**Introduction:**

**Results:**

Table 1 shows the comparison of correct response rate over a thirteen-year period (2006 to 2019). Percentage of correct response to the questions about HIV related awareness have fallen all over the time period for most of the questions except the questions about using of condom every time which shows a drop down in 2012 against 2006 (65.89% to 52.31%) but shows a risen loop in 2019 against 2012 (52.31% to 62.42%) and table 1 shows interesting changes in the percentage of people who know HIV transmission is not possible by sharing food. The overall status of the percentage of knowing that HIV can not be transmitted by food is 49.43% according to 2006 MICS survey whereas it is increased 52.14% in 2012 MICS survey and this percentage increased incredibly in 2019 showing 82.46%.

Table 2 represents the status of respondents affecting the levels of HIV knowledge categorized by their socio-demographic characteristics by using chi square test showing the p-values. Score status shows a significant difference (high or low) for different categories of age group, residence type, educational attainment, religion, mass media accessibility, household’s education level and wealth index. Overall, 75.22% respondents categorized by wealth index scored ‘high score’ in 2012 MICS survey against 2006 MICS survey (63.59%) though it shows a decreasing rate in 2019 (66.38%). On the other hand, in 2012 MICS survey, 24.78% respondents scored ‘low score’ against 2006 MICS survey (36.41%) and 33.62% respondents scored ‘low score’ in 2019 MICS survey. Access of mass media shows the HIV awareness status as 60.32% respondents scored high score in 2019 against 2012 MICS survey (70.10%) and the rest 39.68% scored low score regarding HIV awareness in 2019 against 2012 MICS survey (29.90%). Similarly, over thirteen-year time period, household’s education level shows a significant change in score of HIV awareness. In 2019 MICS survey, 71.75% respondents having non-standard curriculum scored ‘high score’ which was 54.24% in 2006 MICS survey. On the contrary, 28.25% scored low score in 2012 which was 45.76% regarding HIV awareness in 2006 MICS survey. Interesting part is that 63.42% respondents living in rural area scored high score in 2019 compared to urban people’s scoring status (56.93%) of 2019 MICS survey. High scoring status of rural area were 51.96% and 72.05% according to 2006 and 2012 MICS survey. On the other hand, High scoring status of the respondents of urban area were 60.19% and 61.95% according to 2006 and 2012 MICS survey. Awareness score among the young people is higher than the other age groups people. Percentages of high score in 15-24 age group are 55.84%, 66.29% and 60.16% according to 2006, 2012 and 2019 MICS survey, respectively. Also, an increasing rate of high score is clearly understood in the age group 45 and above from 2006 to 2019 which are 48.17%, 58.58% respectively in 2006 and 2012. Though it started decreasing in 2019 (52.13%). In Sylhet division, following 2019 MICS survey, 76.56% respondents scored high score regarding HIV knowledge whereas in 2006 and 2012 MICS, these were 50.65% and 53.09% respectively. However, subjects from Dhaka division made the lowest percentage (54.63%) of high score in 2019, which were previously 68.54% and 54.14% in 2012 and 2006 MICS.

**Factors associated with the HIV/AIDS knowledge and awareness score of married women, MICS 2006, MICS 2012, MICS 2019:**

Table 3 portrays the outcome of binary logistic regression analysis of HIV/AIDS related awareness, counting 95% CI for odds ratio.

In brief, respondents aged 25-34 years tends to get the ‘high score’ 1.11 (95% CI: 1.04- 1.19) in 2019 which is comparatively 0.09 times smaller than 2012 MICS’s high score 1.20 (95% CI: 1.09-1.32) and 0.05 times greater than 2006 MICS which is clearly higher than the respondents aged ≥45 years old. According to MICS 2019, according to HIV awareness, married women from Sylhet division tends to get ‘high score’ 2.42 ((95% CI: 2.08-2.83) which is 1.91 times higher than 2012 MICS (OR=0.51. 95% CI: 0.42-0.61) and 1.59 times higher than 2006 MICS (OR=0.83, 95% CI: 0.71-0.98), respectively. As expected, respondents from urban area (OR=1.13, 95% CI: 1.04-1.22) shows a higher score compare to rural area in 2019 MICS which is 0.01 times smaller than 2012 MICS (OR=1.14, 95% CI: 1.01-1.29) and 0.03 times smaller than 2006 MICS (OR=1.16, 95% CI: 1.06-1.26), respectively. Respondents who have mass media access tends to achieve higher score 1.13 (95% CI: 1.05-1.21) in 2019 MICS which is 0.23 times smaller than 2012 MICS (OR=1.36, 95% CI: 1.24-1.48). On the other hand, Household’s having non-standard curriculum make to achieve high score 1.21 (95% CI: 1.08-1.35) in 2019 MICS which is 0.03 times greater than 2006 MICS (OR=1.18, 95% CI: 0.70-2.00). Similarly, respondents having highest education level get to achieve high score 4.03 (95% CI: 3.50-4.64) in 2019 MICS which is 1.27 times smaller than 2012 MICS (OR=5.30, 95% CI: 4.41-6.37) and 1.44 times greater than 2006 MICS (OR=2.59, 95% CI: 2.28-2.93). As expected, richest respondents made to get the high score 1.21 (95% CI: 1.06-1.37) in 2019 MICS which is 0.05 times smaller than 2012 MICS (OR=1.26, 95% CI: 1.04-1.52) and 0.11 times smaller than the 2006 MICS (OR=1.32, 95% CI: 1.16-1.49).

**Outcome:**

Respondents who have ever heard of AIDS were asked 9 questions in 2012 and 2019 MICS survey and 10 questions were asked in 2006 MICS survey where for each of the question, 1 was assigned for the correct answer and 0 was coded for the ‘wrong’ or ‘don’t know’ one. No deductions were done for any incorrect answer. Based on the summation of the scores, knowledge score was prepared which was used the outcome variable. In 2006 MICS survey, median was taken as 8 whereas medians were taken as 5 and 6 for 2012 and 2019 MICS survey and categorized the scores as high or low.

**Covariates:**

A set of covariates such as ten years age group, residency type, respondent’s education, religion, wealth index, household’ education level, access to mass media and religion were used for this study. Two back-to-back 5 years age groups were merged to generate the 10 years age group variable. Access to mass media variable was generated by respondent’s condition to reach to at least one of three mediums television, newspaper or radio.

**Statistical analysis:**

To generate the association between score categories and socio-demographic characteristics of respondents at the individual level, Binary logistic regression (Chi square test) was conducted counting two dependent variables in the regression model. Variables with a probability of its score statistic less than 0.05 were included in the model.

**Discussion:**

Though the prevalence of HIV in Bangladesh is still low, but the determinants used in this study need to be enumerated to barrage HIV. This study identified some socio-demographic and background determinants of HIV awareness such as age, residence type, level of education, wealth index, and so on.

Findings of our study showed people of age group 15-24 years tend of having high HIV awareness compared to the people of other age groups, reflecting similarities with previous study (Sheikh et al. Archives of Public Health-2017). Since people of this age group generally get in touch with social platform and other ways of mass media, which support them to increase the HIV awareness among them. Level of education was also an important influencing factor among the determinants since this study revealed people of having secondary completed or higher education tend to have more HIV awareness than other, which is consistent with other previous studies (Rahman & Rahman, 2007; Sultana, 2009; Yaya et al., 2016).

Our study also disclosed that married women who have access to mass media were likely to have higher knowledge about HIV awareness. Earlier publications showed the similar result about the influence of mass media accessibility regarding HIV awareness among the married women (Md Tariqujjaman; 2020, Rahman & Rahman; 2007). Similarly richest respondents showed having comparatively higher knowledge regarding HIV than the other categories of wealth indexed people. Because the people of this category have easy access to mass media and tend of having higher education which help them to know more about HIV awareness. Previous publication also shoed same result for this category of people (MD A. Haque ET AL, Md Tariqujjaman; 2020).

We also noticed variations in awareness levels regarding HIV observed among the different people in different administrative divisions in Bangladesh. People living in Sylhet districts had higher HIV awareness in 2019 MICS compared to other division. This clearly indicates the unequal coverage of awareness building programs regarding HIV, so implementation of such programs in all divisions need to be prioritized. However, in an earlier study, people of Barisal division were found to be more aware regarding HIV awareness (Md Tariqujjaman; 2020).

**Conclusion:**

This study revealed the levels of awareness regarding among the married women both from rural and urban area of Bangladesh associated with some influencing factors of HIV awareness such as mass media, levels of education, wealth index, type of living place, age groups and divisions. Although a number of married women were found to be acknowledged regarding HIV awareness, more initiatives should be taken to implement HIV awareness related programs in all divisions and for all age groups people. Government, Non-governmental organizations, program organizers and policy makers should work together to implement the awareness raising strategies and facilitate more educational interventions among the married women. Moreover, awareness raising programs can be arranged in various places like schools, Mosques/Temples/ Churches and different workplaces on regular basis. Thus, a strategic plan and proper implementation should be implied to mitigate the looming threat of an HIV/AIDS epidemic.

**Table 1: Comparison of correct response rate between three consecutive MICS survey.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Questions about HIV related awareness | Correct response | | | | | |
|  | 2006 | | 2012 | | 2019 | |
|  | Yes  N (%) | No  (%) | Yes  N (%) | No  (%) | Yes  N (%) | No  (%) |
| **Percentage who know transmission can be prevented by:** |  |  |  |  |  |  |
| Having only one faithful uninfected sex partner | 25340 (75.34) | 8503 (24.66) | 11640 (58.13) | 9087 (41.87) | 9783 (32.61) | 19941 (67.39) |
| Using a condom every time | 22226 (65.89) | 11617 (34.11) | 10617 (52.31) | 10110 (47.69) | 18277 (62.42) | 11447 (37.58) |
| A healthy-looking person can be infected | 25850 (75.85) | 7993 (24.15) | 11668 (56.15) | 9059 (43.85) | 17212 (58.30) | 12512 (41.70) |
| **Percentage who know that HIV cannot be transmitted by:** |  |  |  |  |  |  |
| HIV cannot be transmitted by sharing food | 16926 (49.43) | 16917 (50.57) | 10409 (52.14) | 10318 (47.86) | 24258 (82.46) | 5466 (17.54) |
| HIV cannot be transmitted by mosquito bites | 14667 (43.60) | 19176 (56.40) | 8638 (42.99) | 12091 (57.01) | 13609 (53.02) | 16115 (46.98) |
| HIV cannot be transmitted by supernatural means | 24223 (71.97) | 9620 (28.03) | 14440 (70.80) | 6287 (29.20) | 14903 (50.84) | 14821 (49.16) |
| HIV can be transmitted by sharing needles | 30994 (91.50) | 2849 (8.50) | - | - |  |  |
| **Percentage of women who know HIV can be transmitted from mother to child:** |  |  |  |  |  |  |
| HIV transmitted during pregnancy | 30373 (89.71) | 3470 (10.29) | 15078 (71.92) | 5649 (28.08) | 21827 (72.57) | 7897 (27.43) |
| HIV transmitted during delivery | 26055 (76.73) | 7788 (23.27) | 9546 (42.26) | 11181 (57.74) | 17298 (43.05) | 12426 (56.95) |
| HIV transmitted through breast milk | 30182 (89.04) | 3661 (10.96) | 14100 (65.83) | 6627 (34.17) | 22344 (75.11) | 7380 (24.89) |

**Table 2. HIV/AIDS knowledge and awareness score status at different levels of covariates.**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Covariates | MICS 2006 | | | MICS 2012 | | | MICS 2019 | | |
|  | Low Score  N (%) | High Score  N (%) | P-value | Low Score  N (%) | High Score  N (%) | P-value | Low Score  N (%) | High Score  N (%) | P-value |
| **Total** | 15160 (44.80) | 18683 (55.20) | - | 7277 (35.07) | 13450 (64.93) |  | 12113 (41.31) | 17611 (58.69) |  |
| **Ten years age group** |  |  |  |  |  |  |  |  |  |
| 15–24 | 5218 (44.16) | 6540 (55.84) | 0.000 | 2027 (33.71) | 4131 (66.29) | 0.000 | 3148 (39.84) | 4971 (60.16) | 0.000 |
| 25–34 | 5225 (43.60) | 6831 (56.40) |  | 2882 (32.62) | 5694 (67.38) |  | 4775 (40.01) | 7352 (59.99) |  |
| 35–44 | 3545 (45.75) | 4209 (54.25) |  | 1836 (39.60) | 2896 (60.40) |  | 3220 (43.26) | 4276 (56.74) |  |
| 45 and above | 1172 (51.83) | 1103 (48.17) |  | 532 (41.42) | 729 (58.58) |  | 970 (47.87) | 1012 (52.13) |  |
| **Division** |  |  |  |  |  |  |  |  |  |
| Barisal | 1517 (44.88) | 1825 (55.12) | 0.000 | 597 (31.88) | 1276 (68.12) | 0.000 | 849 (37.85) | 1223 (62.15) | 0.000 |
| Chittagong | 2451 (42.45) | 3440 (57.55) |  | 1263 (40.73) | 1913 (59.27) |  | 1935 (42.36) | 2931 (57.64) |  |
| Dhaka | 4547 (45.85) | 5224 (54.15) |  | 1715 (31.46) | 3543 (68.54) |  | 2904 (45.37) | 3376 (54.63) |  |
| Khulna | 2379 (39.43) | 3621 (60.57) |  | 1789 (38.55) | 3209 (61.45) |  | 2413 (41.53) | 3476 (58.47) |  |
| Mymenshing | - | - |  | - | - |  | 615 (40.01) | 926 (59.99) |  |
| Rajshahi | 3315 (47.70) | 3565 (52.30) |  | 868 (33.37) | 1660 (66.63) |  | 1804 (46.55) | 1987 (53.45) |  |
| Rangpur | - | - |  | 553 (28.20) | 1317 (71.8) |  | 1045 (35.25) | 2131 (64.75) |  |
| Sylhet | 951 (49.35) | 1008 (50.65) |  | 492 (46.91) | 532 (53.09) |  | 548 (23.44) | 1561 (76.56) |  |
| **Type of place of residence** |  |  |  |  |  |  |  |  |  |
| Rural | 9360 (48.04) | 10120 (51.96) | 0.000 | 1335 (27.95) | 3321 (72.05) | 0.000 | 2587 (36.58) | 4586 (63.42) | 0.000 |
| Urban | 5513 (39.81) | 8109 (60.19) |  | 5942 (38.05) | 10129 (61.95) |  | 9526 (43.07) | 13025 (56.93) |  |
| Tribial | 287 (45.75) | 454 (54.25) |  | - | - |  | - | - |  |
| **Highest educational level** |  |  |  |  |  |  |  |  |  |
| No education | 4208 (57.36) | 3167 (42.64) | 0.000 | 1358 (55.74) | 1169 (44.26) | 0.000 | 1236 (57.52) | 904 (42.48) | 0.000 |
| Primary incomplete | 2496 (51.73) | 2330 (48.27) |  | 1163 (52.39) | 1169 (47.61) |  | - | - |  |
| Primary complete | 2272 (47.50) | 2520 (52.50) |  | 1198 (44.92) | 1464 (55.08) |  | 2911 (54.19) | 2524 (45.81) |  |
| Secondary incomplete | 4507 (40.08) | 6710 (59.92) |  | 2853 (32.54) | 5977 (67.46) |  | 6515 (42.36) | 9300 (57.64) |  |
| Secondary completed or Higher | 1637 (29.71) | 3929 (70.29) |  | 705 (15.93) | 3671 (84.07) |  | 1451 (22.87) | 4883 (77.13) |  |
| Non-standard curriculum | 39 (62.95) | 26 (37.05) |  | - | - |  | - | - |  |
| **Religion** |  |  |  |  |  |  |  |  |  |
| Islam | 13264 (45.22) | 15939 (54.78) | 0.003 | 6450 (35.35) | 11836 (64.75) | 0.322 | 10939 (41.61) | 15617 (58.39) | 0.0229 |
| Others | 1896 (41.64) | 2743 (58.36) |  | 827 (33.62) | 1614 (66.38) |  | 1174 (38.36) | 1994 (61.64) |  |
| **Accessibility to mass media** |  |  |  |  |  |  |  |  |  |
| Do not have mass media access | - | - | - | 3842 (45.25) | 9055 (54.75) | 0.000 | 3890 (45.90) | 4648 (54.10) | 0.000 |
| Have mass media access | - | - |  | 3435 (29.90) | 4395 (70.10) |  | 8223 (39.68) | 12963 (60.32) |  |
| **Househols’s education level** |  |  |  |  |  |  |  |  |  |
| No education | 5463 (52.12) | 5033 (47.88) | 0.000 | 2450 (35.45) | 4423 (64.55) | 0.682 | 3293 (48.37) | 3638 (51.63) | 0.000 |
| Primary | 3756 (47.56) | 4177 (52.44) |  | 1786 (34.41) | 3429 (65.59) |  | 3544 (46.03) | 4306 (53.97) |  |
| Secondary or Higher | 5856 (38.42) | 9383 (61.58) |  | 2640 (35.05) | 4909 (64.95) |  | 3779 (40.23) | 5790 (59.77) |  |
| Non-standard curriculum | 36 (45.76) | 47 (54.24) |  | - | - |  | 1492 (28.25) | 3873 (71.75) |  |
| **Wealth Index** |  |  |  |  |  |  |  |  |  |
| Poorest | 1910 (55.46) | 1470 (44.54) | 0.000 | 1185 (48.47) | 1263 (51.53) | 0.000 | 1828 (49.47) | 1923 (50.53) | 0.000 |
| Poorer | 2547 (52.83) | 2332 (47.17) |  | 1363 (42.89) | 1930 (57.11) |  | 2431 (48.35) | 2673 (51.65) |  |
| Middle | 3240 (48.82) | 3497 (51.18) |  | 1660 (41.09) | 2581 (58.91) |  | 2733 (43.96) | 3666 (56.04) |  |
| Richer | 3830 (43.39) | 5065 (56.61) |  | 1691 (34.73) | 3471 (65.27) |  | 2787 (40.03) | 4468 (66.38) |  |
| Richest | 3633 (36.41) | 6319 (63.59) |  | 1378 (24.78) | 4205 (75.22) |  | 2334 (33.62) | 4881 (66.38) |  |

**Table 3. Factors associated with the HIV/AIDS knowledge and awareness score of married women, MICS 2006, MICS 2012 and 2019.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Covariates | MICS 2006 | | MICS 2012 |  | MICS 2019 |  |
|  | **OR (95% CI)** | P-value | **OR (95% CI)** | P-value | **OR (95% CI)** | P-value |
| **Ten years age group** |  |  |  |  |  |  |
| 15–24 | 1 |  | 1 |  | 1 |  |
| 25–34 | 1.06 (0.99-1.13) | 0.081 | 1.20 (1.09-1.32) | 0.000 | 1.11 (1.04-1.19) | 0.003 |
| 35–44 | 1.02 (0.95-1.10) | 0.588 | 1.03 (0.92-1.17) | 0.810 | 1.06 (0.98-1.15) | 0.138 |
| 45 and above | 0.81 (0.72-0.91) | 0.001 | 0.96 (0.80-1.16) | 0.756 | 0.94 (0.84-1.07) | 0.399 |
| **Division** |  |  |  |  |  |  |
| Barisal | 1 |  | 1 |  | 1 |  |
| Chittagong | 1.03 (0.89-1.19) | 0.692 | 0.61 (0.51-0.72) | 0.000 | 0.78 (0.69-0.89) | 0.000 |
| Dhaka | 0.97 (0.84-1.11) | 0.644 | 0.89 (0.77-1.04) | 0.141 | 0.67 (0.59-0.76) | 0.000 |
| Khulna | 1.31 (1.14-1.49) | 0.000 | 0.84 (0.73-0.97) | 0.033 | 0.87 (0.77-0.98) | 0.025 |
| Mymenshing | - | - | - | - | 1.01 (0.86-1.18) | 0.947 |
| Rajshahi | 0.91 (0.79-1.04) | 0.178 | 0.94 (0.81-1.11) | 0.531 | 0.71 (0.63-0.81) | 0.000 |
| Rangpur |  |  | 1.14 (0.96-1.36) | 0.196 | 1.17 (1.02-1.34) | 0.000 |
| Sylhet | 0.83 (0.71-0.98) | 0.024 | 0.51 (0.42-0.61) | 0.000 | 2.42 (2.08-2.83) | 0.022 |
| **Type of place of residence** |  |  |  |  |  |  |
| Rural | 1 |  | 1 |  | 1 |  |
| Urban | 1.16 (1.06-1.26) | 0.001 | 1.14 (1.01-1.29) | 0.058 | 1.13 (1.04-1.22) | 0.003 |
| Tribial | 1.02 (0.76-1.37) | 0.901 | - | - | - | - |
| **Highest educational level** |  |  |  |  |  |  |
| No education | 1 |  | 1 |  | 1 |  |
| Primary incomplete | 1.21 (1.10-1.33) | 0.001 | 1.12 (0.97-1.29) | 0.084 | - | - |
| Primary complete | 1.42 (1.30-1.55) | 0.001 | 1.48 (1.28-1.71) | 0.000 | 1.12 (0.99-1.26) | 0.059 |
| Secondary incomplete | 1.84 (1.68-2.00) | 0.001 | 2.44 (2.13-2.79) | 0.000 | 1.77 (1.58-1.99) | 0.000 |
| Secondary completed or Higher | 2.59 (2.28-2.93) | 0.001 | 5.30 (4.41-6.37) | 0.000 | 4.03 (3.50-4.64) | 0.000 |
| Non-standard curriculum | 0.81 (0.47-1.41) | 0.458 | - | - | - | - |
| **Religion** |  |  |  |  |  |  |
| Islam | 1 |  | 1 |  | 1 |  |
| Others | 1.07 (0.97-1.18) | 0.199 | 1.02 (0.90-1.18) | 0.743 | 1.01 (0.89-1.13) | 0.904 |
| **Accessibility to mass media** |  |  |  |  |  |  |
| Do not have mass media access | - | - | 1 |  | 1 |  |
| Have mass media access | - | - | 1.36 (1.24-1.48) | 0.000 | 1.13 (1.05-1.21) | 0.001 |
| **Househols’s Head education level** |  |  |  |  |  |  |
| No education | 1 |  | 1 |  | 1 |  |
| Primary | 1.02 (0.95-1.10) | 0.595 | 1.04 (0.94-1.16) | 0.421 | 1.01 (0.93-1.09) | 0.889 |
| Secondary or Higher | 1.06 (0.98-1.14) | 0.156 | 1.03 (0.94-1.14) | 0.516 | 1.08 (0.99-1.17) | 0.071 |
| Non-standard curriculum | 1.18 (0.70-2.00) | 0.526 | - |  | 1.21 (1.08-1.35) | 0.001 |
| **Wealth Index** |  |  |  |  |  |  |
| Poorest | 1 |  | 1 |  | 1 |  |
| Poorer | 1.01 (0.92-1.12) | 0.793 | 1.07 (0.94-1.22) | 0.295 | 1.01 (0.91-1.12) | 0.902 |
| Middle | 1.12 (1.01-1.24) | 0.038 | 1.01 (0.87-1.15) | 0.949 | 1.10 (0.99-1.22) | 0.086 |
| Richer | 1.26 (1.14-1.40) | 0.000 | 1.13 (0.97-1.31) | 0.112 | 1.19 (1.06-1.32) | 0.002 |
| Richest | 1.32 (1.16-1.49) | 0.000 | 1.26 (1.04-1.52) | 0.018 | 1.21 (1.06-1.37) | 0.004 |