rural areas, respectively. Overall, there was an increasing trend across levels of knowledge about HIV/AIDS among women in Bangladesh.

METHODS AND MATERIALS

Sample data and population

The study utilised data obtained from BDHS and the most recent survey, which was conducted in 2014. The survey used the list of Enumeration Areas (EAs) from the 2011 Population and Housing Census of the People's Republic of Bangladesh, provided by the Bangladesh Bureau of Statistics (BBS). The primary sampling unit (PSU) for the survey was an EA, each of which has an average of about 120 households. The survey was based on a two-stage stratified sampling method. In the first stage, a sample of 600 EAs (207 in urban, the rest in rural areas) were selected using the probability proportional to size sampling technique. A complete list of households in the selected EAs produced a sampling frame for the next stage. In the second stage, a systematic sample of 30 households on average was selected from each EA to provide a representative sample covering the seven administrative divisions. Of the 17,989 selected households, 18,245 ever-married women aged 15–49 were identified, and 17,863 of them were interviewed. These women were asked questions on various topics, such as background

characteristics, marriage, reproductive history, family planning, fertility preferences, awareness of HIV/AIDS and other sexually transmitted infections, and so on. A detail description of the survey is available in NIPORT (2016). This study included 12,593 ever-married women (5,125 from urban and 7,468 from rural areas), who had knowledge about HIV/AIDS. Since HIV is mostly a sexually transmitted disease and because premarital sex is against the law, most women in Bangladesh become sexually active only after marriage; therefore, only ever-married women were selected to be asked questions about their HIV knowledge and awareness.

Outcome variables

There were 11 questions about HIV knowledge and awareness in the BDHS dataset. Respondents who had ever heard of HIV/AIDS were asked these questions (Table 1). Each question had three response options: yes, no, and don't know. A score of 1.00 was assigned for each yes answer and a score of 0 for a no or don't know answer. The sum of these scores for each respondent was treated as the 'knowledge score', with possible scores ranging from 0 to 11. Higher scores indicated a greater level of knowledge about HIV, and vice-versa. Finally, the 'High Score' category was defined by scores greater than or equal to the median (Sarkar *et al.*, 2006) and the 'Low Score' category was defined by scores less than the median (Talwar – Rahman, 2015).

Covariates

A total of 11 covariates were chosen based on existing literature on HIV/AIDS and the availability of data. Of the selected covariates, current age is a continuous variable and rest are qualitative or categorical variables. The age variable was converted to a categorical variable. It should be noted that the covariates used in the analysis were kept on the original scale or re-grouped on a new scale or into new categories. The 'access to media' variable was created as a combination of the following three variables: listen to the radio, watch television, and read the newspaper. According to the DHS definition, the 'wealth index' variable was created from easily obtainable information such as: ownership of a home; selected assets

from that home – like televisions, motorbikes, bicycles; types of water access and sanitation facilities; and materials used for the home's construction etc. In fact, the wealth index is a composite measure of the cumulative living standard of a household. A list of covariates, their categories, and the percentage distribution of respondents in urban and rural settings are shown in Table 2.

Methods

The outcome variable as well as all covariates considered in the study are categorical for the easier application of statistical methods. Pearson's Chi-square (χ^2) tests were performed to explore the association between individual covariates and HIV 'knowledge score' of women. Since the 'knowledge scores' were grouped into Low and High Score categories, the binary logistic regression method was performed to assess the effect of the covariates. The effect of the covariates on the outcome variable was assessed using the odds ratio (OR) of each category relative to the reference category.

RESULTS

The rates of correct responses to questions about HIV/AIDS-related knowledge are shown in Table 1. The highest (89.7%) and the lowest (51.6%) correct-response rates were obtained for the questions as about the 'possibility of getting AIDS by using

an unsterilised needle or syringe' and the 'possibility of getting HIV by sharing food with another person'. Table 2 presents women by selected covariates in urban and rural areas. It shows that urban women are relatively older than rural women. By population size, Dhaka and Sylhet are the largest and smallest regional divisions. Relatively more non-Muslims reside in urban areas than in rural areas. The proportion of illiterate women in urban and rural areas are almost the same. However, 2.5 times more women in urban than rural areas have an upper secondary education. Compared to rural women, urban women have better access to mass media. The proportion of women who have used contraceptives is greater than the proportion of women who have not used contraceptives in both rural and urban areas. The proportion of woman with a 'working status' remains close for both rural and urban areas. The percentage of women with upper-secondary-educated husbands in urban areas was two times higher than the percentage in rural areas. In urban areas, husbands mostly had jobs in private and public sectors, whereas in rural areas most husbands mainly had agricultural or farming professions. The wealth index indicates that slightly more than half of urban women are rich, while a large majority of rural women are poor and about nine in ten families have a male household head.

When it comes to their level of knowledge and awareness of HIV/AIDS, 61.4% of all the women

Tab. 1: Correct response rate to questions about HIV/AIDS-related knowledge and awareness, 2014 (in %)

Questions about HIV related awareness	Correct response
Reduce risk of getting HIV: always use condoms during sex	59,4
Reduce risk of getting HIV: have 1 sex partner only, who has no other partners	72,4
Can get HIV from mosquito bites	54,2
Can get HIV by sharing food with person who has AIDS	51,6
A healthy looking person can have HIV	68,1
HIV transmitted during pregnancy	80,1
HIV transmitted during delivery	62,6
HIV transmitted by breastfeeding	78,8
Can get HIV by witchcraft or supernatural means	76,0
Can get AIDS by using unsterilized needle or syringe	89,7
Can get AIDS through unsafe blood transfusion	88,0

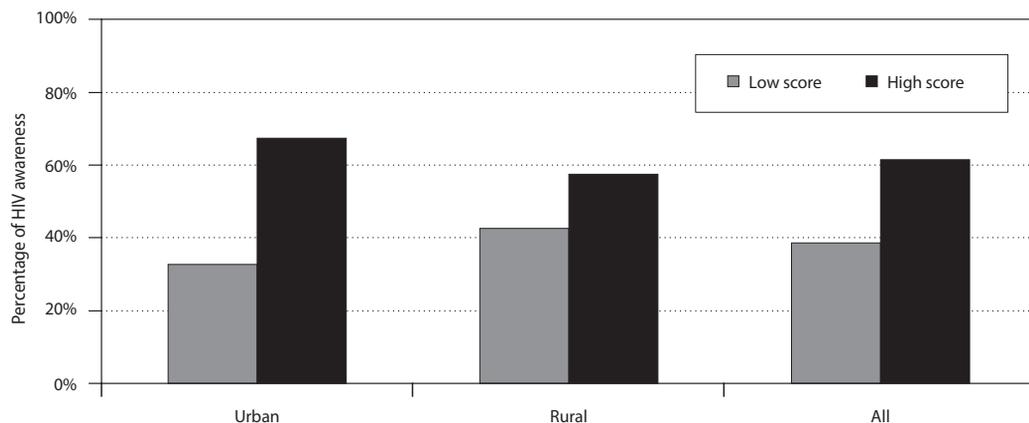
Source: 2014 Bangladesh Demographic and Health Survey.

Tab. 2: Percentage (or number) of ever-married urban and rural women distributed by selected covariates, 2014

Covariates	Category	Urban	Rural
<i>Age group</i>	15–24	27.8 (1423)	33.4 (2495)
	25–34	37.8 (1936)	38.2 (2836)
	35–44	25.3 (1293)	21.1 (1578)
	45+	9.2 (470)	7.2 (541)
<i>Region of residence</i>	Barisal	11.7 (598)	13.0 (972)
	Chittagong	16.1 (823)	16.3 (1218)
	Dhaka	23.3 (1196)	16.2 (1207)
	Khulna	15.0 (769)	17.0 (1266)
	Rajshahi	13.5 (694)	13.1 (975)
	Rangpur	10.8(552)	13.4 (1004)
<i>Religion</i>	Sylhet	9.6 (493)	11.1 (826)
	Islam	90.1 (4619)	91.5 (6835)
<i>Respondent's education</i>	Others	9.9 (506)	8.5 (633)
	Illiterate	13.3 (681)	13.8 (1032)
<i>Access to mass media</i>	Primary	24.6 (1260)	30.3 (2261)
	Secondary	45.0 (2304)	49.3 (3678)
	Higher secondary	17.2 (880)	6.7 (497)
	No access	10.6 (541)	34.4 (2567)
<i>Respondent's working status</i>	Have access	89.4 (4584)	65.6 (4901)
	Not working	71.0 (3638)	68.9 (5145)
<i>Contraceptive use</i>	Working	29.0 (1487)	31.1 (2323)
	No	37.3 (1912)	40.7 (3043)
<i>Husband's education</i>	Yes	62.7 (3213)	59.3 (4425)
	Illiterate	15.7 (806)	22.0 (1642)
	Primary	21.0 (1075)	28.4 (2118)
	Secondary	34.7 (1776)	35.2 (2629)
<i>Husband's occupation</i>	Higher secondary	28.6 (1468)	14.4 (1079)
	Agriculture	13.9 (713)	36.7 (2743)
	Business	29.5 (1510)	22.5 (1681)
	Service	44.7 (2291)	27.3 (2040)
<i>Wealth index</i>	Others	11.9 (611)	13.4 (1004)
	Poorest	5.1 (259)	15.5 (1154)
	Poorer	5.4 (275)	21.8 (1625)
	Middle	12.3 (630)	26.4 (1970)
	Richer	27.0 (1385)	22.7 (1698)
<i>Sex of household head</i>	Richest	50.3 (2576)	13.7 (1021)
	Male	88.2 (4521)	87.9 (6561)
Total	Female	11.8 (604)	12.1 (907)
		100.0 (5125)	100.0 (7468)

Source: 2014 Bangladesh Demographic and Health Survey.

Figure 2: Percentage of HIV/AIDS knowledge and awareness scores among ever-married women in urban and rural areas and across Bangladesh, 2014.



Note: The 'High Score' category was defined by scores greater than or equal to the median.

Source: 2014 Bangladesh Demographic and Health Survey.

have a High Score (Figure 2), and this includes both urban and rural woman, with urban woman scoring 10 percentage points higher than rural women. Table 3 shows the Low and High Score categories of HIV knowledge by the women's socio-demographic characteristics together with the p-values obtained from the Chi-square tests of independence. The score levels (Low and High) in both urban and rural settings vary significantly among different categories of age group, region of residence, respondent's education, access to mass media, contraceptive use, husband's education, husband's occupation, and wealth index.

Younger women score higher than older women. For age groups 15–24, 25–34, 35–44, and 45 and above, the percentage of women in the High Score category are, respectively, 66.8%, 70.0%, 66.7%, and 59.4% in urban and 59.2% 58.7%, 54.5% and 51.2% in rural areas. Apparently, there are bigger differences between age groups' scores in rural areas. In urban areas, women in Khulna division have the highest percentage (73.6%) who are in the High Score category, followed by Rajshahi division with the second-highest High Score (71.0%). However, the percentage of women in the High Score category is lower in Barisal (63.2%) and Sylhet (63.3%) divisions. The percentage of women in the High Score category is smaller in rural areas than in urban areas. For instance, in rural areas,

the highest percentage of women in the High Score category is in Dhaka division (61.8%), followed by Khulna (60.3%), Chittagong (58.7%), Rangpur (58.4%), Rajshahi (57.0%), Barisal (55.1%), and Sylhet (46.7%) divisions. Muslims have a negligibly lower percentage of women with a High Score (67.2% in urban and 57.4% in rural areas) than non-Muslims (68.8% and 57.2%, respectively). Altogether, 83% of urban women with an upper secondary education or more have a High Score, whereas only 53.9% of those with no education have a High Score. The corresponding figures in rural settings are 78.1% and 45.0%, respectively. A similar trend is found for the educational status of the women's spouses. Women with spouses who are employed form the highest percentage with a High Score (70.8% in urban and 61.4% in rural areas) and the scores are lowest for women with spouses in an agricultural profession (56.8% in urban and 53.9% in rural areas). The percentage of High Scores among women who have access to mass media is 69.0% in urban and 60.8% in rural areas. However, the score for women who have no mass media contact in urban areas (53.2%) is not too different from those in rural areas (51.0%). The percentage of contraceptive users who have a High Score on HIV/AIDS knowledge was greater in both rural and urban areas than the score of non-users of contraceptives. However, the difference

Tab. 3: Scores for knowledge and awareness of HIV/AIDS among ever-married urban and rural women by selected covariates, 2014

Covariates	Urban		Rural	
	Low Score	High Score	Low Score	High Score
<i>Current age</i>		(<0.0002)		(<0.0003)
15–24	33.2	66.8	40.8	59.2
25–34	30.0	70.0	41.3	58.7
35–44	33.6	66.4	45.5	54.5
45+	40.6	59.4	48.8	51.2
<i>Region of residence</i>		(<0.0001)		(<0.0001)
Barisal	36.8	63.2	44.9	55.1
Chittagong	33.5	66.5	41.3	58.7
Dhaka	33.5	66.5	38.2	61.8
Khulna	26.4	73.6	39.7	60.3
Rajshahi	29.0	71.0	43.0	57.0
Rangpur	35.0	65.0	41.6	58.4
Sylhet	36.7	63.3	53.3	46.7
Religion		(0.462)		(0.903)
Islam	32.8	67.2	42.6	57.4
Others	31.2	68.8	42.8	57.2
<i>Respondent's education</i>		(<0.0001)		(<0.0001)
Illiterate	46.1	53.9	55.0	45.0
Primary	41.2	58.8	49.5	50.5
Secondary	30.0	70.0	37.6	62.4
Higher secondary	17.0	83.0	21.9	78.1
<i>Access to mass media</i>		(<0.0001)		(<0.0001)
No access	46.8	53.2	49.0	51.0
Have access	31.0	69.0	39.2	60.8
<i>Respondent's working status</i>		(0.599)		(0.140)
Not working	32.5	67.5	43.1	56.9
Working	33.2	66.8	41.3	58.7
<i>Contraceptive use</i>		(0.095)		(0.001)
No	34.1	65.9	44.8	55.2
Yes	31.8	68.2	41.0	59.0
<i>Husband's education</i>		(<0.0001)		(<0.0001)
Illiterate	44.9	55.1	50.0	50.0
Primary	36.0	64.0	46.5	53.5
Secondary	33.3	66.7	39.6	60.4
Higher secondary	22.8	77.2	31.0	69.0
<i>Husband's occupation</i>		(<0.0001)		(<0.0001)
Agriculture	43.2	56.8	46.1	53.9
Business	32.5	67.5	41.4	58.6
Service	29.2	70.8	38.6	61.4
Others	33.9	66.1	42.9	57.1

Tab. 3: cont.

Covariates	Urban		Rural	
	Low Score	High Score	Low Score	High Score
<i>Wealth index</i>		(<0.0001)		(<0.0001)
Poorest	42.1	57.9	49.0	51.0
Poorer	41.5	58.5	48.3	51.7
Middle	42.1	57.9	42.2	57.8
Richer	34.3	65.7	37.5	62.5
Richest	27.6	72.4	35.5	64.5
<i>Sex of household head</i>		(0.970)		(0.381)
Male	32.7	67.3	42.8	57.2
Female	32.6	67.4	41.2	58.8

Note: Figures in the parentheses represent the *p*-values of the Chi-square test of independence.

Source: 2014 Bangladesh Demographic and Health Survey.

between the proportion of users and non-users among the High Score group is somewhat greater in rural (59.0% and 55.2%, respectively) than in urban (68.2% and 65.9%) areas. With respect to poor and middle-class women, the rich class subjects (wealthier women) are less likely to obtain a Low Score (27.6% in urban and 35.5% in rural areas), and vice-versa. Compared with men, women who are the head of their household get a slightly higher percentage of High Score, which are 67.4% in urban and 58.8% in rural areas.

Since the χ^2 test does not indicate any association between religion, the respondent's working status,

and the sex of the household heads on the one hand and knowledge about HIV on the other, these three covariates are not considered in the analysis of binary logistic regression. Table 4 presents the Odds Ratios (OR) of HIV/AIDS-related awareness with 95% confidence intervals for various categories of covariates (with respect to the reference category) among ever-married women in urban and rural areas. The OR designates that only women's education and access to mass media are independently associated with knowledge and awareness of HIV/AIDS. Age group, region of residence, contraceptive use, and husband's education are significant to some extent, and the other

Tab. 4: Odds ratios of HIV/AIDS knowledge and awareness among ever-married urban and rural women by covariates, 2014

Covariates	OR (95% CI)	
	Urban	Rural
<i>Current age (ref: 45–49)</i>		
15–24	1.202 (0.951, 1.521)	0.997 (0.813, 1.221)
25–34	1.403 (1.121, 1.757) ^b	1.078 (0.886, 1.312)
35–44	1.325 (1.055, 1.664) ^c	1.064 (0.869, 1.303)
<i>Division (ref: Sylhet)</i>		
Barisal	0.840 (0.646, 1.091)	1.385 (1.139, 1.683) ^a
Chittagong	1.055 (0.829, 1.343)	1.413 (1.176, 1.697) ^a
Dhaka	1.011 (0.806, 1.268)	1.735 (1.443, 2.085) ^a
Khulna	1.528 (1.185, 1.969) ^a	1.663 (1.385, 1.997) ^a
Rajshahi	1.277 (0.987, 1.654) ^d	1.381 (1.137, 1.677) ^a
Rangpur	0.951 (0.726, 1.245)	1.490 (1.226, 1.811) ^a

Tab. 4:		cont.
Covariates	OR (95% CI)	
	Urban	Rural
<i>Respondent's education (ref: illiterate)</i>		
Primary	1.118 (0.916, 1.366)	1.221 (1.044, 1.428) ^c
Secondary	1.648 (1.332, 2.040) ^a	1.836 (1.547, 2.179) ^a
Higher secondary	3.112 (2.301, 4.209) ^a	3.501 (2.624, 4.672) ^a
<i>Access to mass media (ref: no access)</i>		
Have access	1.410 (1.149, 1.731) ^a	1.171 (1.046, 1.310) ^b
<i>Contraceptive use (ref: no)</i>		
Yes	1.023 (0.901, 1.162)	1.153 (1.044, 1.273) ^b
<i>Husband's education (ref: illiterate)</i>		
Primary	1.205 (0.988, 1.468) ^d	0.982 (0.855, 1.128)
Secondary	1.154 (0.947, 1.407)	1.040 (0.896, 1.207)
Higher secondary	1.253 (0.975, 1.611) ^d	1.164 (0.949, 1.427)
<i>Husband's occupation (ref: agriculture)</i>		
Business	1.081 (0.880, 1.328)	0.995 (0.873, 1.134)
Service	1.133 (0.928, 1.382)	1.041 (0.913, 1.186)
Others	1.210 (0.953, 1.535)	1.059 (0.908, 1.235)
<i>Wealth index (ref: poorest)</i>		
Poorer	0.889 (0.621, 1.271)	0.918 (0.785, 1.074)
Middle	0.762 (0.556, 1.044) ^d	1.018 (0.866, 1.197)
Richer	0.982 (0.725, 1.329)	1.100 (0.919, 1.316)
Richest	1.014 (0.738, 1.392)	1.052 (0.849, 1.302)

Note: ref. is the reference category; values in the parentheses are 95% confidence intervals; level of significance: ^ap-value 0.001 or less, ^bp-value <0.01, ^cp-value <0.05, ^dp-value <0.10.

Source: 2014 Bangladesh Demographic and Health Survey.

two covariates (e.g. husband's occupation and wealth index) are not significant.

With respect to the reference category, younger women are more likely to obtain a High Score on their HIV-related knowledge and awareness if they live in an urban than in a rural area. For instance, urban women aged 25–34 have higher odds (OR=1.403, CI=1.121–1.757) of attaining a High Score than their rural counterparts (OR=1.078, CI=0.886–1.312). Based on the OR, regional differences in having a High Score are greater in rural than in urban areas. As expected, both urban and rural women with upper secondary education are more likely to obtain a High Score (OR=3.112, CI=2.301–4.209 and OR=3.501, CI=2.624–4.672, respectively) than those with a status of no education. The corresponding odds for women with a secondary education are also high (OR=1.648, CI=1.332–2.040 in urban and OR=1.836;

CI=1.547–2.179 in rural areas). Women who had contact with mass media were more likely to achieve a High Score than those who have no mass media contact. (Note that the OR is relatively higher in urban (OR=1.410, CI=1.149–1.731) than in rural (OR=1.171, CI=1.046–1.310) areas). Rural women who use contraceptives are more likely (OR=1.153, CI=1.044–1.273) to obtain a High Score than those who do not use contraceptives. A husband's education is not as influential a factor for attaining a High Score as women's education is.

DISCUSSION

This study investigates separately the level of knowledge and awareness about HIV/AIDS among married women in urban and rural Bangladesh. A large portion of women in both rural and urban

areas are found to have a High Score on HIV-related knowledge and awareness. However, for the overall population, as well as for all background characteristics, the percentage of women with a High Score is lower in rural than in urban areas. These findings are consistent with the previous BDHS reports in 2011 and 2007 (*NIPORT*, 2009, 2013) and with a previous study conducted by Rahman (2009). It should be noted that these findings are higher (in terms of HIV/AIDS knowledge) than that of the other two South Asian countries such as India and Pakistan (*Arnold et al.*, 2009; *NIPS and ICF International*, 2013). However, the percentage of women with a High Score is higher in Indonesia, the largest Muslim country compared to Bangladesh (*BPS et al.*, 2013). Among all regional divisions, the highest percentage of women, who have a High Score on HIV/AIDS knowledge is from Khulna division. Women from Khulna division were found to be more likely to use contraceptives and have more access to mass media (*BBS and UNICEF*, 2014). These are two important sources of knowledge about HIV/AIDS in Bangladesh. In rural settings, women from Dhaka division have the highest High Score on HIV/AIDS knowledge. The finding is logical since Dhaka is the capital of Bangladesh and people have more access to mass media where they can learn about HIV/AIDS. The smallest percentage of women with a High Score on HIV knowledge are from Sylhet division in both urban and rural areas. The reasons for this low score can be attributed to (i) the religious conservatism of the people of Sylhet Division, (ii) less contact with mass media (radio, television, and newspaper) and (iii) the substantially large number of tribal people living in Sylhet division, whose life and livelihood are relatively less privileged than that of non-tribal people.

The regional effects on women's knowledge about HIV/AIDS are statistically significant in rural areas only. The outcomes are partially consistent with the findings from a previous study (*Rahman*, 2009). This might be an indication of narrowing gaps across divisions in terms of education, health, economy, mass media exposure, etc., over time. The influence of women's age on their knowledge about HIV/AIDS is significant in urban areas. This can be explained by the fact that women in different age groups differ in lifestyle, health practice, adaptability, maturity,

affability, sexual behaviours, etc. (*Sheikh et al.*, 2017). Women who marry young are more vulnerable to HIV infection as they have limited access to information on sex-related issues and have little knowledge about HIV/AIDS because of their immaturity (*Khan*, 2002). The findings from the current study are consistent with a study conducted elsewhere (*Rahman*, 2009). The study shows that women between the ages of 25 and 34 are significantly more like to have knowledge about HIV than are women aged 45 and above. Indeed, older women do not absorb information as well or as quickly as young women, which decreases their chances of gaining knowledge about HIV/AIDS (*Sheikh et al.*, 2017).

Education plays a pivotal role in determining the social status of a person as it increases the chances of getting a good job and provides access to information (*Rahman – Rahman*, 2007). In the literature (*Mwamwenda*, 2014), education is referred to as an alternate vaccine for AIDS. This study found that HIV/AIDS knowledge has a strongly positive association with increasing levels of education, especially female education, in both rural and urban areas. Earlier studies have revealed similar findings (*Rahman*, 2009; *Rahman et al.*, 2008). The use of contraceptives during sex has several benefits, such as birth control, protection from HIV/AIDS and sexually transmitted diseases, and overall health protection (*Khan*, 2002; *Sheikh et al.*, 2017). This study reports that rural women who used contraceptives during sex are more likely to score as knowledgeable about HIV/AIDS as non-users of contraceptives. Of urban women, contraceptive uses are insignificantly higher, which is likely attributed to have higher knowledge about HIV/AIDS than non-contraceptive users. This may be because, along with contraceptive use, urban women have many options for obtaining knowledge about HIV/AIDS.

Mass media resources such as radio, television, and newspaper are found to be extremely effective at increasing the level of knowledge and awareness about HIV/AIDS. Indeed, mass media delivers important messages in the form of news reports, dramas, music, movies, advertisements, etc. (*Sheikh et al.*, 2017). This study shows that women in both urban and rural areas who have easy access to mass media have a higher likelihood of obtaining a High

Score on knowledge about HIV/AIDS. The husband's occupation and the wealth index have no influential impact on women's knowledge score on HIV/AIDS. However, spouses of women who have a profession and a wealthy family status were more likely to have a High Score on HIV/AIDS knowledge than those who have agricultural jobs and poor family status, respectively.

Religion, women's working status, and the sex of the household head were also found to have no significant effect on the knowledge score on HIV/AIDS. However, Yaya et al. (2016), and Haque et al. (2018) report that the sex of the household head and women's working status are found to be significantly associated with HIV knowledge. Firstly, both these studies analysed the data together rather than making a separate analysis for rural and urban Bangladesh. Secondly, an improvement in women's empowerment has been observed in Bangladesh in recent years, which means that women have been in the position of making decisions about their family affairs, which they could not do before. In terms of women's working status, working women may have more opportunities to become knowledgeable about HIV/AIDS through discussions with their co-workers (Sheikh et al., 2017) and others than women who are not working do. Conversely, a substantial portion of non-working women are well educated and belong to a rich family, which puts them in advantageous position when it comes to acquiring knowledge about HIV/AIDS.

Urban women are in every respect more likely to have knowledge about HIV/AIDS than women living in rural areas. Although the Global Food Policy Report-2019 has highlighted Bangladesh as a leading South Asian country in terms of improving rural development and food and nutrition security (Daily Sun, 2019), rural women are still vulnerable to HIV infection because of their low level of knowledge about HIV/AIDS (Asaduzzaman et al., 2016). Conversely, urban women often enjoy better living conditions that provide them easy access to mass media, health information, health-care facilities, etc., and this consequently reduces the likelihood of their contracting an HIV infection (Sheikh et al., 2017). Though urban women have a high level of HIV/AIDS knowledge over time, rural women have also shown a significant improvement in their level of knowledge about HIV/AIDS compared to urban women. Finally,

the study's findings may be help policy-makers in developing a policy guideline for educating urban and rural women to be knowledgeable and aware about HIV/AIDS in Bangladesh.

STRENGTHS AND LIMITATIONS

This is the first attempt to separately study knowledge and awareness of HIV/AIDS among ever-married women in rural and urban Bangladesh based on the most recent BDHS data. As the BDHS is a nationally representative sample, the findings of this study present a general picture of women's HIV/AIDS knowledge in rural and urban Bangladesh. This study considers a wide range of covariates that influence knowledge and awareness of HIV/AIDS. In addition, a very popular multivariate technique (e.g. logistic regression) was employed to examine the impact of covariates on HIV/AIDS knowledge. This study nevertheless has some limitations. It had no control over the data quality, measurement indicators, and the selection of variables, as it used secondary data. For instance, there was no information on the knowledge status of the husbands in the BDHS data; a husband's knowledge status may, however, influence the knowledge status of a couple. Moreover, because HIV/AIDS incidence data were unavailable, this study was unable to build on the findings about the HIV incidence rate in relation to HIV knowledge.

CONCLUSION

This study focuses on the trends and determinants of knowledge and awareness about HIV/AIDS among ever-married women from both urban and rural areas in Bangladesh. As a combined effect, age, region of residence, a woman's and a husband's education, and mass media are found to have an effect on HIV/AIDS knowledge. However, female education and mass media require special attention as they are found to have a strong effect in both urban and rural settings. Thus, an initiative should be taken to educate the mass population by providing them with a higher level of education, as highly educated women have a better chance to obtaining knowledge about and becoming aware of HIV/AIDS. Mass media (television, newspaper, and radio) should be regularly used

to raise public awareness through specially designed programmes on the HIV/AIDS pandemic. Moreover, the local government of Bangladesh should take initiatives to campaign in places like schools, mosques, temples, churches, and workplaces on a regular basis

to raise awareness about HIV/AIDS. Finally, a strong social movement throughout the country, especially in rural areas of Bangladesh, against spreading HIV/AIDS risk factors may help people to protect people against this pandemic.

References

- Aliyu, G. et al. (2010). HIV infection awareness and willingness to participate in future HIV vaccine trials across different risk groups in Abuja, Nigeria. *AIDS Care* 22(10):1277–1284.
- Appiah-Agyekum, N. N. – R. H. Suapim, (2013). Knowledge and awareness of HIV/AIDS among high school girls in Ghana. *HIV/AIDS (Auckland, NZ)* 5:137–144.
- Arnold, F. – Parasuraman, S. – Arokiasamy, P. – Kothari, M. (2009). National Family Health Survey (NFHS-3) India 2005–06.
- Asaduzzaman, M. et al. (2016). Awareness and knowledge of HIV/AIDS among married women in rural Bangladesh and exposure to media: A secondary data analysis of the 2011 Bangladesh Demographic and Health Survey. *Nagoya J Med Sci.* 78(1):109.
- BBS and UNICEF. (2014). Bangladesh Multiple Indicator Cluster Survey 2012–2013, ProgotirPathey: Final report. Bangladesh Bureau of Statistics (BBS) and UNICEF Bangladesh, Dhaka, Bangladesh. https://www.unicef.org/bangladesh/MICS_Final_21062015_Low.pdf.
- Daily Sun (2019). Global Food Policy Report: Bangladesh improving in rural development, food security. <https://www.daily-sun.com/printversion/details/386184/2019/04/19/Bangladesh-improving-in-rural-development-food-security>
- Garai, J. (2016). Gender and HIV/AIDS in Bangladesh: A review. *J Health Soc Sci.*1(3):181–198.
- Haque, M. A. – Hossain, M. S. N. – Chowdhury, M. A. B. – Uddin, M. J. (2018). Factors associated with knowledge and awareness of HIV/AIDS among married women in Bangladesh: Evidence from a nationally representative survey. *Journal of Social Aspects of HIV/AIDS* 15(1):121–127.
- Islam, M. M. – Conigrave, K. M. (2008). HIV and sexual risk behaviors among recognized high-risk groups in Bangladesh: need for a comprehensive prevention program. *Int J Infect Dis.* 12(4):363–370.
- Khan, M. A. (2002). Knowledge on aids among female adolescents in Bangladesh: Evidence from the Bangladesh demographic and health survey data. *J Health Popul Nutr.* 20(2):130–137.
- Mwamwenda, T. S. (2014). Education level and human immunodeficiency virus (HIV)/acquired immune deficiency syndrome (AIDS) knowledge in Kenya. *J AIDS HIV Res* 6(2):28–32.
- Mitra, S. N. et al. (1997). *Bangladesh Demographic and Health Survey, 1996–1997*. Dhaka, Bangladesh, and Calverton, Maryland, USA: National Institute of Population Research and Training (NIPORT), Mitra and Associates, and Macro International Inc.
- Nahar, Q. et al. (2009). 20 years of HIV in Bangladesh: Experiences and way forward. Technical report. <http://citeweb.in-fo/20090546364>.
- National Institute of Population Research and Training (NIPORT), Mitra and Associates, and ORC Macro. 2001. *Bangladesh Demographic and Health Survey 1999–2000*. Dhaka, Bangladesh, and Calverton, Maryland: NIPORT, Mitra and Associates, and ORC Macro.
- National Institute of Population Research and Training (NIPORT), Mitra and Associates, and ORC Macro. 2005. *Bangladesh Demographic and Health Survey 2004*. Dhaka, Bangladesh, and Calverton, Maryland: NIPORT, Mitra and Associates, and ORC Macro.
- National Institute of Population Research and Training (NIPORT), Mitra and Associates, and Macro International. (2009). *Bangladesh Demographic and Health survey 2007*. Dhaka, Bangladesh and Calverton, Maryland, USA: NIPORT, Mitra and Associates, and Macro International.
- National Institute of Population Research and Training (NIPORT), Mitra and Associates, and IFC International. (2013). *Bangladesh Demographic and Health Survey 2011*. Dhaka, Bangladesh and Calverton, Maryland, USA: NIPORT, Mitra and Associates, and IFC International.
- National Institute of Population Research and Training (NIPORT), Mitra and Associates, and IFC International. (2016). *Bangladesh Demographic and Health Survey 2014*. Dhaka, Bangladesh Rockville, Maryland, USA: NIPORT, Mitra and Associates, and IFC International.
- Rahman, M. (2009). Determinants of knowledge and awareness about AIDS: Urban-rural differentials in Bangladesh. *Journal of Public Health and Epidemiology* 1(1):14–21.

- Rahman, M. M. – Kabir, M. – Shahidullah, M. (2009). Adolescent knowledge and awareness about AIDS/HIV and factors affecting them in Bangladesh. *Journal of Ayub Medical College, Abbottabad* 21(3):3–6.
- Rahman, M. S. – Rahman, M. L. (2007). Media and education play a tremendous role in mounting AIDS awareness among married couples in Bangladesh. *AIDS Res Therapy* 4(1):10.
- Rahman, M. – Islam, A. – Islam, M. (2008). Determinants of knowledge and awareness about AIDS: Urban-rural differentials in Bangladesh. *The Internet Journal of Health* 9(2):1–8.
- Sarkar, K. et al. (2006). Epidemic of HIV coupled with hepatitis C virus among injecting drug users of Himalayan West Bengal, Eastern India, bordering Nepal, Bhutan, and Bangladesh. *Substance Use & Misuse* 41(3):341–352.
- Sheikh, M. T. –Uddin, M. N. –Khan, J. R. (2017). A comprehensive analysis of trends and determinants of HIV/AIDS knowledge among the Bangladeshi women based on Bangladesh Demographic and Health Surveys, 2007–2014. *Archives of Public Health* 75, article number 59.
- Statistics Indonesia (BPS), National Population and Family Planning Board (BKKBN), Ministry of Health (MoH) and ICF International. (2013). *Indonesia Demographic and Health Survey 2012*. Jakarta, Indonesia: BPS, BKKBN, Kemenkes, and ICF International.
- Talwar, P. – Rahman, M. F. B. A. (2015). Assessment of HIV knowledge among university students using the HIV-KQ-18 scale: A cross-sectional study. *South East Asia Journal of Public Health* 5(1):33–38.
- UNAIDS. (2019a). Documents: Fact sheet - Latest global and regional statistics on the status of the AIDS epidemic. Retrieved from https://www.unaids.org/en/resources/documents/2019/UNAIDS_FactSheet.
- UNAIDS. (2019b). Asia and Pacific. Retrieved from <http://www.unaids.org/en/regionscountries/asiaandpacific>.
- UNAIDS. (2019c). UNAIDS-Bangladesh. Retrieved from <http://www.unaids.org/en/regionscountries/countries/bangladesh>.
- UNAIDS. (2019d). UNAIDS-India. Retrieved from <https://www.unaids.org/en/regionscountries/countries/india>.
- Van Huy, N. et al. (2016). Secular trends in HIV knowledge and attitudes among Vietnamese women based on the multiple indicator cluster surveys, 2000, 2006, and 2011: what do we know and what should we do to protect them? *Glob Health Action* 9:29247.
- Varni, S. E. – Miller, C. T. – Solomon, S. E. (2012). Sexual behavior as a function of stigma and coping with stigma among people with HIV/AIDS in rural new England. *AIDS Behav* 16(8):2330–2339.
- Yaya, S. et al. (2016). Trends and determinants of HIV/AIDS knowledge among women in Bangladesh. *BMC Public Health* 16, article number 812.