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Original Article

Delayed Presentation and Its Impact on Outcome in Head and Neck Squamous Cell Carcinoma

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ABSTRACT

Background: Head and neck squamous cell Carcinoma (HNSCC) pose a significant global health burden, with diverse risk factors and tumor sites complicating management. Delayed presentation often results in advanced-stage disease, necessitating more aggressive treatment and contributing to higher recurrence and mortality, highlighting the importance of assessing its impact on tumor stage, treatment modalities, and clinical outcomes. **Objective:** To assess the impact of delayed presentation on tumor stage, treatment, and outcomes in patients with head and neck squamous cell Carcinoma. **Methods & Materials:** A prospective study was conducted at the Department of Otolaryngology–Head & Neck Surgery, Bangladesh Medical University, Dhaka, Bangladesh, from January 2025 to December 2025, including 120 patients with histopathologically confirmed head and neck squamous cell carcinoma. Data on demographics, tumor site and stage, delay before presentation, treatment, and outcomes were collected. Statistical analysis was performed using IBM SPSS Statistics 26 with descriptive statistics and chi-square tests ($p < 0.05$). **Results:** Mean age was 52.5 ± 11.7 years; 68.3% were male and 58.3% from rural areas. Larynx (37.5%) and oral cavity (29.2%) were most common. Advanced-stage disease (III–IV) was seen in 65.0%, increasing with delay: 45.0% (<3 months), 66.7% (3–6 months), 85.7% (>6 months) ($p < 0.001$). Surgery ± adjuvant therapy was most frequent (50.0%). Recurrence and mortality rose with delay: 15.0%, 26.7%, 42.9% and 10.0%, 17.8%, 34.3% ($p = 0.006$, 0.008). **Conclusion:** Delayed presentation is strongly linked to advanced-stage disease, higher recurrence, and mortality, highlighting the need for early detection and timely treatment..

Keywords: *Delayed Presentation, Head and Neck Squamous Cell Carcinoma, Clinical Outcomes.*

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INTRODUCTION

Head and neck squamous cell Carcinoma (HNSCC) constitute a significant public health challenge worldwide, ranking among the most frequently diagnosed malignancies. Annually, more than 500,000 new cases of HNSCC are reported, making these tumors the fifth most common type of cancer globally [1]. In the Southeast Asian region, HNSCC represents approximately 8–10% of all cancer diagnoses and remains one of the most prevalent malignancies [2]. Overall, worldwide estimates indicate that HNSCC is the seventh most common cancer, with roughly 600,000 new cases and 250,000 deaths recorded each year [3,4]. These statistics highlight the substantial global burden of squamous cell Carcinoma of the head and neck and emphasize the necessity for early detection and prompt management.

HNSCC includes a heterogeneous group of malignant tumors arising from the squamous epithelium of various anatomical locations, such as the nasopharynx, oropharynx, oral cavity, larynx, and hypopharynx. Among these, the oral cavity, oropharynx, hypopharynx, and larynx are the most commonly affected sites [5]. Key risk factors contributing to HNSCC include tobacco consumption, alcohol use, human papillomavirus (HPV) infection, occupational exposures, dietary habits, and family history [6]. The diversity in tumor location and associated histopathology presents challenges in timely diagnosis, treatment selection, and prognostication, underscoring the complex nature of managing head and neck squamous cell Carcinoma.

Delayed presentation remains a prevalent and critical issue in patients with HNSCC. Evidence consistently shows that postponement in diagnosis is associated with larger tumor size, more advanced disease stage, and poorer survival outcomes, with five-year survival rates declining from nearly 80% for small tumors to approximately 30% for stage IV disease [7–9]. Many patients are initially identified at advanced stages due to subtle or absent early symptoms, limited awareness, or failure of primary healthcare providers to recognize early warning signs [10,11]. Such delays in both diagnosis and treatment initiation can result in tumor progression, necessitate more extensive therapeutic interventions, and are associated with higher rates of recurrence and mortality [12-14]. Observational data from African cohorts indicate that up to 83% of patients present with stage III or IV disease, often requiring complex surgical procedures and multimodal treatment strategies [15,16].

Despite the recognized impact of delayed presentation on patient outcomes, there remain significant gaps in understanding the factors that contribute to such delays [17]. Limited studies have investigated the combined influence of patient-related and healthcare system–related delays on oncologic outcomes, and prior reviews have largely focused on survival rather than functional outcomes or quality of life [18,19]. Moreover, research addressing the determinants and consequences of delayed presentation in South Asia, including Bangladesh, remains scarce. To bridge this gap, the present study was designed to assess the effect of delayed presentation on tumor stage, treatment approaches, and clinical outcomes in patients with head and neck squamous cell Carcinoma.

OBJECTIVE

To assess the effect of delayed presentation on tumor stage, treatment modalities, and clinical outcomes in patients with head and neck squamous cell Carcinoma.

METHODS & MATERIALS

This prospective observational study was conducted at the Department of Otolaryngology–Head & Neck Surgery, Bangladesh Medical University (BMU), Dhaka, Bangladesh, from January 2025 to December 2025. A total of 120 patients diagnosed with head and neck squamous cell carcinoma (HNSCC) were included, selected based on predefined inclusion and exclusion criteria. Data were collected to assess the impact of delayed presentation on tumor stage, treatment modalities, and clinical outcomes.

Inclusion Criteria:

- Patients of all ages and both sexes.
- Histopathologically confirmed HNSCC.
- Patients presenting for initial evaluation and treatment at BMU.

Exclusion Criteria:

- Patients with recurrent HNSCC.
- Patients who had received prior treatment (surgery, radiotherapy, or chemotherapy).
- Patients with incomplete clinical records or missing follow-up data.

Data Collection

Demographic data (age, sex, residence) and clinical details including tumor site, stage at presentation, and duration of symptoms before presentation were collected through structured interviews and review of medical records. Delay in presentation was categorized into three groups: <3 months, 3–6 months, and >6 months from symptom onset to first hospital consultation.

Tumor Staging and Treatment

Tumors were staged according to the AJCC/UICC TNM classification. Treatment modalities were recorded, including surgery with or without adjuvant therapy, radiotherapy alone, and chemoradiation, based on tumor site, stage, and patient suitability.

Outcomes

The primary outcomes were the proportion of patients presenting with advanced-stage disease (Stage III–IV), distribution of treatment modalities, and clinical outcomes including recurrence and mortality. Follow-up data were collected until the end of the study period.

Statistical Analysis

Data were entered and analyzed using IBM SPSS Statistics version 26.0. Continuous variables, such as age, were summarized as mean ± standard deviation (SD), while categorical variables, including sex, residence, tumor site, stage, delay category, and treatment modality, were expressed as frequencies (n) and percentages (%). The chi-square test was used to assess associations between delay in presentation and advanced-stage disease, recurrence, and mortality. A p-value <0.05 was considered statistically significant.

RESULTS

Table I presents the age, sex, and residence distribution of the study participants. The mean age was 52.5 ± 11.7 years. Most patients were males (82, 68.3%) and from rural areas (70, 58.3%).

Table I
Demographic Characteristics of the Study Population (*n* = 120).

Variable		Frequency (n)	Percentage (%)
Age (years)	<40	18	15.0
	40–59	58	48.3
	≥60	44	36.7
	Mean ± SD	52.5 ± 11.7	
Sex	Male	82	68.3
	Female	38	31.7
Residence	Rural	70	58.3
	Urban	50	41.7

Table II summarizes the primary tumor sites and stage at presentation. The larynx was the most common tumor site (45, 37.5%), followed by oral cavity (35, 29.2%). A majority of patients presented with advanced-stage disease (Stage III–IV: 78, 65.0%).

Table II
Tumor Site and Stage at Presentation of Patients (*n* = 120).

Variable		Frequency (n)	Percentage (%)
Tumor Site	Larynx	45	37.5
	Oral cavity	35	29.2
	Oropharynx	25	20.8
	Hypopharynx	15	12.5
Stage at Presentation	I–II	42	35.0
	III–IV	78	65.0

Table III shows the relationship between delay in presentation and advanced-stage disease. Patients with longer delays had progressively higher rates of Stage III–IV tumors, from 45.0% in those presenting within 3 months to 85.7% in patients with delays over 6 months (p < 0.001).

Table III
Association Between Delay in Presentation and Advanced Stage Disease (*n* = 120).

Delay Category	Total Patients (n, %)	Patients with Advanced Stage (III–IV) (n, %)	p-value
< 3 months	40 (33.3)	18 (45.0)	<0.001
3–6 months	45 (37.5)	30 (66.7)	
> 6 months	35 (29.2)	30 (85.7)	

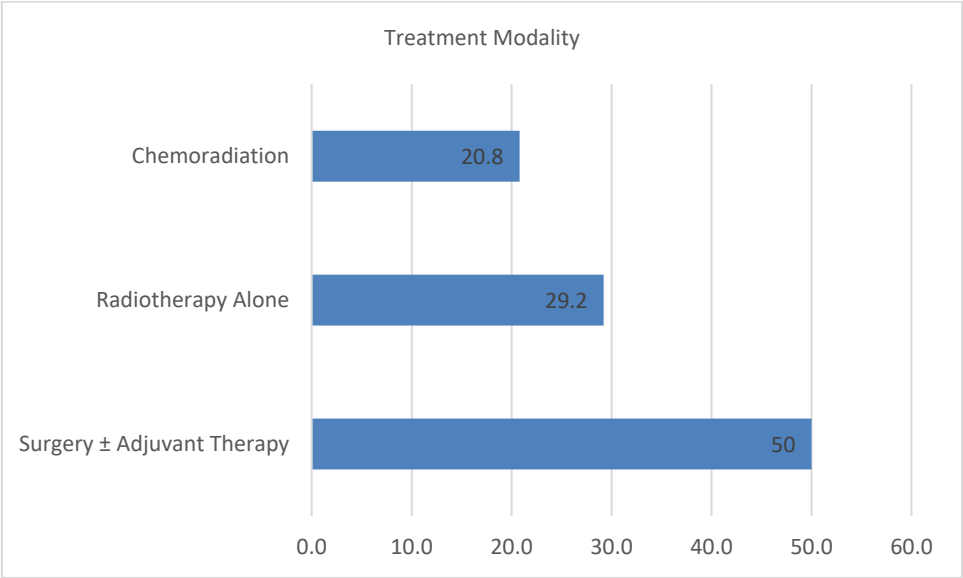

Figure I Distribution of Treatment Modalities Among Patients (*n* = 120).

Figure I illustrates the distribution of treatment modalities among patients. Surgery with or without adjuvant therapy was the most common treatment (60, 50.0%), followed by radiotherapy alone (35, 29.2%) and chemoradiation (25, 20.8%).

Table IV presents recurrence and mortality rates according to delay in presentation. Patients with longer delays (>6 months) had significantly higher recurrence (15, 42.9%) and mortality (12, 34.3%) compared to early presenters (<3 months) (recurrence: 6, 15.0%; mortality: 4, 10.0%) (p = 0.006 and 0.008, respectively).

Table IV
Patient Outcomes According to Delay Category (*n* = 120).

Outcome	< 3 months (n=40)	3–6 months (n=45)	> 6 months (n=35)	p-value
Recurrence (n, %)	6 (15.0)	12 (26.7)	15 (42.9)	0.006
Mortality (n, %)	4 (10.0)	8 (17.8)	12 (34.3)	0.008

DISCUSSION

In this prospective observational study conducted at the Department of Otolaryngology–Head & Neck Surgery, Bangladesh Medical University, a significant proportion of patients with head and neck squamous cell carcinoma (HNSCC) presented at advanced stages, with the larynx and oral cavity being the most commonly affected sites. Most patients were male and from rural areas, and delays in presentation were strongly associated with higher tumor stage, more aggressive treatment modalities, and increased rates of recurrence and mortality, emphasizing the critical impact of timely diagnosis and early intervention in this population.

In the present study, the majority of patients with HNSCC were aged 40–59 years (48.3%), followed by those ≥60 years (36.7%), with a mean age of 52.5 ± 11.7 years, indicating that middle-aged and older adults constitute the predominant affected population. This finding is consistent with Sharma et al., who reported that most patients were aged 50–70 years [20], reflecting a similar age distribution. A clear male predominance was observed in our cohort (68.3% males), which aligns with Sharma et al. (78.9% males) [20], Abraham et al. (66.3% males) [21], and Rastogi et al. (84.3% males) [22], reinforcing the well-established male preponderance in HNSCC. Regarding residence, 58.3% of patients were from rural areas, comparable to Sharma et al., where 63.9% of patients were rural [20], suggesting that rural populations may be at higher risk, possibly due to differences in lifestyle, occupational exposures, and healthcare access. Overall, the demographic profile of our study population mirrors patterns reported in previous regional and international studies, supporting the generalizability of these epidemiological trends.

In the present study, the larynx was the most commonly affected tumor site (37.5%), followed by the oral cavity (29.2%), oropharynx (20.8%), and hypopharynx (12.5%). The majority of patients (65.0%) presented with advanced-stage disease (stage III–IV), whereas only 35.0% presented at early stages (I–II). These findings are consistent with previous reports from similar clinical settings. Asefa et al., in a study of 102 patients with HNSCC, reported that 59.8% of patients presented with advanced-stage disease [23], closely aligning with our observation of 65.0% and confirming that late-stage presentation is common. Similarly, Gilyoma et al. found that the oral cavity was the most frequent anatomical site (37.3%) and that nearly all patients (95.9%) presented with advanced-stage disease [24], supporting both our observations regarding oral cavity prevalence and the predominance of advanced-stage presentation. Collectively, these findings underscore that delayed presentation remains a critical factor contributing to advanced-stage disease in HNSCC, particularly in resource-limited settings, emphasizing the urgent need for early detection programs and public health interventions.

A clear relationship was observed between the duration of delay in presentation and the proportion of patients presenting with advanced-stage disease. Among patients who presented within 3 months of symptom onset, 45.0% had stage III–IV disease, whereas this proportion increased to 66.7% in those presenting between 3–6 months and further to 85.7% in patients with delays exceeding 6 months ($p < 0.001$). These findings indicate that longer delays in seeking medical care are strongly associated with a higher likelihood of advanced-stage presentation. Similar observations were

reported by Pitchers et al., whose retrospective study on oropharyngeal squamous cell carcinoma demonstrated that delays in referral to secondary care were positively associated with more advanced stage at first presentation and were also linked to poorer survival [25]. Together, these results underscore the critical impact of delayed presentation on disease progression in HNSCC, highlighting the importance of timely recognition of symptoms, prompt referral, and early intervention to improve patient outcomes.

In the present study, surgery with or without adjuvant therapy was the most commonly employed treatment modality, administered to 50.0% of patients, followed by radiotherapy alone (29.2%) and chemoradiation (20.8%). These findings reflect the prevalent use of multimodal treatment approaches in HNSCC, particularly for locoregionally advanced disease. Fekadu et al. reported that radiotherapy is an important definitive or adjuvant modality, used either alone or following surgery, with combined approaches frequently employed in advanced cases [26], supporting our observation that surgery with adjuvant therapy and chemoradiation constitute a major portion of management strategies. Similarly, Hansen et al. demonstrated in a large cohort that definitive radiotherapy was used in a substantial proportion of patients, while chemoradiation was also commonly applied, especially in advanced-stage tumors, and surgery alone was less frequent [27]. Collectively, these studies confirm that contemporary management of HNSCC often relies on a combination of surgery, radiotherapy, and chemoradiation, consistent with the treatment patterns observed in our cohort.

Patient outcomes were closely associated with the duration of delay in presentation. Recurrence rates increased progressively from 15.0% among patients presenting within 3 months to 26.7% for those presenting between 3–6 months, and 42.9% in patients with delays exceeding 6 months ($p = 0.006$). Similarly, mortality rose from 10.0% in early presenters to 17.8% and 34.3% in the intermediate and prolonged delay groups, respectively ($p = 0.008$). These findings demonstrate that prolonged delays in seeking care are strongly linked to both higher recurrence and increased mortality in HNSCC. This is consistent with the study by He et al., which analyzed data from the SEER database and found that treatment delays were associated with worse overall survival and cancer-specific survival in patients with lip, oral cavity, oropharyngeal, and laryngeal cancers [28], indicating that longer delays substantially increase mortality risk. Similarly, Graboyes et al., in a systematic review of 18 studies, reported that delays in diagnosis and initiation of treatment were frequently associated with poorer survival outcomes across multiple time-to-treatment intervals [18], confirming that prolonged delays adversely affect oncologic outcomes. Together, these results underscore the critical importance of early recognition of symptoms, prompt diagnosis, and timely initiation of treatment to reduce recurrence and improve survival in patients with HNSCC.

LIMITATIONS

This study had some limitations:

- The sample size is relatively small, potentially affecting the statistical power to detect associations for less common tumor sites or outcomes.
- The study was conducted at a single tertiary care center, which may limit the generalizability of findings to other regions or healthcare settings.
- Outcomes such as recurrence and mortality were assessed within a limited follow-up period, which may not capture long-term survival or late recurrences.

CONCLUSION

Head and neck squamous cell Carcinoma often pose challenges due to delayed diagnosis and complex management. This study demonstrates that delayed presentation is strongly associated with advanced-stage disease, more aggressive treatment, and poorer clinical outcomes. Most patients were middle-aged or older, predominantly male, and from rural areas, with the larynx and oral cavity being the most common tumor sites. Longer delays were correlated with higher rates of advanced-stage tumors, increased recurrence, and higher mortality, while surgery with or without adjuvant therapy was the most frequently employed treatment. These findings underscore the critical importance of early detection, prompt diagnosis, and timely intervention to improve survival in patients with head and neck squamous cell carcinoma.

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CONFLICTS OF INTEREST

There are no conflicts of interest.

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