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AWARENESS ABOUT ORAL MANIFESTATIONS OF DIABETES MELLITUS AMONG DENTAL STUDENTS

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Abstract: Diabetes mellitus (DM) is a chronic disease which is also one of the rising causes of mortality and morbidity worldwide. Periodontal disease, xerostomia, and dental caries are the most common oral manifestations of DM. In patients with poor glycemic control, periodontitis is more frequent. Early identification of these oral complications may help in the identification of diabetes. Diabetes can lead to changes in the oral cavity and gum-related problems such as periodontitis (pyorrhea) and gingival hyperplasia, dental decay, glossodynia, candidiasis, xerostomia, and fruity (acetone) breath. The aim of the study was to assess the awareness of oral manifestations of Diabetes Mellitus among dental students. A survey was conducted among the dental students who were randomly selected. Participants were explained the aims and objectives of the study being conducted in detail. All dental students who participated in the survey voluntarily completed a questionnaire consisting of 10 close-ended questions. The Chi-square test was done using SPSS software with a level of significance set at $p<0.05$. The results showed that 37% of males and 33% of females were aware of the oral manifestations of diabetes mellitus. It is of paramount importance for dental professionals to improve the awareness of diabetic patients of their increased risk for oral diseases and the impact of oral health on their general health. From the study, it could be concluded that the majority of dental students had good knowledge and awareness regarding the oral health and manifestations of diabetic patients. Dental professionals should have increased awareness of the importance of maintaining good oral health and organize programs that can help in educating diabetic patients and also encourage them to maintain proper oral health and to decrease the risk of oral diseases.

Keywords: Diabetes, oral health, oral manifestations, dental, students

INTRODUCTION

Diabetes mellitus (DM) is a chronic disease that is also one of the rising causes of mortality and morbidity affecting all age groups worldwide. It refers to a group of metabolic diseases that is characterized by hypoglycemia (1). Periodontal disease, xerostomia, and dental caries are the most common oral manifestations of DM. In patients with poor glycemic control, periodontitis is more frequent. Early identification of these oral complications may help in the identification of diabetes. The increase in the incidence of diabetes in developing countries follows the trend of unhealthy lifestyle changes and urbanization (2). Diabetes can lead to changes in the oral cavity such as gum-related problems such as periodontitis (pyorrhea) and gingival hyperplasia, dental decay, glossodynia, candidiasis, xerostomia, and fruity (acetone) breath (3). Diabetes exhibits poor oral health and hygiene in diabetic patients than non-diabetic patients. Diabetics have the same plaque index levels or a higher average gingival index relative to controls. Chronic periodontitis is considered a risk factor for poor glycemic control, and the duration of diabetes is a more significant factor for the severity of periodontitis in type 2 diabetics than the patient's age (4). There is a correlation between systemic diseases and oral symptoms which leads to early diagnosis of most systemic diseases. Oral candidiasis is an early, non-specific sign of uncontrolled diabetes (5). Preventive measures such as regular proper brushing, flossing, tongue cleaners, and periodic dental visits should be ensured, which will prevent complications due to diabetes and will decrease the morbidity caused due to oral manifestations of diabetes (6). Oral hygiene behavior and seeking oral health care depend on a number of factors such as lack of knowledge about dental health and hygiene, illiteracy, economic constraints, lack of facilities, and lack of proper guidance (7). Mostly it is found that caring for the oral cavity is often overlooked when trying to control other problems associated with diabetes which may contribute to undue suffering and hidden morbidity from oral health problems (8). This survey was designed to assess the knowledge and awareness of oral manifestations of diabetes mellitus among undergraduate dental students in our institution. This study was also an attempt to create awareness of oral health, oral manifestations, and treatment needs of diabetic patients among our dental students, which will help them to impart good oral health-related quality of life for such patients.

MATERIALS AND METHODS

STUDY DESIGN AND SETTING:

A survey was conducted using a descriptive survey design of dental faculties and practitioners who were randomly selected. Participants were explained the aims and objectives of the study being conducted in detail. All the dental students in the study voluntarily completed a questionnaire consisting of 18 close-ended questions across Chennai were shortlisted based on the inclusion and exclusion criteria.

STUDY POPULATION

The study population included dental students across Chennai . The inclusion criteria included dental students across dental colleges in Chennai and the exclusion criteria excluded faculties across the dental colleges in Chennai.

DATA COLLECTION

The data for this study was taken from the questionnaire-based survey. A total sample of 200 participants met the inclusion criteria which included dental students in dental colleges in Chennai and exclusion criteria excluded faculties from the study. These 200 participants were dental residents and faculties. Dental students were excluded from the study. Data was reviewed by an external reviewer.

STATISTICAL ANALYSIS

Data were recorded in Microsoft Excel 2016 (Microsoft office 10) and later exported to SPSS statistical package for social science for windows versions, 20.0, SPSS Inc, (Chicago IU, USA) and subjected to statistical analysis. The Chi-square test was employed with a level of significance set at $p<0.05$.

RESULTS

A total of 200 students were enrolled in the study. Among males, 37% responded as yes, 5% responded as no and 7% responded as don't know. Among females, 33% responded as yes, 15% responded as no and 3% responded as don't know (Figure 1: Barchart shows the association between the effect of diabetes on diabetes mellitus and gender). The association between awareness of oral manifestations of diabetes mellitus and gender. Among males, 28% responded as yes, 16% responded as no, and 5% responded as don't know. Among females, 30% responded as yes, 7% responded as no and 14% responded as don't know (Figure 2). The association between awareness of management of diabetes mellitus and gender. Among males, 21% responded as yes, 21% responded as no and 7% responded as don't know. Among females, 27% responded as yes, 16% responded as no and 8% responded as don't know (figure 3). The association between awareness of oral manifestations of diabetes mellitus and gender. Among males, 49% responded as halitosis, acetone breath, candidiasis, xerostomia, dental caries. Among females, 31% responded as halitosis, acetone breath, candidiasis, xerostomia, dental caries, and 20% responded as burning sensation, tumor (figure 4). The association between diabetes causing caries and gender. Among males, 22% responded as yes, 17% responded as no, and 10% responded as don't know. Among females, 24% responded as yes, 10% responded as no, and 17% responded as don't know (figure 5). The association between awareness of the effect of diabetes on oral health and gender. Among males, 23% responded as yes, 12% responded as no, and 14% responded as don't know. Among females, 19% responded as yes, 19% responded as no and 13% responded as don't know (figure 6)

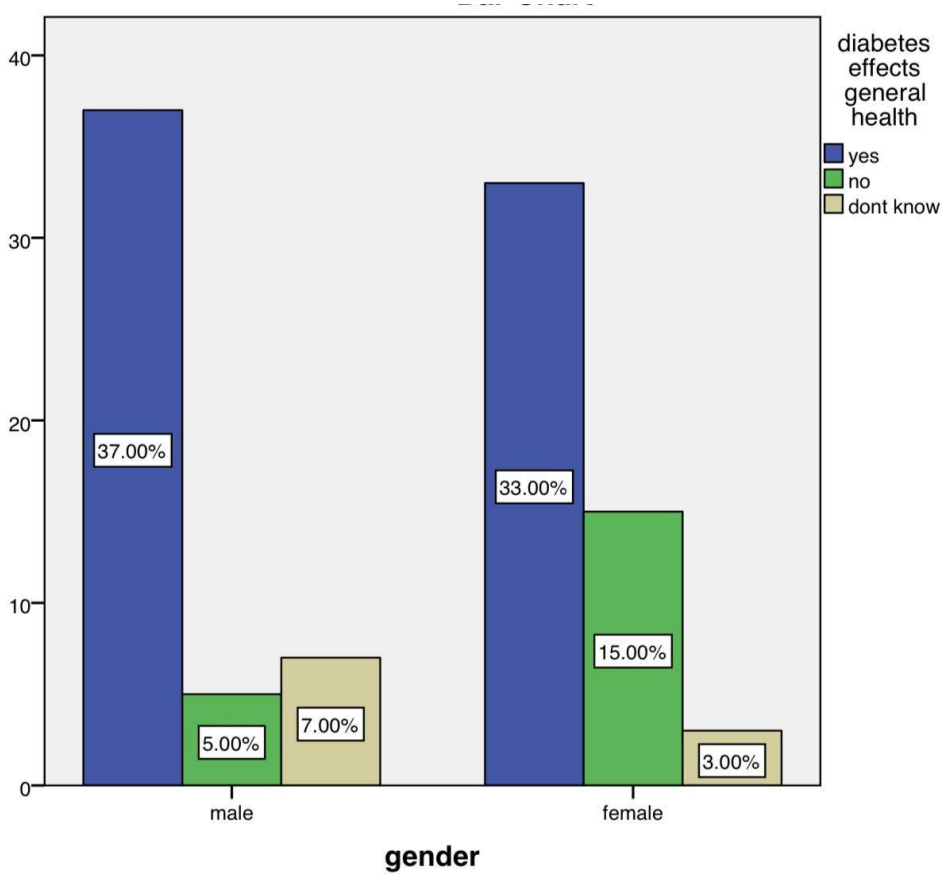

Figure 1: Barchart shows the association between the effect of diabetes on diabetes mellitus and gender. The X-axis represents the percentage of gender and the Y-axis represents the percentage of effect of diabetes mellitus on general health. Blue color denotes yes, green denotes no, and white color denotes don't know. Among males, 37% responded as yes, 5% responded as no and 7% responded as don't know. Among females, 33% responded as yes, 15% responded as no and 3% responded as don't know. Pearson chi-square test shows p-value is 0.03, (p-value > 0.05). Hence, it is statistically significant. Hence proving that there was an association between gender and effects of diabetes on general health.

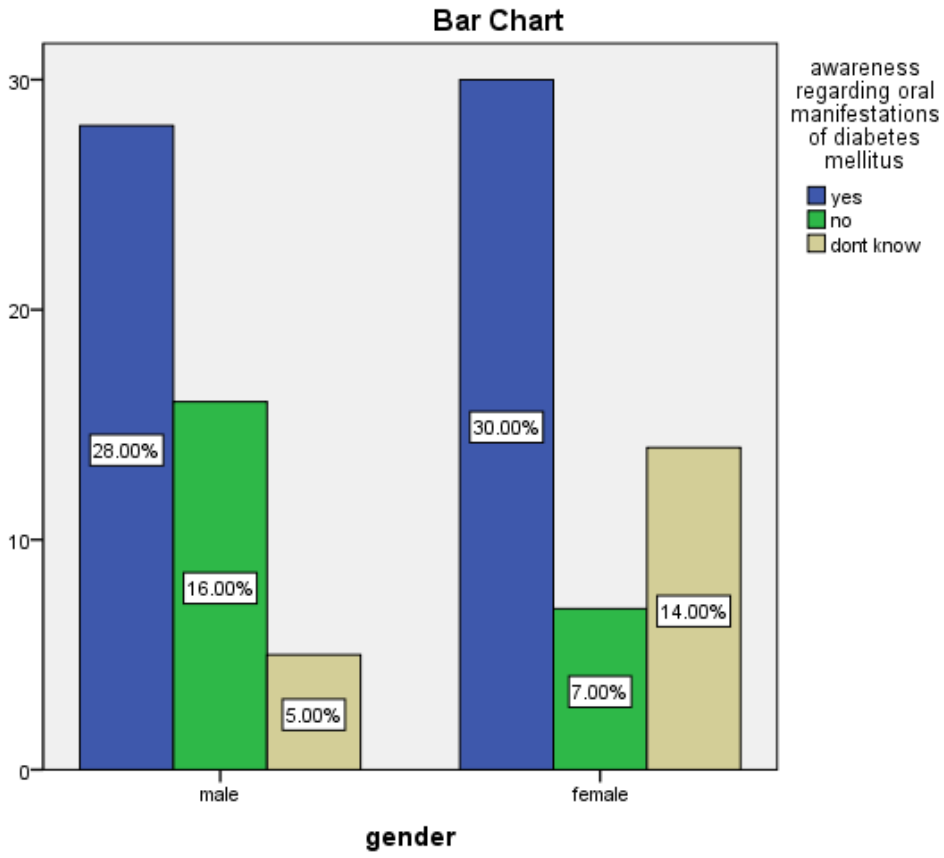

Figure 2: Barchart shows the association between awareness of oral manifestations of diabetes mellitus and gender. The X-axis represents the percentage of gender and the Y-axis represents the percentage of awareness of oral manifestations of diabetes mellitus. Blue color denotes yes, green denotes no, and white color denotes don't know. Among males, 28% responded as yes, 16% responded as no, and 5% responded as don't know. Among females, 30% responded as yes, 7% responded as no and 14% responded as don't know. Pearson chi-square test shows p-value is 0.03, (p-value > 0.05). Hence, it is statistically significant. Hence proving that there was an association between gender and awareness regarding oral manifestations of diabetes mellitus.

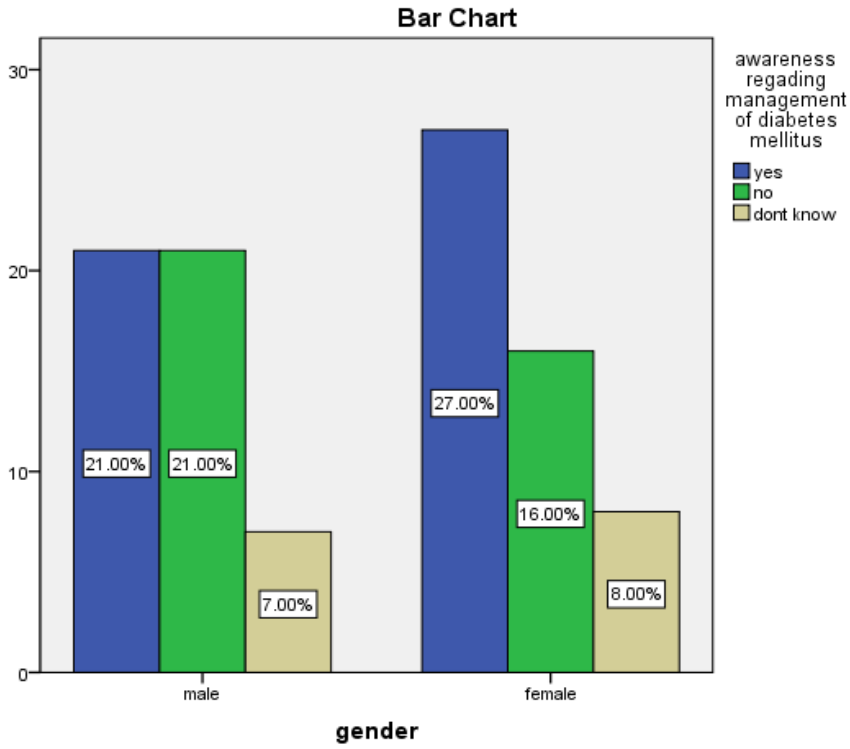

Figure 3: Barchart shows the association between awareness of management of diabetes mellitus and gender. The X-axis represents the percentage of gender and the Y-axis represents the percentage of awareness of management of diabetes mellitus. Blue color denotes yes, green denotes no, and white color denotes don't know. Among males, 21% responded as yes, 21% responded as no and 7% responded as don't know. Among females, 27% responded as yes, 16% responded as no and 8% responded as don't know. Pearson chi-square test shows p-value is 0.03, (p-value > 0.05). Hence, it is statistically significant. Hence proving that there was an association between gender and awareness of management of diabetes mellitus.

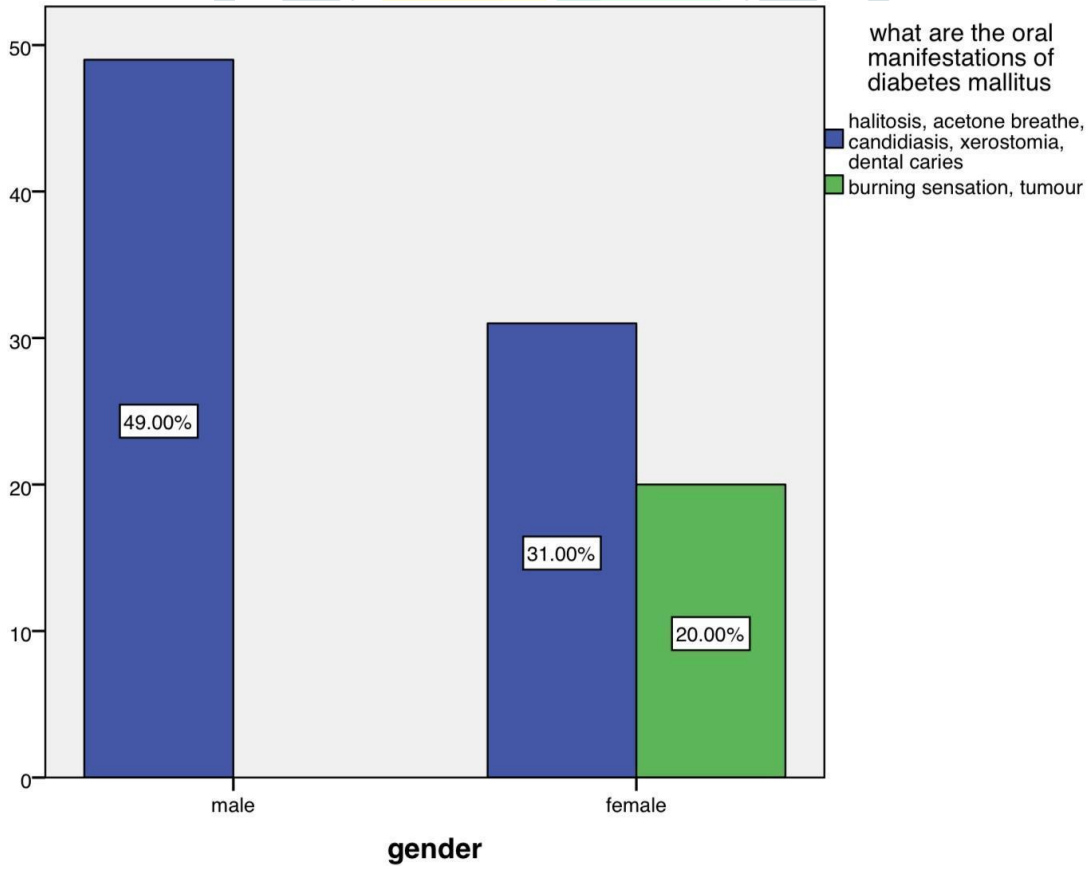

Figure 4: Barchart shows the association between awareness of oral manifestations of diabetes mellitus and gender. The X-axis represents the percentage of gender and the Y-axis represents the percentage of oral manifestations of diabetes mellitus. Blue color denotes halitosis, acetone breath, candidiasis, xerostomia, dental caries, and green denotes burning sensation, tumor. Among males, 49% responded as halitosis, acetone breath, candidiasis, xerostomia, dental caries. Among females, 31% responded as halitosis, acetone breath, candidiasis, xerostomia, dental caries, and 20% responded as burning sensation, tumor. Pearson chi-square test shows p-value is 0.03, (p-value > 0.05). Hence, it is statistically significant. Hence proving that there was an association between gender and oral manifestations of diabetes mellitus.

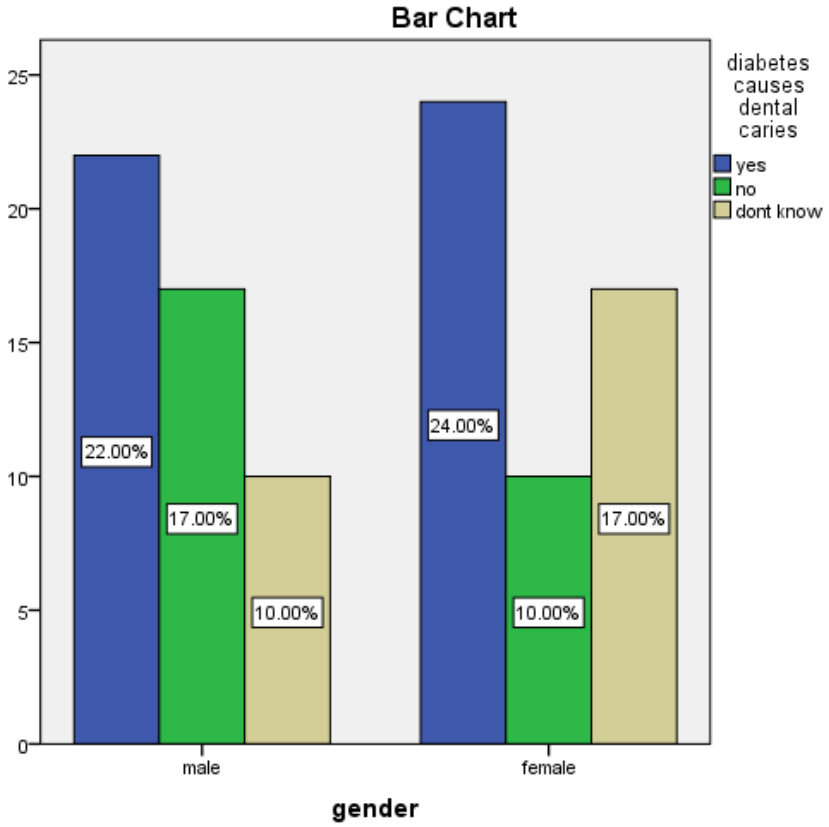

Figure 5: Barchart shows the association between diabetes causing caries and gender. The X-axis represents the percentage of gender and the Y-axis represents the percentage of diabetes causing caries. Blue color denotes yes, green denotes no, and white color denotes don't know. Among males, 22% responded as yes, 17% responded as no, and 10% responded as don't know. Among females, 24% responded as yes, 10% responded as no, and 17% responded as don't know. Pearson chi-square test shows p-value is 0.03, (p-value > 0.05). Hence, it is statistically significant. Hence proving that there was an association between gender and diabetes causing caries.

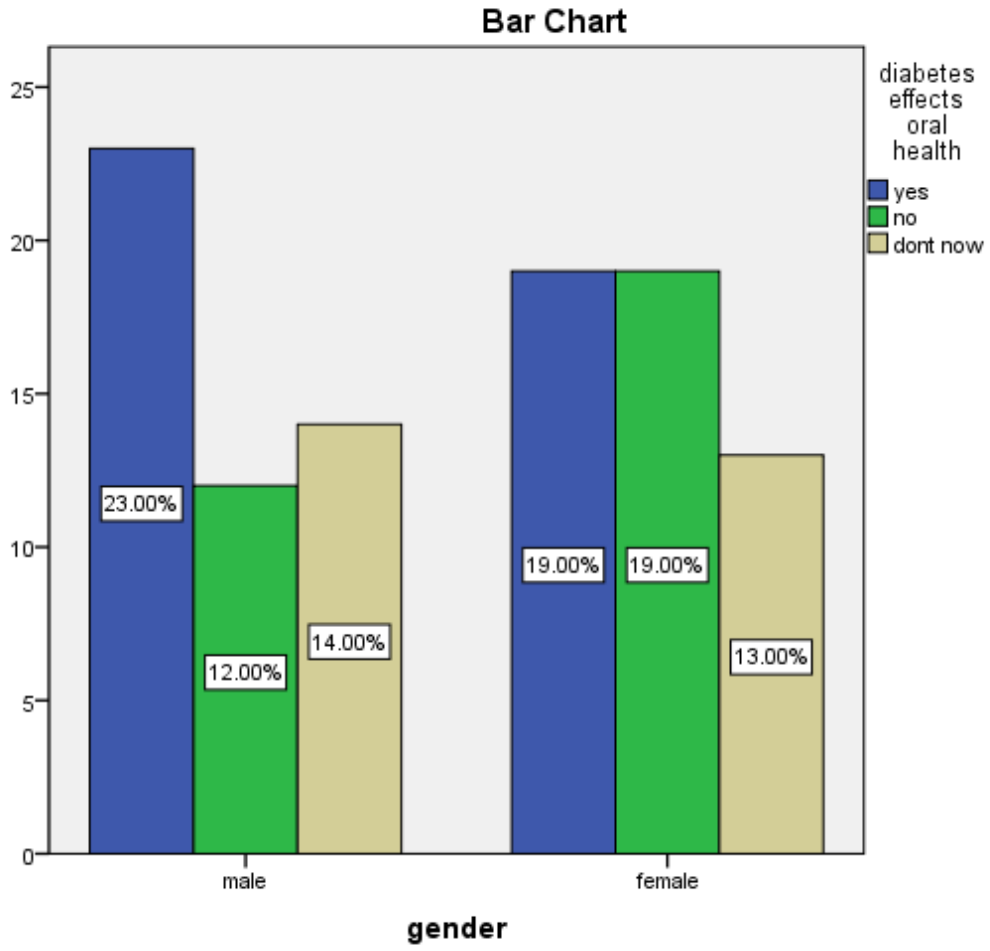

Figure 6: Barchart shows the association between awareness of the effect of diabetes on oral health and gender. The X-axis represents the percentage of gender and the Y-axis represents the percentage of awareness of the effect of diabetes mellitus on oral health. Blue color denotes yes, green denotes no, and white color denotes don't know. Among males, 23% responded as yes, 12% responded as no, and 14% responded as don't know. Among females, 19% responded as yes, 19% responded as no and 13% responded as don't know. Pearson chi-square test shows p-value is 0.03, (p-value > 0.05). Hence, it is statistically significant. Hence proving that there was an association between gender and awareness of the effect of diabetes mellitus on oral health.

DISCUSSION

It is of paramount importance for dental professionals to improve the awareness of diabetes mellitus, their increased risk of oral diseases, and the impact of oral health on general health. Early detection and treatment of tooth caries, periodontal disease, and other oral diseases would be of enormous benefit to protect diabetic patients from the harmful oral complications associated with diabetes. It is important for dental professionals to promote awareness regarding diabetes on oral health to prevent harmful dental complications and expensive treatment. Periodontal diseases include gingivitis (in which the inflammation is confined to the gingiva and is reversible with good oral hygiene) and periodontitis (in which the inflammation extends and results in tissue destruction and alveolar bone resorption) (9). Oral health is an indicator of general health. Many systemic disorders have a direct effect on the oral cavity and oral tissues. In fact, some systemic diseases present with oral manifestations which are the only diagnostic hint in the initial phase of the disease on rare occasions. Some diseases have an indirect

influence on the oral health of an individual by predisposing the individual to various oral ailments or by compromising the integrity of the oral tissues (10). Diabetes is an important risk factor in the pathogenesis of periodontal diseases. Patients with diabetes have a greater prevalence and severity of periodontal disease compared to patients without diabetes. In DM, the function of immune cells including neutrophils, monocytes, and macrophages is often altered. Neutrophil functions such as adherence, chemotaxis, and phagocytosis are changed, inhibiting an adequate defense against microorganisms in periodontal infections, thereby significantly increasing the destruction of the periodontal tissue. In periodontal disease, the host-microbial interactions lead to the production of chemical mediators such as pro-inflammatory cytokine and tumor necrosis factor-alpha (TNF-α) which have local and systemic effects. TNF-α inhibits tyrosine phosphorylation of insulin receptors which impairs the glucose uptake by cells and thus causes increased insulin resistance, leading to poor glycemic control. Previous studies reported that the risk of periodontitis is increased by approximately threefold in diabetic individuals compared with nondiabetic individuals which appears to be a bidirectional relationship between levels of periodontal disease and glycemic levels (11). A previous study, which assessed the awareness of diabetic patients about their increased risk for systemic and oral diseases. The study showed inadequate awareness among the majority of the study population which could be due to the low educational level of the patients and hence the study concluded that type 2 diabetic patients had less awareness of increased risk for oral diseases like periodontitis. The data suggested a strong association between type 2 diabetes and chronic periodontitis (12). Another study was conducted to evaluate awareness among Mangalore individuals regarding diabetes in general and the association between diabetes and periodontal diseases. The study concluded that knowledge among the study group was not up to the mark and the healthcare professionals need to take up the responsibility of educating the masses regarding the same (13). Another study found that diabetic patients had little awareness of their increased risk for oral diseases (14). Similarly, in a study done on the general population in Chennai, people had little knowledge of the oral manifestations of DM (15). A study was conducted to assess the knowledge of diabetic patients about their risk for periodontal disease, their attitude towards oral health, and their oral health-related quality of life. It concluded that awareness of the potential associations between diabetes, oral health, and general health needs to be increased in diabetic patients (16). Another study was conducted to assess the knowledge and awareness of diabetic patients about their risk for oral diseases as complications associated with diabetes and to assess their attitudes and practices toward sustaining good oral health through proper oral hygiene and regular dental checkups. This study concluded that the level of awareness and dental health knowledge in diabetic patients was deficient (17). The researchers in the above studies assessed the awareness and attitude of diabetic patients and common people, while in this study, we have assessed the awareness of dental students since dental students are the first person to diagnose and spread awareness of oral health to the public and patients. In our study, the majority of dental students had good knowledge and awareness regarding the oral health of diabetic patients. The results are similar to the findings by a previous similar study in which most of the dental schools were confident about the knowledge of their students regarding the relationship of oral disease to systemic conditions (18). Studies conducted among medical students showed inadequate knowledge about diabetes (19). The study

concluded that although medical interns have thorough knowledge about diabetes, their knowledge about periodontal disease was poor. Dentists, physicians, and other health providers should recommend that a diabetic patient see a dentist regularly. Dental practitioners have an opportunity and responsibility to educate diabetic patients about the oral complications of diabetes and to promote proper oral health behaviors. Regular dental visits provide opportunities for professional care in the prevention, early detection, and treatment of oral diseases which are important for diabetic patients. The physician's knowledge about the association between diabetes and oral health is also important. General practitioners have the responsibility to consult a dentist in case of any oral complication associated with the disease. A blood glucose level of patients should be assessed before any dental procedure. Public awareness about the association between DM and periodontitis is important which could be achieved by conducting camps, street plays, by newsletters, television, radio programs, etc (20). Dentists are essential elements in screening and diagnosing unidentified diabetes by oral examination in dental clinics. Dental students and dentists must have adequate knowledge in identifying and treating DM and oral health-related problems associated with it. Dentists should inform their patients of the association between diabetes and periodontitis and encourage them to have regular dental checkups. Each diabetic patient and his family should be properly educated in detail, about the prevention and treatment of this disease, and also to ensure that they are regularly consulting with their treating physicians and dentist. The survey was conducted only in Chennai and should include other states so we could assess the awareness about oral manifestations of diabetes mellitus. The survey could help in early diagnosis and assessment of complications of diabetes mellitus.

CONCLUSION

From the study, it could be concluded that the majority of dental students had good knowledge and awareness regarding the oral health and manifestations of diabetic patients. Dental professionals should have increased awareness of the importance of maintaining good oral health and organize programs that can help in educating diabetic patients and also encourage them to maintain proper oral health and to decrease the risk of oral diseases. Health professionals in both the dental and medical fields should take the authority for educating the public about the oral manifestations of diabetes and its complications for oral health.

Acknowledgment-

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Conflict of Interest-

The author declares that there was no conflict of interest in the present study

REFERENCES

1. Nivashini GSV, Kumar MP. Knowledge and awareness among undergraduate dental students regarding oral health of diabetes mellitus patients. Drug Invention Today [Internet]. 2018;10(4). Available from: http://search.ebscohost.com/login.aspx?direct=true&profile=ehost&scope=site&authtype=crawler&jrnl=09757619&AN=130132191&h=USS6HpiVwv4i3JnGzjaP4RAvP6yvphvEI8BSTHKjxDHGRzjxmblcJR2bgwrnPQWk1J7R8vq3RkeJBg9e5lk%2Fog%3D%3D&crl=c

2. Ueno M, Takeuchi S, Oshiro A, Shinada K, Ohara S, Kawaguchi Y. Association between diabetes mellitus and oral health status in Japanese adults. Int J Oral Sci [Internet]. 2010 Jun;2(2):82–9. Available from: http://dx.doi.org/10.4248/IJOS10025

3. Greenberg MS, Brightman VJ, Lynch MA, Ship II. Idiopathic hypoparathyroidism, chronic candidiasis, and dental hypoplasia [Internet]. Vol. 28, Oral Surgery, Oral Medicine, Oral Pathology. 1969. p. 42–53. Available from: http://dx.doi.org/10.1016/0030-4220(69)90192-3

4. López del Valle LM, Ocasio-López C. Comparing the oral health status of diabetic and non-diabetic children from Puerto Rico: a case-control pilot study. P R Health Sci J [Internet]. 2011 Sep;30(3):123–7. Available from: https://www.ncbi.nlm.nih.gov/pubmed/21932712

5. Masood Mirza K, Khan AA, Ali MM, Chaudhry S. Oral health knowledge, attitude, and practices and sources of information for diabetic patients in Lahore, Pakistan. Diabetes Care [Internet]. 2007 Dec;30(12):3046–7. Available from: http://dx.doi.org/10.2337/dc07-0502

6. Nandakumar E. Dental Manifestations in Diabetic and Non Diabetic Patients: A Review. Cuddalore [Internet]. 2015 Jul;7(7):482–4. Available from: https://search.proquest.com/openview/5b0eb86cfe4cdd35a26be51c91aba07c/1?pq-origsite=gscholar&cbl=54977

7. Mealey BL, Oates TW, American Academy of Periodontology. Diabetes mellitus and periodontal diseases. J Periodontol [Internet]. 2006 Aug;77(8):1289–303. Available from: http://dx.doi.org/10.1902/jop.2006.050459

8. Lamster IB, Lalla E, Borgnakke WS, Taylor GW. The relationship between oral health and diabetes mellitus. J Am Dent Assoc [Internet]. 2008 Oct;139 Suppl:19S – 24S. Available from: http://dx.doi.org/10.14219/jada.archive.2008.0363

9. Galili D, Maller O, Brightman VJ. Effects of drug-desalivation on feeding and taste preferences in the rat [Internet]. Vol. 23, Archives of Oral Biology. 1978. p. 459–64. Available from: http://dx.doi.org/10.1016/0003-9969(78)90077-8

10. Loe H, Anerud A, Boysen H, Morrison E. Natural history of periodontal disease in man. Rapid, moderate and no loss of attachment in Sri Lankan laborers 14 to 46 years of age [Internet]. Vol. 13, Journal of Clinical Periodontology. 1986. p. 431–40. Available from: http://dx.doi.org/10.1111/j.1600-051x.1986.tb01487.x

11. Mealey BL, Ocampo GL. Diabetes mellitus and periodontal disease. Periodontol 2000 [Internet]. 2007;44:127–53. Available from: http://dx.doi.org/10.1111/j.1600-0757.2006.00193.x

12. Weinspach K, Staufenbiel I, Memenga-Nicksch S, Ernst S, Geurtsen W, Günay H. Level of information about the relationship between diabetes mellitus and periodontitis--results from a nationwide diabetes information program. Eur J Med Res [Internet]. 2013 Mar 11;18:6. Available from: http://dx.doi.org/10.1186/2047-783X-18-6

13. Kejriwal S, Thomas B, Bhandary R. Assessment of Knowledge and Attitude of Diabetes Mellitus Type 2 Patients about Their Oral Health in Mangalore, India [Internet]. Vol. 4, Universal Research Journal of

Dentistry. 2014. p. 44. Available from: http://dx.doi.org/10.4103/2249-9725.127077

14. Eldarrat AH. Awareness and attitude of diabetic patients about their increased risk for oral diseases. Oral Health Prev Dent [Internet]. 2011;9(3):235–41. Available from: https://www.ncbi.nlm.nih.gov/pubmed/22068179

15. Parakh MK, Kasi A, Ayyappan V, Subramani P. Knowledge and Awareness of Oral Manifestations of Diabetes Mellitus and Oral Health Assessment among Diabetes Mellitus Patients- A Cross Sectional Study [Internet]. Vol. 16, Current Diabetes Reviews. 2020. p. 156–64. Available from: http://dx.doi.org/10.2174/1573399815666190502112603

16. Allen EM, Ziada HM, O'halloran D, Clerehugh V, Allen PF. Attitudes, awareness and oral health-related quality of life in patients with diabetes [Internet]. Vol. 35, Journal of Oral Rehabilitation. 2008. p. 218–23. Available from: http://dx.doi.org/10.1111/j.1365-2842.2007.01760.x

17. Saleh F, Mumu SJ, Ara F, Ali L, Hossain S, Ahmed KR. Knowledge, attitude and practice of type 2 diabetic patients regarding obesity: study in a tertiary care hospital in Bangladesh [Internet]. Vol. 3, Journal of Public Health in Africa. 2012. p. 8. Available from: http://dx.doi.org/10.4081/jphia.2012.e8

18. Wilder RS, Iacopino AM, Feldman CA, Guthmiller J, Linfante J, Lavigne S, et al. Periodontal-Systemic Disease Education in U.S. and Canadian Dental Schools [Internet]. Vol. 73, Journal of Dental Education. 2009. p. 38–52. Available from: http://dx.doi.org/10.1002/j.0022-0337.2009.73.1.tb04638.x

19. Hessett C, Moran A, Boulton AJM, Central Manchester Health Authority Working Party on Diabetes Care. An Evaluation of Diabetes Knowledge Amongst General Practitioners and Senior Medical Students [Internet]. Vol. 6, Diabetic Medicine. 1989. p. 351–3. Available from: http://dx.doi.org/10.1111/j.1464-5491.1989.tb01179.x

20. Moore PA, Orchard T, Guggenheimer J, Weyant RJ. Diabetes and oral health promotion: a survey of disease prevention behaviors. J Am Dent Assoc [Internet]. 2000 Sep;131(9):1333–41. Available from: http://dx.doi.org/10.14219/jada.archive.2000.0388