



RATE OF PROGRESSION OF DENTAL CARIES AMONG TYPE II DIABETIC AND HYPERTENSIVE PATIENTS; A RETROSPECTIVE STUDY

Dental Science

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ABSTRACT

Diabetes mellitus (DM) and hypertension are among the common chronic metabolic disorder which affects millions of people. Since the general and oral health of individuals are interlinked, it is important to evaluate their dental conditions. This study is aimed to explore the association between diabetes mellitus(II), hypertension and caries status in adults

AIM: To identify the dental caries status, progression and evaluate its risk among patients with type II diabetes mellitus and hypertension.

METHODS: In this retrospective study a total of 80 participants were were examined. They were divide into 4 groups. Group1(20)- Diabetic Mellitus (TypeII) Group 2(20)- Hypertensive Group 3(20)- Diabetic mellitus And Hypertensive Group 4(20)- Control (No Systemic Illness). Dental caries was assessed by using the DMFT score

RESULT: The results indicated that type II DM patients were at higher risk of caries development and their DMFT score increased by 1 in 2 years.

KEYWORDS

diabetes mellitus, hypertension, caries status

INTRODUCTION

The association between general and oral health is important, especially in adults with medical conditions. Currently, Diabetes mellitus (DM) and hypertension are among the common chronic metabolic disorder which affects millions of people.

There was an estimation of 40 million people with diabetes in India in 2007 and this number is predicted to rise to almost 70 million people by 2025. According to Diabetes Atlas published by the International Diabetes Federation (IDF), every fifth person with diabetes will be an Indian by 2025.⁽¹⁾

Hypertension, also known as high or raised blood pressure, is a global public health issue. In 2008, approximately 40% of adults worldwide of age 25 and above had been diagnosed with hypertension and the amount of those who has hypertension rose from 600 million in 1980 to 1 billion in 2008⁽²⁾

The World Oral Health Report clearly stated the relationship between oral health and general health. According to the report, oral health and general health are connected in four ways:

- 1) There is significant association between poor oral health and major chronic diseases,
- 2) Poor oral health may cause disability,
- 3) Risk factors of oral health issues and major diseases are commonly the same, and
- 4) Oral health state may be the reason of general health problem or worsen the condition.⁽⁴⁾

In epidemiological oral health surveys, an index is used to represent the prevalence and incidence of a specific condition. Dental indices provide quantitative method to measure, evaluate, and analyze dental condition in individuals and groups. One of dental indices which is used in oral health survey is D.M.F.T index. This index was developed by Henry Klein, Carrole E Palmer and Knutson JW in 1938. DMFT describes the number of decayed, missing, and filled teeth in an individual which represent the caries status.⁽⁵⁾

Since oral health plays an important role, it can no longer be ignored in designing overall national health strategies. Thus, this study is needed and aimed to explore the association between diabetes mellitus(II), hypertension and caries status in adults.

AIM

The aim of the present study was to explore the occurrence, status and progression rate of dental caries and evaluate its risk among patients with type II diabetes mellitus and hypertension.

MATERIALS AND METHOD

The retrospective study was based on dental records of patients treated at the Dental college from the year 2016-2018. The patient history and caries status was gathered through records from the department of oral medicine and public health dentistry. After taking the consent, patients were recalled and through semi-close ended questionnaire and clinical examination, the dental caries status were again recorded by using DMFT.

A total of 80 participants were examined.

- Group1(20)- Diabetic Mellitus (TypeII)
- Group 2(20)- Hypertensive
- Group 3(20)- Diabetic mellitus And Hypertensive
- Group 4(20)- Control (No Systemic Illness)

The data was gathered through semi-close ended questionnaire and clinical examination. Dental caries was assessed by using the DMFT score.

ORAL HEALTH REPORT FOR DIABETIC AND HYPERTENSIVE

PATIENT NO: _____ AGE: _____ DATE: _____

NAME: _____ SEX: _____

MEDICAL HISTORY: _____

DIABETES MELLITUS

TYPE: _____ DATE OF DIAGNOSIS: _____

TREATMENT UNDERGOING: ORAL HYGIENE, VITAMINS

BLOOD SUGAR LEVEL: RANDOM _____ FASTING: _____

HYPERTENSION

DIAGNOSIS: _____ DATE OF DIAGNOSIS: _____

TREATMENT UNDERGOING: _____

BLOOD PRESSURE LEVEL: _____

DMFT score

| | | | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 | 15 |

STATISTICAL ANALYSIS

A one-tailed t-test was used in the follow up of carious teeth because deviations in only one direction (i.e. The *progression* of carious lesions)

Mann-whitney (wilcoxon rank-sum) nonparametric test was used to assess if the caries score for each tooth has changed from the previous appointment and to compare caries progression degree between the different groups.

RESULTS

| | No. of patients | Mean DMFT scores | |
|----------|-----------------|------------------|------|
| | | 2016 | 2018 |
| DIABETIC | 20 | 3.5 | 4.95 |

| | | | |
|---------------------------|----|------|------|
| HYPERTENSIVE | 20 | 2.45 | 2.8 |
| DIABETIC AND HYPERTENSIVE | 20 | 3.7 | 5.1 |
| CONTROL | 20 | 2 | 2.25 |

Table1: Mean DMFT score of 2016 and 2018

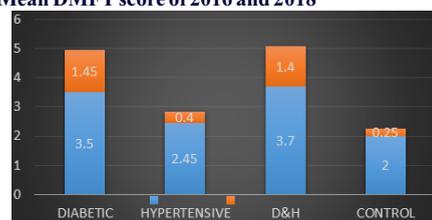


Fig1: rate of progression of caries

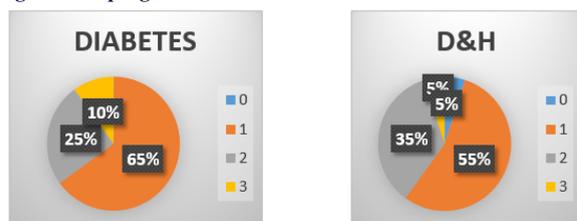


Fig2: caries progression rates. Zero (0) means the carious lesion did not progress. 1 means the teeth had gone from score 0 to 1 or from 1 to 2, etc. 2 means the teeth had gone from score 0 to 2 or from 1 to 3, etc

There was no statistically significant difference in caries progression rate between the hypertensive (p-value =0.12), and the control group (P-value = 0.099)but there was a statistically significant difference in caries progression rate between the group A(diabetic)and group C (diabetic and hypertensive) (p-value=0.014).

Mann-whitney nonparametric test demonstrated that for group1 and group3 the most prevalent (65% and 55%) rate of caries progression between the first and second appointment was 1 (i.e. The teeth had gone from score 0 to 1 or from 1 to 2, etc.)

The higher rate of caries progression, rate 2, meaning the teeth condition had deteriorated from score 0 to 2 or from 1 to 3, etc., had a prevalence of 25%, 5% ,35% and 5% for the group1, group2, group3 and group4, respectively.

DISCUSSION

The prevalence of dental caries and its burden on the general population is of significant public health interest. Therefore, it is important to identify patients who may be at particularly high risk of dental caries.⁽⁵⁾

Hypertension and diabetes mellitus play an important role in influencing the oral health status. they cause general systemic changes, which is often reflected in the oral cavity. Thus, in this study, the D.M.F.T index shows number of dental decay, filled t, and missing teeth due to caries which represent the oral health status of the subject.⁽⁶⁾

According to this study, The caries experience and its components showed the mean of Decayed Teeth (DT), Missing Teeth (MT), and Filled Teeth (FT) component, as well as mean DMFT for patients with diabetic (Group1 and group2) were higher than the mean for the non-diabetic group.

Several other authors have reported similar findings such as Reddy *et al.*,^[7] Singh *et al.*,^[8] Taylor *et al.*,^[9] Kanjirath *et al.*,^[10] and Lalla *et al.*,^[11]

DM is a metabolic disease with numerous systemic manifestations that are also noticeable in the oral cavity as first described by Seifert in 1862. Manifestations in the oral cavity include abnormal development of dentition, increased frequency and intensity of caries, pathologies of the oral mucosa, xerostomia as well as atrophic changes in the alveolar process.⁽¹²⁾

The reasoning behind this high prevalence is that salivary glucose level

among the diabetic patients is very high that favours the propagation of microorganisms and adorn their accumulation on tooth surface and also repeated intakes of even small amount of carbohydrates may be cariogenic when coupled with elevated blood glucose level and hyposalivation.^(7,8,13)

As for hypertension the prevalence of caries was comparatively higher in hypertensive patients than those in the control group however the difference was statistically not significant. Hypertension (HTN) or high blood pressure, sometimes arterial hypertension, is a chronic medical condition in which the blood pressure in the arteries is elevated. This requires the heart to work harder than normal to circulate blood through the blood vessels.⁽¹⁴⁾

There are no recognized oral manifestations of hypertension but antihypertensive drugs can often cause side-effects, such as xerostomia, gingival overgrowth, salivary gland swelling or pain, lichenoid drug reactions, erythema multiforme, taste sense alteration, and parasthesia.⁽¹⁵⁾ Since the saliva secretion is decreased, it may contribute to become the risk factor of the caries level in hypertensive patients.⁽⁶⁾

It must be emphasized that the results of this study may not be directly be comparable with the results of others. This is due to many differences such as the population size and selection criteria for diabetic and nondiabetic groups. Because this was a hospital-based study, the results may not be generalized which suggests a larger scale, community level research in this field.

CONCLUSION

Within the limits of the present study, the results indicated that type II DM patients were at higher risk of caries development. This recommends that the anticipation of dental caries may be based on caries risk assessment in order to prevent and control the burden of dental caries infection in this particular group. Best practices dictate that once the clinician has identified patient's caries risk (low, moderate, high or extreme), a therapeutic and/or preventive plan may be implemented.

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