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EFFECTIVENESS OF DIFFERENT ORAL HYGIENE PRACTICES IN PREVENTING PERIODONTAL DISEASES AMONG DIABETIC PATIENTS

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ABSTRACT

Background: Diabetes mellitus is a vicious system and exacerbates a multitude of periodontal diseases due to impaired immune response, defense systems and their ability to repair. The realization that diabetic patients face a higher risk for severe periodontal complications underscores the importance of good oral hygiene practices and regular dental maintenance to manage their periodontal health.

Objectives: to assess the efficiency in inflammation control on different oral hygiene maneuvers brushing, flossing and mouthwash among dental diabetic patients with general or severe periodontitis.

Study design A Cross-Sectional Study.

Duration and Place of Study. Department of Oral and Maxillofacial Surgery Bacha Khan College of Dentistry Mardan from 05 Jan 2023 to 05 Jan 2024

Method: 150 diabetic patients into three groups: brushing only, flossing and antimicrobial mouthwash with regular tooth brushing. Mechanical and antimicrobial control was performed for 6 months, and gingival index (GI), plaque score/PI, and periodontal pocket depth PPD of all health was conducted.

Results The mean age of the participants was 52.4 years (SD, 6.8 years). A mean reduction of 1.2 (SD = 0.4) for Group A (brushing only), a mean decrease of PI: 1.6(SD =3 /PI:11) was the maximal, whereas with combination agents, i.e., mouthwashes, more effect is seen than manual oral hygiene method which showed a significant difference in reduces plaque adhesion, it reduced by this intervention album group B and final additional use floss did not add apparent benefit to this from resistance he last completed due along [Table/Fig-5]. Differences in effectiveness between the oral hygiene practices also reached statistical significance ($p < 0.01$).

Conclusion: The best method that can be employed to prevent periodontal diseases in a patient undergoing diabetes treatment is brushing, flossing and recommended mouth wash, which constitutes antimicrobial properties. Periodontal complications can be prevented in this population by highlighting the fundamentals of oral hygiene practices.

Keywords: Diabetes, Periodontal Disease, Oral Hygiene, Prevention

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INTRODUCTION

Inflammatory diseases affecting the oral cavity periodontal therapies have become among the most common afflictions, with gingivitis and periodontitis being two of those diseases. Its distinctive feature is the damage that occurs at the level of supporting structures around teeth (Periodontal ligament, alveolar bone and gingival tissues). Periodontal disease may cause tooth loss and is linked to systemic conditions like cardiovascular diseases and diabetes mellitus if not addressed in time [1]. Attributed to high levels of blood glucose volume (hyperglycemia) caused by deficiency in insulin secretion or action, diabetic mellitus is a type 2 diabetes affecting millions worldwide [2]. The frequency and the severity of periodontal disease are higher among individuals with DM. The link between diabetes and periodontal disease is a two-way relationship, as one can worsen the other. Diabetes causes chronic hyperglycemia, which accelerates the formation of advanced glycation end-products (AGEs), malondialdehyde, and related compounds that aggravate inflammation in periodontal tissues [5]. Moreover, the reduced immune response seen in diabetes patients is accentuated by modifications of wound healing and, increased susceptibility to infections and difficulties in periodontal disease extent and management degree within this population [4].

Summary Oral hygiene is a foundation for the primary and secondary prevention of periodontitis. Mechanical removal of dental plaque daily through brushing and flossing is paramount in keeping one's gums healthy. The advantages of these practices also depend on their effectiveness, as they may not work well in diabetic patients with systemic disease. Brushing is a type of physical action which involves bristle gliding on the tooth surface, and since it remains one of the essential but compulsory oral hygienes, by virtue can be uptaken within no time, leading to maintaining overall good periodontal health (5), while flossing itself were used from more significant periods ensures additional component features effectively increasing gingival perfusion due to mechanical polishing besides some known anti-plaque effects along with adding up antimicrobial mouth wash that enhances in decreasing plaque present there before they could irritate us via its inflammatory product arising out. Although these practices are primarily accepted, there is limited Study specifically comparing oral hygiene's effectiveness and relative components in preventing periodontal diseases among diabetic patients. Therefore, This Study compared the efficacy of three oral hygiene regimens in controlling periodontal disease among type 2 diabetic patients. The Study will evaluate patient outcomes in four groups: with regular brushing only then flossing (rather than mouthwashing) to those who add an antimicrobial mouthwash. The primary outcomes that will be evaluated are PI, GI and PPD six months later. Considering the higher risk of periodontal disease in diabetic patients and its role in worsening glycemic control, determining

optimal oral hygiene practices is clinically essential. We aimed to find approaches that could advise diabetic patients by dental professionals and possible recommendations for better practice in oral care methods. In addition, this knowledge plays a role in eventually better understanding the relationship between systemic health and oral hygiene, suggesting that patient care should be considered as an integrated management rather than seen from two completely different points of view [6]. The Study question that this Study aims to answer is, will adding an antimicrobial mouthwash improve periodontal health in people with type II diabetes with good oral hygiene and better than brushing alone or brushing and flossing? The findings could help develop better practices for oral health management in diabetic patients, thus helping to improve their quality and duration of life.

METHODS

150 diabetic patients of the age group 35-65 years having a history of periodontal disease were included. Participants were randomly allocated to one of three groups: A (twice-daily brushing with fluoridated toothpaste), B (brushing twice a day + daily floss) or C (brushing together and using an antimicrobial mouthwash). Gingival index (GI), plaque index (PI) and periodontal pocket depth (PPD) were scored at baseline, 6 months.

ETHICAL APPROVAL STATEMENT

Principal Author Ahmed Khan obtained Ethics Review Board approval No **JBKMC-ERB-766/08/2022** for this study at the Department of Oral and maxillofacial surgery Bacha Khan college of dentistry Mardan Ethics board approval served as the prerequisite for beginning the study while upholding all institutional requirements for human ethics research.

DATA COLLECTION

Data used for the evaluation were collected at baseline and after six months. GI/mean(%), PI/ mean(%), and PPD were measured clinically by recording data on the sterilized proforma using a single piece graduated PCP 19 mm William's calibrated probe. gingival index = 0.8(SD= 0.3), periodontal probing

STATISTICAL ANALYSIS

Analysis was done using SPSS (version 24.0). Summary statistics were generated using descriptive

Approaches. The different oral hygiene practices were compared using ANOVA, with post hoc tests where necessary. Statistical significance was set at $p < 0.05$ in complete sentences.

RESULTS

Patients had a mean age of 52.4 (SD = 6.8) years. In Group A (brushing only), the mean reduction in plaque index was 1.2 (SD=0.4), scale and root planning without thermo curettage resulted in an average decrease of depth/= - starting around PPD= 1,9-, autopsy gaping per mm decreased by /mm greater than previous measurement [5]. Results: Group B (brushing + flossing) -average PI reduction was 1.6(SD = 0.3)-GI reduction -1.2 (SD = 0.3), PPD- mean Pocket Depth Reduction small fraction of significance for better result(Table-II). Group C (brushing + flossing + mouthwash): The group which displayed maximum improvements, reduction of the mean PI from 2.76 to reach a value equal to 0.7 (SD = +/-0.5), an average difference reduced GI equal to 1 compared with baseline & PPD showed at follow-up values: MPPD=3 mm +/- BOP present). The p-value for group differences was <0.01, suggesting improved periodontal health with better oral hygiene practices.

Table 1: Mean PI Reduction and Standard Deviation

Group	Mean PI Reduction	SD PI Reduction
Brushing Only	1.2	0.4
Brushing + Flossing	1.6	0.3
Brushing + Flossing + Mouthwash	2.1	0.5

Table 2: Mean PI Reduction and Standard Deviation

Group	MeanPI Reduction	SD PI Reduction
	1.2	
Brushing + Flossing	1.6	0.3
	2.1	

Table 3: Mean PI Reduction and Standard Deviation

Group	MeanPI Reduction	SD PI Reduction
Brushing Only	1.2	0.4
Brushing + Flossing	1.6	0.3
Brushing + Flossing + Mouthwash	2.1	0.5

Table 4: Mean PI Reduction and Standard Deviation

Group	MeanPI Reduction	SD PI Reduction
Brushing Only	1.2	0.4
Brushing + Flossing	1.6	0.3
Brushing + Flossing + Mouthwash	2.1	0.5

DISCUSSION

The present Study also emphasizes the marked influence of total oral cleanliness efforts on periodontal health in diabetes. The new results are consistent with and build upon previously published studies, confirming the necessity of personalized oral care in this group. Numerous studies have shown that the risk of periodontal disease in diabetic patients is sharply increased relative to non-diabetic subjects, attributing this predisposition precisely to interactions that occur as a result of hyperglycemia and inflammatory responses [7]. Chronic hyperglycemia produce s advanced gyration end- products (AGEs)

that can up regulate inflammatory reactions in periodontal tissues. This system is well- described, and data have indicated that diabetic patients present a more frequent and severe periodontal disease when compared to non-diabetic individuals [8]. This observation is consistent with the conclusion in a previous study that "a combination of tooth brushing, flossing and rinsing twice daily contributes most significantly towards improvement in periodontal indices []". The cornerstone of preventing periodontal disease is mechanical plaque removal by tooth brushing and flossing, as shown in a systematic review from Van der Weijden & Slot (2011) [9]. Remarkably, they also suggested a coadjutant role for antimicrobials in optimizing these practices, which is

congruent with our findings showing better results when combined with mouthwash intervention. Many studies demonstrate the controversial efficacy of various types of mouthwash (including antimicrobial agents like chlorhexidine) in decreasing periodontal pathogens. One example included a study from Santos(2003) provided clear evidence that chlorhexidine mouthwash was more effective than mechanical cleaning at preventing plaque accumulation and gingival inflammation [10]. This Study is consistent with those reports; the category of mouthwash group was best observed as PI, GI and PPD. The use of mouthwash, which diabetic patients may find difficult to properly control plaque due to reduced salivary flow or impaired wound healing [11], has also shown that it is especially effective in diabetes. A study by Al-Mubarak et al. Diabetic patients who supplemented toothbrushing or brushing and flossing with an antimicrobial mouth rinse experienced significantly improved periodontal health results compared to those who brushed only, as reported by Jones et al. (2014) [12]. In this Study, it was found that using mouthwash improved PI to 67.7%, GI to 50.0%, and PPD reacted positively by showing a hundred per cent improvement, which is in line with the findings of our present Study suggesting an additional benefit from the usage of antimicrobial agent on topically treated areas [13]. In addition, the results of this Study add to a growing body of work indicating that patients with diabetes need more intensive and multifaceted oral hygiene programs than non-diabetic individuals. As previously mentioned, several authors have presented the difficulties of periodontal disease management in people with diabetes and advocated for strict oral hygiene measures to control the adverse effects of periodontium that occur with diabetes [14]. Overall, the significant improvements in the brushing, flossing, and mouthwash groups suggest a more intense approach for this high-risk population may be needed. Additionally, the upgrades in periodontal indices seen in this Study, following those of Preshaw and colleagues [15,16] (2012), detailed the evidence regarding glucose metabolic disturbances and their bidirectional relationship with periodontal disease [17,18]. According to co-authors in their Study, the Study work highlighted that reducing periodontal

inflammation can also improve glycemic control among diabetic patients,. Hence, stringent oral hygiene plans are vital for these conditions. This Study highlights the importance of complete oral hygiene care in patients with diabetes for preventing periodontal disease[19]. The results align with previous literature, adding further support to using using a combination method consisting of tooth brushing & flossing and an antimicrobial mouthwash as routine oral care daily for patients diagnosed with diabetes. Maintenance of the above oral hygiene practices, such as daily brushing at least twice a day, flossing daily, and regular scale, helps in improving periodontal health and also likely leads to better management of systemic diseases like diabetes, emphasizing the need for good self-established dental habits [20,21].

CONCLUSION:

This Study supports using a spiro oral hygiene regimen (tooth brushing + interdental cleaning with dental floss+ antimicrobial mouthwash) to improve periodontal health in diabetic patients. These results highlight the need for customized oral care measures to avoid periodontal issues and improve general health among this high-risk group.

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Authors Contribution

Concept & Design of Study: Ahmed Khan

Drafting: Muhammad Naeem

Data Analysis: Muhammad Naeem

Critical Review: Raham Zaman

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