Research Article

PERI-IMPLANTITIS PROPHYLAXIS IN TIMES OF DEMOGRAPHIC CHANGE - EFFECTIVE MEASURES FOR PATIENTS WITH DIABETES

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A R T I C L E   I N F O

A B S T R A C T

Patients with tooth loss must choose between dentures and implants. Pressure points, poor denture retention, diminished chewing performance, impaired taste, and impaired pronunciation are common issues with non-invasive dentures. This representation relies on retention time, or the time an implant is in place. Recent research found over 10,000 implants over 20 years. Implants had 97% one-year survival. After 5 years, it declined to 96% and after 10 years, 93%. This causes function loss, discomfort, and implant detachment from the bone. Peri-implantitis affects 1-47% of patients, according to surveys. Between 0.2 and 63% for implants (Walter, 2021). Proper prophylaxis is vital for implant longevity and patient oral health quality of life. The aim of this work is to retrospectively work out factors in diabetics with dental implants that have proven to be efficient for the prophylaxis of peri-implantitis. In doing so, the existing S3 guidelines will be reviewed for their efficiency and application. Consequently, in the run-up to the work, the following hypotheses were formulated; Hypothesis 1: The worse the blood glucose level is adjusted, the more likely complications in the form of peri-implantitis will also arise in the long term. Hypothesis 2: Networking between the patient's individual specialists (e.g., diabetologist and dentist) can improve the patient's oral health-related quality of life.

INTRODUCTION

Problem definition
In order to ensure the best possible care for all patients in the event of tooth loss in the future, we must face the fact that the proportion of patients with diabetes will continue to rise steadily in the future. These patients require special attention and must be considered individually within the framework of a patient-centred and cross-sectoral therapy. For this purpose, it is necessary to work out factors that are of essential importance for the success of the therapy, including, long service life of the inserted implant, full functionality and aesthetics, and high oral health-related quality of life for all patients. All these therapeutic successes can be achieved by reducing the risk of periimplantitis at different levels. These levels need to be explored and worked out in detail in order to support the treating dentists in integrating important complex procedures for periimplantitis prophylaxis in diabetics into their daily practice.

MATERIALS & METHODS

The aim of this work was to objectively analyse the current situation for diabetes patients with dental implants and their treatment by a dentist. This analysis made it possible to answer the following key questions:

i.   How does the care of diabetic patients with dental implants present itself today in everyday practice, especially with regard to peri-implantitis prophylaxis?

ii.   What is the success rate of dental implants in this patient group?

iii.   Which measures to prevent peri-implantitis are most important in this patient group and how can they be optimized?

iv.   How can the processes be best integrated into everyday practice without tying up too many resources?

The basis of this analysis was formed by a quantitative study in the relevant patient group as well as among treating dentists. The subsequent statistical analysis revealed possible problem areas that needed to be reduced in the future through specific recommendations for action. Similarly, the methodological part of this study consisted of the creation and evaluation of quantitative questionnaires that was aimed at patients or dentists involved in the research. First, the theoretical structure of the questionnaires was explained, followed by their implementation and execution. On the same breath the questionnaire was subjected to a pretest to ensure the expected reliability and validity of the questionnaire in question and was consequently classified as reliable. The study was conducted using two sets of respondents: The respondents that formed the first group were those who had been diagnosed with type 2 diabetes (for at least 2 years before implantation), implanted dental implant since at least 2016 (i.e., since publication of the S3guideline), and aged between 40-70 years. Similarly, the second group comprised of dentist who had had multiple implanted implants in patients with type

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2 diabetes (from 2016), and owned pre- and aftercare of the respective patients. On evaluation of the quantitative survey, the study employed descriptive statistics to summarise the data of a group of subjects and search for meaningful common characteristics that can be presented in tabular or graphical form with the primary aim of identifying the frequencies of certain answers to the individual questions. Consequently, the study employed inductive statistics to work out statistically relevant regularities from the summarised data sets in order to find out whether the observed characteristic values have arisen by chance or actually follow a regularity. Accordingly, the study obtained 160 responses from the surveys. For this research, a significance level of 0.05 was applied. This means that an observed regularity (significance) occurred by chance with a probability of less than 5 per cent (Blasius & Baur, 2019).After the statistical analysis is completed, the data must be interpreted in order to be able to formulate clear problem areas in an evidence-based manner. In this process, the hypotheses established in advance were also tested and the central core question answered.

RESULTS

The research recorded 160 complete responses of which there were 76 female respondents, accounting for 47.5%. On the other hand, there were 84 male respondents, accounting for 52.5%. This suggests that there were slightly more male respondents than female respondents in the population. Moreover, it was noted that the difference in gender distribution in this particular research was relatively small. Similarly, the data revealed that 33.8% (54) of respondents were diagnosed with Type II Diabetes less than 5 years ago, while 28.1% (45) were diagnosed 5-10 years ago and 38.1% (61) were diagnosed more than 10 years ago. The implication of this result is that a significant proportion of individuals with Type II Diabetes have been living with the condition for a long time. This highlights the need for ongoing management and monitoring of the condition to prevent complications and improve health outcomes. It also suggests the importance of early detection and intervention to prevent the progression of the disease and improve long-term outcomes for those affected. Moreover, majority of respondents had their implant placed within the last four years. Specifically, 23.8% of respondents had their implant placed within the last1-2 years, and 44.4% of respondents had their implant placed within the last 3-4 years. The percentage of respondents with implants placed more than 5 years ago decreases significantly, with only 11.9% of respondents having their implant placed 7 or more years ago. Likewise, at the time of the interviews, the study aimed to determine if an implant is still present in patients. The data shows that 99 patients representing 61.9% reported that the implant was no longer present, while 61 patients representing 38.1% reported that the implant was still present. Similarly, a significant proportion of patients reported that the implant was no longer present, consequently, it was observed that the largest percentage of respondents (40%) have had the implant remained in effect for 7 or more years. The next highest percentage (38.8%) have had the implant remained for 5-6 years, followed by 13.1% who have had it for 3-4 years, 3.1% for 1-2 years, and 5% for less than 1 year. Furthermore, 115 (71.9%) participants reported that they have never been diagnosed with Periimplantitis, while 45 (28.1%) responded that they have been diagnosed with the condition at some point, suggesting that a significant portion of the population surveyed has not been diagnosed with Periimplantitis.

Accordingly, the majority of respondents rated the durability of the remaining implant as "good" (40.6%) or "very good" (40.6%). Only a small percentage of respondents rated the durability as "very poor" (3.8%) or "poor" (3.1%). Consequently, this implies that the implant is generally considered to be durable and in good condition by the respondents. This suggests that the implant were performing well and were unlikely to fail in the near future. On the same breath, It was observed that the majority of participants 66 (41.3%) reported that the pain was regularly recurring, followed by occasional pain 60 (37.5%). Only a small percentage of participants reported that they never experienced pain with the implant 4 (2.5%). Consequently, these findings suggest that pain is a common experience for individuals with the existing implants, with a significant proportion of patients experiencing regular or occasional pain. Similarly, majority of participants 78 (48.8%) rated the condition of their implant as "average," followed by "good"58 (36.3%). Only a small percentage of participants rated their implant as "very poor" 6(3.8%) or "poor" 9 (5.6%). Similarly, a small percentage rated their implant as "very good"9 (5.6%). These findings suggest that the majority of participants rated the condition of their implant as average to good. However, a small proportion of patients rated their implant as poor or very poor, indicating potential issues with the longevity or effectiveness of the implant. Moreover, the results show that majority of participants 86 (53.8%) reported going for dental check-ups annually, while 39 (24.4%) of participants reported going 2-3 times a year. Only a small percentage of participants reported going for check-ups every two years 29(18.1%) or more than 3 times a year 6 (3.8%). Consequently, the findings suggest that many individuals with existing implants are aware of the importance of regular dental check-ups and are visiting their dentist at least once a year to monitor their implant. However, a significant proportions of participants (over 40%) are not visiting their dentist as frequently as recommended. Likewise, before implantation the data shows that the majority of participants 91(56.9%) rated their blood sugar status as "good," while 53(33.1%) rated it as "fair." A small percentage of participants rated their blood sugar status as "very poor" 2(1.3%) or "poor" 8 (5.0%). Consequently, these findings suggest that the majority of patients with existing implants had good blood sugar control at the time of implantation. Similarly, after implantation, 90 (56.3%) participants reported that their blood sugar status was "good," while a significant proportion 33 (20.6%) rated their status as "very good." A smaller proportion of participants rated their blood sugar status as "poor" 11 (6.9%) or "fair" 26 (16.3%) thus implying that for many patients, implantation does not appear to have a significant impact on their blood sugar levels, with the majority reporting good or very good status.

Moreover, on how participants rate the status of their blood sugar levels for the day, the results revealed that 75 (46.9%) of the participants rated their blood sugar level status as "moderate," followed by "good" 38 (23.8%) and "poor" 36 (22.5%). Only a small percentage of participants rated their blood sugar level status as "very poor" 6 (3.8%) or "very good" 5 (3.1%). Moreover, this means that many participants may not be achieving optimal blood sugar level control, as a significant proportion rated their status as "moderate" or

"poor." This could have implications for their overall health and well-being, as poorly controlled blood sugar levels can lead to complications in individuals with diabetes. Similarly, the results suggest that there is a wide range of HbA1c values in the sample, with some individuals having very low or very high HbA1c values 0.00 and 14.00 respectively. The mean value of 4.04 is in the normal range for HbA1c, which is typically between 4.0% and 5.6% for individuals without diabetes. However, the standard deviation of 2.21 indicates that there is significant variability in HbA1c values within the sample, indicating that there may be factors that contribute to variability in HbA1cvalues such as differences in treatment approaches or lifestyle factors. Accordingly, 71 individuals representing 44.4% of participants discussed their blood sugar control with their dentist, while the remaining 89respondents translating to 55.6% did not, implying that a significant number of patients who have not discussed their blood sugar control with their dentist at the time of implantation. Likewise, those results revealed that 80 respondents representing 50% of patients did not discuss their blood sugar levels with their dentist, while the other 80 respondents representing 50% diet during their follow-up visits suggesting that discussing blood sugar levels with the dentist is not a routine part of follow-up visits for all patients. Moreover, the majority of participants 120 (75%) reported that they were not in communication with their dentist about their blood sugar control. Only a quarter of participants 40 (25%) reported that they were in communication with their dentist about their blood sugar control. The results suggest that there is a lack of communication between patients and dentists regarding blood sugar control.

The data shows that e pain in the mouth area is a common experience for many respondents, with a significant proportion experiencing pain often, accordingly, majority of participants 101 (63.1%) reported experiencing pain in the mouth area often, with a smaller proportion reporting experiencing pain occasionally 38 (23.8%) or rarely 7 (4.4%). Only a small percentage of participants reported never experiencing pain in the mouth area 4 (2.5%). As a result, 63.1% of the participants reported experiencing pain in the mouth area often, with 6.25% experiencing the pain very often. Similarly, a smaller proportion reporting experiencing pain occasionally 23.8% or rarely4.4%. Only a small percentage of participants reported never experiencing pain in the mouth area 2.5%. Consequently, referencing the participants who in the past month, experienced difficulty chewing food because of problems with their teeth, mouth, or dentures, the data shows that majority of participants reported experiencing difficulty chewing food "very often" 67 (41.9%) or "often" 78 (48.8%), this implies that a significant proportion of the participants in this research have dental or oral problems that are affecting their ability to chew food properly. Moreover, on how often participants perceived that their food tasted less good due to problems with their teeth, mouth, or dentures in the past month, it was established that 84(52.5%) reported that they often experienced a less enjoyable taste of their food due to issues with their teeth, mouth, or dentures. A significant number of participants 55(34.4%) reported experiencing this issue occasionally. Only a small proportion of participants reported that they experienced this issue very often 9(5.6%) or never 5(3.1%). Furthermore, on how often participants felt uncomfortable or unhappy with the appearance of their teeth or dentures in the past month. The results reveal that majority

of participants 85 (53.1%) reported feeling uncomfortable or unhappy with the appearance of their teeth or dentures occasionally, followed by rarely46 (28.7%). A small percentage of participants reported feeling uncomfortable or unhappy with their teeth or dentures very often 3 (1.9%) or often 7 (4.4%). However, almost 19 (12%) of participants reported never feeling uncomfortable or unhappy with their teeth or dentures. Consequently, the findings suggest that a significant proportion of individuals experience discomfort or dissatisfaction with the appearance of their teeth or dentures occasionally, which could impact their overall quality of life.

Accordingly, participants who have placed implants in patients with type-II diabetes in the last 10 years, the results show vast majority of participants 140 (87.5%) have not placed implants in patients with type-II diabetes in the last 10 years. Only a small percentage of participants 20 (12.5%) have placed implants in patients with this condition, implying that the use of implants in patients with type-II diabetes is relatively uncommon among the participants. Similarly, on the general experience regarding implant tolerance in this patient group compared to patients without type II diabetes, it was established that majority of participants 73 (45.6%) reported that the implant compatibility was "much worse" in patients with type II diabetes compared to patients without diabetes. Another significant proportion of participants 67 (41.9%) reported that the implant compatibility was "worse" in patients with type II diabetes. Only a small percentage of participants reported that the implant compatibility was "better" 4 (2.5%) or 4(2.5%)"much better" in patients with type II diabetes. Moreover, 12 (7.5%) of participants reported that the implant compatibility "even". These findings suggest that patients with type II diabetes may have a higher risk of implant incompatibility compared to patients without diabetes. Moreover, regarding the f complications with implant during follow-up compared to patients without type II diabetes, the study results revealed that 89 participants representing 55.6% reported that the frequency of complications with implants was the same as patients without Type II diabetes. However, a significant proportion of participants 38 translating to 23.8% reported that the frequency of complications with implants was less compared to patients without Type II diabetes. Only a small percentage of participants reported that the frequency of complications was either 3much more representing 1.9% or 20 more representing 12.5% compared to patients without Type II diabetes. Similarly, 10 participants representing 6.3% reported that the frequency of complications with implants was much less compared to patients without Type II diabetes. Furthermore, on how well informed the dentists were about the diabetic status of their patients, results show that, 49.4% (79) of the dentists reported that they were moderately informed, followed by poor at35% (56). Only a small percentage rated as good 5.6% (9) or very good 0.6% (1). Moreover,15 dentists representing 9.4% rated themselves as very bad, thus suggesting that the dentists may not be fully informed about the diabetic status of their patients, with a significant proportion rating their knowledge as only moderate or poor. Similarly, the on how dental professionals rated the effort required to place an implant in a patient with type II diabetes compared to other, the data revealed that majority of participants 93 (58.1%) rated the effort required to place an implant in a patient with type II diabetes as "equal" to other patients. However, a significant proportion of dental professionals 38 (23.8%) rated the effort required as "less" for

patients with type II diabetes. Similarly, 24 (15.0%) rated the effort required to place an implant in a patient with type II diabetes as "more" to other patients. Consequently, the findings imply that dental professionals do not perceive placing an implant in a patient with type II diabetes to require significantly more effort than placing an implant in other patients. However, a significant proportion of professionals believe that less effort is required for these patients.

The first hypothesis which stated that the worse the blood glucose level is adjusted, the more likely complications in the form of peri-implantitis will also arise in the long term was examined against a number of research questions. First, this hypothesis was tested against questions 11 and 6, as observed from a cross-tabulation of participants' blood glucose levels on the day of implantation and peri-implantitis diagnosis. The analysis shows that 45 people out of 160 were diagnosed with peri-implantitis. Twenty-six of patients who were later identified with peri-implantitis had "good" blood glucose levels, whereas 12 had "fair" levels. Blood glucose levels were "poor" in only 4 of patients with peri-implantitis, and "very poor" in none. At the time of implantation, the majority (65) of those who did not have peri-implantitis reported "good" blood glucose levels, while the next largest group (41) reported "fair" levels. Results contradict hypothesis 1, which predicted an inverse relationship between blood sugar control and the development of peri-implantitis. A considerable percentage of people who were diagnosed with peri-implantitis had a decent blood glucose level at the time of implantation, suggesting that a good blood glucose level at the time of implantation may not definitely protect against peri-implantitis. Moreover, neither the Pearson chi-square test nor the likelihood-ratio test yielded statistically significant results (p = 0.274 and p = 0.298, respectively). This evidence points toward the possibility that blood sugar levels and the development of periimplantitis are unrelated in the long run. Although there is no difference in implant stability after 1 year compared to no diabetic patients, and although diabetics have more marginal bone loss, no statistics on implant failure rates between the two were found, according to Naujoktat et al., (2016) implant osseointegration can be completed in diabetic patients with good glycemic control. Similarly, in a long-term study by Alasqah found no changes in plaque index, bleeding on probing, probing depth, or peri-implant bone deterioration between patients with well controlled glycemic management (glycosylated hemoglobin 5.5%) and those without DM(Alasqah et al., 2018). Similarly, the hypothesis was tested against those who had ever been diagnosed with peri-implantitis and rate the status of their blood sugar control after implantation, the results show out of the 160 participants, 45 had been diagnosed with periimplantitis, while 115 had not. Among those who had not been diagnosed with periimplantitis, the majority rated their blood glucose level as "good" (66), followed by "very good" (21), "fairly" (19), and "poorly" (7). Similarly, among those who had been diagnosed with periimplantitis, the majority rated their blood glucose level as "good" (24), followed by "very good" (12), "fairly" (7), and "poorly" (2). Consequently, these findings do not support the hypothesis that the worse the blood glucose level is adjusted, the more likely complications in the form of peri-implantitis will also arise in the long term. This is because the participants who rated their blood glucose level as "good" had the highest incidence of periimplantitis diagnosis. On the other

hand, the participants who rated their blood glucose level as "poorly" had the lowest incidence of periimplantitis diagnosis. Moreover, the implications of these findings suggest that blood glucose levels may not be a reliable predictor of the risk of periimplantitis in the long term. Similarly, the chi-square test resultsindicate that there is no significant association between blood glucose level and periimplantitis diagnosis (p = .624). Therefore, we cannot conclude that the worse the blood glucose level is adjusted, the more likely complications in the form of peri-implantitis will also arise in the long term (Alberti et al., 2020). Similarly, hypothesis 1 was tested againstwhether the participants had ever been diagnosed with peri-implantitis, and how the participants rated the status of their blood sugar control on the day of the survey (Q 6&13).The results show that 45 out of 160 participants were diagnosed with peri-implantitis. Among those with very poor blood glucose level status, two out of six participants had periimplantitis. For those with poor, fair, good, and very good blood glucose level status, the numbers of participants with peri-implantitis were 9, 21, 10, and 3, respectively. Moreover, the results show that out of 160 participants, 45 were diagnosed with peri-implantitis. Among those who had been diagnosed with peri-implantitis, a higher percentage rated their blood glucose level as moderate or good compared to those who had not been diagnosed with the condition. Specifically, 11 out of 45 participants who had peri-implantitis rated their blood glucose level as poor or very poor, while 31 out of 115 participants who did not have peri-implantitis rated their blood glucose level as poor or very poor. Consequently, these results suggest that there is no clear association between blood glucose level status and the likelihood of peri-implantitis, Similarly, the Chi-square test results indicate that there is no statistically significant relationship between blood glucose level and the presence of peri-implantitis (Chi-square = 2.830, df = 4, p = 0.587). In light of the hypothesis that the worse the blood glucose level is adjusted, the more likely complications in the form of peri-implantitis will arise in the long term, the results do not provide strong evidence to support the hypothesis (Mazel et al., 2019). In addition, an independent t test was conducted to compare the means of two groups using independent samples. Similarly, peri-implantitis is being studied to see if it is more likely to develop the less effectively blood glucose levels are regulated. Additionally, if the variances of the two groups being compared are identical, this was determined via the Levene test of variance equivalence. In this case, the test results show that the variances are equal (F=0.136, p=0.713), implying that the assumption of equal variances can be met. In addition, the t-test results show that there is no significant difference between the mean scores of the two groups (t=1.290, p=0.199). The mean difference is 0.51885. The 95% confidence interval for the difference ranges from -0.27589 to 1.31358.Thus, the hypothesis that the worse the blood glucose level is adjusted, the more likely complications in the form of peri-implantitis will also arise in the long term is rejected.

For hypothesis 2, which tested whether networking between the patient's individual specialists (e.g., diabetologist and dentist) can improve the patient's oral health-related quality of life was examined using a group of questions 18-22 and question 10 analysed together. Similarly, for this hypothesis, chi-square independence test was used. Analysis of question 10 and 18 together, Chi-Square test results indicate that there

is no statistically significant relationship between the frequency of dental checkups and the frequency of pain experienced in the oral area (χ^2=16.866, df=12, p=.155). This suggests that the hypothesis that networking between the patient's specialists can improve their oral health-related quality of life may not hold true, however these findings is contrary to the findings of Jain et al.,(2020) that found that coordination of care models that prioritize dental health have been shown to dramatically improve diabetics' quality of life. Similarly, a Chi-Square test between dental check-up frequency and chewing difficulties indicated a significant relationship between dental check-up frequency and chewing difficulties (Pearson's chi-squared p =0.02),implying that there may be a potential benefit to increased networking between a patient's individual specialists (e.g., diabetologist and dentist) to improve oral health-related quality of life. Moreover, chi-square test of frequency of dental check-up to monitor the implant and the participants having impression in the past one month that their food didn't taste as good because of problems with their teeth, mouth or dentures, indicated that there was no statistically significant association between dental check-up frequency and patients 'perception of reduced taste(p=0.994). Consequently, the observed association between check-up frequency and patients' perception of reduced taste was consistent with findings of Garrido-Martinez et al., (2019) who found that the most notable aspect of dental changes was the presence of dental erosion (DE). Non-stimulated salivary flow was significantly different across the groups (p=0.001). Moreover, a chi-square test of the frequency of dental check-up to monitor the implant and having felt uncomfortable about the appearance of the participants teeth or dentures in the past month revealed that there was a significant association between frequency of dental check-up to monitor the implant and having felt uncomfortable about the appearance of the participants teeth or dentures in the past month (p=0.004). Consequently, the observed association between check-up frequency and patients' feeling uncomfortable about the appearance of the participants teeth or dentures in the past month was consistent with findings of Valdez et al., (2020) who established that frequent dental visits were associated with less satisfaction with life. Similarly, a chi-square test between frequency of dental visits and patients in the past month, finding it difficult to go about their daily activities because of problems with their teeth, mouth, or dentures indicated no statistically significant association between the frequency of dental check-ups and the difficulty in performing daily activities due to dental problems (p > .162). Thus, the observed association between check-up frequency and the difficulty in performing daily activities due to dental problems however was not consistent with findings of Keles et al.,(2018) that the investigated the oral health status and oral health related quality of life in adolescent workers found that frequency of visits to a dentist impacted on the OHRQoL of adolescent workers.

In addition, regarding hypothesis 2, additional questions were analysed using the ChiSquare tests. A Chi-Square analysis of frequency of dental check-up to monitor the implant against whether participants were in in discussion with their dentist about their current blood sugar level revealed that there is a significant association between dental check-up to monitor the implant against whether participants were in discussion with their dentist about their current blood sugar level (Pearson's chi-square value = 24.895, p < .000). Specifically, patients

who communicated with their dentist about their blood sugar levels were less likely to report mouth pain than those who did not communicate with their dentist. Consequently, according to the findings of a study that was carried out in India (Shanmukappa et al., 2017), 64.8% of the participants disclosed that they had diabetes to their dentist. In contrast, a study that was carried out in the United Kingdom found that 56.9% of the participants never brought up the fact that they were diabetic to the dentist (Lindenmeyer et al., 2012). Another study carried out in the United Kingdom found that only 30.2% of the participants' dentists were aware of whether or not their patients had diabetes (Bowyer et al., 2011). According to the findings of a survey that was carried out in Sweden on patients who had been randomly selected to have Type II diabetes (Sandberg et al., 2001), it was found that 48% of these patients had been receiving treatment without disclosing their diabetes status, and the dentist had never asked about it. Moreover, a Chi-Square test of whether the participants had had difficulty chewing food because of problems with your teeth, mouth, or dentures and whether the participants were discussion with the dentist today about their current blood sugar level, the results indicated no significant association between the two questions (Pearson's Chisquare = 2.867, p = .580). In addition, regarding, whether the patients were in discussion with their dentist today about their current blood sugar level and in the past month, they had had the impression that their food didn't taste as good because of problems with their teeth, mouth or dentures, the analysis results show that relationship between these two questions was not statistically significant (p = .291). Furthermore, a Chi-Square analysis of whether the patients were in discussion with their dentist today about their current blood sugar level and whether in the past month, the patients had felt uncomfortable about the appearance of their teeth or dentures, the test results indicated that that there is no statistically significant relationship between the two variables (p = 0.051). Similarly, whether the patients were in discussion with their dentist "today "about their current blood sugar level, and whether in the past month, it had been difficult for them to go about their daily activities because of problems with their teeth, mouth, or dentures, the Chi-Square test results show that there was no statistically significant relationship between networking between specialists and oral health-related quality of life (p = .519).

OUTLOOK

This dissertation sought to retrospectively work out factors in diabetics with dental implants that have proven to be efficient for the prophylaxis of peri-implantitis, consequently, the investigation set to answer two research hypotheses using a number of research question namely: the worse the blood glucose level is adjusted, the more likely complications in the form of peri-implantitis will also arise in the long term; and that networking between the patient's individual specialists (e.g. diabetologist and dentist) can improve the patient's oral health-related quality of life.

The first hypothesis(the worse the blood glucose level is adjusted, the more likely complications in the form of peri-implantitis will also arise in the long term) was tested against question 6 and 11, that is whether the patients had ever been diagnosed with peri-implantitis vis a vis how they rated the status of their blood sugar control at the time of implantation, respectively, as observed from a cross-tabulation of

participants' blood glucose levels on the day of implantation and peri-implantitis diagnosis. The results revealed that a considerable percentage of people who were diagnosed with peri-implantitis had a decent blood glucose level at the time of implantation, suggesting that a good blood glucose level at the time of implantation may not definitely protect against peri-implantitis. Moreover, neither the Pearson chi-square test nor the likelihood-ratio test yielded statistically significant results (p = 0.274 and p = 0.298, respectively). Thus, the results of the researches indicate that there is no significant association between blood glucose levels at the time of implantation and the occurrence of peri-implantitis. A considerable percentage of participants diagnosed with peri-implantitis had a decent blood glucose level at the time of implantation, suggesting that a good blood glucose level alone may not provide definite protection against peri-implantitis. Consequently, based on hypothesis 1 using question 11and 6, it is recommended that a further investigation on other factors that may contribute to the development of peri-implantitis. It is possible that additional factors such as oral hygiene practices, implant maintenance protocols, or systemic conditions could play a role in the occurrence of peri-implantitis, given, it is crucial to identify these factors to develop preventive strategies and improve treatment outcomes for patients undergoing dental implant procedures. Consequently, based on the results, there should be a concerted effort to encourage collaboration among dental and medical professionals to conduct comprehensive studies on peri-implantitis. This collaboration will help investigate the influence of systemic conditions such as diabetes, immune disorders, and cardiovascular diseases on the occurrence of peri-implantitis, as well as identify potential risk factors and preventive measures. Similarly, there is need to develop and update clinical guidelines for dental implant procedures to include recommendations on oral hygiene practices and implant maintenance protocols. These guidelines should emphasize the importance of regular dental check-ups, proper oral hygiene, and appropriate implant maintenance procedures to reduce the risk of peri-implantitis. Moreover, there should be focus on patient education that is by implementing educational programs to raise awareness among patients undergoing dental implant procedures about the potential risk factors for peri-implantitis and the importance of maintaining good oral hygiene. Provide patients with information on how systemic conditions, such as diabetes, can impact oral health and the need for regular monitoring and management. Similarly, the findings of the dissertation indicate that there is no support for the hypothesis that worse blood glucose control leads to a higher incidence of peri-implantitis. Therefore, relying solely on blood glucose levels to assess the risk of peri-implantitis may not be reliable. Moreover, dental and healthcare professionals should be aware of the limitations of using blood glucose levels as the sole indicator of peri-implantitis risk. They should adopt a more comprehensive approach that considers a range of factors such as oral hygiene practices, smoking habits, systemic health conditions, and individual patient characteristics. This broader evaluation could provide a more accurate assessment of the risk of peri-implantitis and inform treatment decisions, preventive measures, and patient education. Equally, policymakers and regulatory bodies in the dental and healthcare sectors should consider updating guidelines and recommendations to reflect the current understanding that blood glucose levels may not be a reliable predictor of peri-implantitisrisk. This could help prevent the potential misdiagnosis or inappropriate treatment decisions based solely on blood glucose control, leading to more effective and patient-centered care in the long term.

Accordingly, hypothesis two was tested against a number of questions (networking between the patient's individual specialists (e.g., dialectologist and dentist) can improve the patient's oral health-related quality of life). Using question, 10 together 18, the Chi-Square test results indicate that there is no statistically significant relationship between the frequency of dental check-ups and the frequency of pain experienced in the oral area(χ^2=16.866, df=12, p=.155). Based on the Chi-Square test results, which indicate no statistically significant relationship between the frequency of dental check-ups and the frequency of pain experienced in the oral area, we can conclude that there is no direct association between the frequency of dental check-ups and the frequency of pain experienced in the oral area in the studied population. Therefore, the hypothesis that networking between the patient's individual specialists can improve the patient's oral health related quality of life cannot be supported solely by this analysis. Thus, based on the finding, the following policy recommendations are made: Promote interdisciplinary collaboration, that is, although the specific hypothesis was not supported, it is still crucial to encourage collaboration and communication among healthcare professionals to provide comprehensive care for patients. Interdisciplinary cooperation can lead to a holistic approach to patient care, addressing the various aspects of oral health and overall well-being. Similarly, there should be focus on patient education, that is, emphasize the importance of regular dental check-ups and oral hygiene practices to patients. Educating patients about maintaining good oral health habits, including regular visits to the dentist, can contribute to overall oral health improvement and reduce the risk of oral health-related issues. Moreover, implementation of a comprehensive care models, that integrate dental and medical health services. Coordinated care between diabetologists and dentists, as well as other relevant specialists, may improve patient outcomes by addressing potential interactions between systemic health conditions and oral health.

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How to cite this article:

Jalil Kiann., Luliak., 2023, Peri-Implantitis Prophylaxis in Times of Demographic Change - Effective Measures for Patients with Diabetes. *International Journal of Current Advanced Research.*12 (11), pp.2613-2619.

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