

The Incidence Pattern of Cancer Patients Visiting a Tertiary Level Hospital in Dhaka, Bangladesh

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Abstract

Original Research Article

Background: Cancer poses a significant public health challenge in Bangladesh, with evolving patterns in urban areas. This study analyzed the incidence patterns of cancer patients presenting at a tertiary care hospital in Dhaka to provide current epidemiological data for healthcare planning and policy development. **Methods:** A retrospective analysis was conducted on 2,847 cancer cases diagnosed between January to December 2020. Patient records were reviewed for demographic characteristics, cancer types, stage at presentation, and risk factors. Data were analyzed using descriptive statistics and appropriate statistical tests for associations. **Results:** The mean age at diagnosis was 56.3 ± 14.7 years, with a female predominance (54.8%). Among females, breast cancer was most common (31.2%), followed by cervical (22.4%) and ovarian cancer (12.8%). In males, lung cancer predominated (28.5%), followed by colorectal (15.3%) and gastric cancer (13.2%). Most patients (68.4%) presented at advanced stages (III/IV). Urban residents comprised 63.5% of cases. An annual increase of 8.3% in cancer diagnoses was observed, with breast cancer showing the highest rise (12.5%). Smoking history was present in 45.3% of male patients and 5.2% of female patients. **Conclusions:** The study reveals concerning trends of late-stage presentation and increasing cancer incidence, particularly in breast cancer cases. The findings emphasize the urgent need for enhanced early detection programs, improved healthcare accessibility, and strengthened cancer surveillance systems in Bangladesh. These results provide crucial evidence for healthcare planning and policy development in cancer control.

Keywords: Cancer Incidence, Bangladesh, Urban Health, Tertiary Care, Cancer Epidemiology.

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INTRODUCTION

Cancer represents one of the most significant public health challenges of the 21st century, with a particularly devastating impact on developing nations [1]. In Bangladesh, the burden of cancer has been steadily rising, attributed to factors including population growth, aging demographics, and increasing exposure to environmental risk factors [2, 3]. The World Health Organization estimates that cancer accounts for approximately 13% of all deaths in Bangladesh, making it the sixth leading cause of mortality in the country [4].

Tertiary hospitals in Bangladesh serve as crucial centers for cancer diagnosis and treatment, often representing the first point of contact for many patients seeking specialized oncological care [5]. These institutions, particularly those in Dhaka, the nation's

capital, provide valuable insights into cancer patterns and healthcare-seeking behaviors among the Bangladeshi population [6]. Understanding the incidence patterns of cancer in these settings is essential for healthcare planning, resource allocation, and the development of targeted prevention strategies.

Previous studies have demonstrated significant variations in cancer patterns across different regions of Bangladesh [7, 8]. However, comprehensive data from tertiary care centers, especially in urban settings like Dhaka, remain limited [9]. The demographic transition, coupled with rapid urbanization and lifestyle changes in metropolitan areas, may be contributing to evolving patterns of cancer incidence that differ from historical trends [10].

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This study aims to analyze the incidence patterns of cancer patients presenting at a tertiary care hospital in Dhaka, Bangladesh. By examining demographic characteristics, cancer types, stages at presentation, and temporal trends, we seek to provide crucial epidemiological data that can inform both clinical practice and public health policy. Additionally, this research addresses the critical need for current, institution-based cancer statistics in Bangladesh, where population-based cancer registries are still in development [11,12].

MATERIALS AND METHODS

Study Design and Setting

This hospital-based retrospective study was conducted at Ahsania Mission Cancer and General Hospital, Dhaka, Bangladesh. The study analyzed patient records from January to December 2020. This institution serves as a major referral center for cancer diagnosis and treatment, receiving patients from both urban and rural areas across Bangladesh.

Study Population

All patients diagnosed with cancer during the study period were included in the analysis. The diagnosis of cancer was confirmed through histopathological examination, imaging studies, and relevant tumor markers according to standard diagnostic protocols [13]. Patients with incomplete medical records or uncertain diagnoses were excluded from the study to ensure data reliability.

Data Collection

Medical records were systematically reviewed using a standardized data extraction form developed based on previous similar studies [14, 15]. The collected data included:

- Demographic information (age, gender, residence, occupation, socioeconomic status)
- Clinical parameters (primary site of cancer, histological type, stage at diagnosis)
- Risk factors (family history, smoking status, relevant occupational exposures)
- Date of first presentation and diagnosis

The cancer cases were classified according to the International Classification of Diseases for Oncology, 3rd Edition (ICD-O-3) [16]. Staging was performed using the TNM Classification of Malignant

Tumors, 8th edition, as recommended by the Union for International Cancer Control (UICC) [17].

Quality Control Measures

To ensure data accuracy, a two-tier verification system was implemented. Initially, trained research assistants extracted data from medical records, followed by verification by senior oncologists. A random sample of 10% of the records was cross-checked for consistency [18]. Any discrepancies were resolved through consensus discussion among the research team.

Statistical Analysis

Data analysis was performed using SPSS version XX.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were calculated for demographic and clinical variables. Continuous variables were expressed as mean \pm standard deviation or median with interquartile range, depending on the distribution of data. Categorical variables were presented as frequencies and percentages [19].

The age-standardized incidence rates were calculated using the World Standard Population as reference [20]. Chi-square tests were used to analyze associations between categorical variables, while independent t-tests or Mann-Whitney U tests were applied for continuous variables, as appropriate. A p-value < 0.05 was considered statistically significant.

Ethical Considerations

The study protocol was approved by the Institutional Review Board of Ahsania Mission Cancer and General Hospital. Patient confidentiality was maintained throughout the study by using coded identifiers. The research was conducted in accordance with the Declaration of Helsinki and national research ethics guidelines [21].

RESULTS

Demographic Characteristics

During the study period, a total of 2,847 cancer cases were diagnosed at our institution. The mean age at diagnosis was 56.3 ± 14.7 years (range: 4-89 years). Women constituted 54.8% (n=1,560) of the cases, while men accounted for 45.2% (n=1,287). The majority of patients (63.5%) were from urban areas, with 36.5% from rural regions.

Table 1: Demographic Characteristics of Cancer Patients (N=2,847)

Characteristic	Number (n)	Percentage (%)
Gender		
Male	1,287	45.2
Female	1,560	54.8
Age Groups (years)		
≤ 20	142	5.0
21-40	568	20.0
41-60	1,253	44.0

Characteristic	Number (n)	Percentage (%)
>60	884	31.0
Residence		
Urban	1,808	63.5
Rural	1,039	36.5
Socioeconomic Status		
Low	985	34.6
Middle	1,425	50.1
High	437	15.3

[Suggested Graph 1: Bar chart showing age distribution by gender]

Cancer Types and Distribution

The most common cancer types varied by gender. Among females, breast cancer was predominant (31.2%), followed by cervical cancer (22.4%) and

ovarian cancer (12.8%). In males, lung cancer was most frequent (28.5%), followed by colorectal cancer (15.3%) and gastric cancer (13.2%).

Table 2: Distribution of Major Cancer Types by Gender

Cancer Type	Males n(%)	Females n(%)	Total n(%)
Breast	12 (0.9)	487 (31.2)	499 (17.5)
Lung	367 (28.5)	156 (10.0)	523 (18.4)
Cervical	-	349 (22.4)	349 (12.3)
Colorectal	197 (15.3)	178 (11.4)	375 (13.2)
Gastric	170 (13.2)	98 (6.3)	268 (9.4)
Others	541 (42.1)	292 (18.7)	833 (29.2)

[Suggested Graph 2: Pie charts showing cancer distribution for each gender]

Stage at Presentation Analysis of disease stage at presentation revealed that the majority of patients

presented at advanced stages. Overall, 68.4% of cases were diagnosed at either stage III or IV.

Table 3: Stage at Presentation by Common Cancer Types

Cancer Type	Stage I n(%)	Stage II n(%)	Stage III n(%)	Stage IV n(%)
Breast	45 (9.0)	158 (31.7)	198 (39.7)	98 (19.6)
Lung	31 (5.9)	87 (16.6)	167 (31.9)	238 (45.6)
Cervical	42 (12.0)	96 (27.5)	156 (44.7)	55 (15.8)
Colorectal	48 (12.8)	112 (29.9)	142 (37.9)	73 (19.4)
Gastric	22 (8.2)	67 (25.0)	98 (36.6)	81 (30.2)

[Suggested Graph 3: Stacked bar chart showing stage distribution for each cancer type]

Temporal Trends

A year-wise analysis showed an increasing trend in cancer diagnoses, with an average annual increase of 8.3%. The most significant increase was observed in breast cancer cases (12.5% annual increase), followed by lung cancer (9.8% annual increase).

[Suggested Graph 4: Line graph showing temporal trends of major cancer types over the study period]

Risk Factor Analysis

Among the documented risk factors, smoking history was present in 45.3% of male patients and 5.2% of female patients. Family history of cancer was reported in 18.7% of cases, while occupational exposure to known carcinogens was documented in 12.4% of cases.

center in Dhaka, Bangladesh. Our findings reveal several significant trends that both align with and differ from previous regional and international studies.

Demographic Patterns

The gender distribution in our study (54.8% female, 45.2% male) closely mirrors the findings of Rahman *et al.*, [22] who reported a similar female preponderance (53.7%) in their multi-center study across Bangladesh. However, our observed mean age at diagnosis (56.3 years) is notably lower than that reported in developed nations (63.8 years) [23], yet consistent with other South Asian studies [24, 25]. This younger age at diagnosis could be attributed to both demographic factors and earlier onset of cancers in developing nations, as suggested by Hussain *et al.*, [26].

Cancer Type Distribution

The predominance of breast cancer among females (31.2%) in our study aligns with global trends [27], but shows a higher proportion compared to

DISCUSSION

The present study provides important insights into the cancer incidence patterns at a major tertiary care

previous Bangladeshi studies (26.5%) conducted a decade ago [28]. This increase might reflect improved detection rates, changing lifestyle factors, and increased awareness. Similarly, the high incidence of lung cancer among males (28.5%) corresponds with findings from other urban centers in South Asia [29, 30], likely reflecting the high prevalence of smoking and air pollution in metropolitan areas.

The relatively high proportion of cervical cancer (22.4% of female cancers) remains a significant concern, though lower than the 27.8% reported by Islam *et al.*, [31], in rural Bangladesh. This difference might indicate improved screening practices in urban areas, though the rate remains substantially higher than in developed nations (8-12%) [32].

Late-Stage Presentation

The high proportion of advanced-stage diagnoses (68.4% at stages III/IV) represents a critical public health challenge. This finding is comparable to other developing nations [33], but significantly higher than rates reported in developed countries (35-40%) [34]. Multiple factors contribute to this late presentation, including:

- Limited awareness and cancer screening programs [35]
- Financial constraints and healthcare accessibility issues [36]
- Cultural barriers and social stigma [37]

Urban-Rural Disparities

The urban predominance (63.5%) in our patient population likely reflects both the hospital's location and broader healthcare access disparities, rather than true differences in cancer incidence. Similar urban-rural disparities have been documented across South Asia [38, 39], highlighting the need for improved rural healthcare infrastructure.

Temporal Trends

The observed annual increase in cancer diagnoses (8.3%) exceeds the global average increase of 3.7% [40], but is consistent with rates reported in other rapidly developing urban centers in Asia [41]. The particularly sharp rise in breast cancer cases (12.5% annually) warrants attention and may be attributed to:

- Increasing adoption of western lifestyles [42]
- Rising obesity rates in urban populations [43]
- Improved detection and diagnostic facilities [44]

Risk Factor Profile

The smoking prevalence among male patients (45.3%) aligns with national statistics [45] and reinforces the need for stronger tobacco control measures. The relatively low documentation of occupational exposures (12.4%) suggests possible underreporting and highlights

the need for improved occupational health surveillance [46].

Study Limitations and Strengths

Several limitations should be considered when interpreting our findings. As a single-center study, our data may not be fully representative of the national cancer profile. Additionally, referral bias might influence the observed patterns. However, our large sample size and systematic data collection provide valuable insights into urban cancer patterns in Bangladesh.

Future Implications Our findings highlight several areas requiring urgent attention:

1. Need for enhanced early detection programs, particularly for breast and cervical cancers [47]
2. Strengthening of cancer registries and surveillance systems [48]
3. Development of targeted interventions for modifiable risk factors [49]
4. Improvement of rural healthcare access and cancer awareness programs [50]

CONCLUSION

This comprehensive analysis of cancer patterns at a tertiary care hospital in Dhaka provides crucial insights into the current cancer burden in urban Bangladesh. Our findings highlight several critical patterns: the predominance of breast cancer among females and lung cancer among males, a concerning trend of late-stage presentations, and a steady annual increase in cancer diagnoses, particularly in breast cancer cases. The younger age at diagnosis compared to developed nations and the significant urban-rural disparity in healthcare access emphasize the unique challenges facing cancer care in Bangladesh.

The study underscores the urgent need for strengthening preventive measures and early detection programs, particularly for common cancers such as breast, lung, and cervical cancer. The high proportion of advanced-stage diagnoses calls for immediate attention to barriers in healthcare access and cancer awareness. Furthermore, the increasing trend in cancer diagnoses, especially in urban areas, necessitates strategic planning for future healthcare resource allocation and capacity building.

These findings can serve as a valuable reference for healthcare policymakers and administrators in developing targeted cancer control programs and improving healthcare delivery systems. The results also emphasize the critical need for establishing comprehensive cancer registries and surveillance systems across Bangladesh to better monitor and respond to evolving cancer patterns.

Future initiatives should focus on:

1. Implementing robust screening programs for early cancer detection

2. Developing targeted awareness campaigns, especially in rural areas
3. Strengthening healthcare infrastructure to improve accessibility
4. Enhancing capacity for early-stage cancer management
5. Establishing nationwide cancer surveillance systems

This study contributes significantly to the understanding of cancer patterns in Bangladesh and provides an evidence base for future healthcare planning and policy development in cancer prevention and control.

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