

Awareness on the Association Between Periodontitis And Metabolic Syndrome among General Practitioners

Running Title: Awareness on the Association between Periodontitis and Metabolic Syndrome

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Abstract:

Aim: The aim of the survey was to assess the awareness on the association between periodontitis and metabolic syndrome among general practitioners

Materials and Methods: The present observational cross sectional study was conducted among General Practitioners. The study was conducted in the locality of Chennai, Tamil Nadu. The rationale behind the study was explained to the general practitioners and their permission was obtained to conduct the study. A total of 78 general practitioners were assessed using an online questionnaire that consisted of 10 questions that analyzed their awareness regarding periodontal diseases and its association with metabolic syndrome.

Results: A total of 78 general practitioners were assessed regarding their awareness about metabolic syndrome and its association to periodontitis. On analysis of data, it was observed that nearly 64.1% of the practitioners were not entirely aware of what Metabolic Syndrome was and nearly 59% of them were unaware of the predilection of periodontitis among patients with metabolic syndrome.

Conclusion: From this study, it was concluded that there was a lack of knowledge regarding the association of periodontal health and metabolic syndrome, and it is of paramount importance to impart further knowledge regarding the etiology and association of both periodontal disease and metabolic syndrome and their appropriate treatment and prevention modalities.

Keywords: Cardiac Disorders, Diabetes Mellitus, Hypertension, Metabolic syndrome, Periodontitis

INTRODUCTION:

The metabolic syndrome, a clustering within individuals of several cardiovascular risk factors, is becoming a typical disorder among citizens worldwide. A diagnosis of metabolic syndrome is related to doubling in risk for future cardiovascular diseases and sort 2 diabetes.^{1,2} The metabolic

syndrome is defined because the concurrence of hypertension and atherogenic lipid profiles [hypertriglyceridemia and low lipoprotein (HDL)-cholesterol but also obesity and insulin resistance.³ A proinflammatory and procoagulant state may additionally coexist during this syndrome, with elevation of C-reactive protein and fibrinogen. There is evidence to also suggest that this chronic inflammatory state is related to endothelial dysfunction, which could contribute to the increased cardiovascular risk of individuals littered with this disorder and with the increased risk of type 2 diabetes.^{4,5}

Periodontitis could be a common chronic infection of the adult population characterized by an exaggerated gingival inflammatory response against a pathogenic bacterial microflora, leading to alveolar bone and eventually tooth loss. Periodontitis has also been related to systemic alterations like low-grade inflammation, dyslipidemia, glucose intolerance, a procoagulant state, and endothelial dysfunction.⁶ A growing body of evidence also indicates that periodontitis is related to measures of weight in youth likewise as insulin resistance.⁷

Clinical evidence has been produced on the association between periodontitis and measures of insulin resistance, therefore considered the sixth complication of diabetes, lipid alterations, and vascular dysfunction. Few studies have also reported on a possible positive association between periodontitis, blood pressure, endothelial dysfunction⁸ and a dyslipidemic state. As both periodontitis and metabolic syndrome are related to systemic inflammation and insulin resistance, these two diseases have been linked through a standard pathophysiological pathway.^{9,10}

In an era where lifestyle disorders such as Diabetes mellitus, Cardiovascular disease and hypertension are at rise, syndromes such as Metabolic syndrome have also risen in alarming numbers. This study has been conducted to analyze the awareness among General practitioners regarding metabolic syndrome, as they interact with many patients with such clustered ailments and to analyze their awareness regarding the importance of maintaining oral health and the association between periodontitis and metabolic syndrome.

MATERIALS AND METHODS:

The present observational cross sectional study was conducted among General Practitioners. The study was conducted in the locality of Chennai, Tamil Nadu. The rationale behind the study was explained to the general practitioners, and their permission was obtained to conduct the study.

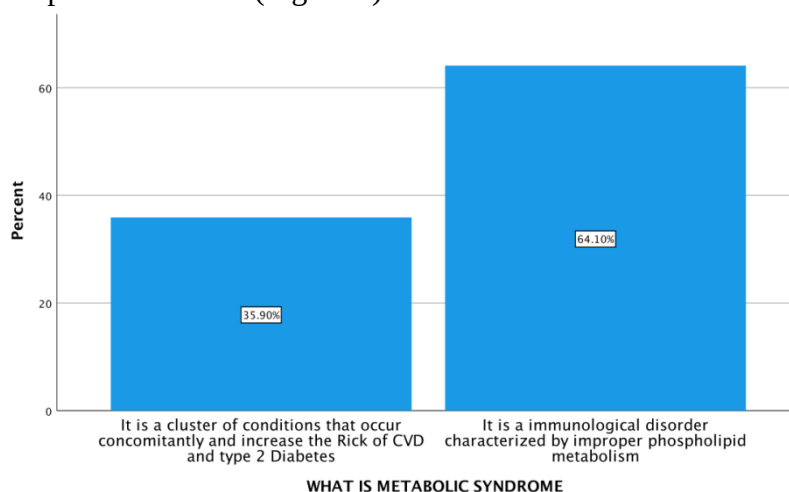
A total of 78 general practitioners were assessed using an online questionnaire that consisted of 10 questions that analyzed their awareness regarding periodontal diseases and its association with metabolic syndrome. The questions were designed to analyse the awareness the awareness regarding metabolic syndrome as a cluster of multiple diseases, the risk factors of metabolic syndrome, the predilection among patients possessing the syndrome towards periodontitis, the increase in severity of metabolic syndrome in patients with increased serum levels of pathogenic bacteria, and had a series of questions that assessed whether the practitioners had been exposed to such patients and when exposed what their treatment of choice were and how often they advised the patients to acquire council from dentists.

Each question was formulated in a manner fit to deduce the knowledge possessed by the practitioners so as to aid in a better understanding regarding the awareness possessed and to plan the further steps that need to be taken in imparting more knowledge and thereby ensuring better health and better quality of care for patients.

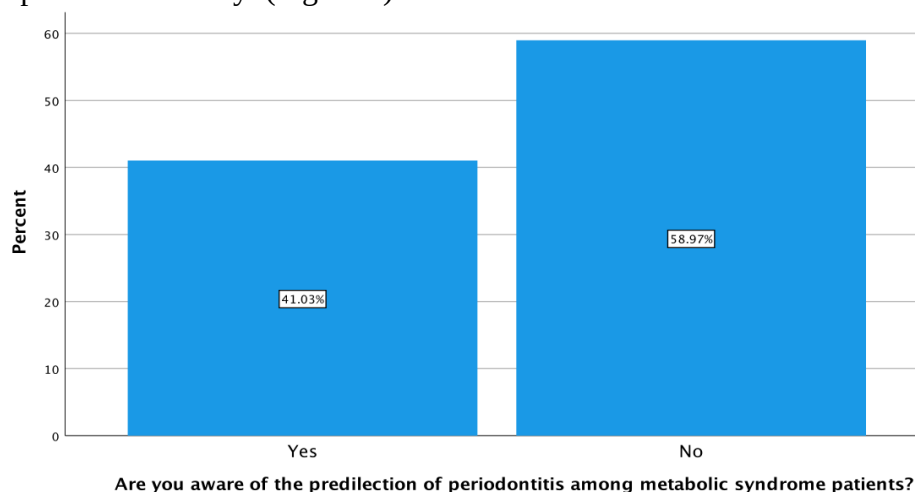
RESULTS:

A total of 78 general practitioners had taken part in this study and were asked to answer a series of 10 questions in an online portal so as to analyze their awareness regarding periodontitis and its predilection among patients with metabolic syndrome.

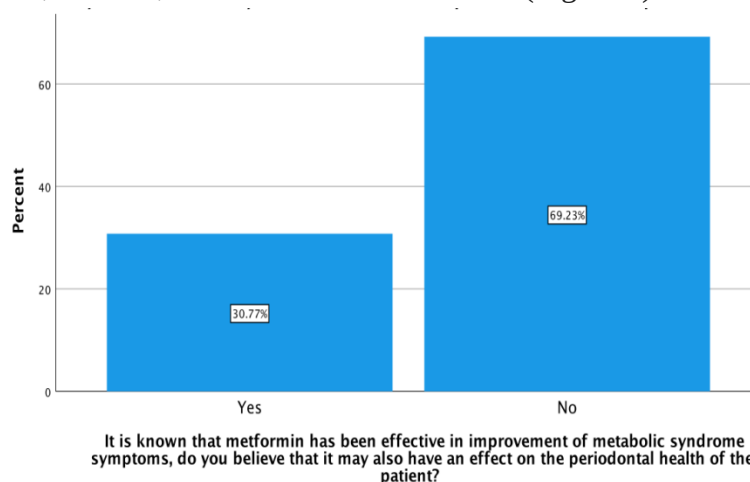
Upon obtaining the responses, the data was subjected to statistical analysis. Upon the quantitative analysis of the given data, it was observed that 64.1% of the practitioners were not entirely aware of Metabolic Syndrome. They were questioned regarding what the precipitating factors of metabolic syndrome were and most (64.1%) believed it to have been an immunological disease characterized by improper phospholipid metabolism.(Figure 1)



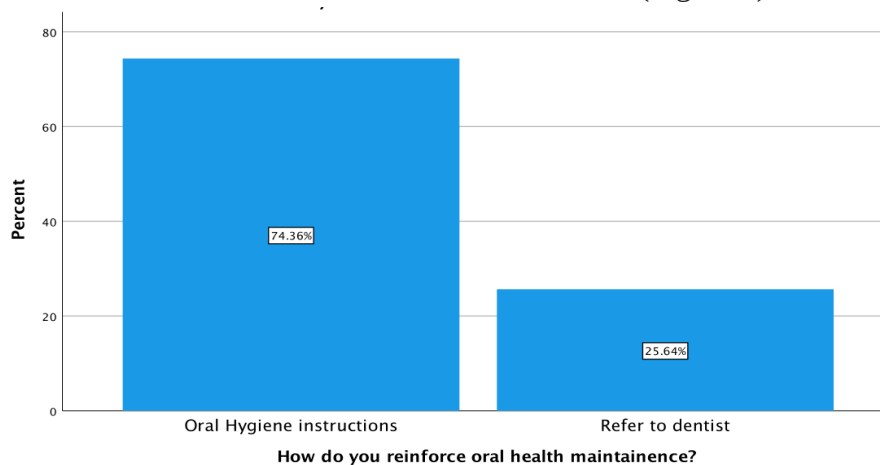
It was also observed that most practitioners, 58.97%, were unaware of the predilection of periodontitis among metabolic syndrome patients since they believe periodontitis only occurs due to the body's depressed immunity. (Figure 2)



In recent studies it was noticed that metformin reduced the inflammatory response and had a positive effect on correcting bone loss, thereby proving very efficient in managing periodontitis as well. Most practitioners, 69.23%, were unaware of the same. (Figure 3)



Upon analyzing the data regarding the treatment provided by practitioners to those affected by periodontitis whilst suffering from metabolic syndrome it was observed that only 25.64% of practitioners referred the patients to dentists and most of them recommended just the use of appropriate dentifrices but did not tackle the issue at tissue level. (Figure 4)



DISCUSSION:

The Metabolic syndrome often known as Syndrome X entitles a constellation of metabolic abnormalities that are associated with visceral adiposity. These myriad of disorders include insulin resistance, hypertension, dyslipidemia (low high-density lipoprotein cholesterol, hypertriglyceridemia), and central obesity.^{11,12}

In a study conducted by Jepsen et. al, it was explained that the condition was diagnosed by the co occurrence of three out of the five above mentioned metabolic abnormalities. The presence of pathology in various tissues of the body is common in those affected by syndrome X.¹³ Upon analyzing the data obtained from the survey it can be eluded that though improper phospholipid metabolism does hold an important role in the precipitation of syndrome X, it only occurs due to the

pathogenic expression of the bodily tissues such as visceral adiposity, insulin resistance and the overall deterioration of the body's cardiovascular, renal and pancreatic status. This helps to explain why cardiovascular disease, type 2 diabetes mellitus, and cirrhosis are among the leading causes of death in individuals with metabolic syndrome.

In a study conducted by Bray et.al, Metabolic syndrome is common and its incidence has been rising for several decades, even in parts of the world where malnutrition remains common.¹⁴ Recent data indicate that about 25% of the adults in many first world countries have metabolic syndrome, and suggest that it accounts for much of the population-attributable risk for premature cardiovascular mortality.

A study conducted by Garcia et. al, suggested that chronic periodontal infections can produce local and systemic host responses leading to transient bacteremia. Lipopolysaccharide endotoxins and other bacterial toxins can easily gain access to gingival tissue, thereby initiating local inflammatory reactions, and as a consequence produce high levels of pro inflammatory cytokines.¹⁵ The disease modifiers, such as cardiovascular disease, liver cirrhosis and diabetes mellitus, shift the immuno-inflammatory responses outside their normal physiological boundaries.¹⁶ Both humoral and cellular immune responses are also activated, but it is the inflammatory response that is believed to be responsible for the tissue destruction that characterizes periodontitis.¹⁷ It was also concluded in a study conducted by Reeves et.al and Genco et.al, that both periodontitis and the metabolic syndrome are associated with systemic inflammation and insulin resistance, these two diseases are linked through a common pathophysiological pathway. This could explain the almost 20% increased risk of cardiovascular diseases, diabetes and periodontitis reported in patients with metabolic syndrome.^{18,19}

According to a study conducted by Vitale et.al, metformin has been a gold standard treatment for treating metabolic syndrome as it improved the endothelial functioning thereby increasing cell turnover, minimizing the strain of compromised organs such as the heart, pancreas and liver.²⁰ To aid to the efficacy of metformin, in a recent study conducted by Araujo et.al, it was noticed that metformin reduced the inflammatory response, oxidative stress and bone loss, thereby proving very efficacious in managing periodontitis as well.²¹

CONCLUSION:

It was concluded from this study, that there was a lack of proficiency amongst general practitioners regarding the association of periodontal health and metabolic syndrome, and it is of paramount importance to impart further knowledge regarding the etiology and association of both periodontal disease and metabolic syndrome and their appropriate treatment and prevention modalities. General practitioners must urge such patients to maintain their oral health alongside the maintenance of their overall health, they must be educated regarding the importance of regular dental check-ups and must be encouraged to value them as much as their regular medical visits, so as to ensure the well-being of themselves.

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