

Oral Health Related Quality of Life of Controlled and Uncontrolled Type II Diabetes Mellitus Patients-A Questionnaire Based Comparative Study

* Swatantra Shrivastava¹, Giridhar S. Naidu², Ramanpal Singh Makkad³, Ravleen Nagi⁴ and Supreet Jain⁵

*Corresponding Author E - Mail: swatantra.1281@gmail.com

Contributors:

¹Post Graduate Student, ²Professor and Head, ^{3,4}Reader, Department of Oral Medicine and Radiology, New Horizon Dental College and Research Institute, Sakri, Bilaspur
⁵Senior Lecturer, Department of Oral and Maxillofacial Surgery, New Horizon Dental College and Research Institute, Sakri, Bilaspur

Abstract

Background: Diabetes mellitus is one of the systemic metabolic diseases characterized by oral complications that influence quality of life of patients. Questionnaires are valuable tools to estimate the effect of diabetes on the oral and general health of the patients. **Objective:** The aim and objectives of this study was to analyze the oral health and oral health related quality of life

(OHRQoL) among people with type 2 diabetes mellitus in Bilaspur, Chhattisgarh and to assess the validity and reliability of the Geriatric Oral Health Assessment Index (GOHAI) and oral health impact profile-14(OHIP-14) questionnaires in determining OHRQL. **Materials and Methods:** A cross sectional survey study comprised of 110 patients with Type II diabetes mellitus, referred to the Diabetes Clinic, and data was collected by GOHAI and OHIP-14 questionnaires. 57 diabetic patients on oral hypoglycemics and with adequate dietary control were kept as controlled group. Whereas 53 patients undiagnosed/randomly diagnosed as diabetics with reference to their symptoms and oral findings were kept as uncontrolled group. Collected data was statistically analyzed by student t test and pearson's correlation test. **Results:** The results showed that scores of the uncontrolled diabetic group patients were more in both the questionnaires GOHAI and OHIP. 79.2%, 67.9%, 64.1% and 86.8% experienced difficulty in chewing, swallowing, speaking, and during eating respectively (p=0.000), 71.7% patients had trouble in pronouncing words, 83% felt that their sense of taste had worsened, 86.8% felt pain in the mouth, and 86.8% were uncomfortable during eating (p=0.000). Moreover, there was a strong correlation between GOHAI, OHIP-14 and levels of HbA1c. **Conclusion:** In diabetic patients to some extent, oral problems affect oral health-related quality of life. This study showed ability of GOHAI in determining physical function and pain whereas OHIP-14 determined multiple aspects like functional limitation, pain, psychological disability and social problems and physical handicaps. It should be pointed out that GOHAI and OHIP-14 could be used as an intermediary tool to establish a relationship between diabetic and oral health status of the patients.

Keywords: Diabetes Mellitus, GOHAI, Oral Health Related Quality Of Life, OHIP- 14

1. INTRODUCTION

Diabetes mellitus (DM) is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both.¹ Diabetes is fast gaining the status of a potential epidemic in India with more than 62 million diabetic individuals currently diagnosed with the disease. In 2000, India (31.7 million) topped the world with the highest number of people with diabetes mellitus.² DM includes general complications like diabetic nephropathy, neuropathy, and retinopathy, atherosclerosis and diabetic cardiomyopathy which is a specific

Complication that develops independently of coronary artery disease or hypertension and leads to increased morbidity and mortality.³

Studies have shown that oral conditions affect economic, social and mental status of an individual.⁴ The most common oral health problems associated with diabetes are tooth decay or dental caries which is a bacterial infection of the mouth that can result in demineralization of teeth that further leads to cavity formation. Increased prevalence of dry mouth (xerostomia) has been reported in diabetic patients due to poor



blood glucose control. The combination of decreased salivary flow rate and immune deficiency greatly increases the risk of oral candidiasis with significantly high rates of candida carriage in patients with diabetes.⁵

A large number of studies have shown that high blood glucose levels alter the oral and general health of individuals, thus affecting their quality of life.⁶ Questionnaires are useful for evaluation of oral health-related quality of life (OHRQL) in diabetic patients. The aim and objectives of this study was to assess oral health and oral health-related quality of life in type II diabetic patients and to assess correlation between Geriatric Oral Health Assessment Index (GOHAI) and oral health impact profile-14 questionnaire (OHIP-14) with HbA1c.

2. MATERIAL and METHODOLOGY

The study was conducted in the department of Oral Medicine and Radiology in New horizon Dental College and Research Institute and Shree Ram care Hospital, Bilaspur (C.G) in 2017 July. Patients diagnosed as type 2 diabetes mellitus by physician, based on HbA1c <8% were kept under controlled diabetics group and HbA1c >8% as uncontrolled diabetics group.

Co-existing systemic disease with similar oral manifestation, subjects who were unable to fill out the questionnaires and who were not willing to participate were excluded from study.

This research was designed as cross sectional study on 110 subjects which consisted of 57 controlled diabetics and 53 uncontrolled diabetics. All patients were duly informed about the questions in their own language of communication, to remove the bias. Data was collected by using GOHAI and OHIP14 English/Hindi language questionnaires (Table1). All the volunteers were informed about the aim and method of this study, and written informed consent was obtained.

GOHAI and OHIP-14 questionnaires had 5 choices in each question. Each answer has its own score: Never = 5; Seldom=4; Sometimes = 3; Often = 2; Always = 1.

3. STATISTICAL ANALYSIS

Collected Data were tabulated and evaluated statistically using Statistical Package for Social Service (SPSS) version 21 software for Microsoft windows. Mean scores were compared using Students t test. Correlation between both scores was done by Pearson's correlation test. 'p' value of <0.05 was considered to be statistically significant.

4. RESULTS

The present study was conducted in Department of Oral Medicine and Radiology in New Horizon Dental College and Research Institute and Shree Ram care Hospital, Bilaspur (C.G) in July 2017. Total 110 subjects were divided into 57 controlled diabetic group (n=57, 28 males and 29 females) and uncontrolled diabetic group (n=53, 16 males and 37 females). The mean age of controlled diabetic group was 55.53±6.54 years and uncontrolled diabetic group was 53.03±5.9 years, and difference was found to be nonsignificant. [(f=0.152), (p=0.698)].

The responses of the subjects were elicited regarding the items of the Geriatric Oral Health Assessment Index (GOHAI); statistically significant difference was found for variables between both the groups which suggested that impact was more in uncontrolled diabetic group as compared to controlled diabetic group. In uncontrolled diabetic group, 5.7% patients had limited food (p=.002), 79.2%, 67.9%, 64.1% and 86.8% experienced difficulty in chewing, swallowing, speaking, and during eating respectively (p=.000), 73.6% were taking medication for pain (p=.003), 39.6% patients had sensitivity in teeth (p=.046), 58.5% had limited contacts with other (p=.004), 39.6% were unhappy with their appearance (p=.028), 68% felt uncomfortable while eating in front of others (p=.132), 81.2% patients were worried (p=.001), and 79.9% subjects felt nervous (p=.021), as compared to controlled group (Table 2).

Oral Health Impact profile-14 showed that impact was more in uncontrolled diabetic patients as compared to controlled diabetic patients. In uncontrolled diabetic group, 71.7% patients had trouble in pronouncing words (p=.000), 83% felt that their sense of taste had worsened (p=.000),



86.8% felt pain in the mouth ($p=.000$), 86.8% were uncomfortable during eating ($p=.000$), 71.7% patients often had an unsatisfactory diet ($p=.016$), and 51% interrupted their meals ($p=.186$). 88.6% patients felt self-conscious ($p=.029$), 88.7% were tensed ($p=.071$), 77.4% found difficult to relax ($p=.000$), 33% felt embarrassed ($p=.139$), 52.8% were irritable with others ($p=.050$), 71.8% had difficulty in doing usual jobs ($p=.018$), 79% were less satisfied ($p=.061$), and 69.8% were unable to function ($p=.001$) as compared to controlled group (Table 3).

The mean score of GOHAI and OHIP-14 in controlled diabetic group was 19.73 and 24.00 respectively, and in uncontrolled diabetic group the mean score of GOHAI and OHIP-14 was 16.66 and 18.66, respectively ($p=0.000$). Less score in uncontrolled diabetics as compared to controlled diabetics indicates that incidence of oral and general health problems was more in patients with poor glycaemic control (Figure 1,2). Questionnaire scores correlated negatively with HBA1c levels (GOHAI, $r=-0.160$ and OHIP, $r=0.137$), thus impact was more in uncontrolled diabetics (Figure 3, 4).

5. DISCUSSION

Type II diabetes mellitus is most common type of diabetes, affecting 95% of diabetic individuals. Hyperglycemia is associated with alteration of normal oral flora, increase in opportunistic infections, delayed healing of injured mucous membranes, hyposalivation and decreased immunity in patients.⁷⁻⁹ there are various questionnaires that has been approved and verified for assessment of Oral health related quality of life (OHRQoL). Most commonly and frequently used questionnaires in diabetic patients are OHIP-20, SF-36, GOHAI, and OHIP-14.4, 10-12

GOHAI questionnaire comprises 12 questions to analyze three dimensions (i.e. physical function, pain and discomfort and psychosocial function) of oral problems.¹³ Oral Health Impact Profile (OHIP), also known as OHIP-14 questionnaire comprises of 14 questions that focus on seven dimensions of impact (i.e. physical pain, functional limitation, psychological discomfort,

psychological disability, physical disability, social disability and handicap).¹⁴ Jain R et al and Batra M et al used GOHAI and OHIP-14 questionnaires to evaluate OHRQL of diabetic patients and found that these questionnaires had acceptable reproducibility and reliability.^{15,16} We also used the same questionnaire in our study.

Many studies in the literature have evaluated OHRQoL in diabetic patients but this is the first study to our best knowledge that evaluated and compared OHRQoL in controlled and uncontrolled diabetic patients using GOHAI and OHIP-14 questionnaires. In the present study, both GOHAI score & OHIP-14 showed that maximum patients with uncontrolled diabetes were having pain and discomfort while eating (86.8%) which may be due to mobility of teeth. Most of the uncontrolled diabetic patients were having deep psychological impact i.e. worried (81.2%) and tensed (88.7%). Studies have suggested that higher level of psychological stress directly affects nervous system, it increases the secretion of glucagon resulting in higher blood glucose levels, in present study, uncontrolled diabetic patients had more psychosocial impact than controlled diabetic subjects (worried 81.2% and tensed 88.7%). Similar level of impact i.e functional limitation, physical pain, psychological and social disability was reported by Nikbin et al and Rao A et al in diabetic patients.^{4,17} In their study, GOHAI showed more reliability in determining pain and discomfort and psychosocial impact while OHIP14 was more sensitive for determining psychological discomfort and physical pain. Ikebe K et al also found higher ability of GOHAI in determining functional problems, pain and discomfort, and of OHIP-14 to detect more psychological and social problems and physical handicaps.¹⁸

Most common complaint due to diabetes is xerostomia, which can lead to oral problems such as increased accumulation of plaque and calculi, candidiasis, periodontitis, periapical abscess and burning mouth syndrome, thus affecting quality of life of the patients.⁵ In our study, patients with poor glycaemic control, had trouble in swallowing (67.9%), pronouncing words (71.7%) and altered taste (83%) which indicates presence of xerostomia. The taste alteration in diabetic patients may be due to defects in taste receptor or



neuropathy of taste nerve tracts or microangiopathy of taste buds in severe diabetes with complications. In this study also, although changes in taste perception was seen in both controlled and uncontrolled diabetic patients but more decreased taste sensation was observed in uncontrolled subjects (83%, $p=0.000$).^{5, 6}

Diabetes related health problems affect the quality of life of patients leading to physical inactivity and functional limitation. Studies that used different questionnaire to assess OHRQoL by using the SF-36 questionnaire had shown poor quality of life in uncontrolled diabetic patients, and this finding was consistent with the present study.^{19,20} In contrast, Allen et al, Sadighi et al reported that oral complications of diabetes did not adversely affect OHRQoL among most diabetic patients.^{10,11} They suggested that good education, regular dental visits, frequent brushing and time duration of diagnosed diabetes had made the result in 'Good' category. Similarly, Sandberg et al [2001] in their case-control study on 204 Swedish diabetic and non-diabetic patients using SF-36 questionnaire demonstrated that patients in both study groups were satisfied with their oral health.¹²

Although this study showed more impact on oral health related quality of life in uncontrolled diabetic patients, limitations should be considered in the interpretation of the results. The patients were not clinically examined. These results were collected from patients who were referred to one hospital only. Patients usually reply to questions with answers which seem to be more reasonable. Based on the results of this survey, it was seen that OHRQoL is adversely affected by the presence of uncontrolled diabetes mellitus; dentists and physicians play an important role in improving diabetic patients' knowledge regarding oral complications and their effect on their quality of life.

6. CONCLUSION

This study showed ability of GOHAI in determining physical function and pain whereas OHIP-14 determined multiple aspects like functional limitation, pain, psychological disability and social problems and physical handicaps. It should be pointed out that GOHAI and OHIP-14 could be used as an intermediary

tool to establish a relationship between diabetic and oral health status of the patients.

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