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Impact of socio-demographic factors on knowledge of cervical cancer among women in rural Bangladesh: A cross-sectional study

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Abstract

Introduction: Cervical cancer poses a significant public health challenge globally, particularly in low- and middle-income countries (LMICs) where it leads to substantial morbidity and mortality. In Bangladesh, cervical cancer is the second most common cancer among women, with socioeconomic factors, educational attainment, and access to healthcare being critical determinants of health outcomes. This study investigates the impact of socio-demographic factors on the knowledge of cervical cancer among women in rural Bangladesh.

Method: An analytical cross-sectional study was conducted across four subdistricts: Bakergonj, Amtoli, Kumarkhali, and Jagannathpur. A sample size of 245 women aged 30 to 49 years was selected through systematic random sampling. Data were collected from November 2020 to February 2021 using structured questionnaires administered during face-to-face interviews. Knowledge was assessed based on responses to 15 questions about cervical cancer, with scores ranging from 0 to 15. Statistical analysis was performed to determine the associations between knowledge levels and socio-demographic variables.

Results: The study revealed that only 17.14% of the respondents demonstrated good knowledge of cervical cancer, while 82.86% exhibited poor knowledge. Significant associations were found between knowledge levels and factors such as age, education, and household size. Notably, 15.38% of respondents aged 30-34 demonstrated good knowledge compared to only 12.82% of those aged 45-49 (P=0.022). Similarly, 100% of respondents with graduate or higher education had good knowledge (P=0.026). Smaller household sizes were also associated with better knowledge (P=0.047).

Conclusion: The findings highlight substantial gaps in cervical cancer knowledge among rural women in Bangladesh, underscoring the need for targeted educational interventions. These interventions should focus on providing comprehensive information about HPV, cervical cancer, and screening methods, and addressing cultural stigmas and misconceptions.

Keywords: Cervical cancer; Knowledge; Rural women; Socio-demographic factors; Bangladesh.

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1. Introduction

Cervical cancer remains one of the most significant public health challenges globally, particularly in low- and middle-income countries (LMICs) where it causes substantial morbidity and mortality (Shin et al., 2021). As the fourth most common cancer in women worldwide, cervical cancer accounted for an estimated 604,000 new cases and 342,000 deaths globally in 2020 (Zhang et al., 2022). Nearly 94% of the deaths from cervical cancer in 2022 occurred in low- and middle-income countries (WHO, 2024). In regions such as Sub-Saharan Africa, Latin America, and parts of Asia, the incidence of cervical cancer is particularly high due to barriers in healthcare infrastructure, socioeconomic factors, and limited public health initiatives targeting this disease (Petersen et al., 2022). For example, studies in countries like India and Nigeria have shown that lack of awareness and cultural stigmas significantly hinder the effectiveness of cervical cancer screening programs (Singh et al., 2022; Efuwape & Adekunle, 2021). Conversely, countries such as Australia and Finland have dramatically reduced their cervical cancer rates through comprehensive vaccination and regular screening programs that are integrated into their public healthcare systems (Shin et al., 2021). Despite the known effectiveness of early screening and vaccination, disparities in knowledge and access to these preventive measures persist, particularly among women in rural settings. In Bangladesh, cervical cancer is the second most common cancer among women, with socioeconomic factors, educational attainment, and access to healthcare playing critical roles in shaping these health outcomes (Uddin et al., 2023). With an age-standardized incidence rate of 10.6 and a mortality rate of 6.67 per 100,000 population, there were about 8,268 new cases of cervical cancer in 2020 (IARC, 2024). This substantial burden underscores the urgent need for targeted research and public health interventions in these areas. Previous studies have highlighted a significant gap in awareness and knowledge about cervical cancer among rural Bangladeshi women compared to the women of urban areas, with marked differences based on educational level, socioeconomic status, and geographical location. Alam et al. (2022) found in their study that only 45.2% (493 out of 1090) of the respondents were aware of cervical cancer, with women from urban areas, those possessing university-level education, and those from high-income families more likely to have heard of the disease. There was a significant association between literacy, place of residence, and socio-economic status with women's knowledge of cervical cancer, indicating the impact of these factors on awareness ($p < 0.05$) (Alam et al., 2022). Islam et al. (2018) revealed in their study that the awareness of cervical cancer was relatively high among rural women (93.4%), however, detailed knowledge about its risk factors and prevention methods was significantly lower, at only 8.8% and 4.4% respectively (Islam et al., 2018). Another study reported that though most of the respondents heard about cervical cancer, the underutilization of VIA was attributed to concerns about privacy during examination, lack of awareness that VIA screens for cervical cancer, the misconception that the test incurs a fee, and the exams being performed by nurses (Qayum et al., 2021). The enduring gaps in awareness and understanding of cervical cancer contribute significantly to late diagnoses and consequently poor survival rates (Fokom Domgue et al., 2019). This underscores the need to assess the socio-demographic factors that influence knowledge and awareness, particularly in rural settings where systemic healthcare barriers and low health literacy persist (Jahan et al., 2021). This study is designed to probe how socio-demographic attributes affect cervical cancer knowledge among women in rural Bangladesh. With a focus on varied rural locales such as Bakergonj, Amtoli, Kumarkhali, and Jagannathpur, the research aims to deliver a detailed perspective on how factors like age, education, household size, religion, and occupation impact awareness and understanding of cervical cancer. The objectives of this cross-sectional study are dual: firstly, to evaluate the level of cervical cancer knowledge among women aged 30 to 49 in rural regions; and secondly, to analyze how socio-demographic factors correlate with this knowledge. This comprehensive analysis is expected to inform policymakers and health professionals in devising strategic interventions that are culturally appropriate and geographically specific, ultimately helping the reduction of cervical cancer incidences and improving survival rates in rural Bangladesh. Insights garnered from this study are intended to guide the development of targeted educational and health interventions that could significantly boost the uptake of cervical cancer screening and vaccination initiatives, ultimately enhancing health outcomes in these vulnerable communities.

2. Method and material

This was an analytical cross-sectional study designed to examine the associations between socio-demographic characteristics and knowledge about cervical cancer among women. The target population comprised all women residing in selected areas, from which the sample population was systematically chosen. The research was conducted in four distinct subdistricts within Bangladesh: Bakergonj of Barisal district, Amtoli of Borguna district, Kumarkhali of Kushtia, and Jagannathpur of Sunamgonj. Data collection spanned from November 2020 to February 2021. The sample size was calculated using the formula $p=z^2pq/d^2$ with a 95% confidence interval and a 5% margin of error. The calculated sample size was 245. Women aged 30 to 49 years from the selected study areas were eligible for inclusion. The study excluded women who were seriously ill or pregnant at the time of data collection. A systematic random sampling method was employed. Data were collected through structured questionnaires during face-to-face interviews. The questionnaire covered all necessary aspects to achieve the study objectives. Respondents were asked 15 questions

about cervical cancer, site, and sufferer, risk factors, mode of transmission, symptoms, treatment, and prevention process of cervical cancer. Data analysis was performed using statistical tools, with findings presented in tables and charts. Data were rigorously cleaned before analysis to ensure accuracy. Responses to the questions were scored from 0 to 15 based on correctness. Scores of 8-15 indicated good and below 8 was considered as poor knowledge. Data quality was regularly checked by the researcher, with additional input from academic supervisors to guide the research process. Ethical approval was obtained from the Department of Public Health at North South University, Dhaka, Bangladesh. Participants were fully informed about the study's aims and procedures in their local language, and informed consent was obtained. Privacy and confidentiality of data were strictly maintained.

3. Results

Table 1 describes the socio-demographic profile of the 245 participants involved in this study. The age distribution is segmented into four categories: 31.84% (78) of the respondents are aged 30-34 years, 34.69% (85) are between 35-39 years, 17.55% (43) are between 40-44 years, and 15.92% (39) are aged 45-49 years, resulting in a mean age of 37.88 ± 4.08 years. Educational levels among participants vary, with 17.96% (44) having no formal education, 37.96% (93) with primary education, 26.94% (66) with secondary education, 16.33% (40) with higher secondary education, and only 0.82% (2) possessing a graduate degree or higher. Household size distribution indicates that 21.22% (52) live in households with fewer than four members, 54.29% (133) in households of four to six members, and 24.49% (60) in households exceeding six members. Most of the study population is Muslim (93.88%, 230), with a small Hindu minority (6.12%, 15). Regarding occupational status, 65.31% (160) of participants are housewives, 7.76% (19) are engaged in business, 13.06% (32) are service holders, and 13.88% (34) occupy various other employment categories.

Table 1 Socio-demographic characteristics of the respondents (n=245)

Socio-demographic variables	No. of respondents	Percentage
Respondent's age group		
30-34	78	31.84
35-39	85	34.69
40-44	43	17.55
45-49	39	15.92
Mean + SD	37.88 ± 4.08	
Highest educational attainment		
No formal education	44	17.96
Primary	93	37.96
Secondary	66	26.94
Higher Secondary	40	16.33
Graduate or above	2	0.82
Household size		
<4	52	21.22
4 to 6	133	54.29
>6	60	24.49
Religion		
Islam	230	93.88
Hinduism	15	6.12
Occupation		
Housewife	160	65.31

Business	19	7.76
Service	32	13.06
Others	34	13.88

Figure 1 illustrates the distribution of respondents' knowledge levels regarding cervical cancer. 42 respondents, representing 17.14% of the sample, demonstrated a good understanding of cervical cancer. In contrast, the majority, 203 respondents or 82.86%, exhibited poor knowledge of the disease. This disparity highlights significant gaps in awareness and understanding of cervical cancer within the study population, underscoring the need for enhanced educational interventions aimed at improving knowledge about this critical health issue.

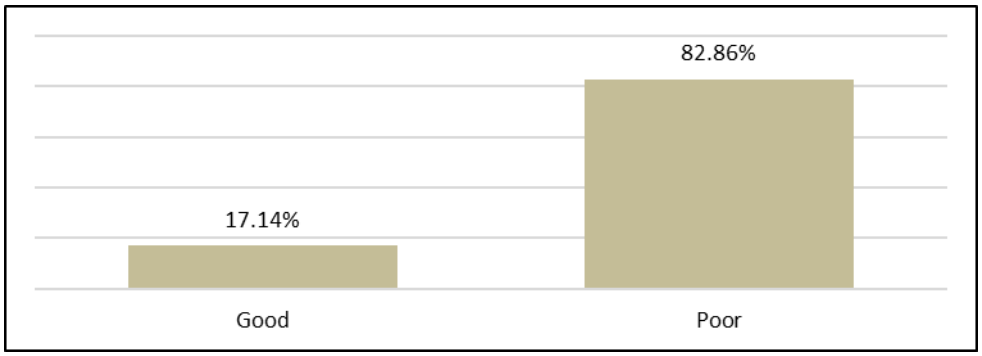

Figure 1 Respondent's level of knowledge on cervical cancer (n=245)

Table 2 Association of respondent's level of knowledge with their socio-demographic characteristics

Socio-demographic variables	**No. of respondents**		**Level of knowledge**				**P value**
			Good		**Poor**		
	Freq.	**Perc.**	**Freq.**	**Perc.**	**Freq.**	**Perc.**	
Respondent's age group							
30-34	78	31.84	12	15.38	66	84.62	0.022
35-39	85	34.69	19	22.35	66	77.65	
40-44	43	17.55	6	13.95	37	86.05	
45-49	39	15.92	5	12.82	34	87.18	
Highest educational attainment							
No formal education	44	17.96	7	15.91	37	84.09	0.026
Primary	93	37.96	16	17.20	77	82.80	
Secondary	66	26.94	10	15.15	56	84.85	
Higher Secondary	40	16.33	7	17.50	33	82.50	
Graduate or above	2	0.82	2	100.00	0	0.00	
Household size							
<4	52	21.22	10	19.23	42	80.77	0.047
4 to 6	133	54.29	17	12.78	116	87.22	
>6	60	24.49	15	25.00	45	75.00	
Religion							

Islam	230	93.88	35	15.22	195	84.78	0.069
Hinduism	15	6.12	7	46.67	8	53.33	
Occupation							
Housewife	160	65.31	29	18.13	131	81.88	0.058
Business	19	7.76	3	15.79	16	84.21	
Service	32	13.06	5	15.63	27	84.38	
Others	34	13.88	5	14.71	29	85.29	

Table 3 Association of respondent's level of knowledge with their socio-demographic characteristics: Crude Odds Ratios (COR) analysis

Socio-demographic variables	**No. of respondents**		**Level of knowledge**				**COR (95% Confidence interval)**
			Good		**Poor**		
	Freq.	**Perc.**	**Freq.**	**Perc.**	**Freq.**	**Perc.**	
Respondent's age group							
30-34	78	31.84	12	15.38	66	84.62	0.83 (0.40, 1.72)
35-39	85	34.69	19	22.35	66	77.65	1.71 (0.87, 3.37)
40-44	43	17.55	6	13.95	37	86.05	0.75 (0.29, 1.90)
45-49	39	15.92	5	12.82	34	87.18	0.67 (0.25, 1.83)
Highest educational attainment							
No formal education	44	17.96	7	15.91	37	84.09	0.90 (0.37, 2.18)
Primary	93	37.96	16	17.20	77	82.80	1.01 (0.51, 2.00)
Secondary	66	26.94	10	15.15	56	84.85	0.82 (0.38, 1.78)
Higher Secondary	40	16.33	7	17.50	33	82.50	1.03 (0.42, 2.52)
Graduate or above	2	0.82	2	100.00	0	0.00	10.15 (0.90, 114.64)
Household size							
<4	52	21.22	10	19.23	42	80.77	1.20 (0.55, 2.63)
4 to 6	133	54.29	17	12.78	116	87.22	0.51 (0.26, 1.00)
>6	60	24.49	15	25.00	45	75.00	1.95 (0.96, 3.98)
Religion							
Islam	230	93.88	35	15.22	195	84.78	0.21 (0.07, 0.60)
Hinduism	15	6.12	7	46.67	8	53.33	4.88 (1.66, 14.30)
Occupation							
Housewife	160	65.31	29	18.13	131	81.88	1.23 (0.60, 2.51)
Business	19	7.76	3	15.79	16	84.21	0.90 (0.25, 3.24)
Service	32	13.06	5	15.63	27	84.38	0.88 (0.32, 2.44)
Others	34	13.88	5	14.71	29	85.29	0.81 (0.29, 2.23)

Table 2 presents the associations between respondents' levels of knowledge about cervical cancer and their socio-demographic characteristics among 245 participants. Here, age appears to influence knowledge levels significantly, with

younger age groups showing relatively better understanding; for instance, 15.38% of respondents aged 30-34 (12 out of 78) demonstrated good knowledge, contrasting sharply with the older age groups like 45-49, where only 12.82% (5 out of 39) showed good knowledge, with a significant P value of 0.022. Educational attainment also correlates with knowledge levels, as those with no formal education exhibited lower knowledge (15.91%, 7 out of 44) compared to those with higher education levels, notably the two respondents with graduate or higher education, both of whom had good knowledge. However, this group is too small for generalizable conclusions. The P value for education's influence on knowledge was significant at 0.026. Household size further demonstrated significant differences in knowledge; smaller households (less than four members) had a higher proportion of good knowledge (19.23%, 10 out of 52) compared to larger households, with a significant P value of 0.047. In terms of religion, Muslims showed a lower proportion of good knowledge (15.22%, 35 out of 230) compared to Hindus (46.67%, 7 out of 15), though this difference was not statistically significant (P=0.069). Occupationally, housewives had a relatively higher level of knowledge (18.13%, 29 out of 160) than other professions, but the difference was insignificant (P value 0.058). These findings indicate that socio-demographic factors such as age, education, and household size significantly impact the level of knowledge about cervical cancer, suggesting targeted educational interventions could be beneficial.

Table 3 provides an analysis of the associations between respondents' levels of knowledge on cervical cancer and their socio-demographic characteristics using Crude Odds Ratios (COR) among 245 participants. The table classifies the respondents into various demographic categories including age, educational attainment, household size, religion, and occupation, alongside their corresponding knowledge levels, presented as both frequencies and percentages. Additionally, it quantifies these relationships through CORs with their respective 95% confidence intervals. In the age category, the analysis reveals varying knowledge levels, with the youngest age group (30-34 years) demonstrating a COR of 0.83 (95% CI: 0.40, 1.72), indicating a lower likelihood of good knowledge relative to the reference group. The highest likelihood of good knowledge is observed in the 35-39 age group with a COR of 1.71 (95% CI: 0.87, 3.37). Educational attainment also shows significant variations; individuals with graduate or higher education levels exhibit a markedly higher COR of 10.15 (95% CI: 0.90, 114.64), although this is based on a very small sample size, suggesting caution in interpretation. Household size also appears to influence knowledge levels, where individuals from larger households (>6 members) have a higher COR of 1.95 (95% CI: 0.96, 3.98) compared to smaller households. In terms of religion, Hindus demonstrate a substantially higher likelihood of good knowledge with a COR of 4.88 (95% CI: 1.66, 14.30) compared to Muslims. Occupational differences are apparent as well; housewives show a relatively higher COR of 1.23 (95% CI: 0.60, 2.51) indicating a better knowledge level compared to other occupations. These findings illustrate significant associations between socio-demographic factors and the level of knowledge about cervical cancer,

4. Discussion

The results from this cross-sectional study illuminate significant disparities in knowledge about cervical cancer among rural women in Bangladesh, a finding that echoes trends observed globally but is particularly pronounced in low- and middle-income countries. This study identified that only a small fraction of rural women have comprehensive knowledge about cervical cancer. This disparity is concerning given the critical role that informed awareness plays in the prevention and early detection of cervical cancer. The findings align with recent studies that have also reported low levels of detailed knowledge and understanding of cervical cancer risk factors and prevention methods among similar populations. For example, Islam et al. (2018) found that while awareness was high, detailed knowledge remained low in rural Bangladeshi women, which is consistent with our observations. This is comparable to a study by Alam et al. (2022), which also highlighted those higher educational levels and socioeconomic status were significantly associated with better knowledge of cervical cancer. Interestingly, this study also revealed that younger and more educated women tended to have a better understanding of cervical cancer, suggesting that education serves as a crucial determinant of health literacy. This result is supported by findings from Petersen et al. (2022), who noted similar trends in Sub-Saharan Africa, where higher educational attainment was linked to greater awareness and understanding of cervical cancer. This is also consistent with two earlier research findings from Pakistan (Javaeed et al., 2019) and the Maldives (Basu et al., 2014), which showed that women's knowledge increased with higher education. Similar findings were also reported in the study of Cimke & Borekci (2019) which showed the significant impact of education level on awareness and knowledge of cervical cancer among Turkish women. The findings from this study highlight critical policy implications for addressing the knowledge gap about cervical cancer in rural Bangladeshi communities. Firstly, there is a significant need for educational interventions that are provided specifically to populations with lower literacy in rural areas; these should focus on enhancing awareness about HPV and its association with cervical cancer, alongside disseminating information about available screening methods such as VIA. Integrating cervical cancer education into existing women's health programs presents a cost-effective strategy to extend reach, including training community health workers to provide relevant health education—a method proven effective in similar contexts as reported by Singh et al. (2022). Additionally, enhancing the accessibility and affordability of cervical cancer screenings is crucial; this involves reducing screening costs, addressing misconceptions about these costs, and improving privacy during examinations to boost

service uptake, as underscored by Qayum et al. (2021). Lastly, developing comprehensive healthcare policies that challenge the socio-economic barriers to healthcare access is essential, which includes supporting educational initiatives for girls and young women, thereby fostering a range of health and social benefits.

5. Conclusion

This study provides a detailed examination of the socio-demographic factors influencing knowledge and awareness of cervical cancer among rural women in Bangladesh. The findings highlight significant disparities in knowledge levels, with most of the respondents demonstrating poor understanding of cervical cancer, despite a high level of general awareness. Younger age, higher educational attainment, and smaller household size were significantly associated with better knowledge, underscoring the critical role of education and socioeconomic factors in shaping health literacy. The study underscores the urgent need for targeted educational interventions in rural areas to enhance awareness and understanding of cervical cancer. These interventions should focus on providing comprehensive information about HPV and cervical cancer, promoting regular screening, and addressing cultural stigmas and misconceptions. Integrating such educational efforts into existing women's health programs and training community health workers to disseminate relevant information could significantly improve knowledge levels. Additionally, improving access to affordable and private cervical cancer screening services is crucial. Policy measures should focus on reducing screening costs, addressing misconceptions about these costs, and ensuring privacy during examinations to increase uptake. Developing comprehensive healthcare policies that tackle socio-economic barriers to healthcare access, including educational initiatives for girls and young women, is essential for fostering long-term health benefits. The study's insights are expected to inform policymakers and health professionals in devising culturally appropriate and geographically specific interventions to reduce cervical cancer incidence and improve survival rates in rural Bangladesh. Future research should explore the implementation and effectiveness of these interventions, aiming to bridge the knowledge gap and promote better health outcomes in these vulnerable communities.

Compliance with ethical standards

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Disclosure of conflict of interest

No conflict of interest to be disclosed.

Consent for publication

The consent to publish this paper has been granted by each author.

Statement of informed consent

Every individual participant participating in the study gave informed consent.

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