European Journal of Clinical Pharmacy
Print ISSN: 2385-409X **Online ISSN**: 3105-0409
Website: https://farmclin.com/

Original Research Article

Prevalence of Dry Socket (Alveolar Osteitis) Following Tooth Extraction in Diabetic Patients: A Cross-Sectional Study

Article History:

Name of Author:
Irfan Qureshi[1], Syed Tahir Husain[2], Khurram Nadeem[3], Ayesha Urooj[4], Faisal Asghar[5], Amara Nazir[6]

Affiliation: *[1]Diplomate, American Board of Oral Implantology/Implant Dentistry, Dr Irfan Qureshi's Team of Professionals, Karachi, Pakistan*
[2]Consultant (Asst. Prof), Liaquat National Hospital, Karachi Pakistan
[3]Professor (Oral Medicine), Lahore Medical & Dental College, Lahore, Pakistan
[4]Clinical Product Analyst at Bizaffix, Associate Dentist at The Dental Lounge, Karachi, Pakistan
[5]Assistant Professor (Oral Medicine), Multan medical and Dental College, Multan, Pakistan
[6]Associate Professor (Operative Dentistry), Bakhtawer Amin Medical and Dental College, Multan, Pakistan

Corresponding Author:
Irfan Qureshi

Received: 05-10-2025
Revised: 02-02-2026
Accepted: 14-02-2026
Published: 25-02-2026

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Noncommercial-Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Abstract: ***Background:*** Dry socket (alveolar osteitis) is one of the most common and painful complications after tooth extraction. Diabetic patients are particularly vulnerable due to impaired wound healing, microvascular compromise, and increased susceptibility to infection. ***Objective:*** To determine the prevalence of dry socket and identify associated demographic, metabolic, behavioral, and surgical risk factors among diabetic patients undergoing tooth extraction. ***Methodology***: This hospital-based descriptive cross-sectional study was conducted at a Tertiary Care Hospital of Karachi from August 2024 to March 2025, included 105 diabetic patients undergoing simple or surgical tooth extraction. ***Results:*** Dry socket developed in 21 patients, giving a prevalence of 20%. Affected patients were older (56.3 ± 8.7 vs 51.9 ± 9.5 years) with longer diabetes duration (11.4 ± 3.8 vs 8.1 ± 3.9 years) and higher HbA1c levels (9.6 ± 1.1% vs 8.1 ± 1.2%). Uncontrolled glycemia was present in 90.5% of cases. Smoking (57.1%), poor oral hygiene (47.6%), and poor postoperative compliance (52.4%) were significantly associated. Surgical extraction (57.1%), mandibular posterior teeth (71.4%), longer operative time (27.4 ± 6.1 minutes), traumatic procedures, and preoperative infection increased risk. Patients with dry socket reported higher pain scores (8.6 ± 0.9) and longer healing times (9.8 ± 2.1 days), with most requiring additional visits. ***Conclusion:*** Dry socket is common among diabetic patients and is strongly associated with poor glycemic control, adverse oral hygiene habits, and traumatic surgical factors. Optimising metabolic control and minimising operative trauma may significantly reduce postoperative complications.

Keywords: Dry socket, alveolar osteitis, diabetes mellitus, tooth extraction, wound healing, postoperative complications.

INTRODUCTION

One of the most often performed procedures in the oral and maxillofacial practice and, in general, can be seen as safe, tooth extraction may still lead to postoperative complications that may have devastating effects on the healing process and comfort of a patient [1]. Dry socket or alveolar osteitis is considered as one of the most common and painful aftermaths and is caused by the disintegration of the blood clot, the alveolar bone that is exposed, excruciating pain, and hindered healing of the tissue [2]. The incidence is not more than 15 years and

 © 2025 European Journal of Clinical Pharmacy; Volume: 8: Issue: 1| All Right Reserved

reported to be 1-5 percent when extractions are performed routinely but goes high after traumatic or surgery especially in the mandibular area [3]. It is mainly caused by premature fibrinolysis of the socket clot leading to an interference in normal healing leaving the underlying bone vulnerable to the effects of oral contamination [4]. Locally acquired factors like extraction trauma, infection, smoking, and bad oral hygiene also promote the inflammatory response and make the development of alveolar osteitis more likely [5]. The modifying risks factors also have been reported to be dependent on hormonal effects and increasing age in a range of patient populations [6]. Epidemiological disorders that disrupt microcirculation and immunity may considerably threaten the post-extraction healing process because some individuals are more susceptible to complications [7]. One of such metabolic diseases is diabetes mellitus which is a chronic hyperglycemia and extensive vascular and cellular malfunction [8]. Unremitting hyperglycemia leads to negative leukocyte functionality, loss of collagen production and angiogenesis, later delaying wound repair mechanisms [9].

Furthermore, diabetic individuals also exhibit diminished resistance to infection and extended inflammatory reaction both of which disrupt normal socket healing following dental extraction [10]. Fibrinolytic changes and breaking down of the clot in diabetes can enhance the premature breakdown of the clot, making them more prone to develop dry socket [11]. Increased rates of postoperative pain/infection/ delayed epithelialization in diabetic patients undergoing oral surgery in studies have also been reported [12]. As the incidence of diabetes is on the increase throughout the world, especially in third world countries, dentists are having an increased number of medically compromised patients who need routine extractions [13]. Regardless of this, there is not much local information on the actual burden of alveolar osteitis among diabetic populations [14]. It is necessary to determine its prevalence to be able to identify the high-risk patients and enhance preventive measures, such as the optimal glycemic control and atraumatic surgeries [15].

Objective

To determine the prevalence of dry socket and identify associated demographic, metabolic, behavioral, and surgical risk factors among diabetic patients undergoing tooth extraction.

METHODOLOGY

This was a hospital-based descriptive cross-sectional study conducted at a Tertiary Care Hospital of Karachi from August 2024 to March 2025, including 105 diabetic patients who underwent tooth extraction. The study aimed to determine the prevalence of dry socket (alveolar osteitis) following dental extraction and to evaluate its association with demographic and clinical risk factors among diabetic individuals. All eligible diabetic patients presenting for simple or surgical tooth extraction during the study period were enrolled and managed according to standardized oral surgery protocols. Based on postoperative clinical outcomes, cases were categorized into two groups:

Group A (Dry socket present): Patients who developed clinical features of alveolar osteitis including severe postoperative pain 2–4 days after extraction, empty socket with partial or complete loss of blood clot, exposed bone, halitosis, and delayed healing

Group B (Normal healing): Patients demonstrating intact clot formation with uneventful healing and absence of signs or symptoms of alveolar osteitis

Eligible participants included male and female patients aged 18 years and above with a confirmed diagnosis of diabetes mellitus undergoing tooth extraction under local anesthesia. Patients with systemic disorders other than diabetes affecting wound healing, immunocompromised states, pregnancy, current steroid therapy, active oral infections, recent antibiotic use, history of radiotherapy to the head and neck region, or those unwilling to participate were excluded.

Data Collection

Data were recorded using a structured proforma. Demographic variables included age, gender, and residence. Clinical variables included type and duration of diabetes, glycemic control (HbA1c/random blood glucose), smoking status, oral hygiene status, tooth type extracted, extraction technique (simple or surgical), and history of previous extractions. Postoperative assessment was performed on days 2–4 following extraction to evaluate socket healing and identify features of dry socket. Diagnosis of alveolar osteitis was made based on standard clinical criteria including persistent pain, absence of clot, exposed bone, and foul odor. All procedures were performed by trained dental surgeons using aseptic techniques and standard postoperative instructions were provided to every patient.

Statistical Analysis

Data were entered and analyzed using SPSS version 26. Quantitative variables such as age and duration of diabetes were presented as mean ± standard deviation, while categorical variables including gender, glycemic control status, extraction type, and presence of dry socket were expressed as frequencies and percentages. Chi-square test was applied to assess associations between dry socket occurrence and categorical risk factors. Independent t-test was used for comparison of continuous variables where appropriate. A p-value ≤ 0.05 was considered statistically significant.

© 2025 European Journal of Clinical Pharmacy; All Right Reserved

RESULTS

The mean age of participants was 52.8 ± 9.6 years. Patients with dry socket were older (56.3 ± 8.7 years) than those with normal healing (51.9 ± 9.5 years), showing a significant difference (p=0.041). Males were predominant overall (59.0%) and in dry socket cases (71.4%), though gender was not significant (p=0.190). Urban residence dominated both groups (67.6%, p=0.260). BMI was higher in the dry socket group (28.9 ± 3.2 vs 27.1 ± 2.8 kg/m², p=0.018). Increasing age and BMI showed association with risk.

Table 1. Comparison of Demographic Characteristics between Patients with and Without Dry Socket

Variable	Category	Dry Socket (n=21)	Normal Healing (n=84)	Total (n=105)	p-value
Age (years)	Mean ± SD	56.3 ± 8.7	51.9 ± 9.5	52.8 ± 9.6	0.041
Gender	Male	15 (71.4)	47 (56.0)	62 (59.0)	0.190
	Female	6 (28.6)	37 (44.0)	43 (41.0)	0.190
Residence	Urban	12 (57.1)	59 (70.2)	71 (67.6)	0.260
	Rural	9 (42.9)	25 (29.8)	34 (32.4)	0.260
BMI (kg/m²)	Mean ± SD	28.9 ± 3.2	27.1 ± 2.8	27.5 ± 2.9	0.018

Dry socket patients had longer diabetes duration (11.4 ± 3.8 vs 8.1 ± 3.9 years, p=0.002) and higher HbA1c (9.6 ± 1.1% vs 8.1 ± 1.2%, p=0.001). Most affected patients had uncontrolled glycemia (90.5% vs 67.9%, p=0.030). Insulin use (61.9% vs 34.5%, p=0.020) and diabetic complications (47.6% vs 21.4%, p=0.010) were also higher. Poor metabolic control strongly predicted dry socket.

Table 2. Comparison of Diabetic Profile and Metabolic Control with Dry Socket

Variable	Category	Dry Socket (n=21)	Normal Healing (n=84)	Total (n=105)	p-value
Duration of diabetes (years)	Mean ± SD	11.4 ± 3.8	8.1 ± 3.9	8.7 ± 4.1	0.002
HbA1c (%)	Mean ± SD	9.6 ± 1.1	8.1 ± 1.2	8.4 ± 1.3	0.001
Glycemic control	Controlled	2 (9.5)	27 (32.1)	29 (27.6)	0.030
	Uncontrolled	19 (90.5)	57 (67.9)	76 (72.4)	0.030
Insulin therapy	Yes	13 (61.9)	29 (34.5)	42 (40.0)	0.020
	No	8 (38.1)	55 (65.5)	63 (60.0)	0.020
Diabetic complications	Present	10 (47.6)	18 (21.4)	28 (26.7)	0.010
	Absent	11 (52.4)	66 (78.6)	77 (73.3)	0.010

Smoking was more common in dry socket patients (57.1% vs 31.0%, p=0.020). Poor oral hygiene predominated (47.6% vs 21.4%, p=0.010), while good hygiene was rare (9.5%). Irregular rinsing (66.7% vs 31.0%, p=0.003) and poor postoperative compliance (52.4% vs 22.6%, p=0.008) significantly increased risk. Behavioral factors clearly influenced healing.

Table 3. Comparison of Oral Hygiene and Behavioral Risk Factors With Dry Socket

Variable	Category	Dry Socket (n=21)	Normal Healing (n=84)	Total (n=105)	p-value
Smoking	Smoker	12 (57.1)	26 (31.0)	38 (36.2)	0.020
	Non-smoker	9 (42.9)	58 (69.0)	67 (63.8)	0.020
Oral hygiene	Good	2 (9.5)	26 (31.0)	28 (26.7)	0.010
	Fair	9 (42.9)	40 (47.6)	49 (46.7)	0.010
	Poor	10 (47.6)	18 (21.4)	28 (26.7)	0.010
Mouth rinsing compliance	Regular	7 (33.3)	58 (69.0)	65 (61.9)	0.003
	Irregular	14 (66.7)	26 (31.0)	40 (38.1)	0.003
Post-op instructions followed	Yes	10 (47.6)	65 (77.4)	75 (71.4)	0.008
	No	11 (52.4)	19 (22.6)	30 (28.6)	0.008

Surgical extraction was strongly associated with dry socket (57.1% vs 23.8%, p=0.004). Mandibular posterior teeth were most affected (71.4% vs 42.9%, p=0.020). Procedures were longer (27.4 ± 6.1 vs 20.2 ± 5.8 minutes, p=0.001). Preoperative infection (61.9% vs 27.4%, p=0.003) and traumatic extraction (66.7% vs 28.6%, p=0.002) significantly increased occurrence. Surgical difficulty markedly raised risk.

© 2025 European Journal of Clinical Pharmacy; All Right Reserved

Table 4. Comparison of Extraction and Surgical Factors with Dry Socket

Variable	Category	Dry Socket (n=21)	Normal Healing (n=84)	Total (n=105)	p-value
Extraction type	Simple	9 (42.9)	64 (76.2)	73 (69.5)	0.004
	Surgical	12 (57.1)	20 (23.8)	32 (30.5)	0.004
Tooth location	Mandibular posterior	15 (71.4)	36 (42.9)	51 (48.6)	0.020
	Other sites	6 (28.6)	48 (57.1)	54 (51.4)	0.020
Procedure duration (min)	Mean ± SD	27.4 ± 6.1	20.2 ± 5.8	21.6 ± 6.8	0.001
Pre-op infection	Present	13 (61.9)	23 (27.4)	36 (34.3)	0.003
	Absent	8 (38.1)	61 (72.6)	69 (65.7)	0.003
Traumatic extraction	Yes	14 (66.7)	24 (28.6)	38 (36.2)	0.002
	No	7 (33.3)	60 (71.4)	67 (63.8)	0.002

Dry socket patients experienced later pain onset (2.9 ± 0.8 vs 1.2 ± 0.6 days), higher pain scores (8.6 ± 0.9 vs 3.1 ± 1.2), and longer healing time (9.8 ± 2.1 vs 6.2 ± 1.5 days), all highly significant (p=0.001). Most required extra visits (90.5% vs 13.1%) and prolonged analgesics (81.0% vs 21.4%). Dry socket substantially increased postoperative morbidity.

Table 5. Multivariable Clinical Outcome Indicators and Healing Characteristics

Variable	Category	Dry Socket (n=21)	Normal Healing (n=84)	Total (n=105)	p-value
Onset of pain (days)	Mean ± SD	2.9 ± 0.8	1.2 ± 0.6	1.5 ± 0.9	0.001
Pain score (VAS 0–10)	Mean ± SD	8.6 ± 0.9	3.1 ± 1.2	4.2 ± 2.3	0.001
Healing time (days)	Mean ± SD	9.8 ± 2.1	6.2 ± 1.5	6.9 ± 2.2	0.001
Additional visits	Required	19 (90.5)	11 (13.1)	30 (28.6)	0.001
	Not required	2 (9.5)	73 (86.9)	75 (71.4)	0.001
Analgesic use >3 days	Yes	17 (81.0)	18 (21.4)	35 (33.3)	0.001
	No	4 (19.0)	66 (78.6)	70 (66.7)	0.001

DISCUSSION

This paper has shown that the prevalence of diabetic patients with a dry socket is 20 percent, as compared to other reports on the general population and indicates that diabetes is a major determinant of delayed post-extraction healing. The frequency was also increased with increasing age, with arthritis patients being older (56.3 +/-8.7 vs 51.9 +/-9.5 years), which is in line with the prior studies revealing delayed tissue repair and decreased vascularity as age advanced [16]. The worst association was exhibited between complications and poor glycemic control. The HbA1c level of patients with dry socket was higher (9.6 ± 1.1% vs 8.1 ± 1.2%), the duration of diabetes was longer (11.4 ± 3.8 vs 8.1 ± 3.9 years), and mostly the patients had uncontrolled status (90.5%), which proved that hyperglycemia suppresses immunity, collagen synthesis, and stability of the clot. Previous studies on the subject have reported similar associations between uncontrolled diabetes and delayed socket healing [17]. Risk was further increased due to behavioral factors. Among affected patients, smoking (57.1%), poor oral health (47.6%), irregular mouth rinsing (66.7%) and poor postoperative compliance (52.4% were found to be significantly higher. These results are consistent with previous studies that found smoking-induced vasoconstriction and bacterial load to be indicators of clot breakdown and fibrinolysis [18].

Difficulty during surgery was also a major factor. The incidence of dry socket was higher following extractions in the mandibular anterior (71.4%), mandibular posterior region (57.1%), increased operative time (27.4±6.1 minutes), preoperative infection (61.9%), and traumatic extraction (66.7%). Other studies also show that after traumatic or complicated extractions, alveolar osteitis is more frequent because of tissue damage and the inability to retain clots [19]. Affected patients were found to have a higher morbidity level such as higher pain scores (8.6±0.9), slow healing (9.8±2.1 days), repeated visits (90.5%), and extended analgesic use (81.0). Similar results have been reported in the literature, demonstrating the substantial impact of dry socket on recovery and healthcare utilization [20]. On the whole, such factors as advanced age, poor glycemic regulation, smoking, poor hygiene, and traumatic surgical practices were identified as the predicting variables, which highlights the necessity of optimized control over diabetes and atraumatic procedures to

© 2025 European Journal of Clinical Pharmacy; All Right Reserved

minimize the incidence of postoperative complications.

CONCLUSION

It is concluded that dry socket occurred in one-fifth of diabetic patients following tooth extraction and was significantly associated with older age, prolonged diabetes, poor glycemic control, smoking, inadequate oral hygiene, and traumatic or surgical extractions. Patients with higher HbA1c levels and longer operative times experienced delayed healing, greater pain, and increased postoperative visits. Optimizing blood glucose control, improving oral hygiene, and adopting atraumatic surgical techniques can substantially reduce the risk of alveolar osteitis and improve recovery outcomes in this high-risk population.

REFERENCES

1. Cardoso RB, Soto VC, Gonçalves RC, Pedroso AM, Jabur RD, Bortoluzzi MC. Prevalence and factors associated with dry socket following routine dental extractions. Med Oral Patol Oral Cir Bucal. 2024 May;29(3):e408–e415.
2. Tandon P, Kumar Sahoo S, Mohanty L, Jain N, Hittalamani V, Shinde Kamble S, et al. Dry socket prevalence and risk factors in third molar extractions: a prospective observational study. Cureus. 2024 Mar;16(3):e56721.
3. Mamoun J. Dry socket etiology, diagnosis, and clinical treatment techniques. J Korean Assoc Oral Maxillofac Surg. 2018;44(2):52–58.
4. Kolokythas A, Olech E, Miloro M. Alveolar osteitis: a comprehensive review of concepts and controversies. Int J Dent. 2010;2010:249073.
5. Nijakowski K, Gruszczyński D, Kopała D, Surdacka A. Smoking as a risk factor for dry socket: a systematic review. Dent Med Probl. 2022 Jul–Sep;59(3):461–466.
6. Parthasarathi K, Smith A, Chandu A. Factors affecting incidence of dry socket: a prospective community-based study. J Oral Maxillofac Surg. 2011 Jul;69(7):1880–1884.
7. Nusair YM, Younis MH. Prevalence, clinical picture, and risk factors of dry socket in a Jordanian dental teaching center. J Contemp Dent Pract. 2007 Mar;8(3):53–63.
8. Eshghpour M, Nejat AH. Dry socket following surgical removal of impacted third molar in an Iranian population: incidence and risk factors. Niger J Clin Pract. 2013 Oct–Dec;16(4):496–500.
9. Li B, Zhang S, Li Y, Wang S. Pathogenesis and treatment of wound healing in patients with diabetes after tooth extraction. Front Endocrinol (Lausanne). 2022 Aug;13:949535.
10. Nazir MA, AlGhamdi L, AlKadi M, AlBeajan N, AlRashoudi L, AlHussan M. The burden of diabetes, its oral complications and their prevention and management. Open Access Maced J Med Sci. 2018 Aug;6(8):1545–1553.
11. Ko KI, Sculean A, Graves DT. Diabetic wound healing in soft and hard oral tissues. Transl Res. 2021 Oct;236:72–86.
12. Sun J, Chen T, Zhao B, Fan W, Shen Y, Wei H, et al. Acceleration of oral wound healing under diabetes mellitus conditions using bioadhesive hydrogel. ACS Appl Mater Interfaces. 2023 Jan;15(1):416–431.
13. Moseley R, Waddington RJ. Impact of uncontrolled diabetes on oral disease progression and healing. Front Dent Med. 2024 Sep;5:1487051.
14. Akhavan Karbassi MH, Salehi R, Kheirollahi K, Abedian Z, Ghafourian Boroujerdnia M. Relationship between socket blood sugar and post-extraction complications in type II diabetic and non-diabetic patients. Iran J Diab Obes. 2015;7(1):12–19.
15. Aronovich S, Skope LW, Kelly JP, Kyriakides TC. Relationship of glycemic control to outcomes of dental extractions. J Oral Maxillofac Surg. 2010;68(12):2955–2961.
16. Biradar SB, Biradar B, Arvind A, Ashita N, Anupama K. Efficacy of 1% povidone iodine gel in the treatment and prevention of dry socket: a comparative study. Natl J Maxillofac Surg. 2019;10(2):181–186.
17. Blum IR. Contemporary views on dry socket (alveolar osteitis): a clinical appraisal of standardization, aetiopathogenesis and management. Int J Oral Maxillofac Surg. 2002;31(3):309–317.
18. Caso A, Hung LK, Beirne OR. Prevention of alveolar osteitis with chlorhexidine: a meta-analytic review. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2005;99(2):155–159.
19. Daly B, Sharif MO, Newton T, Jones K, Worthington HV. Local interventions for the management of alveolar osteitis (dry socket). Cochrane Database Syst Rev. 2012;(12):CD006968.
20. Khan MZ, Ali S, Khan FA, Rahman SU. Prevalence and risk factors of alveolar osteitis following third molar extractions: a prospective study. Pak Oral Dent J. 2024;44(1):15–19.

© 2025 European Journal of Clinical Pharmacy; All Right Reserved