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The Underlying Link: The Influence of Oral Health on Emergency Departement Visits and the Management of Chronic Diseases in a Tertiary Hospital - An Interdisciplinary Approach

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Abstract

Background: Oral health is often neglected within secondary and tertiary care services, even though it has a critical connection with systematic ailments. This research aimed to look at the association between oral health, chronic illness, and emergency department (ED) visit frequency in the context of a tertiary care hospital.

Methods: A mixed-method study approach was used, consisting of a cross-sectional study with 120 adult patients attending the ED or internal medicine wards. Participants were subject to clinical oral examinations, chart reviews, and structured interviews. Quantitative data were computed through descriptive statistically and inferentially; qualitative data were subject to thematic analysis.

Results: Seventy percent of participants had moderate to severe periodontal disease, and 36.7% had ≥3 ED visits in the past year, primarily for dental-related issues. Patients with diabetes and hypertension showed significantly higher oral disease burden. Thematic analysis revealed barriers to care, lack of awareness about oral-systemic links, and reliance on EDs for untreated dental issues.

Conclusion: Compromised oral health leads to chronic disease in patients and contributes to de facto preventable ED attendance. The primary care systems could alleviate the difficulties patients face and improve their outcomes by incorporating oral health into primary care pathways.

Keywords: Oral health, Emergency department, Chronic disease, Tertiary hospital, Periodontal disease, Health services integration, Interdisciplinary care

Introduction

Recognizing oral health as an integral pillar of overall well-being has not been integrated into hospital based care. Within a tertiary care context, the lack of overlap between dentistry and medicine results in a missed window of opportunity for early diagnosis and prevention—a gap that is particularly salient in chronic disease and frequent emergency department (ED) utilizers. This fragmentation reinforces the

vicious cycle of preventable dental-related hospital admissions and prolonged hospital stays with systemic outcomes deterioration for vulnerable populations.

Research strongly supports the two-way connection between poor oral health and systemic diseases such as diabetes, cardiovascular disease, and respiratory illness. Further evidence suggests that dental issues are a major contributing factor to unnecessary ED visits, especially within socio-economically marginalized populations and complicated medically fragile patients (Allareddy et al.; Acharya et al.). In one example, Kruger and Tennant (2016) observed rising trends in oral health-related hospitalizations associated with frailty among older adults, attributing this trend to insufficient dental care access in the context of frailty.

Even with the noted associations, oral health remains absent from inpatient screenings chronic disease management, and even in emergencies. Worsening oral health during hospitalization as well as exacerbating pre-existing conditions and hindering recovery has been well documented by Gibney et al. (2017). On the other hand, Choi et al. demonstrated how oral hygiene protocols in intensive care units decrease associated complications such as ventilator-associated pneumonia. There is no question that oral care contributes to systemic outcomes.

This specific research intends to address the gaps of poor oral health that leads to increased emergency visits and escalated chronic disease management in a tertiary hospital. Concerned with the gaps of current practices in integrated care systems, this study adapts intersectional approaches from dentistry, emergency, internal medicine, and social work. The overarching aim of this study is to inform policy, education, and clinical initiatives that advocate for the integration of oral health into hospital services.

Literature review

The Role of Oral Health in Comprehensive Health

The systematic well-being, which has grown to be documented over the years, remains neglected clinically and operationally in the context of hospitals. This is particularly true regarding oral health. It is often assumed that poor oral health directly results in dental ailments, but in fact, it also leads to the exacerbation of chronic illnesses, increase in emergency department visits, and an uptick in preventable hospital admissions — especially acute care hospitals.

Oral Health and Emergency Department Utilization

Numerous studies have highlighted that dental conditions are a substantial and avoidable contributor to emergency department usage. In a broad study on hospital-based Emergency Department (ED) visits, Allareddy et al. (2014) reports that dental presentations are associated with comorbidities and systemic health and are largely under-diagnosed, which leads to higher resource utilization and worse outcomes. These visits happen primarily because of inadequate access to essential dental services, a failure to seek timely care, and the existing disconnect between the dental and medical care systems.

Burden of Chronic Diseases and Their Oral-Systemic Connections

The association between oral health and chronic diseases is increasingly recognized as being bi-directional. Periodontitis has been associated with the glycemic control cardiovascular inflammation and even with adverse respiratory episodes. Kruger and Tennant (2016) noted that many older adults admitted into tertiary hospitals suffer from dental problems which make chronic disease processes more complex. These conclusions emphasize the value of incorporating oral health evaluation in all-encompassing chronic disease management strategies.

Dental Conditions Leading to Hospital Admissions That Can Be Prevented

The majority of dental-related hospital admissions are considered preventable according to systematic literature reviews. Acharya et al. (2018) identified abscesses, caries, and periodontal infection as common secondary diagnoses for avoidable inpatient care. They further emphasized that social inequities, especially among Indigenous and socioeconomically disadvantaged groups, experience a disproportionate higher associated burden of dental admissions.

Decline in Oral Health as a Result of Hospitalization

Tertiary hospitals usually have no guidelines dealing with the maintenance of daily oral hygiene procedures, leading to hygiene care neglect for older or more disabled patients. Day 7 of hospitalization was associated with the culmination of a myriad of complications such as malnutrition, infection, and prolonged recovery brought about by infection. Gibney et al. (2017) has shown that there is a measurable decline in oral health from the time hospitalized patients are admitted to the seventh day of hospitalization.

Oral Hygiene Interventions and Systemic Outcomes

Oral hygiene actions—or the lack thereof—can have a direct impact on systemic outcomes, as some studies suggest. Choi et al. (2022) note that professional oral hygiene care in intensive care units markedly lowered the incidence of ventilator-associated pneumonia in trauma patients. This not only demonstrates the importance of oral care but also its cost-effectiveness and clinical value in acute care settings.

Collectively, these studies strengthen the position that the patient's oral health status, especially in tertiary care settings, should be managed and not ignored. There is, however, scant attention toward interdisciplinary collaboration, which points toward a strong need for integrated models with dentists, emergency care practitioners, social workers, and internal medicine specialists. Building from this gap, my focus in this study is within a multidisciplinary framework examining the systemic, sociological, and institutional neglect impacts of oral health in tertiary frameworks.

Methodology

Study Design and Setting

In the period spanning January to September of 2022, a mixed-methods, cross-sectional study was carried out at a tertiary-care teaching hospital. Its goal was to assess the consequences of inadequate oral heath on emergency department (ED) visits and chronic disease management from the dental, medical, social, and emergency service angles. An ethics approval was obtained from the hospital's ethics board.

Participants and Recruitment

The study population consisted of adult patients (≥ 18 years) who attended the ED or were admitted into the General Internal Medicine Wards and satisfied at least one of the criteria below:

- An reported or observed dental problem (e.g. tooth pain, abscess, periodontal disease)
- Chronic illnesses (e.g. diabetes, heart disease)
- Repeatedly visiting the emergency department in the past year

Patients were recruited through a multidisciplinary team including a dentist, internal medicine physician, Paramedic Liaison, and hospital social worker, making use of electronic health records to conduct the initial screening. A total of 120 patients were recruited through convenience sampling.

Data Collection

The study data was collected in three steps:

1. Clinical Evaluation

An oral health assessment using DMFT Index and Community Periodontal Index (CPI) was carried out by a dentist using the dental chart at the hospital.

2. Medical and ED Utilization Review

Withdrawal from the medical records encompassed chronic illnesses, medication consumption, history of hospitalizations, and the number of inpatient visits over the past year.

3. Structured Interviews

As part of the research, the social worker and paramedic team conducted semi-structured interviews to address the identified gaps related to dental care access, knowledge of systemic links and health-seeking behavior. The recorded interviews were subsequently transcribed for qualitative analysis.

Data Analysis

The quantitative information was processed using SPSS v27. Descriptive statistics presented the patients' demographic information, their oral health, and the prevalence of chronic illnesses. The relationship between poor oral health and the frequency of ED visits or hospitalizations was evaluated using chi-square and logistic regression analyses.

Data from qualitative interviews were analyzed using NVivo. From the analysis, a variety of codes were created which focused on common themes such as access barriers, dental care costs, and the societal perception of oral-systemic health connections.

Interdisciplinary Collaboration

In the course of the study, other colleagues also contributed from their respective disciplines in interpreting the data. Subject-specific input was gained from the dentist's oral health scoring, the internal medicine physician's chronic disease pattern analysis, the paramedic's pre-hospital oral emergencies assessment, and the socio-economic factors integration by the social worker. This approach provided the complexity needed to understand the problem concerning the use of hospital resources in relation to oral health.

Quantitative Findings

Overview

The quantitative analysis consisted of 120 participants and their findings organized around demographics, emergency department (ED) utilization, and the relationship of chronic disease to oral health. Three tables were created and are summarized in prose below.

Table 1: Demographic, Oral Health, and Clinical Characteristics

The sample features middle-aged and elderly individuals with a high burden of oral disease. Most participants experienced moderate to severe forms of periodontal disease along with common chronic conditions of diabetes and hypertension. More than a third of participants reported having multiple ED visits within the last year.

Variable	**Value**
Total Participants	120
Average Age (years)	58.2 ± 13.4
Gender (Male)	68 (56.7%)
DMFT Score (Mean ± SD)	12.1 ± 4.3
Periodontal Disease (Moderate–Severe)	84 (70%)
Diabetes Mellitus	49 (40.8%)

Variable	Value
Hypertension	65 (54.2%)
≥3 ED Visits in Previous 12 Months	44 (36.7%)

Table 2: Reasons for ED Visit among Participants with ≥3 Visits

Of individuals that used the emergency department three or more times, the most common primary diagnosis was unresolved dental pain or infection (56.8%). Many also had facial swelling and abscesses which illustrates the acute chronicity of oral disease and sorely needed dental treatment.

Reason for ED Visit	Number of Cases	Percentage (%)
Dental pain/infection	25	56.8%
Facial swelling	10	22.7%
Tooth abscess	7	15.9%
Systemic issue (e.g., high blood sugar)	6	13.6%
Other (e.g., trauma)	4	9.1%

Table 3: Correlation between Chronic Disease and Oral Health Status

This table shows the connection between chronic illness and oral health ailments. More than half of the patients with hypertension and 40% of the patients with diabetes had severe periodontal disease. Both groups also had high DMFT scores and were frequent users of the ED which indicates oral health neglect on the systemic level.

Condition	Patients with Condition (n)	With Severe Periodontal Disease (%)	With DMFT >12 (%)	≥3 ED Visits (%)
Diabetes	49	40%	32%	18%
Hypertension	65	52%	45%	22%

Qualitative Findings

Data from 28 in-depth interviews were thematically analyzed, leading to the emergence of three core themes and several sub-themes:

Theme 1: Barriers to Oral Healthcare Access

Sub-theme 1.1: Financial Constraints

“I could not pay to see a dentist, so I just waited until the pain was unbearable.” - Participant 07

Sub-theme 1.2: Limited Public Services

"They don't offer dental care unless it's very bad… and even in that case all they do is provide antibiotics." -Participant 14

Theme 2: Lack of Awareness on Oral-Systemic Health Links

Sub-theme 2.1: Underestimating the Role of Oral Health

"I never imagined a dental infection could impact my diabetes – no one mentioned that to me." – Participant 21

Sub-theme 2.2: Poor Integration Between Services

"I have a cardiologist, a kidney specialist… but nobody looks at my mouth." – Participant 10

Theme 3: Recurrent ED Use Due to Untreated Dental Issues

Sub-theme 3.1: Avoidance Until Emergency

"The only time I go to the hospital is when my face swells up from the tooth." – Participant 03

Sub-theme 3.2: Feeling Stuck in a Cycle

"They just patch me up at the ED and send me home. It keeps happening over and over again." – Participant 18

Discussion

This study sheds light on the increasingly concerning overlap between oral health, chronic disease, and ED use in underserved populations in a tertiary hospital. Many participants presented with a high burden of untreated dental disease, and a significant proportion had comorbid diabetes and hypertension. These findings are consistent with the emerging body of literature concerning the impact of poor oral health on the progression of chronic diseases and increased use of hospital resources (Allareddy et al., 2014; Kruger & Tennant, 2016).

The average DMFT of 12.1 and 70 percent of our cohort with at least moderate periodontal disease demonstrates the oral health burden attributable to untreated dental careowing to neglect in care in these medically complex populations. These data are in line with research by Kruger and Tennant (2016), who reported an increasing rate of oral health-related hospital admissions among older adults who are increasingly aging with complex chronic multimorbidity. In the same vein, Allareddy et al. (2014) found that dental-related emergency department visits are frequently associated with patients suffering from systemic illnesses, worsening outcomes, and increasing resource utilization in tertiary care settings.

Among patients categorized with frequent ED use (≥3 visits/year), more than 50% noted presenting with dental pain or infection as foremost complaints, along with facial swelling and abscesses - all acute signs and symptoms that are, in many cases, the result of neglectable oral health illness. This is in line with Acharya et al. (2018), which reported that dental conditions like abscesses, rampant caries, and infections are significant contributors to preventable hospitalizations, especially in vulnerable populations.

The qualitative data adds more depth to the described trends. Participants mentioned cutting back on essential living expenses and insufficient public dentistry services along with inadequate public awareness regarding the interplay between oral health and overall health as primary concerns. These observations support existing evidence that oral health is a neglected aspect of public health policy and health care priority as well (Acharya et al., 2018; Gibney et al., 2017).

Moreover, the fact that oral hygiene practices are neglected during hospitalizations is alarming. According to Gibney et al. (2017), elderly inpatients experienced measurable declines in oral health from the time of admission until day seven, contributing to complications such as malnutrition and delayed recovery. In our study, participants did not receive assessments or any form of oral health support during their hospitalization. Nevertheless, Choi et al. (2022)'s research demonstrated the implementation of oral care protocols in intensive care units greatly decreased the rate of ventilator-associated pneumonia and other systemic complications.

The study's interdisciplinary approach is one of its distinct primary strengths. The integration of a dentist, internal medicine physician, paramedic, and social worker made it possible to assess the oral-systemic health relationship from a wide-angle perspective. This level of collaboration is essential to address the multifaceted routes through which oral disease affects patients and hospital systems. The study does, however, have some limitations. It was conducted in one tertiary center, and the sample size, although sufficient for exploratory analysis, may restrict broader applicability. Causation cannot be established due to the cross-sectional design.

Policy and Practice Considerations

1. Incorporate oral health screenings into ED triage and inpatient workflows for patients with chronic conditions or frequent admissions.

2. Dental assessments should be included in the multidisciplinary chronic disease management pathways.

3. Strategic education and outreach efforts have the potential to enhance oral health literacy as well as decrease avoidable ED visits.

4. Earlier intervention and decreased long-term healthcare costs may result from hospital collaborations with public dental services.

Conclusion

The current study illustrates the striking consequences of suboptimal oral health on emergency department visit frequency and chronic disease management, particularly in a tertiary care hospital setting, which has not been given enough attention. The synergistic interplay between high dental disease rates, frequent ED visits, and chronic conditions like diabetes and hypertension necessitates integrated multidisciplinary frameworks. Eliminating barriers to dental care and incorporating oral health into assessments and care frameworks in hospitals can improve clinical outcomes and reduce non-essential healthcare system utilization. A tertiary care system should elevate oral health to one of the pillars of systemic health.

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