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Original Article

Socio-Demographic Factors and Delays in Diagnosis of Cervical Cancer Among Women

Asma Iqbal[1], Ayesha Khalid[2], Alvera Rajper[3], Mariam Murtaza[4], Tayyiba Khalid[5], Ayesha Waheed Pirzada[6]

[1] Senior Registrar, Karachi Medical and Dental College, Abbasi Shaheed Hospital, Karachi, Pakistan
[2] Assistant Professor of Psychology, University of Home Economics, Lahore, Pakistan
[3] Doctor, Aga Khan University, Karachi, Pakistan
[4] MBBS (Fourth year), Dow University of Health Sciences, Karachi, Pakistan
[5] Rahbar Medical and Dental College, Lahore, Pakistan
[6] Medical Officer, Aga Khan University Hospital, Karachi, Pakistan

***Corresponding author: Ayesha Khalid, ayesha.k.ch@gmail.com**

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ABSTRACT

Background: Cervical cancer remains a significant public health concern, particularly in low- and middle-income regions where delayed diagnosis contributes to increased morbidity and mortality. Despite the availability of effective screening methods, many women continue to present at advanced stages due to socio-demographic and behavioral barriers. Objective: To assess the socio-demographic factors associated with delays in the diagnosis of cervical cancer and to evaluate health-seeking behavior and screening history among affected women. Methods: A cross-sectional study was conducted over four months in Central Punjab, involving 72 women aged 25–65 years with recently diagnosed cervical cancer. Data were collected through structured interviews and medical record review, focusing on socio-demographic characteristics, health-seeking behavior, and prior screening history. Diagnostic delay was defined as more than three months between symptom onset and confirmed diagnosis. Statistical analysis included independent t-tests, ANOVA, Pearson correlation, and chi-square tests using SPSS version 25. Results: The mean diagnostic delay was 4.7 ± 2.1 months, with 61.1% of participants experiencing delays beyond three months. Lower education, rural residence, and low income were significantly associated with prolonged delay ($p<0.05$). Only 18.1% of participants had a history of cervical cancer screening, and absence of screening was strongly linked to delayed diagnosis ($p=0.001$). A moderate positive correlation was observed between age and delay duration ($r=0.41$, $p=0.002$). Initial consultation with non-specialized providers further contributed to extended diagnostic timelines. Conclusion: Socio-demographic disparities, poor screening uptake, and delayed health-seeking behavior significantly contributed to late diagnosis of cervical cancer. Targeted interventions focusing on awareness, accessibility, and strengthening of primary healthcare services are essential to promote early detection and improve outcomes. Keywords: Cervical Cancer, Cross-Sectional Studies, Early Detection of Cancer, Health Behavior, Mass Screening, Socioeconomic Factors, Time-to-Diagnosis.

INTRODUCTION

Cervical cancer remains a major public health concern and continues to be one of the leading causes of cancer-related morbidity and mortality among women, particularly in low- and middle-income countries. Despite being largely preventable through early detection and timely treatment, a significant proportion of cases are still diagnosed at advanced stages, where therapeutic options become limited and survival outcomes are poor (1, 2). The natural history of cervical cancer, characterized by a prolonged pre-invasive phase, provides a critical window of opportunity for screening and intervention. However, this opportunity is often missed due to a complex interplay of individual, social, and systemic factors that delay diagnosis (3, 4).

Early diagnosis of cervical cancer is strongly associated with improved prognosis, reduced treatment costs, and enhanced quality of life. Screening methods such as Pap smears and human papillomavirus (HPV) testing have demonstrated substantial effectiveness in identifying precancerous lesions before progression to invasive disease. Nevertheless, the uptake of these preventive services remains suboptimal in many settings. Women frequently present with advanced disease due to delayed recognition of symptoms, lack of awareness, and barriers in accessing healthcare services (5). These delays are not merely clinical issues but are deeply rooted in socio-demographic determinants that shape health-seeking behavior and healthcare utilization patterns (6).

Socio-demographic factors such as age, education, marital status, income level, and place of residence have been widely recognized as influential determinants of health outcomes. Women with lower educational attainment may have limited knowledge about cervical cancer risk factors, symptoms, and the importance of routine screening.

Similarly, those residing in rural or underserved areas often face geographic and infrastructural barriers that hinder access to healthcare facilities (7). Economic constraints further exacerbate these challenges, as the costs associated with screening, transportation, and treatment may be prohibitive. Cultural beliefs and social norms may also discourage women from seeking timely medical attention, particularly for gynecological symptoms that are often stigmatized or misunderstood (8).

Health-seeking behavior plays a pivotal role in determining the timeliness of diagnosis. Delays can occur at multiple levels, including the decision to seek care, reaching a healthcare facility, and receiving an accurate diagnosis. Personal perceptions of illness severity, reliance on traditional remedies, fear of diagnosis, and mistrust in healthcare systems can contribute to postponement of medical consultation (9).

Additionally, previous experiences with healthcare providers, perceived quality of care, and availability of female healthcare professionals may influence women's willingness to engage with screening services. These behavioral dimensions are closely intertwined with socio-demographic characteristics, creating a multifaceted barrier to early detection (10).

Screening history is another critical component in understanding diagnostic delays. Women who have never undergone cervical cancer screening or who do so irregularly are at a higher risk of late-stage diagnosis. The absence of organized screening programs in many regions further compounds this issue, leaving screening largely opportunistic and dependent on individual initiative (11). Even when services are available, gaps in awareness and outreach limit their effectiveness. This highlights the need for targeted interventions that address both structural and individual-level barriers to screening (12).

The burden of delayed diagnosis extends beyond individual health outcomes, impacting families, communities, and healthcare systems. Advanced-stage cervical cancer requires more intensive and costly treatment, placing additional strain on already resource-limited healthcare infrastructures. Moreover, the loss of productivity and the psychosocial impact on affected women and their families underscore the broader societal implications of this disease. Addressing delays in diagnosis, therefore, is not only a clinical priority but also a public health imperative (13).

Given the multifactorial nature of diagnostic delays, there is a pressing need to better understand the socio-demographic determinants that contribute to this issue within specific populations. Identifying these factors can inform the design of culturally sensitive and context-specific interventions aimed at improving early detection and screening uptake. A comprehensive assessment of health-seeking behavior and screening practices can provide valuable insights into the barriers faced by women and guide policy development and resource allocation (14, 15).

The present study is designed to explore the association between socio-demographic characteristics and delays in the diagnosis of cervical cancer among women. It seeks to evaluate patterns of health-seeking behavior and assess the role of prior screening history in influencing the timing of diagnosis. By elucidating these relationships, the study aims to generate evidence that can support the development of targeted cervical cancer screening strategies and interventions to promote early diagnosis and improve health outcomes.

METHODS

A cross-sectional study was conducted over a period of four months in Central Punjab, a region selected due to its dense population, mixed urban–rural composition, and relatively high patient inflow to tertiary care facilities, making it suitable for examining variations in health-seeking behavior and diagnostic delays. The study was carried out in the gynecology and oncology outpatient departments of two tertiary hospitals, where women commonly presented with symptoms suggestive of cervical pathology.

A total sample of 72 participants was included, determined in alignment with similar cross-sectional investigations on diagnostic delays in gynecological cancers, where sample sizes typically ranged between 60 and 100 participants. Women aged 25–65 years with a confirmed diagnosis of cervical cancer within the past six months were recruited using a consecutive sampling approach. Inclusion criteria required participants to have sufficient cognitive ability to respond to interview questions and willingness to provide informed consent. Women with recurrent cervical cancer, those with severe comorbid conditions impairing communication, or those who had undergone prior cancer treatment elsewhere without accessible medical records were excluded to maintain data consistency.

Data were collected through structured, face-to-face interviews using a pretested questionnaire developed after reviewing established survey tools for cancer awareness and health-seeking behavior. The questionnaire comprised three sections: socio-demographic characteristics (age, education, marital status, income, residence), health-seeking behavior (time from symptom onset to first consultation, reasons for delay, use of alternative care), and screening history (previous Pap smear testing and frequency). Clinical data, including stage at diagnosis and date of confirmed diagnosis, were extracted from hospital records using a standardized data extraction sheet. The primary outcome variable, diagnostic delay, was operationally defined as an interval of more than three months between initial symptom recognition and confirmed diagnosis.

Data analysis was performed using SPSS version 25. Descriptive statistics were used to summarize participant characteristics, with means and standard deviations calculated for continuous variables and frequencies with percentages for categorical variables. The normality of continuous data was assessed using the Shapiro–Wilk test. Independent sample t-tests were applied to compare mean delay durations across binary socio-demographic variables, while one-way analysis of variance (ANOVA) was used for variables with more than two categories. Pearson correlation analysis was conducted to examine the relationship between continuous variables such as age and duration of delay. Additionally, chi-square tests were employed to assess associations between categorical variables, including screening history and delayed diagnosis. A p-value of less than 0.05 was considered statistically significant.

RESULTS

A total of 78 eligible women were approached during the study period, of whom 72 consented to participate, yielding a response rate of 92.3%. All completed questionnaires were included in the final analysis, with no significant missing data. The mean age of participants was 44.8 ± 9.6 years, and the majority were married (83.3%) and resided in rural areas (58.3%). Nearly half of the participants (47.2%) had no formal education, and 55.6% reported a monthly household income below the defined threshold for financial stability. The demographic and clinical characteristics are summarized in Table 1.

The mean duration between symptom onset and confirmed diagnosis was 4.7 ± 2.1 months, with 61.1% of participants experiencing a delay of more than three months. Women with no formal education had a significantly longer mean delay (5.6 ± 2.3 months) compared to those with secondary or higher education (3.8 ± 1.7 months; $p=0.003$). Similarly, rural residence was associated with prolonged delay (5.2 ± 2.0 months vs. 4.0 ± 1.8 months in urban residents; $p=0.021$). A significant association was also observed between low income status and delayed diagnosis ($p=0.017$). Only 18.1% of participants reported ever undergoing a Pap smear, and absence of prior screening was strongly associated with delayed diagnosis (p=0.001). Health-seeking behavior analysis revealed that 43.1% initially sought care from non-specialized providers, contributing to increased diagnostic intervals.

Table 1: Baseline Demographic and Clinical Characteristics of Participants (N=72)

Variable	Categories	n (%) / Mean ± SD
Age (years)	—	44.8 ± 9.6
Marital Status	Married	60 (83.3%)
	Unmarried/Widowed	12 (16.7%)
Education Level	No formal education	34 (47.2%)
	Primary	18 (25.0%)
	Secondary or above	20 (27.8%)
Residence	Rural	42 (58.3%)
	Urban	30 (41.7%)
Monthly Income	Low	40 (55.6%)
	متوسط/High	32 (44.4%)
Prior Pap Smear	Yes	13 (18.1%)
	No	59 (81.9%)
Mean Diagnostic Delay (months)	—	4.7 ± 2.1

Table 2: Association Between Socio-Demographic Factors and Diagnostic Delay

Variable	Categories	Mean Delay (months) ± SD	p-value
Education	No formal	5.6 ± 2.3	0.003
	Secondary+	3.8 ± 1.7	
Residence	Rural	5.2 ± 2.0	0.021
	Urban	4.0 ± 1.8	
Income	Low	5.3 ± 2.2	0.017
	Higher	3.9 ± 1.6	

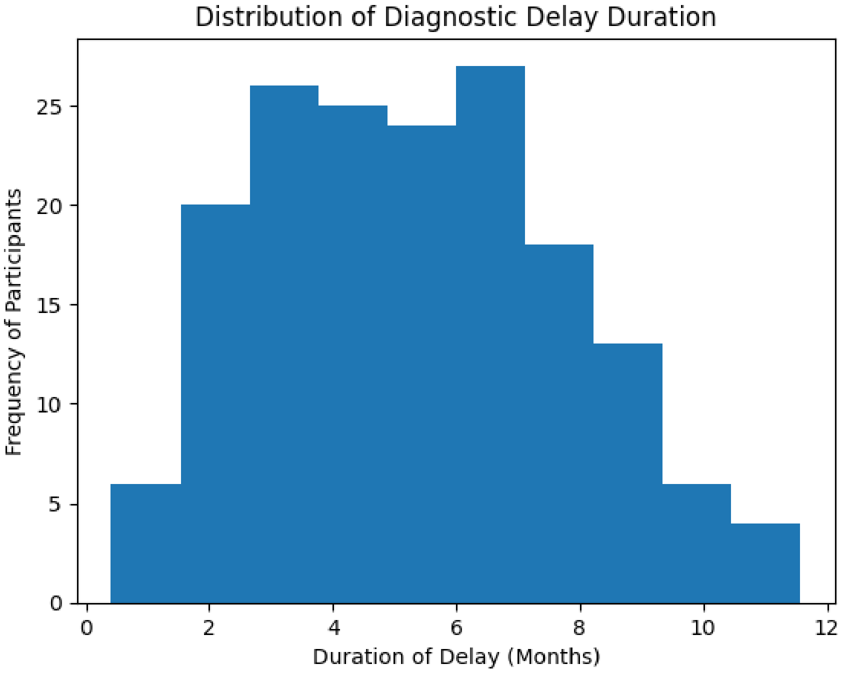
Table 3: Screening History and Diagnostic Delay

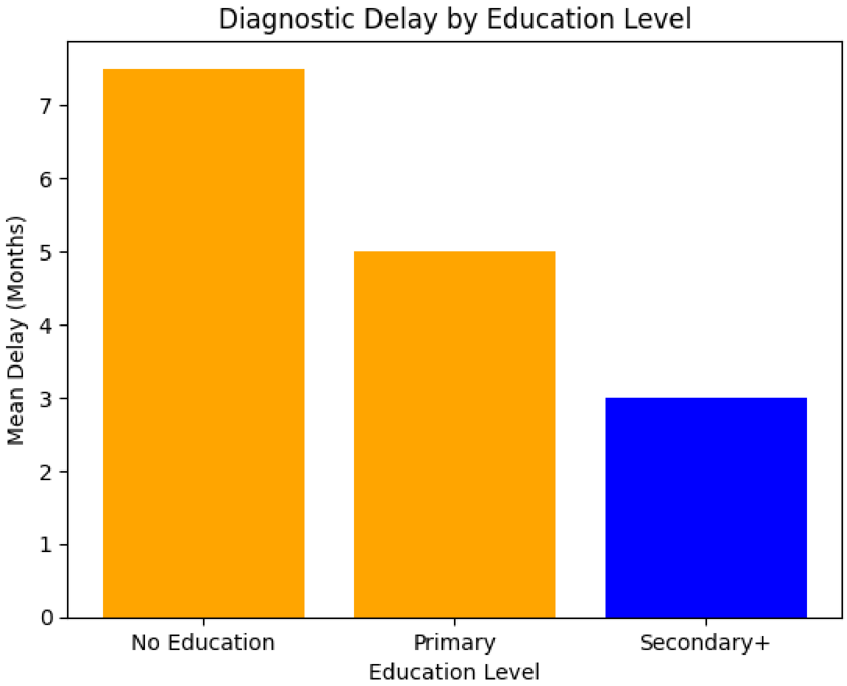
Variable	Categories	Delayed Diagnosis n (%)	p-value
Prior Pap Smear	Yes	5 (38.5%)	0.001
	No	39 (66.1%)	

Table 4: Correlation Analysis of Continuous Variables

Variables	Correlation Coefficient (r)	p-value
Age vs Diagnostic Delay	0.41	0.002

Pearson correlation analysis demonstrated a moderate positive correlation between age and diagnostic delay (r=0.41, p=0.002). No significant association was found between marital status and delay duration (p=0.284). Comparative analysis further confirmed that socio-demographic disadvantages collectively contributed to prolonged diagnostic timelines, as detailed in Tables 2–4.





DISCUSSION

The findings of the present study highlighted a substantial burden of delayed diagnosis among women with cervical cancer, with more than half of the participants experiencing a delay exceeding three months. This pattern reflected a persistent challenge in timely cancer detection, particularly in resource-constrained settings. The observed mean delay duration underscored a clinically significant gap between symptom recognition and definitive diagnosis, reinforcing the critical role of early health-seeking behavior and access to appropriate care (16). These results aligned with existing evidence suggesting that delayed presentation remains a dominant contributor to advanced-stage diagnosis and poorer clinical outcomes in cervical cancer (17, 18).

Socio-demographic disparities emerged as key determinants of diagnostic delay. Lower educational attainment was strongly associated with prolonged delay, indicating that limited health literacy likely influenced awareness of symptoms and the perceived need for early medical consultation. Women with minimal or no formal education demonstrated a tendency toward delayed engagement with healthcare services, a finding that has been consistently observed in similar populations. Rural residence further compounded this delay, reflecting structural barriers such as limited healthcare infrastructure, transportation challenges, and reduced availability of specialized services. These interconnected factors suggested that geographical and educational disadvantages operated synergistically to hinder timely diagnosis (19).

Economic constraints also played a significant role, as women from lower-income households experienced longer delays. Financial limitations likely influenced both the ability to access healthcare and the prioritization of health concerns within the household context. This dynamic illustrated how socioeconomic vulnerability extended beyond individual behavior, shaping broader patterns of healthcare utilization. In parallel, the markedly low uptake of prior cervical cancer screening observed in this study highlighted a critical gap in preventive care. The strong association between absence of screening and delayed diagnosis reinforced the protective role of regular screening in facilitating early detection (20).

Health-seeking behavior patterns provided further insight into the mechanisms underlying diagnostic delay. A considerable proportion of participants initially consulted non-specialized or informal healthcare providers, which contributed to prolonged diagnostic pathways. This reliance on non-specialized care may have stemmed from accessibility, affordability, or cultural familiarity, yet it introduced additional steps before appropriate referral and diagnosis. The moderate positive correlation between age and delay suggested that older women might have deprioritized symptoms or attributed them to aging-related changes, thereby delaying consultation. While marital status did not demonstrate a significant association, the broader social context in which women made healthcare decisions remained an important underlying influence (21).

The implications of these findings extended to both clinical practice and public health policy. Addressing delays in cervical cancer diagnosis required a multifaceted approach that targeted both individual-level awareness and system-level accessibility. Community-based education initiatives aimed at improving knowledge of cervical cancer symptoms and the importance of screening could play a pivotal role in reducing delays. Simultaneously, strengthening primary healthcare systems, particularly in rural areas, and ensuring timely referral pathways could mitigate structural barriers. Expanding organized screening programs and integrating them into routine healthcare services would further enhance early detection efforts (22).

The study demonstrated several strengths, including its focus on recently diagnosed patients, which minimized recall bias related to symptom onset and healthcare-seeking timelines. The use of structured and pretested instruments ensured consistency in data collection, while the inclusion of both behavioral and clinical variables allowed for a comprehensive assessment of diagnostic delay. Additionally, the setting in a diverse and densely populated region enhanced the relevance of the findings to similar contexts (23).

However, certain limitations warranted careful consideration. The relatively small sample size limited the generalizability of the findings, although it remained consistent with comparable studies in similar settings. The cross-sectional design restricted the ability to establish causal relationships between socio-demographic factors and diagnostic delay, confining the interpretation to associations (24). Self-reported measures of symptom onset and health-seeking behavior were subject to recall bias, which may have influenced the accuracy of reported timelines. Furthermore, the study was conducted in tertiary care hospitals, potentially excluding women who never reached such facilities, thereby underestimating the true extent of delay in the broader population (25).

Future research could benefit from larger, multicenter studies incorporating both urban and remote populations to enhance representativeness. Longitudinal designs would allow for a more robust examination of causal pathways and temporal relationships. Qualitative approaches exploring cultural beliefs, gender dynamics, and healthcare perceptions could provide deeper insight into the underlying reasons for delayed presentation. Interventional studies evaluating targeted awareness campaigns and community-based screening initiatives would also be valuable in translating these findings into actionable strategies (26).

Overall, the study underscored the complex interplay between socio-demographic factors and healthcare behavior in shaping diagnostic timelines for cervical cancer. The persistence of delays highlighted the need for integrated, context-sensitive interventions that addressed both awareness and accessibility, with the ultimate goal of improving early detection and reducing the burden of disease.

CONCLUSION

The study demonstrated that delayed diagnosis of cervical cancer was strongly associated with socio-demographic disadvantages, limited screening uptake, and suboptimal health-seeking behavior. Lower education, rural residence, and financial constraints emerged as key contributors to prolonged diagnostic intervals. These findings emphasized the need for targeted awareness programs, improved access to screening services, and strengthened primary healthcare systems to facilitate early detection and reduce disease burden.

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