International Journal of
Health Sciences
(IJHS)

Causative Factors Associated with Dry Socket; A Retrospective Study Among the Patients Visiting REU Clinics.

CARI Journals

International Journal of Health Sciences
ISSN: 2710-2564 (Online)
Vol. 6, Issue No. 3, pp 29 - 38, 2023
www.carijournals.org

Causative Factors Associated with Dry Socket; A Retrospective Study Among the Patients Visiting REU Clinics.

Jarrah alabdali[1], Mohammad Alsadani[1], Mohammed almutlaq[1], Saud Bin Thafrah[1], Maher Alzabin[1], Mohammed Sheker[1], Zeeshan Qamar[2]

[1]Dental Intern, College of Dentistry, Riyadh Elm University, Riyadh, Kingdom of Saudi Arabia

[2]BDS, MSc, PhD, Oral and Maxillofacial Surgery Department, Riyadh Elm University, Riyadh, Kingdom of Saudi Arabia

Corresponding Author's Email: jarrahalabdali@gmail.com

Accepted: 21st Apr 2023 Received in Revised Form: 9th May 2023 Published: 19th May 2023

Abstract:

Purpose: There are various factors associated with the incidence of dry socket, which includes operator experience, perioperative crown, and root fractures, periodontal disease, posterior teeth, and, interestingly, the use of mental health medications to be significant independent risk factors for the development of alveolar osteitis. This study aims to determine the risk factors associated with dry socket and to compare the prevalence of dry socket on the basis of gender, smoking habit, systemic condition, extraction site and use of antibiotics.

Methodology: This is a retrospective study using the patients' files at Muneseya campus, Riyadh Elm University. A total of 385 patient files were accessed after seeking approval from the hospital director. Information from patients' files was recorded including gender, operator's level, habits, medical history and extraction site.

Results: According to the findings, the percentage of male participants was 70.9%, whereas the percentage of female participants was 29.1%. The findings indicate that 25.3% of the population suffers from systemic illness, whereas the remaining 74.7% does not have any systematic disease. Dry sockets, which are caused by inflammation of the alveolus bone, are present in upper teeth 40% of the time, whereas lower teeth inflammation affects 60% of individuals with lower teeth.

Unique Contribution to Theory, Policy and Practice: In this study significant differences were observed for dry socket prevalence when compared the groups on the basis of smoking, systemic disease and gender.

Keywords: *Dry, Socket, risk factors, prevalence*

Introduction:

One of the most popular procedures carried out in dental clinics is dental extraction and notably extraction of wisdom teeth. Such procedures accompany specific problems such as iatrogenic (e.g., nerve damage, bone fractures, etc.) and inflammatory sequelae (such as dry socket, postoperative discomfort, delayed healing, postoperative infection, hematoma, edema, trismus, etc.). The overall complication rate is typically modest, and they are mainly mild. Nonetheless, as tooth extraction is commonly done, the morbidity of problems in the community may be evident. Furthermore, there are common and devastating consequences as well, including dry sockets (Halabi et al., 2012).

Dry socket also known as alveolar or fibrinolytic osteitis is one of the common complications that occur after the extraction of tooth/teeth in oral surgery. It is an acute inflammation of the alveolar bone around the extracted tooth, and it is presented with severe pain, interruption of the clot formed inside the socket making the socket empty (without the clot), and frequently filled with food debris. There is mild swelling and redness of the gingiva, halitosis, bone exposure, and severe tenderness on examination (Akinbami & Godspower, 2014; Bowe, 2011).

The incidence of dry socket is 10 times more in the mandible when compared to the maxilla ranging from 1 to 4% of extractions, reaching 45% for mandibular third molars. Dry sockets may occur among women in a ratio of 5:1 with respect to males. Because of changes in endogenous estrogens during the menstrual cycle since estrogens activate the fibrinolytic system in an indirect way in females (Gowda et al., 2013; Chandran et al., 2016; Almeida et al., 2016).

There are various factors associated with the incidence of dry socket, which includes operator experience, perioperative crown, and root fractures, periodontal disease, posterior teeth, and, interestingly, the use of mental health medications to be significant independent risk factors for the development of alveolar osteitis (Parthasarathi, Smith & Chandu, 2011). Moreover, another study reported that smoking; surgical trauma and single extractions are considered predisposing factors in the occurrence of dry sockets (Abu Younis & Abu Hantash, 2011).

- Surgeons need to identify these risk factors in patients with certain medical conditions and record this evidence as a part of the informed consent. Some of these causes could be smoking, surgical trauma, single extractions, age, gender, medical history, systemic disorder, extraction site, amount of anesthesia, operator experience, antibiotics use prior to surgery, the difficulty of the surgery, and the previous surgical site infection in addition to oral contraceptive use and menstrual cycle (Tarakji et al., 2015; Eshghpour & Nejat, 2013). This study aims to determine the risk factors associated with dry socket and to compare the prevalence of dry socket on the basis of gender, smoking habit, systemic condition, extraction site and use of antibiotics.

Extraction difficulty and trauma

Tissue activators may be released from the bone marrow in response to the inflammation caused by the surgical damage. The vascular injury also decreases blood flow to the affected area. Also, the vasoconstrictor in local anesthetics may increase the risk of dry sockets during more extensive surgeries involving longer periods. Excessive curettage has also been implicated as a factor that may increase the incidence of the dry socket. Suturing would likely require more extensive procedures, which might be a contributing factor. Consequently, traumatic, complex procedures or taking a long time to complete may raise the risk of problems and dry sockets. A few studies still need to reveal a correlation (de Santana-Santos et al., 2013).

Qualifications of the operator

A skilled surgeon may make the procedure more hygienic, less painful, and still more rapid. As a bonus, patients may be more likely to place their faith in experienced doctors rather than inexperienced ones. Trauma, length of surgery, and anxiety may all play a part in causing problems. As a consequence, performance may improve when managed by trained medical professionals. Surgeon skill has been found by Rakhshan [2015] as a determinant of dry socket occurrence. Some publications, however, including, have argued that there is no correlation between surgeon ability and dry sockets. Some of these purportedly higher "levels of experience" were, in reality, just various semesters of an introductory dental hygiene course. It has been suggested by Parthasarathi et al. [2010] that experienced surgeons may be more likely to produce dry sockets than dental students.

Tobacco smoking

Smoking may hinder the body's natural healing processes, suctioning the clot, disrupting blood vessel function, and preventing the socket from filling adequately with blood. Since this is the case, it may have a dose-dependent influence on the likelihood of developing a dry socket. Smoking could cause patients of numerous extractions to be more prone to problems. However, several studies have failed to find a connection between smoking and these results.

Gender

Some studies have shown an increased incidence of dry sockets in women, while others have found no such increased risk (Haraji et al., 2013). One possible cause of the disagreement is that people fail to acknowledge that the concept of "gender" encompasses a wide range of characteristics that are seldom quantified separately (habitual, hormonal, etc.). Furthermore, estrogen levels in women who have not yet reached menopause fluctuate phase shift during the menstrual cycle. Hammad et al., [2011] and Eshghpour et al. [2013] found a correlation between the use of contraceptives and the prevalence of dry sockets. For example, in descriptive research conducted on over 2000 patients, 71.4% of women who had dry sockets after surgery were using oral contraceptives. In recent meta-analyses, taking oral contraceptives has been linked to an increased incidence of dry sockets.

Age

Some have shown no correlation between age and dry sockets Bruce et al.[55] looked at the possibility of old age causing illness. Haraji et al. [2014] found age as a risk of increased postextraction morbidities, including dry sockets, but they did not investigate its influence on dry sockets separately. However, Haraji et al. [2015] overlooked a significant significance (P = 0.14) for age in postoperative inflammatory consequences of wisdom teeth extraction. The potential influence of age could be related to the difficulties of surgery at this age. Age could be a factor in the surgical problems owing to relative root and bone stiffness, leading to more traumatic procedures or longer surgeries in older patients. The reported effects can also be an artifact of the increased smoking incidence in elderly adults. age was shown to be linked with dry socket risk even after Haraji [2015], and Nusair [2007] accounted for the effects of surgical complexity and smoking. This indicates other aging features, such as diminished wound healing ability and slower metabolism in older persons. Similarly, Egauvoen [2013] reported the most significant occurrence of dry sockets in the third life decade (followed by the fourth and sixth in 2218 and 3008 patients. Halabi et al. [2012] considered it more prevalent in the fourth decade. Dry socket patients in the research by Momeni et al. [2011] were, on average, 36 years old, but their non-dry socket patients were much older (about 42 years old).

Study Rationale:

Identification of risk factors associated with dry socket can play an important role in preventing its incidence among patients having tooth extraction.

Study hypotheses:

Smoking, operator experience, systemic conditions and gender are the most common risk factors behind the incidence of dry socket.

Materials and methods:

Study Design & Sample: This is a retrospective study using the patients' files at Muneseya campus, Riyadh Elm University. A total of 385 patient files were accessed after seeking approval from the hospital director.

Inclusion criteria: Patients files having a prevalence of dry socket.

Exclusion criteria: Patients having no prevalence of dry socket.

Study Instrument: Information from patients' files was recorded including gender, operator's level, habits, medical history and extraction site.

Statistical Analysis: Collected data were analyzed using SPSS version 22, where descriptive as well as inferential statistics were conducted using chi-square test.

Results:

Table 1: Frequency distribution of the groups

Groups	Frequencies
Gender	**Male: 70.9%** **Female: 29.1%**
Smoking status	**Smoker: 40%** **Non-smoker: 60%**
Systemic disease	**Have systemic disease: 25.3%** **Does not have systemic disease: 74.7%**
Tooth location	**Upper: 40%** **Lower: 60%**
Use of antibiotics	**Yes: 18%** **No: 82%**

Table 1 presents the findings of an analysis that used the frequency distribution of participants to determine whether patients suffered from dry socket and the factors that contributed to their condition. According to the findings, the percentage of male participants was 70.9%, whereas the percentage of female participants was 29.1%. The percentage of male participants who take part in the study to evaluate the disease of dry socket in their mouths The findings further expand on the smoking status of the participants, revealing that forty percent of them are smokers whereas sixty percent of them do not smoke. The findings indicate that 25.3% of the population suffers from systemic illness, whereas the remaining 74.7% does not have any systematic disease. Dry sockets, which are caused by inflammation of the alveolus bone, are present in upper teeth 40% of the time, whereas lower teeth inflammation affects 60% of individuals with lower teeth. 18% of patients who suffer with dry socket go on to take antibiotic treatment, whereas 82% do not use any kind of antibiotics once their condition has been diagnosed.

Table 2: Comparison between groups using chi-square test

Groups	Frequencies	Chi-square	P-value
Gender	**Male: 70.9%** **Female: 29.1%**	**59.306**	**.000**

Smoking status	**Smoker: 40%** **Non-smoker: 60%**	**13.600**	**.000**
Systemic disease	**Have systemic disease: 25.3%** **Does not have systemic disease: 74.7%**	**83.012**	**.000**
Tooth location	**Upper: 40%** **Lower: 60%**	**13.600**	**.000**
Use of antibiotics	**Yes: 18%** **No: 82%**	**139.776**	**.000**

The comparison of the groups is shown in Table 2 via the use of the chi-square P-value. The fact that the P value is 0.000 implies that there is a substantial difference between the groups, as seen by the table. The comparison of individuals based on their gender reveals a significant difference between male and female participants, as shown by the chi-square score of (59.3) and the Pvalue (0.000). The chi-square test revealed a significant difference between those who smoked and those who did not smoke, with the former having a value of 13.6 and the latter having a significance level of 0.000. The second consideration is a comparison of patients who have systematic illness and those who have non-systematic disease. Patients who have systematic disease have a high chi square value of 83.02, while patients who have non-systematic disease have a P value of 0.000. The existence of a dry socket in the tooth position is the next factor, and it has a high chi-square value of 13.600. This factor is present in the lower portion (60%) and upper part (40%) of the mouth. The use of antibiotics by patients suffering from dry socket accounts for 18% of cases, while those patients who do not take antibiotics account for 82% of cases. This contrast demonstrates a significant difference and a highly significant chi square value of 139.776 in comparison to the other factor.

Discussion:

According to the findings of our comprehensive research, there is a link between the use of smokers and the development of dry sockets. It is difficult to apply the summarized findings to individual studies due to the different methods of tooth extraction (surgical and nonsurgical), the different types of teeth that were taken, and the quantity of cigarette smoking. Therefore, the literature that is studied starts with uncomplicated extractions of any sort and finishes with the literature that exclusively discusses retained third molars. This order ensures that the most relevant information

is presented first. The amount of cigarettes smoked was an additional factor that was considered for the studies that were reviewed(Kuśnierek et al., 2022).

A logistic regression study of risk variables for the development of alveolitis was published by (Halabí et al., 2012). An infection at the extraction site in the past, surgical trauma, and smoking behaviors were shown to be related with a higher incidence of dry sockets In all, there were 1304 patients who agreed to take part in the research and have teeth extracted. Extraction procedures were carried out on each and every kind of tooth. In order to evaluate tobacco usage, either smoking (defined as having smoked more than 5 cigarettes 24 hours following extraction) or not smoking was done (below 5 cigarettes 24 h after extraction). On the other hand, the incidence of dry socket was 58% among smokers, whereas it was 40% among our study participants. Vettori et al. (2019) conducted a retrospective analysis on a group of 1701 patients and explored the variables that determine the incidence of intraoperative and postoperative problems following tooth extraction. This was the most current study on the topic. A greater incidence of postoperative alveolitis was shown to be connected with both the habit of smoking and the presentation of coagulopathy, which is similar to what we found in our study.

Antibiotic use did not seem to have a preventative effect on the occurrence of postoperative infectious complications, according to the findings that were given here (Bortoluzzi et al., 2012) investigated the question of whether or not smoking increases the risk of developing postoperative problems after simple extractions. These findings are in agreement to what we achieved in our results.

On the other hand, previous findings reported that significant independent factors that contributed to the development of alveolar osteomyelitis included the presence of posterior teeth, teeth that were extracted due to periapical disease, intraoperative crown-root fractures, teeth that were extracted by specialists or dentists, and a history of taking medications. When compared to our study, significant association of extraction site, history of taking medication was observed as well.

In a similar research the authors addressed how the actions of patients following tooth extraction might influence the formation of dry socket. Smokers made up 26.4% of the patient population, which was another notable factor. These individuals were given the instruction to refrain from smoking for the subsequent three days; however, not all of them followed the directive. On the day of the extraction, a total of 68% of the smokers continued to smoke, while the remaining 40% did not smoke (for the next 72 h). Smokers and patients who had dry alveolus were not significantly associated with one another in any meaningful way(Alsaleh et al., 2018). However, these findings were not similar to what we found in our study.

Lopez Carriches et al. (2006) concluded that some characteristics, such as gender, systemic disorders, age, and the use of antibiotics before surgery, did not demonstrate a significant connection with the alveolitis occurrence, which is different from our findings. On the other hand, a strong correlation was found between the occurrence of dry socket and smoking, hence similar to our results.

One of the limitations of this study is that we did not take into account variables such as time before extraction, detailed medication history other than antibiotics. Moreover, we were unable to note down the operator's level due to limited access and available time.

Conclusion: It can be concluded that the overall prevalence of dry socket is higher among males, with most common occurrence in the lower teeth. Significant differences were observed for dry socket prevalence when compared the groups on the basis of smoking, systemic disease and gender.

Recommendations:

Further prospective studies on larger groups of patients are necessary, taking into account in detail the frequency of smoking, systemic disease and gender.

References:

Abu Younis, M.H. and Abu Hantash, R.E.O., 2011. Dry socket: frequency, clinical picture, and risk factors in a Palestinian dental teaching center. *The open dentistry journal*, *5*(1).

Akinbami, B.O. and Godspower, T., 2014. Dry socket: incidence, clinical features, and predisposing factors. *International journal of dentistry*, *2014*.

Almeida, L.E., Pierce, S., Klar, K. and Sherman, K., 2016. Effects of oral contraceptives on the prevalence of alveolar osteitis after mandibular third molar surgery: a retrospective study. *International Journal of Oral and Maxillofacial Surgery*, *45*(10), pp.1299-1302.

ALSALEH, M. K., ALAJLAN, S. S., ALATEEQ, N. F., ALAMER, N. S., ALSHAMMARY, F., ALHOBEIRA, H. A., KHAN, S. & SIDDIQUI, A. A. 2018. Alveolar Osteitis: Patient's Compliance with Post-extraction Instructions Following Permanent Teeth Extraction. *The Journal of Contemporary Dental Practice,* 19**,** 1517-1524.

BORTOLUZZI, M. C., CAPELLA, D. L., BARBIERI, T., MARCHETTI, S., DRESCH, C. P. & TIRELLO, C. 2012. Does smoking increase the incidence of postoperative complications in simple exodontia? *International dental journal,* 62**,** 106-108.

Bowe, D.D.C., 2011. The management of dry socket alveolar osteitis.

Chandran, S., Alaguvelrajan, M., Karthikeyan, A., Ganesan, K., Faiz, M.K. and Vallabhaneni, S.K., 2016. Incidence of dry socket in south Chennai population: A retrospective study. *Journal of International Oral Health*, *8*(1), p.119.

de Santana-Santos T, de Souza-Santos a A, Martins-Filho PR, da Silva LC, de Oliveira ESED, Gomes AC. Prediction of postoperative facial swelling, pain and trismus following third molar surgery based on preoperative variables. Med Oral Patol Oral Cir Bucal. 2013 Jan;18(1):e65-70

Eshghpour, M. and Nejat, A.H., 2013. Dry socket following surgical removal of impacted third molar in an Iranian population: Incidence and risk factors. *Nigerian journal of clinical practice*, *16*(4).

Gowda, G.G., Viswanath, D., Kumar, M. and Umashanker, D., 2013. Dry socket (alveolar osteitis): Incidence, pathogenesis, prevention and management. *J Indian Acad Oral Med Radiol*, *25*(3), pp.196-199.

Haraji, A., Rakhshan, V., Khamverdi, N. and Khanzadeh Alishahi, H., 2013. Effects of intraalveolar placement of 0.2% chlorhexidine bioadhesive gel on dry socket incidence and postsurgical pain: a double-blind split-mouth randomized controlled clinical trial. *Journal of orofacial pain*, *27*(3).

Haraji, A. and Rakhshan, V., 2014. Single-dose intra-alveolar chlorhexidine gel application, easier surgeries, and younger ages are associated with reduced dry socket risk. *Journal of Oral and Maxillofacial Surgery*, *72*(2), pp.259-265.

Haraji, A. and Rakhshan, V., 2015. Chlorhexidine gel and less difficult surgeries might reduce post-operative pain, controlling for dry socket, infection and analgesic consumption: a splitmouth controlled randomised clinical trial. *Journal of oral rehabilitation*, *42*(3), pp.209-219. Halabí, D., Escobar, J., Muñoz, C. and Uribe, S., 2012. Logistic regression analysis of risk factors for the development of alveolar osteitis. *Journal of oral and maxillofacial surgery*, *70*(5), pp.1040-1044.

Hammad, H.M., Hammad, M.M., Abdelhadi, I.N. and Khalifeh, M.S., 2011. Effects of topically applied agents on intra-oral wound healing in a rat model: a clinical and histomorphometric study. *International journal of dental hygiene*, *9*(1), pp.9-16

HENG, C. K., BADNER, V. M., CLEMENS, D. L., MERCER, L. T. & MERCER, D. W. 2007. The relationship of cigarette smoking to postoperative complications from dental extractions among female inmates. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology,* 104**,** 757-762.

KUŚNIEREK, W., BRZEZIŃSKA, K., NIJAKOWSKI, K. & SURDACKA, A. 2022a. Smoking as a Risk Factor for Dry Socket: A Systematic Review. *Dent J (Basel),* 10.

KUŚNIEREK, W., BRZEZIŃSKA, K., NIJAKOWSKI, K. & SURDACKA, A. 2022b. Smoking as a Risk Factor for Dry Socket: A Systematic Review. *Dentistry Journal,* 10**,** 121.

LÓPEZ CARRICHES, C., GÓMEZ FONT, R., MARTÍNEZ GONZÁLEZ, J. M. & DONADO RODRÍGUEZ, M. 2006. Influence of smoking upon the postoperative course of lower third molar surgery.

Momeni, H., Shahnaseri, S. and Hamzeheil, Z., 2011. Evaluation of relative distribution and risk factors in patients with dry socket referring to Yazd dental clinics. *Dental research journal*, *8*(Suppl1), p.S84.

Nusair, Y.M. and Younis, M.H., 2007. Prevalence, clinical picture, and risk factors of dry socket in a Jordanian dental teaching center. *J Contemp Dent Pract*, *8*(3), pp.53-63.

Parthasarathi, K., Smith, A. and Chandu, A., 2011. Factors affecting incidence of dry socket: a prospective community-based study. *Journal of oral and maxillofacial surgery*, *69*(7), pp.18801884.

Rakhshan, V., 2015. Common risk factors for postoperative pain following the extraction of wisdom teeth. *Journal of the Korean Association of Oral and Maxillofacial Surgeons*, *41*(2), p.59.

Tarakji, B., Saleh, L.A., Umair, A., Azzeghaiby, S.N. and Hanouneh, S., 2015. Systemic review of dry socket: aetiology, treatment, and prevention. *Journal of clinical and diagnostic research: JCDR*, *9*(4), p.ZE10.

VETTORI, E., COSTANTINIDES, F., NICOLIN, V., RIZZO, R., PERINETTI, G., MAGLIONE, M. & DI LENARDA, R. 2019. Factors influencing the onset of intra-and post-operative complications following tooth exodontia: retrospective survey on 1701 patients. *Antibiotics*, 8**,** 264