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Frequency of Dry Socket among Patients Undergoing Dental Extractions Presenting to A Teaching Hospital, Rawalpindi

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ABSTRACT

A dry socket, a painful post-extraction complication, occurs when the blood clot at the extraction site is dislodged or fails to form. Understanding its prevalence is crucial for improving outcomes in dental practices. **Objective:** To determine the frequency of dry sockets in patients undergoing dental extraction. **Methods:** A cross-sectional descriptive study was carried out and two customized questionnaires were filled out over three months. One questionnaire was for patients undergoing extractions and the other was filled for patients returning with dry sockets. The study included Pakistani individuals with permanent dentition while excluding non-Pakistani individuals, children with deciduous/mixed dentition, and severely immunocompromised patients. Chi-square and Fischer's exact tests were used to compare the frequency of dry sockets between gender and age groups. p-value of less than or equal to 0.05 was considered statistically significant. **Results:** Out of the 188 patients, 85 (45.2%) were males and 103 (54.8%) were females. Medically compromised patients comprised 24.5% of the study population. The overall incidence of dry sockets was 9.0%, with a slightly higher occurrence in females (9.7%), though the difference was not statistically significant (p-value=0.802). Smokers demonstrated a higher incidence of dry sockets (23.1%), which was also not statistically significant (p-value=0.099). Medically compromised patients experienced dry sockets at 17.4%, compared to 6.3% in healthy patients, suggesting a trend that did not reach statistical significance (p-value=0.363). **Conclusions:** It was concluded that identifying high-risk groups and promoting effective prevention and management techniques can reduce the incidence of dry sockets, leading to better outcomes and overall oral health.

INTRODUCTION

Dry socket, also known as alveolar osteitis, is a common post-extraction complication. It is caused due to acute inflammation of the alveolar bone of the extracted tooth and is characterized by severe pain, a dislodged clot leaving the socket empty [1]. The bone is exposed to the fluids in the oral cavity and bacteria. It takes about fourteen days for the connective tissue to cover the denuded bone and restore it to normal condition in which the bone is not exposed anymore. Till the time the healing process occurs, the exposed bone irritates resulting in pain [2]. As per recent previous literature, the ratio of occurrence of dry sockets has increased by 10% in physically fit individuals and up to 25% in patients with compromised immune systems. The occurrence of dry sockets has also been very commonly linked with the extraction of 3rd molars [3]. Recent advancements in the pathophysiology of dry sockets have paved the way for the development of several preventive approaches. For instance, the use of local antimicrobial agents like chlorhexidine has emerged as a promising strategy for decreasing the occurrence of dry sockets [4]. It works by lowering the growth of bacteria at the extraction, which helps in reducing the likelihood of infection and the subsequent breakdown of the blood clot [5]. These discoveries emphasize the critical role of

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integrating scientifically supported methods into everyday dental practices to improve patient results. Another emerging area of focus involves investigating how systemic health conditions contribute to the onset of dry sockets. Systemic conditions like diabetes and immunosuppression have been associated with higher chances of postoperative complications like dry socket [6]. Recognizing the connection between overall health and oral health is essential for crafting comprehensive treatment plans for individuals undergoing dental extractions. This holistic approach enables the customization of preventive and treatment measures to suit each patient's specific requirements, ultimately enhancing the quality of care provided. The risk factors associated with dry sockets include smoking (12%) as compared to non-smokers ratio (4%), surgical extractions (15%) as compared to non-surgical extractions (1.7%), single case extractions (13%) as compared to multiple extractions (5%). Risk factors for developing dry sockets include the use of oral contraceptives and also use of immediate irrigation of the socket with normal saline post-operatively. Post-operative socket bleeding is crucial as it promotes the formation of a blood clot, facilitating uncomplicated healing of the socket [7].

This study aims to determine the frequency of dry sockets in patients undergoing dental extraction in a teaching hospital in Rawalpindi

METHODS

A cross-sectional descriptive study was carried out at Margalla Dental Hospital, Rawalpindi from April 2023 to July 2023 for 3 months. The approval was taken from the ethical review committee (ref no. DN/193/23). The Inclusion criteria was the Pakistani population who have permanent dentition and the exclusion criteria were the Non-Pakistani population, children who have deciduous/mixed dentition, and extremely immunocompromised patients. The sample size taken for this study was 188 and the sampling technique used for this study was Non-probability convenience sampling. The sample size was calculated using Epi Info software, based on an expected dry socket prevalence of 5%, a 95% confidence interval, and a 5% margin of error. Approval of this study was taken from the ethical review committee of Margalla Dental College and informed consent of patients visiting the Oral Surgery Department, all the patients satisfying inclusion criteria were examined for the presence of Dry Sockets. A periapical radiograph was taken after the patient's consent only if conditions like a root left behind post-extraction, any chance of periapical lesion, a soft tissue lesion, food stagnation or any clinical symptoms associated with these conditions were examined. Two questionnaires were filled out over three months (Figure 1). One was for patients undergoing extraction of permanent teeth at the Oral and Maxilo-Facial Department, while the other was for those diagnosed with dry sockets during a postoperative visit within the study period. Data were entered and analyzed using the Statistical Package for Social Sciences (SPSS) version 21.0. The normal distribution of quantitative variables was checked using the Shapiro-Wilk test. Mean and standard deviation are calculated for quantitative variables while frequencies and percentages are given for qualitative variables. Chi-square tests were used to find the association between dry sockets and gender. Fisher's exact test was applied for smaller sample sizes. A p-value of less than or equal to 0.05 was considered statistically significant.

RESULTS

This study included a total of 188 patients undergoing dental extractions, of which 85 (45.2%) were males and 103 (54.8%) were females. Among the participants, 46 (24.5%) had various medical ailments, classifying them as medically compromised, and 13 (6.9%) were identified as smokers (Table 1).

Table 1: Demographic and Clinical Characteristics

Category	Total Patients	Percentage
Total Patients	188	100%
Male	85	45.2%
Female	103	54.8%
Medically Compromised	46	24.5%
Smokers	13	6.9%

Dry socket was observed in 17 (9.0%) of the patients. The distribution of dry socket cases was slightly higher in females (10 out of 103, 9.7%) compared to males (7 out of 85, 8.2%), with a non-significant p-value of 0.802. Presenting complaints of the patients with dry sockets were pain and discomfort on the extracted side along with halitosis. Dry sockets were more frequent among smokers, affecting 3 out of 13 (23.1%), compared to non-smokers, where 14 out of 175 (8.0%) developed the condition. This difference, however, did not reach statistical significance (p-value=0.099). Of the 17 dry socket cases, 9 (52.9%) occurred in the maxillary region and 8 (47.1%) in the mandibular region. Notably, 16 cases were in the posterior region, with an equal split of 8 cases each in the maxillary and mandibular arches. Only 1 case was reported in the anterior region (Table 2).

Table 2: Incidence of Dry Socket by Subgroup and Statistical Significance

Subgroup	Total in Subgroup	Dry Socket Cases	Subgroup Percentage (%)	p-value (Test)
Smokers	13	3	23.1	0.099 (Fisher's exact)
Non-Smokers	175	14	8.0	
Healthy Patients	142	9	6.3	0.363 (Chi-Square)
Medically Compromised	46	8	17.64	

While not the focus of the current study, it is noteworthy to mention the incidence of dry sockets among medically

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compromised patients was 17.6% compared to the overall rate. However, this finding, along with the data for smokers, is provided for informational purposes and was not subjected to comparative analysis with healthy patients. Specifically, dry socket cases were slightly more prevalent in the maxillary region (52.9%) compared to the mandibular region (47.1%), with no significant gender-based variation. The p-values for all categories (maxillary, mandibular, anterior, and posterior teeth) were above 0.05, confirming the lack of statistically significant differences in dry socket occurrence by gender or tooth region. The distribution of dry socket cases showed no significant difference between males and females across maxillary, mandibular, anterior, and posterior teeth regions by the non-significant chi-square values ($p>0.05$) (Table 3).

Table 3: Incidence of Dry Socket by Gender and Location

Location	-	Male	Female	p-value
Incidence of Dry socket in maxillary teeth	Yes	3	6	0.733
	No	82	87	
Incidence of Dry socket in mandibular teeth	Yes	4	4	0.722
	No	81	96	

Two questionnaires were filled out over three months (Figure 1).

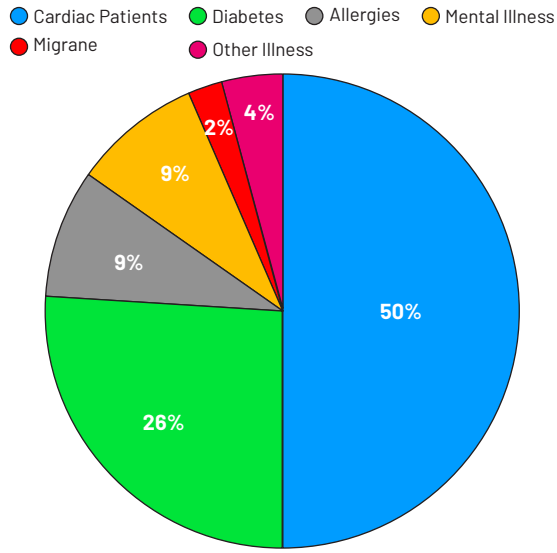

Figure 1: Distribution of Medically Compromised Patients

DISCUSSION

Alveolar osteitis is characterized by a disruption in the healing process at the extraction site before wound establishment, leading to mild to severe pain in the extraction region typically starting on the 2nd or 3rd day post-surgery, often accompanied by a foul smell and coloured discharge [8]. The occurrence of alveolar osteitis (dry socket) following a tooth extraction procedure has long been a concern for patients and dentists equally, particularly after mandibular third molar extraction [9]. Despite the use of common postoperative analgesics, a substantial proportion of patients, approximately 45%, require multiple postoperative visits before symptom resolution [10]. Historically, the frequency of alveolar osteitis has varied between 5% and 30% [11]. However, the current study recorded an incidence of 9% for all extractions conducted during the study period, which is lower than values reported in Iran, where the frequency of alveolar osteitis formation after surgical removal of mandibular impacted teeth was 23.45% [12]. Tobacco smoking has been extensively associated with various adverse effects, including negative outcomes in surgery [13]. Although smoking's adverse effects are well-documented in various surgical procedures, recent data on its influence on exodontia are scarce [14]. Alveolar osteitis developed in 23.1% of smokers, with no significant relationship identified. Similarly, a study in Bangladesh reported an insignificant relationship between smoking and the development of alveolar osteitis [15]. Localized tissue ischemia, possibly mediated by nicotine-induced vasoconstriction and platelet aggregation, may contribute to delayed wound healing and the formation of thrombotic microvascular occlusion [16]. Contrary to previous reports showing a strong female preponderance in alveolar osteitis occurrence, the current study did not find a significant gender association with the complication. However, a study in India in 2019 observed that females on oral contraceptive drugs had approximately twice the incidence of alveolar osteitis compared to females not on oral contraceptives and males [17]. A Study in Jordan study found that dry sockets occurred more frequently in mandibular extractions compared to maxillary extractions [18]. These findings are consistent with general observations that lower jaw extractions are more prone to developing dry sockets, likely due to factors such as denser bone and poorer vascular supply in the mandible. This aligns with general observations that lower jaw extractions are more prone to developing dry sockets due to factors such as denser bone and poorer vascular supply in the mandible. In the current study, the incidence was equal in both maxillary and mandibular teeth which aligns with the study done by Abdullah who also reported equal incidence between maxillary and mandibular teeth [19]. A local study on impacted 3rd molars in Kohat reported a 20.7% incidence of dry sockets, which is higher/lower than the findings presented, likely due to the focus on impacted 3rd molars in a local study done on impacted 3rd molar in Kohat found that 20.7% reported dry sockets which is higher as compared to this study considering cu t study was done on impacted 3rd molars [20]. In another study in Swat, khan found only 4% of patients complained about dry sockets. The incidence was high among males aged 20-30 and smokers had more prevalence [21]. A study in Karachi found a 3.3% incidence of dry sockets among patients visiting for extraction [22].

CONCLUSIONS

It was concluded that dry socket remains a common

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complication following tooth extractions, particularly among individuals with certain risk factors such as smoking, and complex surgical procedures. The data underscores the need for preventive strategies, including patient education on post-operative care and the implementation of best practices by dental professionals. By identifying high-risk groups and promoting effective prevention and management techniques, the incidence of dry sockets can be reduced, leading to better patient outcomes and overall oral health. Future research should continue to explore innovative approaches to prevention and treatment, aiming to minimize the occurrence and impact of this painful condition.

Authors Contribution

Conceptualization: NBK
Methodology: NBK, AA, MA
Formal analysis: KN
Writing review and editing: NBK, AA, AY, MA

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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