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A cross-sectional study on assessment of perceived threat to cervical cancer using health belief model among women in a slum area of Kolkata

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Abstract:

BACKGROUND: Despite the implementation of various cervical cancer preventive strategies by the Government of India, there is a scarcity of knowledge and consequent low utilization of cervical cancer screening services among women in India. This contributes to the burden of cervical cancer among Indian women. This study was conducted to assess perceived threat-regarding cervical cancer among women and to identify its explanatory factors in a slum area of Kolkata.

MATERIALS AND METHODS: A cross-sectional study was conducted among 192 adult women from May to September 2019 in Kolkata. The multistage sampling technique was used using a structured schedule. Perceived threat to cervical cancer was measured using a composite score including perceived susceptibility and perceived severity constructs of the health belief model. Data were analyzed by descriptive statistics and multivariable logistic regression model using SPSS software version 16.

RESULTS: Overall, 22.9% of the participants had satisfactory levels of perceived threat to cervical cancer. Statistically significant association was found between unsatisfactory levels of perceived threat with reproductive age group (adjusted odds ratio [AOR] = 3.01; $P = 0.036$), education level up to primary (AOR = 2.89; $P = 0.026$), and unsatisfactory knowledge (AOR = 2.94; $P < 0.001$) among respondents. The multivariable regression model was of good fit.

CONCLUSION: The study population had very unsatisfactory levels of perceived threat to cervical cancer. Thus, to increase cervical cancer screening uptake among women, it is necessary to tailor robust behavior change communication campaigns to increase the perception of susceptibility and severity, thereby increasing the perception of threat of cervical cancer among women.

Keywords:

Cervical cancer, health belief model, India, perceived threat, women

Introduction

Cervical cancer is a serious public health setback in India with an annual contribution of 122,844 new cases and 67,477 deaths.^[1] It is the second most common gynecological cancer after carcinoma breast among women in India.^[1] Thus, in developing countries such as India, the prevention of cervical cancer is extremely important.

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Cervical cancer is preventable, but cervical screening is acknowledged as currently the most effective approach for cervical cancer control, most women do not access nor utilize the existing screening programs. Screening and early diagnosis of cervical cancer at the primary health facilities, with treatment through regional cancer centers are important preventive strategies under the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Disease, and Stroke NPCDCS.^[2] It was

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envisaged that cervical cancer screening would be conducted for free among women of age 30–65 years, once in 5 years through visual inspection with acetic acid is envisaged under this program.^[3] Presently, this service is provided in health and wellness center under the umbrella of the Ayushman Bharat program.

The health belief model (HBM) is a health behavior change model developed to describe the insufficient use of screening and preventive services for the detection and early treatment of asymptomatic diseases. It is divided into three main categories – individual perceptions, modifying factors, and likelihood of action.^[4] Perceptions includes perceived susceptibility, perceived severity, perceives benefits, and perceived barriers. Perceived susceptibility and perceived severity collectively known as perceived threat. Perception of threat is one of the crucial factors for predicting likelihood of accepting health services.^[5] Thus, to increase cervical cancer screening uptake among women, it is necessary that their perception of threat regarding cervical cancer be enhanced.^[6]

In a systematic review done by Thulaseedharan *et al.*, it was found that women who took cervical cancer screening at least once in their lifetime ranges from 0% to 53% among different populations in India.^[7] Furthermore, due to the lack of awareness regarding cervical cancer, cervical cancer screening is yet to achieve popularity in India.^[7-9] Thus, it can be assumed that if cervical cancer screening services in India are accessible as well as affordable then the uptake of cervical cancer screening services will largely depend on the perceived threat to cervical cancer. If we aim to reduce incidence and deaths due to cervical cancer, we need to scale-up cervical cancer screening uptake among Indian women.

With this background, this study was conducted to assess the perceived threat regarding cervical cancer among women at risk and to identify its explanatory factors. The evidence generated in this study will aid the policymakers to understand the barriers to utilize cervical cancer screening services, especially among the social groups at high risk. This will facilitate the development of need-based, culture-specific educational programs for behavior change among the target audience to improve uptake of cervical cancer screening services by Indian women at risk of cervical cancer.

Materials and Methods

Study design and setting

A community-based observational cross-sectional study was conducted for 5 months (May to September 2019) in a ward under Kolkata Municipal Cooperation, Kolkata

district, West Bengal, comprising six “paras” with total population of 49,586 according to Census 2011.^[10]

Study participants

The study population consisted of women aged 18 years and above, residing in the selected urban area for at least 1 year. Those who had cervical cancer screening in the past 5 years, who did not give informed written consent and those who were critically ill at the time of study were excluded from the study.

Sample size

According to a study done by Narayana *et al.* among women in South India, 29.2% of women agreed that they may susceptible for cervical cancer.^[11] Taking confidence interval as 95% with $Z = 1.96$; estimated prevalence (P) = 29.2%, absolute error (d) = 10%, design effect of 2, and nonresponse rate of 20%, the sample size was estimated as 192 (multistage sampling).

Sampling technique

The multistage probability sampling method was used. “Para” is a Bengali word which means a neighborhood or locality, usually characterized by a strong sense of community. The name of such location in West Bengal ends with the suffix “para.” The entire population of the selected ward was distributed across the six “paras” or hamlets. Of these, two “paras” (primary enumeration area) were randomly selected. In second stage of sampling, women aged 18 years and above were selected from each primary enumeration area was determined by probability proportional to population size. Sample in primary enumeration area was selected using simple random sampling with replacement from electoral roll. If any participant was not available on 2 consecutive days, the next participant was visited.

Data collection tools and technique

Data were collected by face-to-face interview of participants using a predesigned and pretested structured schedule (Bengali version). Cronbach’s alpha was calculated for perceived threat construct items. The face and content validity of the instrument were evaluated by public health experts of the institute. Privacy and confidentiality were maintained during the interview.

Study variables

Dependent variables

Perceived threat to cervical cancer

There were total 6 items in this construct. Every item of the construct was scored on the basis of 3-point Likert scale (*Agree-score of 3, Neutral-score of 2, and disagree-score of 1*). The score was divided into two categories based on the 50% of attainable score (18): satisfactory ($\geq 50\%$ of maximum attainable score) and unsatisfactory ($< 50\%$ of maximum attainable score).

Independent variables

1. Sociodemographic variables (age, education, marital status, occupational status, and socioeconomic status according to modified B. G. Prasad scale 2019^[12]).
2. Knowledge regarding cervical cancer and its screening: there were total 15 items. Each item was scored. Those who responded “yes” were given score of 1, otherwise 0. The score was dichotomized for knowledge (score of ≥ 7.5 → Satisfactory knowledge; < 7.5 → Unsatisfactory knowledge), taking 50% of attainable score (15) as the cutoff criteria.

Data description and analysis

Data were analyzed using Microsoft Excel 2007 and Statistical Package for the Social Sciences version 16 (SPSS for Windows, version 16.0, SPSS Inc. Chicago, Illinois, USA). Descriptive statistics and logistic regression analyses were performed. All the significant ($P < 0.05$) explanatory variables of unsatisfactory perceived threat to cervical cancer obtained from univariate analysis were entered into multivariable regression model to obtain adjusted odds.

Ethics approval

Ethical approval was taken from the Institutional Ethical Committee of All India Institute of Hygiene and Public Health, Kolkata. Ethical codes were followed as per the Declaration of Helsinki protocol. Principle of confidentiality, principle of autonomy, principle of nonmaleficence, principle of consent, and principle of justice were strictly considered.

Results

Background characteristics

The mean \pm standard deviation (SD) age of the study population was 45.3 ± 9.2 years with a range of 24–68 years. Among study participants, 65.4% were in the reproductive age groups and 9.2% were elderly. The mean \pm SD years of schooling was 5.7 ± 4.3 years with 24.3% illiterate study participants. The majority of the participants belonged to the general caste (78.4%) and 19.4% belonged to the scheduled tribe/scheduled caste category. Regarding occupational status, almost two-third (61.4%) of women stayed at home while 28.1% were employed. The majority of the participants were currently married (79.5%) and lived with their husbands. According to B. G. Prasad socioeconomic scale 2020, 35.7% belonged to class III, 11.9% to class V, and only 3.2% belonged to class I socioeconomic group.

Overall, 66.2% of women had unsatisfactory knowledge regarding cervical cancer and its screening procedure.

Perceived threat to cervical cancer

About four-fifth of the women said that there was no need for cervical cancer screening in the absence of

symptoms. On the other hand, 69.6% of women felt that they were susceptible to this cancer. Regarding the perception of severity, most of the women agreed that cervical cancer is a serious health problem among women (71.3%) and women having cervical cancer can die (69.8%). The proportion of the women who felt that cervical cancer may lead to hysterectomy was 50.5% [Table 1 and Figure 1]. Overall, only 22.9% of the participating females had satisfactory whereas the majority (77.1%) of them had unsatisfactory levels of perceived threat to cervical cancer.

Predictors of unsatisfactory perceived threat to cervical cancer

On univariate logistic regression, significant association of unsatisfactory perceived threat was found with age ≤ 49 years (odds ratio [OR] = 3.25), education up to primary level (OR = 2.83), occupation other than employed (OR = 3.11), socioeconomic status class III, and below (OR = 3.51) and unsatisfactory knowledge (OR = 2.73).

The independent variables found significant on univariate logistic regression were put into the multivariable regression model. Finally, age ≤ 49 years (Adjusted odds ratio [AOR] = 3.01), education up to primary level (AOR = 2.89), and unsatisfactory knowledge (AOR = 2.94) retained their significance with explained variance of 26.9% (Nagelkerke pseudo R squared) for unsatisfactory perceived threat regarding cervical cancer. The model was of good fit as predicted by Hosmer–Lemeshow test ($P = 0.381$) [Table 2]. The results revealed that there are around 3 times more odds of having unsatisfactory perceived threat to cervical cancer in women in the reproductive age group than in elder women. Similarly, there are around 2.89 times more odds of having unsatisfactory perceived threat to cervical cancer in those with education level up to primary than in those with higher education level.

Discussion

HBM is a good framework to predict health behaviors and has been widely used to study the acceptance of preventive health services such as screening. The assumption in HBM is that constructs, i.e., perceived threat (perceived susceptibility and perceived severity together), perceived benefits, perceived barriers, cues to action, and self-efficacy affect health behaviors of people.^[13] Two HBM constructs, perceived susceptibility and perceived severity, were together used as perceived threats to assess the possibility of utilizing cervical cancer screening services by women at risk. The inclusion of external factors such as sociodemographic factors and knowledge regarding cervical cancer strengthened the use of the HBM as an explanatory model in this study.

Table 1: Distribution of the participants according to perceived threat to cervical cancer (n=192)

Item number	Variables	Agree, n (%)	Neither agree nor disagree, n (%)	Disagree, n (%)
1	Cervical cancer is one of the common cancer among women of your age	62 (32.3)	59 (30.7)	71 (37.0)
2	You (respondent) are at risk of having cervical cancer	33 (17.2)	58 (30.2)	101 (52.6)
3*	Women having cervical cancer can die (reversely scored)	134 (69.8)	16 (8.3)	42 (21.9)
4	Having cervical cancer will make life difficult	116 (60.4)	45 (23.4)	31 (16.2)
5	Cervical cancer treatment may lead to removal of uterus	97 (50.5)	45 (23.4)	50 (26.1)
6	Cervical cancer involves complicated and prolonged treatment such as chemotherapy and radiotherapy	88 (45.8)	68 (35.4)	36 (18.8)

Table 2: Univariate and multivariable logistic regression model of unsatisfactory perceived threat to cervical cancer (n=192)

Model Category	Unsatisfactory perceived threat to cervical cancer			
	OR (95% CI)	P	AOR (95% CI)	P
Age (years)				
≤49	3.25 (1.28-4.40)	0.021	3.01 (1.18-3.89)	0.036
>49 (reference)				
Education				
Up to primary	2.83 (1.25-6.80)	0.020	2.89 (1.11-6.27)	0.026
Above primary (reference)				
Marital status				
Currently married	1.84 (0.76-3.54)	0.714	-	-
Others (reference) [‡]				
Occupation				
Others [§]	3.11 (1.62-8.64)	0.043	3.19 (0.89-7.19)	0.233
Employed (reference)				
Socioeconomic status				
Class III and below	3.51 (1.09-5.68)	0.041	3.12 (1.12-4.98)	0.083
Above class III (reference)				
Knowledge				
Unsatisfactory	2.73 (1.06-6.36)	<0.001	2.94 (1.14-7.16)	<0.001
Satisfactory (reference)				

[‡]Others include unmarried and widow/separated women, [§]Others include unemployed and stay at home category, Model fitting is good (Hosmer-Lemeshow test, P 0.381), Nagelkerke R² was 0.26. OBC=Other backward caste, OR=Odds ratio, AOR=Adjusted OR, CI=Confidence interval

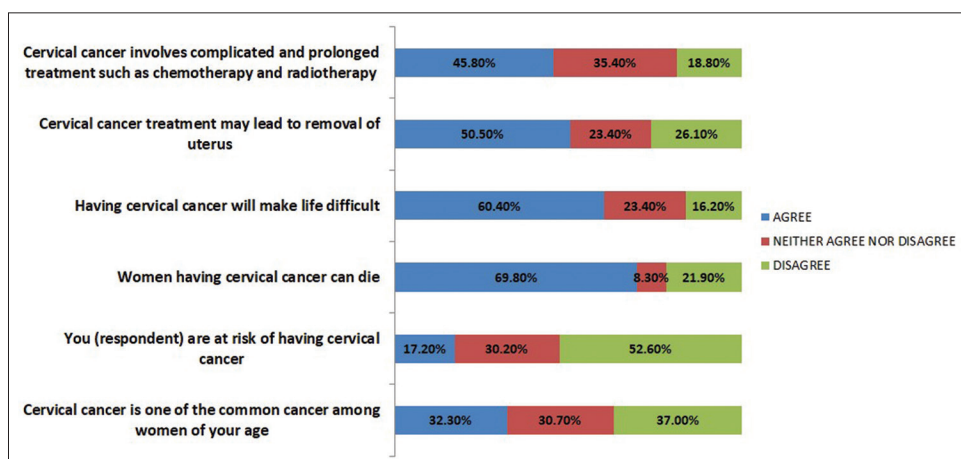


Figure 1: Distribution of the participations according to perceived threat to cervical cancer (n = 192)

The present study showed that most of the women did not feel that they were at risk of cervical cancer. This finding was in conjunction with a qualitative study by Marlow *et al.*, which stated that some women did not

feel concerned about cervical cancer and as a result had delayed screening attendance in the past.^[14] Similarly, Roy and Tang found that approximately 35% of women did not feel they were at personal risk for developing

cancer; however, 75% of women believed that younger women are susceptible to the disease.^[15] Haworth *et al.* also found that 47.6% of women agreed that they were not at risk of cervical cancer and 18.5% believed that only young women are at risk for cervical cancer.^[16]

Most of the women felt that women having cervical cancer can die (69.8%). Similar findings were described by Roy and Tang where Almost 30% of women did not consider cervical cancer to be a severe as other types of cancer; however, 95% of women agreed that having cervical cancer would affect a women's life negatively.^[15] The similarity in findings may be contributed to the fact that both the studies are done in similar settings.

Participants in the current study had low perceived threat scores, indicating that they did not believe that cervical cancer was a serious disease and did not feel susceptible to the disease.

Overall, 22.9% of the participating females had satisfactory levels of perception of threat regarding cervical cancer. In a study by Shirazi Zadeh Mehraban *et al.*, 35% of all the participants had a good score for perception of susceptibility and 56.5% of participants had a good perceived severity score which explained women's familiarity to the consequences of cervical cancer.^[17] This difference may contributed to the difference in sociocultural factors of these two populations and differences in the cutoff score. Having satisfactory perceived threat is very crucial to adopt positive health behavior. In a study done by Chisale Maboŋja *et al.*, it was found that women who perceived cervical cancer to be a severe disease and those who agreed that cervical cancer is a terminal illness which they feared, were more likely to take Pap smear.^[18]

Predictors of perceived threat regarding cervical cancer

In this study, low levels of perceived threat were found significantly associated with the reproductive age group, education up to primary level, and poor knowledge on multivariable logistic regression model with explained variance of 26.9%. This model was a good fit according to Hosmer–Lemeshow test.

Similar results were found by Marlow *et al.*, where higher knowledge about cervical cancer reduced the uncertainty about perceived susceptibility. Marlow *et al.* also concluded that information about HPV alone did not have an effect on perceived susceptibility. It is because perception of susceptibility is shaped based on personal experiences and perception of cervical cancer risk factors as well.^[14]

In an analysis of the relation of HBM constructs with population variables by Hajjalizadeh *et al.*, similar

results were found. Higher levels of education increase the perceived severity. It seems that high education increases awareness which then increases participation in preventive and treatment services.^[19]

The findings from this study have implications for future health promotion and education interventions among women of the reproductive age group. For increasing utilization of cervical cancer screening services, health promotion and education interventions should not only provide factual information about cervical cancer and its associated risk factors, signs, and effects but also design appropriate risk communication to increase perceptions of susceptibility and severity regarding cervical cancer. This will help target the women at risk to increase the utilization of cervical cancer screening services.

Limitations and future research recommendations

The use of a cross-sectional study and selecting only two of the HBM constructs serve as limitations to the findings from this study. Furthermore, the relatively small sample size may also impact on the generalizability of the findings. In future researches, late adolescent females should also be included to elicit their knowledge and perceptions regarding cervical cancer prevention. There was also the possibility of responses to be affected by social necessity as the study relied on self-report measures. Future research in the area of cervical cancer should include qualitative approach to gain in-depth understanding of beliefs toward cervical cancer and its screening, prevailing in the families and community.

Despite these shortfalls, this is one of the few studies within the Indian setting to have used perceived threat construct of the HBM in explaining cervical cancer screening behavior.

Conclusion

It can be concluded that the poor educational level, unemployment, and low-socioeconomic status lead to poor perceived threats regarding cervical cancer. Thus, under-educated and underprivileged women are at more risk of adopting poor health-seeking practices. One of the most important striking findings of this study was that poor knowledge was one of the reasons for low levels of perceived threat to cervical cancer.

Cervical cancer is a largely preventable disease. Thus, empowering women through education and employment and improving health literacy regarding cervical cancer in the community so that the women at risk can perceive their susceptibility and severity of cervical cancer is of utmost importance for facilitating the adoption of appropriate preventive and screening services for cervical cancer.

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Conflicts of interest

There are no conflicts of interest.

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