

Evaluation of Health Outcomes for Dental Implant Patients in Iraq

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Abstract: Background Dental implants are artificial roots that are surgically inserted into the jawbone or upper jaw and become firmly attached to the bone through a process called osseointegration. **Objective:** This paper was conducted a statistical analysis to assess the health outcomes of dental implants in Iraqi patients. **Patients and methods:** the study conducted a comparison between delayed and immediate implants in male and female participants aged 27-70, who were collected from different hospitals in Iraq between June 9th, 2022, and March 17th, 2023. The study assessed the demographic outcomes of patients, including age, sex, smoking, causes, and comorbidities. Of the 84 patients who received delayed implants, 50% were under the age of 50, compared to 34% of those who received immediate implants. The SPSS program was used to design and analyse our outcomes. Our findings were established through the database of all participants, which includes the anterior and posterior regions of patients aged over 30 years who underwent treatment for dental implants. **Results and discussion** Results were determined secondary outcomes of a dental implant in terms of region, the success of treatment, and types. Where we found that the posterior region had higher to compare anterior, which rates of cases were 36 (72%) for delayed implant and 21 (61.76%) for immediate implant. Additionally, we enrolled participants who survived and failed to evaluate the success of treatment. The rate of surviving patients was 40 (80%) for patients after delayed implant surgery and 30 (88.24%) after immediate implant surgery. It was observed that the implant time was longer in Delayed implant surgery compared to Immediate implant surgery. In addition to that, our study showed an increasing mortality rate of patients under delayed implant surgery while found shorter in immediate implant surgery. The analysis of multivariable identified risk factors for delayed implant surgery, including smoking, posterior location, male gender, hypertension, osteoporosis, and heart attack. **Conclusion** Our study showed that immediate implants are an ideal treatment for patients who have undergone dental implants, as the failure rates for immediate implants are much lower than those for delayed implants.

Keywords: Dental implant, Delayed implant, Immediate implant, smoking, and mortality rate.

INTRODUCTION

Osseointegrated dental implants represent the most ergonomic, predictable, and durable therapeutic solution for replacing missing teeth. It should be noted, however, that extracting a tooth for the purpose of implant placement is only recommended as a final treatment option. [Jung, R.E. *et al.*, 2012- Iasella, J.M. *et al.*, 2003]

Dental implants present a valuable option in instances of missing teeth. Ensuring successful implantation requires periodic clinical and radiographic follow-up evaluations in addition to gauging peri-implant health conditions. Failure rates ranging from 1 to 22% have been reported in dental implant placement, with a success rate of 71 to 93%. This long-term treatment effectively substitutes the missing tooth. [Lim, G. *et al.*, 2018- Lai, H.C. *et al.*, 2009]

After the placement of the implant, it is necessary to undergo clinical and radiographic evaluation at regular intervals. This is to assess the implant's condition in the short, medium, and long term and determine if it has been successful, survived, or resulted in failure. It is crucial to follow through with this periodic control to ensure the utmost success of the implant. Implant success relies on

several factors, including the absence of mobility and radiopacity around the implant, a bone loss rate of no more than 1.5 mm in one year and 0.2 mm annually thereafter. An adequate distance between teeth adjacent to the implant with a probing depth of no more than 3 mm and the absence of bleeding or inflammation is also necessary. Failure occurs if there are signs of pain, infection, paresthesia, bleeding, or inflammation. [Chen, S.T. *et al.*, 2009- Schropp, L. *et al.*, 2008]

Numerous studies report a ten-year implant survival rate of 90%. However, early or late postoperative complications may cause dental implant loss or failure, contradicting these positive results [Grandi, T. *et al.*, 2013]. Endo-bone implants are an established option for treating partial and complete edentulism. The bone's healing response, which results in osseointegration, permits the endosseous component of the implants to be anchored [Atieh, M.A. *et al.*, 2013]. This relationship between tooth and implant can withstand the loads exerted by the superstructures on the implants. [Ardekian, L. *et al.*, 2003]

Additionally, a competent and stable seal is established within the oral cavity by the implant, which penetrates the surrounding tissues. This is typically observed under standard clinical conditions. Numerous factors contribute significantly to achieving and maintaining long-term implant stability [Esposito, M. *et al.*, 2010]. These factors include those impacting the behavior and overall health of patients, the condition of the implant receiving bed, the quality and quantity of the receiving bed tissues, the forces exerted on the implants and surrounding tissues, the selected implant type and system, and the skill of the professionals carrying out the surgical, prosthetic, and maintenance procedures [Chrcanovic, B.R. *et al.*, 2016; Manor, Y. *et al.*, 2009]. It is vital to consider all these elements for successful, lasting implant outcomes. Gathering the pertinent information from the clinical history and conducting the requisite examinations prior to, during, and after the insertion of endo-bone implants aids in the design and implementation of treatment and subsequent maintenance therapy. [Esposito, M. *et al.*, 1998]

PATIENTS AND METHODS

This study was conducted a comparison as a cross-sectional study in associated with between delayed implant and immediate implant involved participants aged between 27-70 years in both males and females of all participants collected

from different hospitals in Iraq from 9th June 2022 even 17th March 2023. Our study was identified demographic outcomes of patients, which included 84 cases for patients under delayed implant were 50% and immediate implant 34% in terms of age, gender, smoking, causes, and comorbidities. The SPSS programme was used to design and analyse our outcomes related to postoperative.

Findings were informed of all participants database in terms of regions, which include in anterior and posterior of patients with age over than 30 years in treatment timing with dental implants. In terms of implant dimension, we determined secondary demographic outcomes of patients receiving dental implants in terms of implant length and implant diameter, in minimum and maximum in the range of implant timing.

Furthermore, the mortality rate was assessed in patients following with success of treatment outcomes and types of implants in relation to preoperative comorbidities for all participants who perform delayed and immediate implants for 24 months. Our study was analysed by risk factors of a multivariable regression model for a dental implant by hazard ratio, which includes age, male, smoking, posterior, high cholesterol, hypertension, osteoporosis, and myocardial infarction.

RESULTS

Table 1: Clinical, demographic health outcomes of patients who underwent dental implants based on age.

N	V	84
	Mi	0
Me		48.5000
SEM		1.42658
Med		48.5000
SD		13.07485
Var		170.952
Ra		43.00
Min		27.00
Max		70.00

Table 2: Identify the classification of gender through dental implant surgery.

		F	P (%)	VP (%)	CP (%)
V	Women	28	33.3	33.3	33.3
	Men	56	66.7	66.7	100.0
	T	84	100.0	100.0	

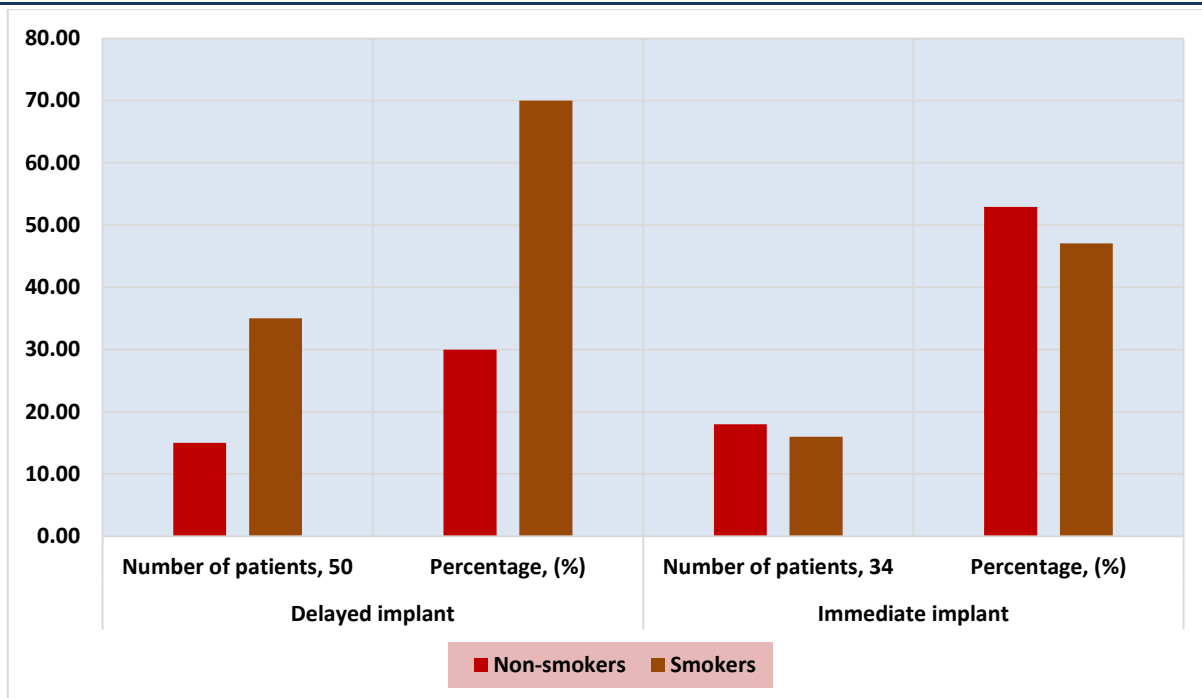


Figure 1: Identification of patients who are smokers and non-smokers.

Table 3: Causes driving patients toward dental implants.

		F	P (%)	VP (%)	CP (%)
V	Gum disease	49	58.3	58.3	58.3
	Plaque and tartar buildup	14	16.7	16.7	75.0
	Poor of oral hygiene	8	9.5	9.5	84.5
	Tooth decay	13	15.5	15.5	100.0
T		84	100.0	100.0	

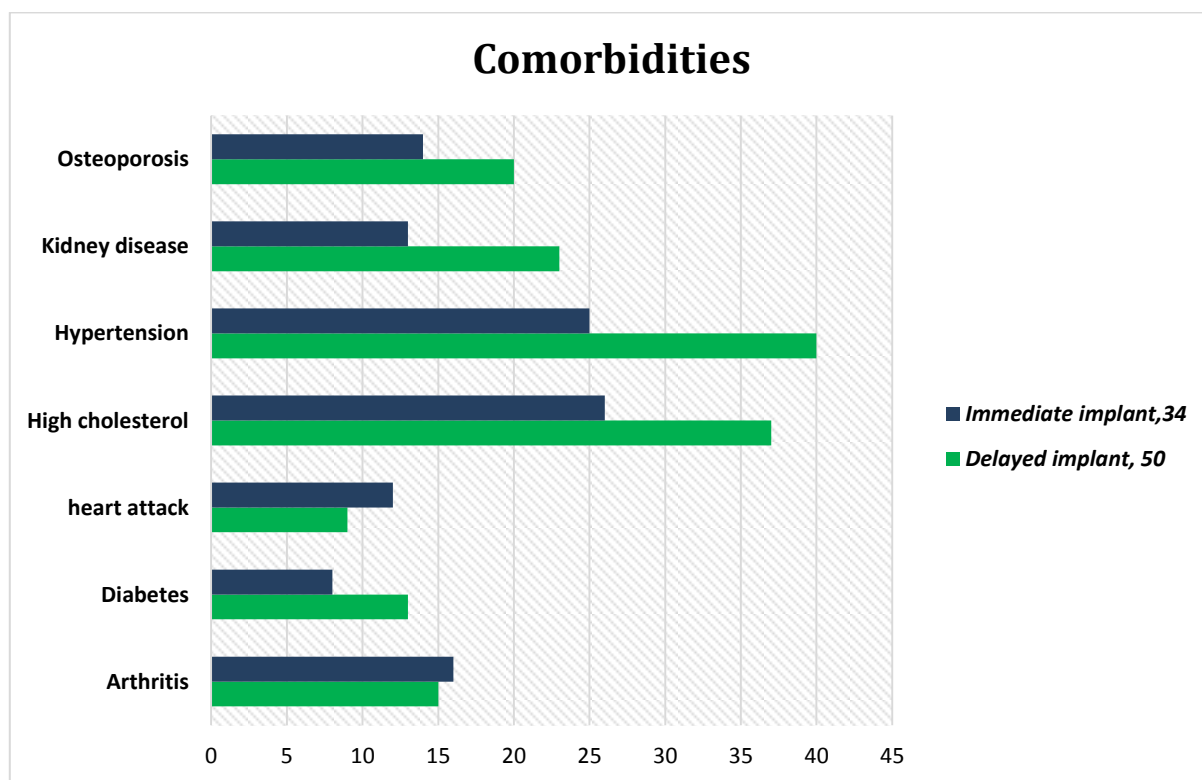


Figure 2: Results of preoperative clinical comorbidities in 84 cases of dental implantation.

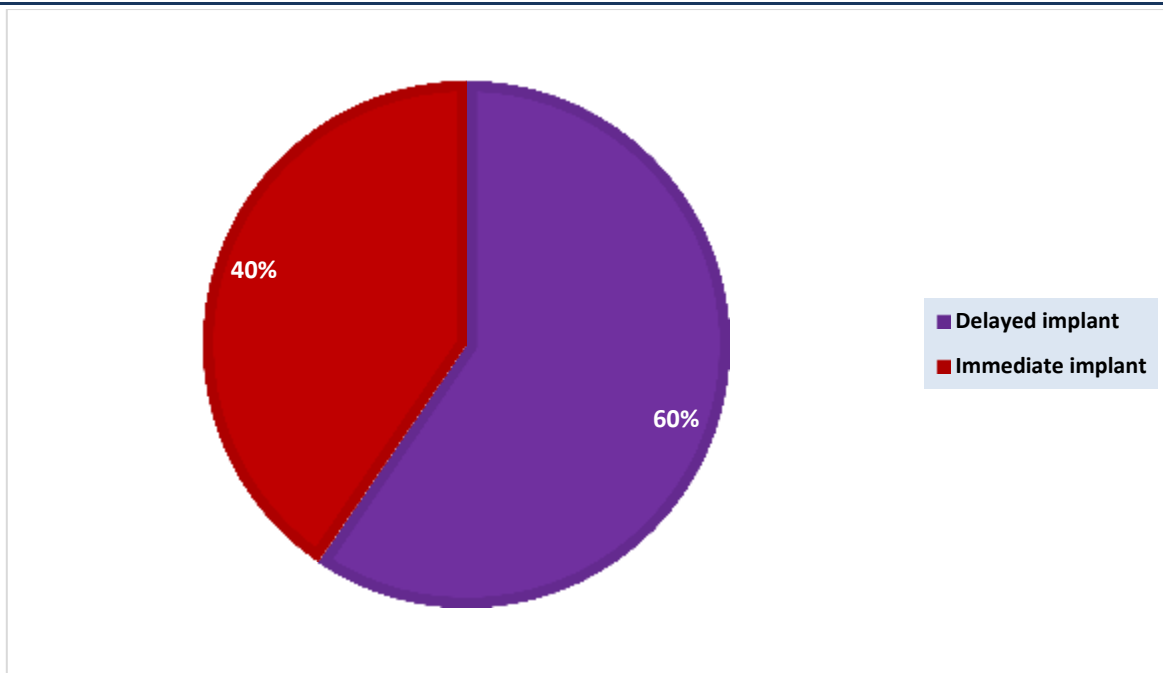


Figure 3: Secondary outcomes of dental implant types.

Table 4: Post-operative dental implant in terms of region, success of treatment

Parameters	Delayed implant, 50	Immediate implant, 34
Regions		
Anterior	14 (28%)	13 (38.24%)
Posterior	36 (72%)	21 (61.76%)
Success of treatment (%)		
Survived	40 (80%)	30 (88.24%)
Failed	10 (20%)	4 (11.76%)

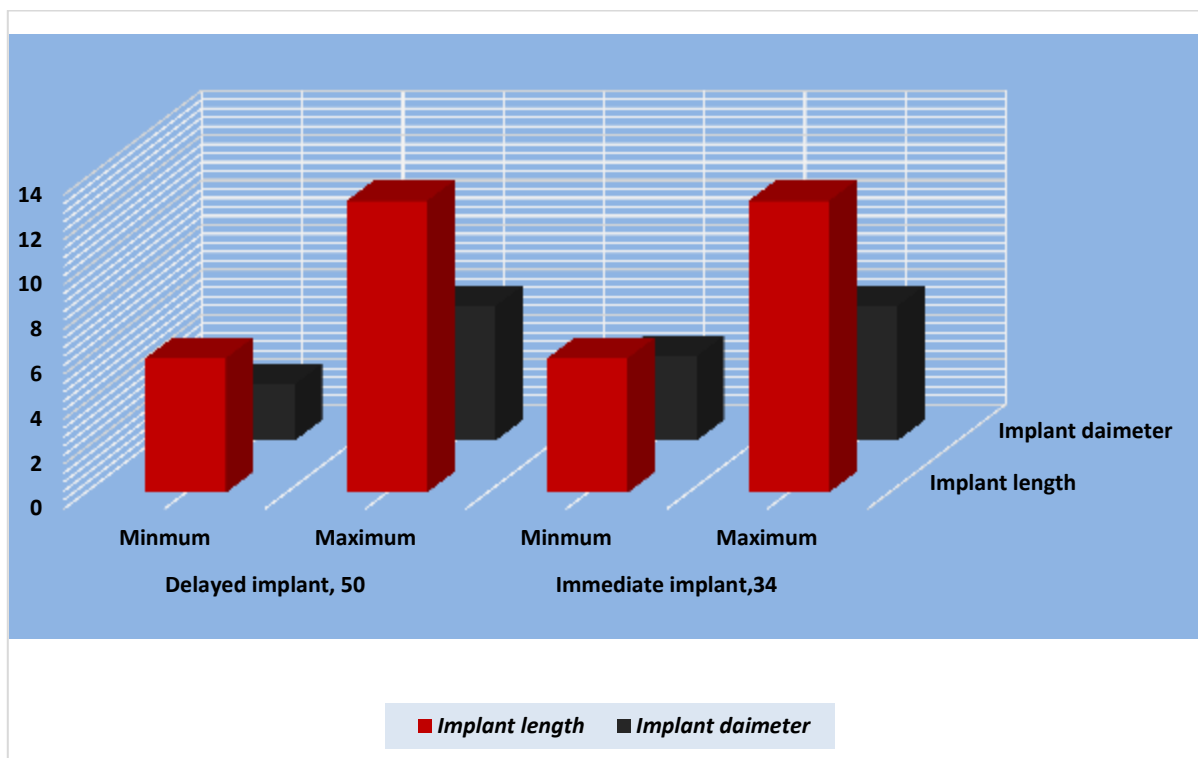


Figure 4: Determination of dental implant dimensions.

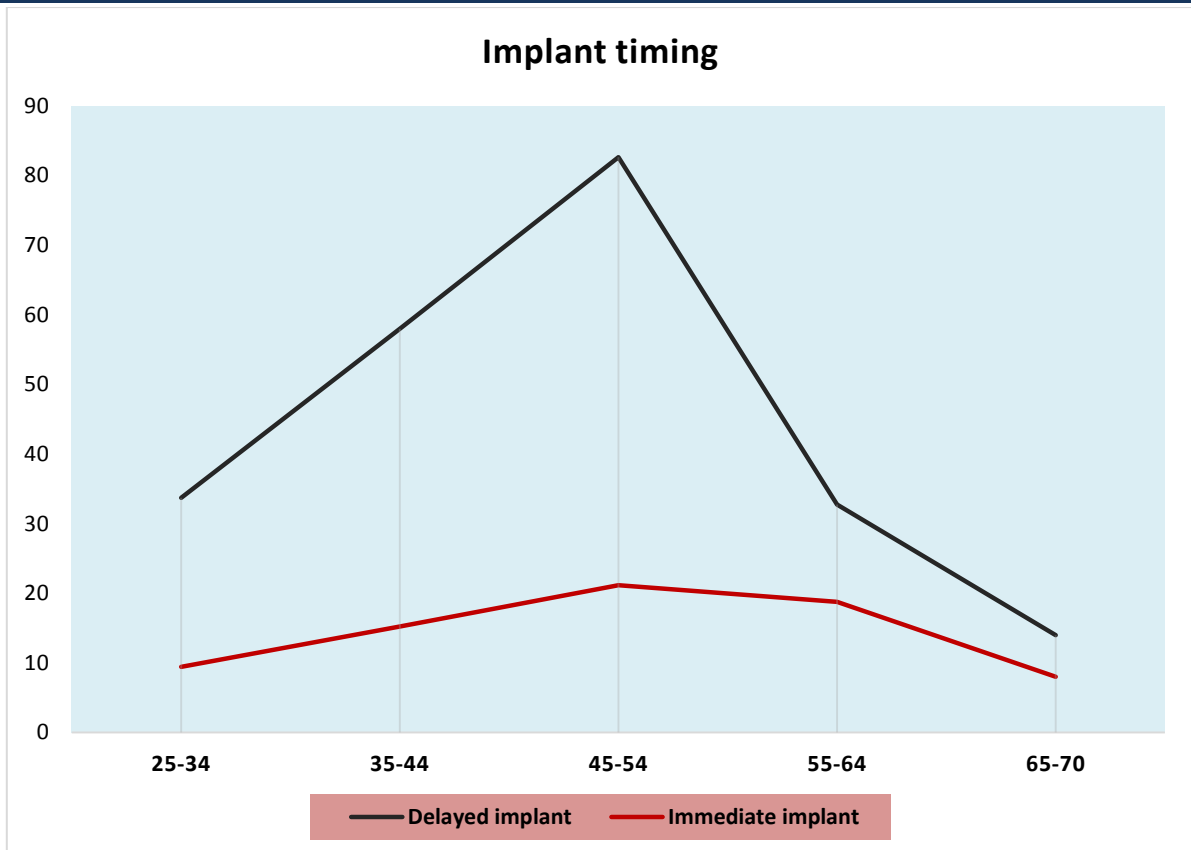


Figure 5: Post-operative dental implant time in for patients who underwent delayed and immediate implants.

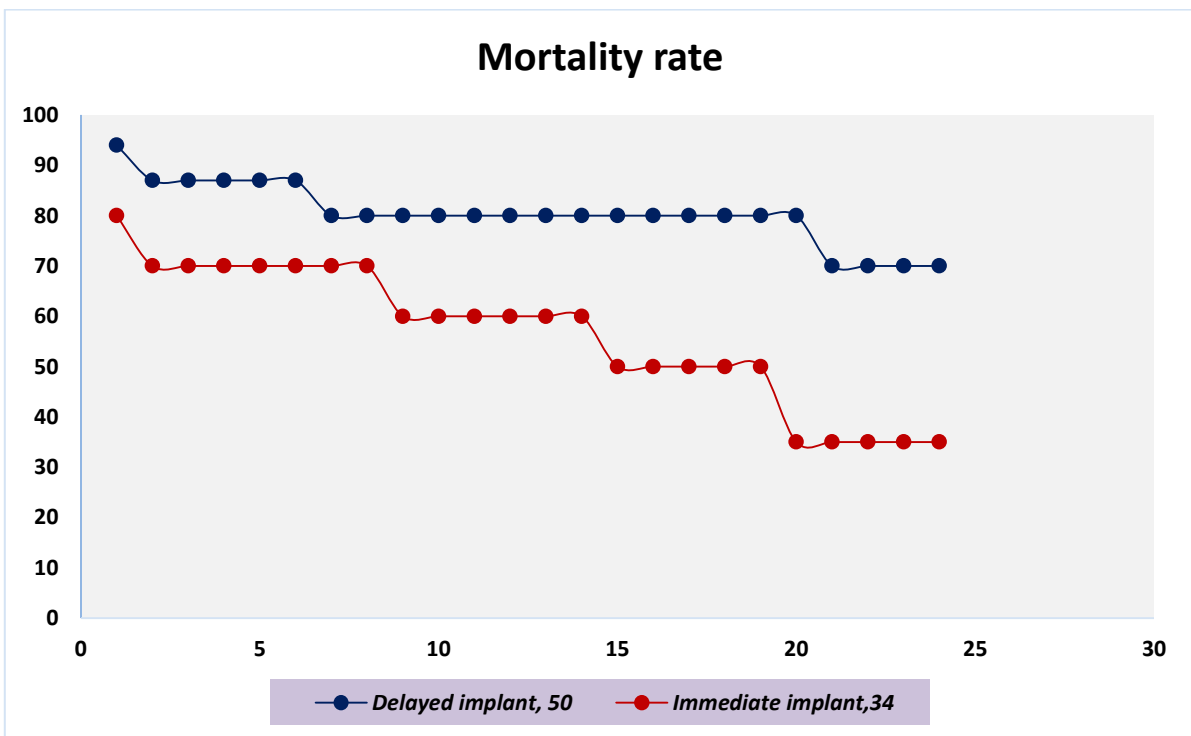


Figure 6: Clinical results of the post-operative mortality rate.

Table 5: Analysis of risk factors of Multivariable regression model for a dental implant by Hazzard Ratio

Risk factor	Hazzard Ratio	95% CI, Upper	95% CI, Lower	P-value
Age				
50-60	0.982	0.927	1.124	0.785
60-70	0.966	0.0925	1.24	0.844
Gender				
Males	2.43	1.12	3.822	0.0355
Smoking	0.88	0.55	1.79	0.732
Regions				
Posterior	1.65	0.827	2.667	0.335
Comorbidities				
High cholesterol	1.31	0.647	2.814	0.44
Hypertension	1.62	0.31	2.26	0.968
Osteoporosis	5.548	2.33	9.727	0.00128
heart attack	1.662	0.775	3.26	0.235

DISCUSSION

Our study covered all health outcomes related to patients who underwent dental implants in both sex males and females who have an age over than 27 years. Our study showed that the rate of patients with age over than 50 years was more performed with dental implant surgery, where the rate of men (66.7%) were over than women (33.3%). Smoking was considered as one of the risk factors that can affect patients in the long term; the finding enrolled smokers were 70%, and non-smokers were 30%. Our results presented causes that led to make patients did dental implants, and gum disease was occupied half of the patients with, almost 49%. Our results were identified comorbidities of patients' hypertension high in delayed implant with 80% while heart attack at 30% in immediate implant and high cholesterol were high in both implants, where 77% in implant patients and 66% in immediate patients.

Moreover, results were determined secondary outcomes of dental implants in terms of region, the success of treatment, and types, where we found that the posterior region had higher to compare anterior which rates of cases were 36 (72%) for a delayed implant and 21 (61.76%) for an immediate implant. Also, the success of treatment was enrolled participants who survived and failed, where the rate of surviving patients was 40 (80%) for patients after Delayed implant surgery and 30 (88.24%) after Immediate implant surgery, where implant time showed longer in Delayed implant surgery to compare Immediate implant surgery. In addition to that, our study showed an increasing mortality rate of patients under delayed implant surgery while found shorter in immediate implant surgery.

Recent studies have shown a significant difference in treatment success rates between immediate and delayed implants. A study conducted in 2015 found that delayed implants had a higher success rate than immediate implants [Derks, J. *et al.*, 2005; Palattella, P. *et al.*, 2008]. However, more recent studies published in 2016 suggest that both immediate and delayed implants can achieve successful clinical outcomes. However, immediate implantation resulted in higher satisfaction and better aesthetic effects, with a success rate of 90%, compared to delayed implantation, which showed a success rate of 70% after 12 months. It should be noted, however, that the immediate implantation group experienced lower implant surrounding bone absorption. [Felice, P. *et al.*, 2016]

Delayed and immediate implants have high survival rates where the immediate implant has shortened the time to final prosthesis insertion without adversely affecting overall implant survival. Also, immediate implants have shown significantly better results than delayed implants. Immediate implant surgery has lower of surgical conducting in the gum and bone of patients because immediate implant has less invasive, due to immediate implant has less pain in comparison with conducting by delayed implant [Tonetti, M. S. *et al.*, 2017].

CONCLUSIONS

Our findings indicate that an immediate implant is a favourable option for patients with dental implant needs, as they have a lower failure rate when compared to delayed implants. Furthermore, the surgical process for immediate implants is quicker than that of delayed implants. However, the study demonstrated the superiority of

immediate implantation compared to delayed implantation, as the mortality rate was higher for patients who underwent delayed implantation. Additionally, our findings elucidated the risk factors and long-term impact on patients. The findings indicate that long-term complications following surgery are significantly impacted by smoking, osteoporosis, high cholesterol, age, and other factors. These factors should be taken into account when assessing a patient's prognosis post-surgery.

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