

Socioeconomic Disparities in Cervical Cancer Screening Uptake among Women in Dhulikhel and Banepa Municipalities Nepal

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ABSTRACT

Background

Cervical cancer is one of the most preventable types of cancer. In Nepal, however, most women are at risk due to the underutilization of screening services that significantly contribute to preventing cervical cancer.

Objective

To investigate the socioeconomic and sociodemographic disparities that impact the utilization of cervical cancer screening in Dhulikhel and Banepa municipalities.

Method

This study utilized secondary data analysis of the cross-sectional survey on cervical cancer screening uptake conducted by Dhulikhel Hospital in Nepal. A quantitative survey was conducted from February 2021 to July 2022, with women participants aged 30-60 who were eligible for cervical cancer screening. Socioeconomic characteristics, including age, sex, ethnicity, religion, marital status, annual income, and education, were collected. Univariable and multivariable logistic regression analysis was performed to determine the association of socioeconomic factors with cervical cancer screening uptake.

Result

Of the 1625 participants, 1206 (74.2%) were screened via self-sampling. About one-third were Brahmin (33.8%) or had no formal education (32.9%), and half (50.0%) were engaged in agriculture. Screening uptake was significantly associated with ethnicity, education, and occupation. Newar women had 30% lower odds of screening than Brahmin/Chhetri (aOR: 0.7; 95% CI: 0.41–0.91; $p = 0.012$), while women with education above secondary level had 60% higher odds than those with no formal education (aOR: 1.6; 95% CI: 1.02–2.4; $p = 0.03$). Homemakers (aOR: 0.5; 95% CI: 0.34–0.84; $p = 0.007$) and self-employed women (aOR: 0.4; 95% CI: 0.35–0.68; $p < 0.001$) had lower odds of screening compared to farmers.

Conclusion

Women from the Newar ethnic group, those with lower levels of education, homemakers, and self-employed individuals were less likely to undergo cervical cancer screening. Tailored interventions targeting these groups could help improve screening uptake.

KEY WORDS

Cervical cancer, Screening, Socioeconomic factors, Nepal

INTRODUCTION

Cervical cancer is the second most common cancer cause of death in women worldwide despite being highly preventable.¹ Approximately 11.4 million women in Nepal are at risk of cervical cancer, with an incidence and mortality rate of 14.2% and 9.46%, respectively, which is higher than the worldwide rate.² Cervical cancer is the most prevalent cancer among the women of Nepal and is the first leading cancer causing death among these women.² Cervical cancer is easily preventable with the vaccination against Human papillomavirus (HPV), screening, and treatment of any pre-cancer lesions. However, 80% of cervical cancer cases are diagnosed late with advanced cancer, resulting in a higher mortality rate in countries such as Nepal.³ Most of these cases and deaths occur in low and middle-income countries (LMICs) as screening programs that make cervical cancer preventable require massive infrastructure and high-quality healthcare services, which most LMICs cannot afford.⁴ On top of cervical cancer's health and mortality burden, it also imposes a significant socioeconomic disadvantage.⁴ According to the WHO, by investing in cervical cancer prevention, approximately 250,000 women will remain productive workforce members, adding an estimated 28 billion USD back into the world's economy.⁵

Various socioeconomic and sociodemographic factors impact access to health services. Nepalese women in semi-urban or rural, low-income settings face many challenges due to education, geography, expenses, and family acceptance.⁶ The mountainous terrain of Nepal makes access to services extremely difficult, and a general lack of health knowledge impacts the health-seeking behavior of participating in prevention services.⁴ Many complex factors influence women's decision to seek these preventative services. Nepal Demographic Health Survey in 2022 reveals that the proportion of women who make decisions on sexual relations, contraceptive use, and reproductive health increases with women's education.⁷ The percentage of women making informed decisions on their sexual and reproductive health increases from 55% of women with no education to 83% of women with more than secondary education.⁷

Regarding employment, more men are currently employed than women, and a higher proportion of women are engaged in agriculture than men, 67% versus 27%.⁷ However, most women working in agriculture are likelier not to get paid for their work. It was also found that only 8% of women are engaged in professional jobs, and the proportions of women involved in professional work are highest among those in the Brahmin/Chhetri ethnic group.⁷

There is strong evidence that reveals the association between socioeconomic status and cervical cancer; it is expected that there are differences in education, socioeconomic conditions, living standards, and health services that account for the inequities in cervical cancer incidence and mortality.⁸ Consequently, inequalities

in the use of cervical cancer screening services due to socioeconomic status have been detected in some settings, with women of lower socioeconomic status being less likely to be screened.⁹ One study in Bhaktapur, Nepal, found that women's age, education level, and occupation were significantly associated with the utilization of cervical cancer screening, yet focused more on women's attitudes and knowledge of cervical cancer.⁵ Similarly, it was found in a study performed in Botswana that women of lower socioeconomic status were less likely to be screened for cervical cancer.¹⁰ Additionally, they found that the odds of being screened increased from age 45 to 65 years, and the odds of screening were significantly low among students and homemakers.¹⁰

However, limited studies continue to evaluate sociodemographic and socioeconomic factors that affect the utilization of cervical cancer screening in settings like Nepal. Therefore, this study evaluates sociodemographic and socioeconomic factors affecting cervical cancer screening utilization in Nepal.

METHODS

This study utilized secondary data analysis of the cross sectional survey on cervical cancer screening uptake conducted by Dhulikhel Hospital in Nepal. Researchers quantitatively surveyed women aged 30-60 years eligible for cervical cancer screening in Dhulikhel and Banepa municipalities of Kavrepalanchowk district, Nepal, from February 5th, 2021, to July 17th, 2022. Dhulikhel and Banepa are approximately 30 kilometers east of the capital, Kathmandu. Banepa has a population of 55,628, while Dhulikhel municipality has a population of 32,162 with an equal distribution of around 50% females in both areas. Seventeen government health facilities, 7 in Banepa and 10 in Dhulikhel, offer free-of-cost visual inspection with Acetic Acid (VIA).¹⁰ Liquid-based cytology (LBC) and HPV testing are available at community-based hospitals.

Researchers contacted Female Community Health Volunteers (FCHVs) about the VIA screening and study objectives. FCHVs identified eligible women residing in Dhulikhel or Banepa municipality through home visits, informed them about our study, and shared the contact details of interested participants with the research assistants. FCHVs serve as part of the Nepali community health workforce, primarily supporting health education, counseling, outreach, and resource distribution.¹¹ The age of women was selected based on the target cervical cancer screening group per the national guidelines for Cervical Cancer Screening and Prevention.¹² The study's inclusion criteria were women 30 to 60 years old, with intact uteruses, and residents of Dhulikhel and Banepa. Exclusion criteria were currently pregnant and a previous history of cervical intraepithelial neoplasia (CIN) or cancer. Verbal informed consent was obtained from interested participants to

collect baseline information. Written informed consent was obtained for women who were screened. This study received ethical approval from the Nepal Health Research Council #44469 and Icahn School of Medicine at Mount Sinai IRB (Study-23-00362).

Trained research assistants conducted telephone interviews with the participants using a standardized electronic questionnaire on kobotoolbox. The questionnaire assessed socioeconomic characteristics, including age, sex, ethnicity, religion, marital status, annual income, and education. One month after the interviews, all women who expressed interest in the telephone interviews were formally invited to the cervical cancer screening camp. FCHVs were mobilized to call women for a cervical cancer screening camp. Women were screened using HPV DNA CareHPV self-sampling methods developed by Qiagen. Dhulikhel Hospital, a community-based hospital situated at Dhulikhel, Kavrepalanchowk district, conducted the screening camp. The project team developed a process tracking sheet to record baseline information from phone interviews and screening uptake for each woman. The baseline information was linked with screening uptake based on the unique identity number given to each participant during their baseline data collection.

Socio-demographic variables included age (in years), ethnicity (Brahmin, Chettri/Thakuri/Sanyasi, Newar, Magar/Tamang/Rai/Limbu, Sherpa/Bhote, Kami/Damai/Sarki/Gaaine/Baadi, Other), education (no formal education, primary, secondary, above secondary), religion (Hindu, Buddhist, Christian), occupation (home-maker, farmer, self-employed, service workers, others), cash income (yes, no), and household income. The questions were adopted from previous surveys in Nepal. This information was collected through a telephone interview.

Uptake was measured based on a process tracking sheet developed by the project team. Regardless of their previous history of cervical cancer screening, all women were invited for screening uptake. Those women who refused to provide baseline information were also asked for screening uptake if they were interested. The project team developed a database to track study participants who provided baseline information, recording information on who attended screening, screening results, and referrals for further follow-up and treatment. Information on screening uptake was obtained from this tracking sheet.

The participants' characteristics were presented in frequency and proportion for categorical variables and mean and standard deviation for numerical variables. We conducted a univariable and multivariable logistic regression analysis to determine the association between socioeconomic characteristics and cervical cancer screening uptake among women in the Dhulikhel and Banepa municipalities of Nepal. Crude (cOR) and adjusted

odds ratio (aOR) with 95% CI were presented. P-values less than 0.05 were considered statistically significant. We analyzed data using STATA software (STATA-version:13.0).

RESULTS

2066 women were approached for the study. With a response rate of 79%, 1625 women participated in the study. The mean age of the participants was 41.6 ± 8.0 years (Table 1). Of the 1625 participants, 1206 (74.2%) women were screened via self-sampling. About one-third were Brahmin (33.8%) or had no formal education (32.9%), and half (50.0%) were engaged in agriculture. About three-quarters (74.3%) of women had cash income; the mean household income was NRs. 204,780.5 $\pm$ 370883.

Table 1. Socio-demographic characteristics of participants (n=1625)

Characteristics	Frequency (%)
Age(years), Mean(SD)	41.6 (8.0)
Ethnicity	
Brahmin	549 (33.8)
Chettri/Thakuri/Sanyasi	352 (21.7)
Newar	436 (26.8)
Magar/Tamang/Rai/Limbu/Sherpa/Bhote	194 (11.9)
Kami/Damai/Sarki/Gaaine/Baadi	94 (5.8)
Religion	
Hindu	1,439 (88.6)
Buddhist	129 (7.9)
Christian/Muslim	57 (3.5)
Educational Status	
No formal Education	534 (32.9)
Primary	280 (17.3)
Secondary	524 (33.3)
Above secondary	269 (16.5)
Marital Status	
Married	1,504 (92.5)
Separated	29 (1.8)
Widowed	92 (5.7)
Occupation	
Farmer	812 (50.0)
Homemaker	362 (22.9)
Self-Employed	226 (13.9)
Service Worker	88 (5.4)
*Others	137 (8.4)
Cash Income	
Yes	1,208 (74.3)
No	417 (26.7)
Annual Household Income (NPR),	204,780.5
Mean (SD)	(370883)

*Other: labor, helper, tailor, social worker, and caretaker

The odds of being screened were 30% lower among Newar ethnicity compared to Brahmin/Chhetri (aOR: 0.7; 95% CI: 0.41-0.91; p-value: 0.012) after adjusting for age, religion, education, marital status, occupation, and cash income (Table 2).

There was a significant association between cervical cancer screening uptake and education. While compared with women with no formal education, women with above secondary education had 60% increased odds of being screened. (aOR: 1.6; 95% CI: 1.02-2.4; p-value:0.03) after adjusting for age, religion, education, marital status, occupation, and cash income (Table 2).

Table 2. Association between socio-demographic factors and cervical cancer screening uptake (n=1625)

Characteristics	Screening		Univariable			Multivariable		
	Yes n(%)	No n(%)	OR	95% CI	p-value	aOR*	95% CI	p-value
Age	41.73	41.18	1.0	0.99, 1.01	0.717	1.0	1.0, 1.03	0.05
Cash Income								
No	289 (69.3)	128 (30.7)	Ref			Ref		
Yes	917 (75.9)	291 (24.1)	1.4	1.09, 1.78	0.008	1.02	0.68, 1.53	0.90
Ethnicity								
Brahmin	437 (79.6)	112 (20.4)	Ref			Ref		
Chettri/Thakuri/ Sanyasi	265 (75.3)	87 (24.7)	0.8	0.57, 1.07	0.063	0.8	0.58, 1.1	0.185
Newar	296 (67.9)	140 (32.1)	0.5	0.40, 0.72	<0.001	0.7	0.49, 0.91	0.012*
Magar/Tamang/ Rai/Limbu/Sherpa/ Bhote	138 (71.1)	56 (28.9)	0.6	0.43, 0.91	0.016	0.8	0.47, 1.33	0.363
Kami/Damai/Sarki/ Gaaine/Baadi	70 (74.5)	24 (25.5)	0.7	0.45, 1.24	0.313	1.1	0.60, 1.89	0.82
Religion								
Hindu	1,077 (74.8)	362 (25.2)	Ref			Ref		
Buddhist	92 (71.4)	37 (28.7)	0.8	0.56, 1.24	0.37	1.0	0.54, 1.74	0.93
Christian/Muslim	37 (64.9)	20 (35.1)	0.6	0.37, 1.09	0.09	0.6	0.34, 1.18	0.157
Educational Status								
No Formal Education	396 (74.2)	138 (25.8)	Ref			Ref		
Primary	209 (74.6)	71 (25.4)	1.0	0.74, 1.41	0.880	1.2	0.85, 1.74	0.275
Secondary	401 (74.0)	141 (26.0)	0.99	0.75, 1.30	0.995	1.32	0.95, 1.83	0.09
Above Secondary	200 (74.3)	69 (25.7)	1.0	0.72, 1.41	0.616	1.6	1.02, 2.4	0.03*
Marital Status								
Married	1,114 (74.1)	390 (25.9)	Ref			Ref		
Separated	23 (79.3)	6 (20.7)	1.3	0.54, 3.32	0.52	1.2	0.49, 3.11	0.661
Widowed	69 (75.0)	23 (25.00)	1.1	0.64, 1.70	0.84	1.0	0.62, 1.70	0.91
Occupation								
Farmer	648 (79.8)	164 (20.2)	Ref			Ref		
Homemaker	244 (67.4)	118 (32.6)	0.5	0.39, 0.69	<0.001	0.5	0.34, 0.84	0.007*
Self-Employed	144 (63.7)	82 (36.3)	0.4	0.32, 0.61	<0.001	0.5	0.35, 0.68	<0.001*
Service Worker	69 (78.4)	19 (21.6)	0.9	0.54, 1.56	0.758	0.9	0.52, 1.57	0.817
Other	101 (73.7)	36 (26.9)	0.7	0.47, 1.08	0.108	0.7	0.43, 1.05	0.08

OR- Odds Ratio; aOR=adjusted Odds Ratio
 *p-value < 0.05
 Adjusted for age, ethnicity, religion, education, marital status, occupation, and cash income

Occupation was significantly associated with cervical cancer screening uptake. The odds of being screened were 50% lower in homemakers (aOR: 0.5; 95% CI: 0.34-0.84; p-value: 0.007), 50% lower in self-employed (aOR: 0.4; 95% CI: 0.35-0.68; p-value <0.001) compared to a farmer after adjusting for age, ethnicity, religion, education, marital status, and cash income (Table 2).

DISCUSSIONS

Socioeconomic factors significantly influence women's health-seeking behaviors. Our study found a significant association between cervical cancer screening uptake and women's ethnicity, education, and occupation. Based on the results, Newar women were less likely to be screened for cervical cancer than Brahmin women. Women with higher levels of education were more likely to be screened.

When looking into women's occupations, it was found that homemakers or self-employed women were less likely to be screened than farmers.

In our study, homemakers and self-employed women were less likely to be screened than farmers. This finding may suggest that homemakers and self-employed women may have more restricted schedules due to household and work-related responsibilities. Homemakers may prioritize family and household responsibilities over preventive healthcare, while self-employed women may face greater opportunity costs associated with taking time away from work to attend screening services. However, these are potential explanations, and further qualitative research is needed to better understand the underlying reasons for these differences.

Cultural beliefs impact how people perceive health information and can become a barrier to seeking healthcare services. In this study, Newar women were less likely to be screened for cervical cancer compared to Brahmin and Chhetri. In support of this study's findings, Lamichhane et al. showed positive associations between belonging to the Brahmin/Chhetri ethnic group and cervical cancer screening awareness in Nepal.¹⁴ However, the opposite was found in a similar study performed in mid-western Nepal; researchers found that despite the Brahmin and Chhetri ethnic groups having a higher literacy rate, they were less likely to attend the cervical cancer screening.¹⁵ The difference can likely be due to the contextual factor. The distinct cultural beliefs and practices in different ethnic groups may vary according to the location. Also, other differences, such as the type of test offered, if screening was performed at a clinic versus a camp, or if they were provided self-sampling kits versus a pelvic exam from a medical professional, may vary based on ethnic group and location of residence. The study suggests further in-depth exploration of screening behavior in different ethnic groups.

Cervical cancer screening uptake increases with increasing education. The increased awareness of cervical cancer screening behavior is higher among educated women, likely due to increased awareness of cervical cancer and prevention and being more conscious of their well-being. No doubt, education is a key factor in influencing health-seeking behavior. Women with less education mostly have inadequate health literacy.¹⁶ This finding is in line with the other studies conducted among Nepali and Filipino women, which demonstrate the positive relationship between education and cervical cancer screening uptake.^{7,17}

Our study found no association between religion and income with cervical cancer screening uptake. In the Nepal Ministry of Health and Population 2022 demographic and health survey, income was found to have significant associations with cervical cancer screening uptake,

with higher-income women being more likely to attend screening.⁷ The possible reason for not being important in our study might be the information flow from FCHVs and the availability of services free of cost. This likely encouraged women to participate in screening regardless of their income levels. Further studies are needed to understand better how income relates to participation in cervical cancer screening programs in Nepal.

To our knowledge, this is the first study to investigate the socioeconomic and sociodemographic factors affecting cervical cancer screening utilization among women in Nepal. The study included a sufficiently large sample size of 1625 women. We used univariable and multivariable regression models to minimize alternative explanations.

This study had a few limitations worth discussing. Firstly, because this study focused on the population in Dhulikhel and Banepa municipalities, it should not be used to generalize all of Nepal. In the future, it would be helpful to research other municipalities. Another limitation could be an underestimation of the women who participated in cervical cancer screening after interviews with the FCHVs, as our study only followed the women who attended the cervical cancer screening camps. Some women may have sought screening in one of the clinics, which may underestimate the screening rates. Furthermore, screening uptake was defined as attendance at a project-organized HPV self-sampling camp following active invitation and follow-up rather than participation in routine cervical cancer screening. Therefore, the findings may have limited generalizability to routine population-based screening programs. Finally, women who were difficult to contact, socially isolated, or less engaged with community health services may have been underrepresented because they were less likely to be reached during participant recruitment.

CONCLUSION

Women of the Newar ethnic group, having low education levels, being homemakers or self-employed, were found to have low cervical cancer screening uptake. Further studies should be done to understand the barriers within the groups with low screening uptake. However, these findings suggest the importance of developing and implementing interventions aimed at increasing cervical cancer screening uptake, particularly among populations facing socioeconomic disparities.

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