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Evaluation of Awareness Regarding Diabetes Mellitus and its Association with Periodontal Health: A Cross Sectional Study

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Abstract:

Background: In present scenario majority of the people is suffering from systemic disease. Diabetes is a metabolic disorder known to involve many important organs and also systems of the body, including oral tissues. Oral care is the most preceding priority because it doesn't threat life. Present study was done to evaluate awareness among Bengaluru individuals regarding diabetes in general and association between diabetes and periodontal diseases.

Materials and Methods: The present cross sectional questionnaire study was conducted in Bengaluru city. The study sample included 400 residents of Bengaluru city. The survey was scheduled to spread over a period of 1-month. Data was collected by using self designed questionnaire. Questionnaire was administered by investigator himself to each participant on scheduled days and collected back on next visit. Collected data was coded, compiled and tabulated. The data was analyzed by applying descriptive and inferential statistical analysis. Analysis was carried out using SPSS package version 17.

Results: The entire individual responded. A strong correlation between educational status and awareness was found whereas a weak positive correlation with age was established (R^2 = 0.102 and R^2 = 0.004 respectively). Other questions revealed overall limited knowledge and awareness among the study group regarding diabetes and its oral and periodontal association.

Conclusion: Overall findings and results of the study reveal 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.

Key Words: Diabetes mellitus, educational status, periodontal condition

Introduction

It is rightly said that oral health is a true indicator of the general health. Many systemic disorders have an overt and direct effect on the oral cavity and oral tissues. In fact, some systemic diseases present with oral manifestations which prove to be the only diagnostic hint in the initial phase of the disease on seldom occasions. Some diseases on the contrary, have an indirect influence on the oral health of an individual by either predisposing the individual for various oral ailments or by compromising the integrity of the oral tissues. One such disorder, metabolic in nature which has challenged the medical fraternity for centuries is diabetes mellitus (DM). DM mostly leads to end-stage renal disease, atraumatic lower extremity amputations, and adult blindness and even cause cardiovascular diseases, and thereby considered as leading cause of morbidity and mortality for the foreseeable future.[1]

Uncontrolled DM has tremendous potential to affect multiple vital organs in a detrimental manner which often undermines the effects it exerts on the oral health of an individual. It has been reported that a close association exists between inflammatory periodontal diseases and diabetes through which one exerts a reciprocal influence on the other. This two-way relationship is based on the extensively reported assumption that the one condition so modifies the systemic and local environments that the progress of the other is favoured.[2] Though DM has an exuberant morbidity potential, it has been proven over years that patients with regular monitoring and control of sugar levels have achieved good living standards. Awareness for the disease and techniques for glucose control are important on patient's part for the control of disease. This questionnaire study was taken up with an intention of evaluating the awareness regarding DM and its association with periodontal health.

Materials and Methods

Bengaluru is the largest city and capital of the Karnataka. It's one the major city of India. It's located in the southern part of the India. The study sample includes individuals from city of Bengaluru.

A total of 400 individuals were included in the study which includes all types of educational, social and economical class. The selection of sample for the study was carried out by using simple random sampling technique. Participants who do not want to participate in the study, not responding after repeated reminders and incompletely filled questionnaires were excluded from the study.

The survey was scheduled to spread over a period of 1-month. A detailed weekly schedule was prepared well in advance. Although a detailed schedule was prepared meticulously, few adjustments and changes were done due to logistic reasons. Two days in a week were allotted for conducting the study. A questionnaire in the form of multiple choices was given to each participant and the response sheets were collated after a week. The data was collected by Principal Investigator. A pilot study was conducted on 20% of the total sample size to check the feasibility of the study and to validate the questionnaire. Prior to study a questionnaire was pre-tested and validated. The questionnaire was validated for construct and content validity, reliability and ease of use. Content and construct validity shows no significant changes. Questionnaire showed high degree (0.89) of agreement during test-retest of questionnaire. Those individuals who participated in the pilot study were not considered for the main study to prevent possible bias. The ethical clearance for the present study was obtained from the concerned authorities.

The purpose and procedure of the study was informed to each participant and also participant information sheet was provided to each participant, which explains all aspects of the study. It was explained to them that they had no obligation to complete the questionnaire and could abandon it at any point without stating a reason.

After explaining the purpose of the study, the informed consent was obtained from each participant who was willing to participate in the study. Data was collected by using pre-tested self designed questionnaire. The questionnaire of 11 questions pertaining to awareness regarding DM, periodontal diseases and correlation between the two was formed. Each participant was given a separate copy of the questionnaire personally by investigator and requested to fill it up. Correlation were checked for:

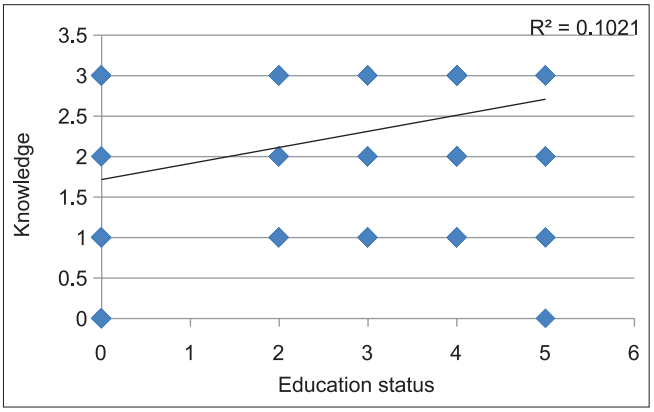
1. Educational status and association between diabetes with periodontal diseases
2. Between age and diabetes awareness
3. Between age and association between diabetes and periodontal diseases
4. Percentage wise distribution of the individuals according to the feedback of the questionnaire.

Collected data was coded, compiled and tabulated. The data was analyzed by applying descriptive and inferential statistical analysis. Analysis was carried out using SPSS package version 17.

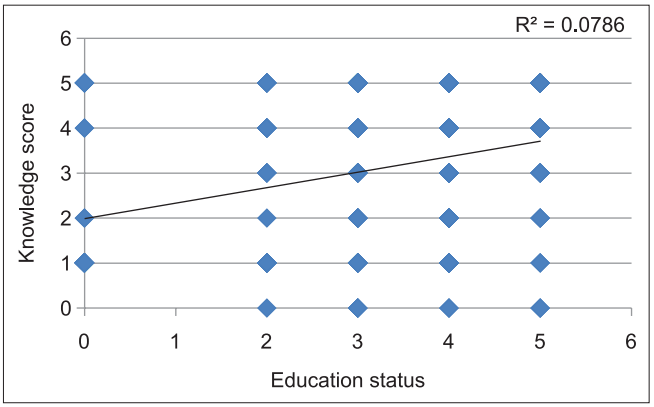
Results

The results from Graphs 1 and 2, it was found that there is a strong positive correlation between educational status of individuals and awareness regarding DM as well as association between diabetes and periodontal diseases (R^2 = 0.102, R^2 = 0.078 respectively).

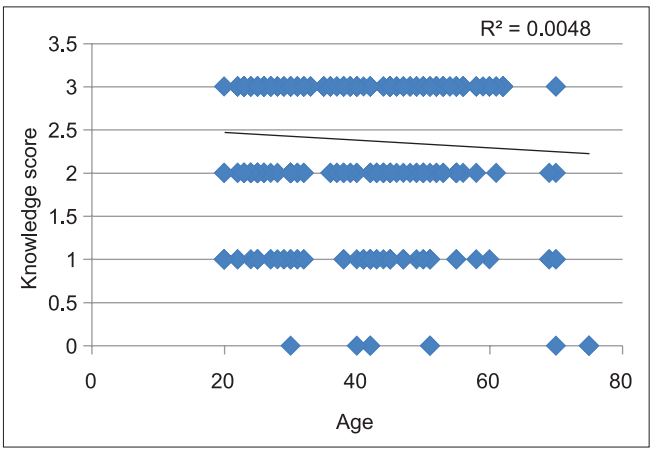
However from Graphs 3 and 4, a weak positive correlation was found between age and the awareness regarding DM as



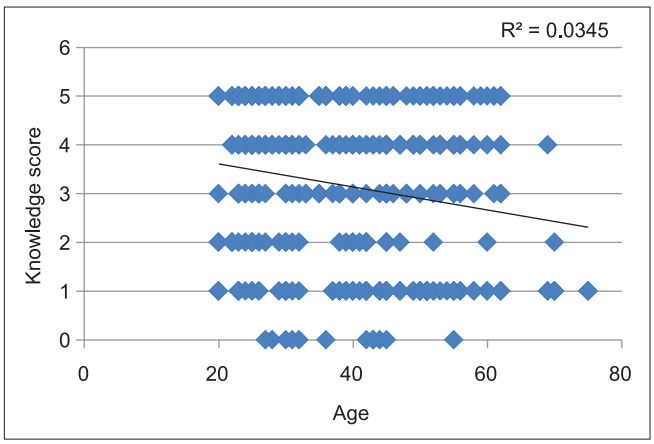
Graph 1: Illustrates correlation of education status and knowledge.



Graph 2: Explains about correlation of education status and knowledge with diabetes and periodontal disease.



Graph 3: The correlation of age and knowledge with diabetes.



Graph 4: Demonstrates correlation of age and knowledge with diabetes and periodontal disease.

well as association between diabetes and periodontal diseases (R^2 = 0.004, R^2 = 0.034 respectively).

Discussion

DM has varying systemic as well as oral complications. The periodontium remains the major target for diabetic damage. In recent years, link between periodontitis and DM has been postulated.[3] Both period a strong correlation is established between DM and periodontitis. Numerous studies, review articles and meta-analyses supported mutual influence between periodontitis and DM.[4-7]

Present study was taken up to evaluate the awareness regarding DM and its association with periodontitis among Bengaluru individuals. Individuals were graded according to their age and educational status and a positive correlation was found between age and awareness as well as between educational status and awareness. 95% of the total individuals were aware of the disease called DM. 72% of the total individuals were aware of the systemic complications of diabetes. As the study shifts from diabetes to correlation between diabetes and oral diseases, the percentage of awareness sinks down. 65% of the total individuals were found to be aware of oral manifestations of systemic diseases. The percentage of individuals aware of oral manifestations of diabetes was as low as 58%.

These statistics suggest that a larger role has to be played by oral health care practitioners, community dentists and periodontitis to create awareness among the masses regarding the oral manifestations and complications of DM. Only 29.75% of the individuals gained information about the disease from the doctors while rest of them were informed by their peers or got educated through media.

This statistic underlines the need of role of practitioners in educating their patients about the disease and disease process. 70% of the individuals agreed to the importance of visit to the dental clinic for maintenance of oral health in case of diabetic patients. Correlation between educational status and awareness regarding DM presented with value of R^2 = 0.102. This positive correlation strongly suggests that increase in the education of individual increases awareness among the individuals. Educated individuals have access to various sources of knowledge regarding the disease.

An overall sense of alertness regarding health develops in an individual as a consequence of education a positive correlation was found between educational status and awareness regarding association between diabetes and periodontitis. Similar study was done by Al Habashneh R *et al*. who found that 48% individuals from their study group had awareness regarding correlation between diabetes and periodontal diseases.[8] The correlation between age and awareness regarding diabetes was weakly positive. Also the correlation between increasing age and awareness regarding association between diabetes and periodontal problems was found to be weakly positive. The weak positivity or the low value of R^2 (0.004) can be attributed to the fact that educational status was not proportionately increasing with age in case of all individuals. This suggests that education and exposure to healthcare data is more relevant for awareness than the age of an individual.

Overall results of the study were suggestive of the fact that majority of the individuals were aware of diabetes but significant and comprehensive knowledge regarding diabetes and periodontal diseases and the particular details was lacking among the study group. This finding was in accordance with the findings of the study done by Weinspach *et al*.[9] A similar questionnaire study involving diabetes patients was conducted by Bowyer e*t al*. who concluded that adults with diabetes are less aware of oral care and health complications associated with diabetes, and thereby receive limited advice from healthcare professionals.[10]

DM is a disorder, if not treated or not well monitored can virtually involve any body system. Nephropathy, retinopathy and vasculopathy are few of the grave complications of uncontrolled diabetes. The seriousness of such grave complications could be one of the reasons for negligence towards the less grave oral manifestations and complications of diabetes. Studies hypothesizing association between obesity and periodontal diseases also have been conducted. Obesity is abnormal or excessive deposition of fat. Its consequences leads to adverse metabolic effects on health, include endothelial dysfunction and increase in pro-inflammatory cytokines. Thus, obesity appears to participate in the multifactorial phenomenon of causality of periodontitis with increased production of reactive oxygen species.[11]

These findings emphasis the fact that educating non-diabetic as well as predisposed individuals is as important as educating diabetic individuals regarding diabetes and its oral complications. Also, the concept that relation between diabetes and periodontal health is a two-way relation is holding ground.

Gurav with his study suggested that periodontal therapy in Type 2 diabetic subjects ameliorate inflammatory biomarker levels and glycemic status. There remains wide scope for further studies to highlight the beneficial effects of physical therapy in diabetic subjects.[12]

Conclusion

This questionnaire study revealed that although a significant portion of the study group was aware of diabetes, knowledge regarding periodontal association of that disease was not known to a significant portion of the study group. Dentists and health professionals formed a small percentage of sources of information for the study group which underlines the need of significant and a herculean task on behalf of community dentists, periodontitis and healthcare professionals. Also, special responsibility lies on the shoulders of periodontitis to educate patients regarding oral healthcare practices which the present study group does not seem to be convincingly familiar with.

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