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Original Research Article

Risk factors for cervical cancer among women reporting government tertiary care hospitals in Chennai, Tamil Nadu, Southern India: a cross-sectional study

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ABSTRACT

Background: Cervical cancer is widely recognized as a disease characterized by significant disparities, with marked differences in both incidence and mortality rates observed between low and middle-income countries (LMICs) and high-income countries. In India, the disease poses a substantial burden, leading to one death every 8 minutes. India's contribution to global cervical cancer statistics is substantial, with 21% of new cases and 23% of deaths worldwide, surpassing previously leading nations like China. Within Tamil Nadu, it ranks as the second most prevalent cancer among women. This study seeks to comprehensively explore these disparities and identify associated risk factors among women undergoing treatment for cervical cancer at tertiary hospitals in Chennai.
Methods: Participants (n=41) were recruited from October 2021 to May 2022 from five specialized oncology centers. Data on socio-demographic characteristics and medical history, were collected through face-to-face interviews.
Results: The study participants had a mean age of 54±8.26 years, with a majority from Chennai (44%) and Northern Tamil Nadu (36.5%). Common socio-demographic features included low educational attainment (46% with no formal education), rural residence (56%), and modest income levels. Significant risk factors identified included multiparity (Crude's OR 33.7), family history of cancer (Crude's OR 22.5), and advancing age.
Conclusions: Cervical carcinoma presents a substantial health burden among women in Chennai. This study identifies critical socio-demographic factors, including age, family history, and parity, as significant contributors to cervical cancer risk. The findings underscore the necessity for targeted public health interventions to enhance awareness and implement effective preventive strategies.

Keywords: Cervical cancer, Risk factors, Socio-demographic, India

INTRODUCTION

Cancer is a significant non-communicable disease that represents a considerable portion of the global burden of illnesses. It ranks as one of the leading causes of death worldwide, second only to cardiovascular disease.[1] The ongoing global demographic and epidemiological changes indicate an increasing burden of cancer in the coming decades, particularly in developing countries.[2] Cervical cancer ranks as the fourth most common cancer among women globally and is primarily caused by human papillomavirus (HPV). This virus, particularly high-risk types, initiates cervical intraepithelial lesions, which, if untreated, can advance to cervical carcinoma—a malignancy arising from the cells of the cervix.[3,4]

Cervical cancer is widely recognized as a "disease of disparity," with significant variations in both incidence and mortality rates between low and middle-income countries (LMICs) and high-income countries. Globally,

LMICs bear the overwhelming burden of cervical cancer, accounting for over 90% of all deaths attributed to the disease.[5] According to global estimates, approximately 604,127 new cases of cervical cancer and 341,831 deaths were reported in 2020.[6] In India, 453.02 million women aged 15 and older are at risk of cervical cancer. Annually, about 96,922 Indian women are diagnosed with cervical cancer, and tragically, 60,078 lose their lives to this disease, equivalent to one death every 8 minutes.[7] India's contribution to global cervical cancer statistics is substantial, accounting for 21% of new cases and 23% of deaths worldwide, surpassing previously leading countries like China.[8] Age-wise, cervical cancer predominantly affects women aged 50 to 59 in India, whereas in developed nations, the peak incidence typically occurs earlier, between 35 and 44 years of age.[9]

In the state of Tamil Nadu, the overall incidence rate of cancer stands at 84.2 per 100,000 populations, with higher rates observed among women than men. The cervical cancer ranks as the second most prevalent cancer among women in the state accounting for 20.6% of all cancers and is particularly prevalent in rural areas, where 80% of women belong to the low socio-economic strata.[10,11] With the projected population growth rate suggesting a 54% increase in new cervical cancer cases and a 61% rise in fatalities by 2040 compared to 2020, understanding the underlying risk factors becomes crucial.[12] Therefore, this study aims to comprehensively explore the risk factors among women with cervical cancer seeking care at tertiary hospitals in Chennai.

METHODS

This cross-sectional study was conducted from October 2021 to May 2022 at five leading tertiary healthcare institutions in Chennai, India. These institutions were selected for their specialized oncology departments and their ability to serve a diverse population of cervical cancer patients. The study included 41 participants diagnosed with cervical cancer, ranging from stage 0 to stage 4, who were attending the oncology outpatient departments (OPDs) of these hospitals. Inclusion criteria encompassed individuals undergoing treatment, in remission (either permanent or temporary), or under regular follow-up at these centers. Exclusion criteria excluded participants with multiple cancers, those in terminal stages of cancer, individuals with severe cancer cachexia, or those unable to effectively communicate or respond during the study period. The study employed purposive sampling to ensure a representative sample of cervical cancer cases across different stages and demographic backgrounds within the study sites. Face-to-face interviews were conducted with each participant to gather socio-demographic data, medical history, and details pertinent to cervical cancer risk factors using pre-tested structured questionnaire. These interviews were conducted in a private setting to ensure confidentiality and encourage candid responses from participants.

Statistical analysis was conducted using statistical package for the social sciences (SPSS) version 21.0 (SPSS Inc., Chicago, IL, USA). Data were analyzed using descriptive statistics, including frequency and percentage distributions. The association of potential risk factors with cervical cancer was assessed using logistic regression analysis. Crude odds ratios (ORs) and 95% confidence intervals (CIs) were calculated to identify the potential risk factors for cervical cancer and various socio-demographic variables.

RESULTS

Table 1 provides the socio-demographic characteristics of 41 study participants. The mean age of the study participants was 54±8.26 years. In terms of age distribution, the majority of participants (39%) fell within the 51 to 60 years age group, followed by those aged 41 to 50 years (27%) and 61 to 70 years (24.3%). Geographically, participants were predominantly from Chennai and its suburban areas (44%) or Northern Tamil Nadu (36.5%), with a notable representation from rural settings (56%). Marital status indicated that most participants were married (76%), while a significant minority reported being either deserted (22%) or separated (2%). Education levels varied widely, with 46% of participants having no formal education and 34.1% having education up to middle school. Regarding occupation, 44% were homemakers, and an equal percentage were daily wage workers (56%). The spouses of participants primarily engaged in daily wage work (71%). Family incomes were modest, with 71% earning between 5,000 and 15,000 rupees monthly. Health indicators revealed that a majority had a normal BMI (51%), breastfed for 12 to 18 months on average (61%), and had no family history of cancer (93%).

Table 1: Socio-demographic information of study participants (n=41).

Socio-demographic variables	Frequency	Percentage
Age (years)		
31–40	3	7.3
41–50	11	27
51–60	16	39
61–70	10	24.3
>70	1	2.4
Residing location		

Continued.

Socio-demographic variables	Frequency	Percentage
Chennai and its suburban	18	44
Northern TN*	15	36.5
Central TN**	4	9.7
Southern TN***	2	4.9
Outside TN (Andhra Pradesh and Puducherry)	2	4.9
Place of residence		
Rural	23	56
Urban	18	44
Marital status		
Married	31	76
Deserted	9	22
Separated	1	2
Education		
Uneducated	19	46
Primary school	4	9.7
Middle school	14	34.1
High school	2	4.9
Higher secondary/inter-mediate/diploma	2	4.9
Occupation (self)		
Homemakers	18	44
Daily wage workers	23	56
Occupation (spouse)		
Unemployed	12	29
Daily wage workers	29	71
Monthly income (family)		
Nil	5	12.2
<5,000	4	9.8
5,000–15,000	29	71
>15,001	3	7
Average body mass index (BMI)		
<16	5	12.2
16.1–18.4	3	7
18.5–24.9	21	51
25–29.9	10	24.3
>30	2	4.9
Consanguinity		
Yes	23	56
No	18	44
Number of children		
1	5	12.2
2	13	32
3–5	22	54
>5	1	2
Average breast feeding duration (in months)		
<12	7	17
12–18	25	61
>18	7	17
Underlying medical conditions		
Nil	23	56
Diabetes mellitus	12	29.2
Hypertension	3	7.3
Other ailments	3	7.3
Family history of cancer		
Yes	3	7.3

Continued.

Socio-demographic variables	Frequency	Percentage
No	38	93
Use of contraceptive pills/barrier		
Yes	2	4.9
No	39	95
Age of menarche (years)		
10–12	6	14.6
13–16	32	78
>17	3	7.3
Age at first coitus (years)		
≤18	27	66
19–35	14	34
Age of menopause (years)		
Not yet	6	14.6
≤40	6	14.6
41–50	23	56
>50	4	9.7
General importance given to health		
Very important	2	4.9
Fairly important**	35	85
Not important	4	9.7
Distance to health care facility (in km)		
≤3	25	61
4–8	13	31.7
9–28	3	7.3

*Northern Tamil Nadu (TN) – Chengalpattu, Cuddalore, Thiruvarur, Kanchipuram, Kallakurichi, Thirupattur, Tiruvannamalai, Tiruvallur, Dharmapuri, Kalpakkam, Salem, Vellore, Krishnagiri, Neyveli, Villupuram; **Central Tamil Nadu (TN) – Nagapattinam, Kumbakonam, Mayiladuthurai, Pudukkottai, Tiruchirappalli, Dindugal; ***Southern Tamil Nadu (TN) - Karaikudi, Sivagangai, Theni, Ramanadhapuram, Tirunelveli, Madurai; ****Traditional healers, private AYUSH practitioners

Table 2 provides significant risk factors for cervical cancer among the study participants, emphasizing crude odds ratios (OR), with 95% confidence intervals (CI), and associated p values. The Hosmer Lemeshow test for goodness of fit was not statistically significant X^2 (8) =13.31, p=0.1. The model explained 37% (Nagelkerke R^2) of variance in identifying potential risk factors and correctly classified 63% of cases**.** More number of children bore by a woman (OR 33.7), family history of cancer (OR 22.5) and their increasing age were found to be the potential risk factors.

Table 2: Potential risk factors for cancer cervix among study participants using logistic regression analysis.

Factors considered	Crude OR	95% CI for crude OR
Age (in years)	3.14	1.78–9.66
Education	2.7	1.73–5.97
Monthly income	1.44	1.11–3.58
Total number of children	33.7	3.62–148
Family history of cancer	22.5	1.18–29
Residence	1.4	2.07–4.96
General health importance	1.24	1.02–7.04
Distance of healthcare facility from residence (in km)	3	1.44–26.15

DISCUSSION

In comparing the findings of this study with existing literature on cervical cancer risk factors, several notable similarities and differences emerge. Our study, conducted among 41 participants, identified significant socio-demographic characteristics that align with broader trends observed in previous research.

The findings from this study on cervical cancer risk factors among participants in Chennai align closely with several previous studies, highlighting both similarities and distinctions. The mean age of our study participants, (54±8.26 years), mirrors the findings of Kashyap et al which reported a similar mean age of (54±9 years).[13]

Geographically, the present study showed that participants predominantly hailed from Chennai and its suburban areas (44%) and Northern Tamil Nadu (36.5%), with a notable representation from rural settings (56%). This distribution is reminiscent of Kashyap et al and Singh et al findings where rural residents comprised a significant portion of their study.[13,14]

Education levels in our study exhibited a wide variation, with 46% of participants having no formal education and 34.1% educated up to middle school, which mirrors the educational profile seen in studies by Thakur et al.[15]

Similarly, socio-economic status, although not statistically significant in our study, has been underscored as a significant factor in other research by Thakur et al and Kashyap et al.[13,15]

Age emerged as a prominent risk factor in our study exhibiting a significant odds ratio for cervical cancer. Kalavathy et al reported that higher education was associated with a notably lower odds ratio (OR: 0.05, 95% CI: 0.01-0.2), indicating a protective effect against cervical cancer. In contrast, our study did not identify education level as a significant factor in cervical cancer risk.[16] Multiparity also showed a substantial OR in our study, aligning closely with research Thakur et al which highlighted multiparity as a significant risk factor.[15]

Limitations

While this study contributes valuable insights into socio-demographic risk factors, it is essential to note the limitations. The study's small sample size of 41 participants from specific tertiary care hospitals in Chennai may not fully represent the diversity within Tamil Nadu or India as a whole. Future research should aim for larger, more diverse samples to enhance the generalizability of findings and further explore additional risk factors such as HPV infection status and genetic predispositions.

CONCLUSION

Cervical carcinoma remains a significant health concern among women in Chennai, echoing broader patterns observed in developing nations. This study has identified critical socio-demographic factors associated with cervical cancer risk among its participants. Specifically, factors such as age, Family history and number of children born were significant contributors to the disease burden among the study participants. The findings underscore the need for targeted public health interventions aimed at raising awareness about cervical cancer risk factors and promoting preventive measures among women.

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