Association of Oral Health and Systemic Disease among Elderly in Thiruthani Taluk - Thiruvallur District

Dr. Indhu

B.D.S, MPH

Abstract: *Oral health may have an impact on systemic health with clinical implications. This study evaluated whether oral disorders were associated with systemic health in 275 elderly people. Who are old and very old. A brief oral examination was documented tooth retention, caries, gingival health, self reports of periodontal conditions with clinically obtained data. Medical history, medications provided information about systemic conditions. Participants who had chronic systemic conditions also tended to have poorer gingival or periodontal conditions, fewer teeth higher risk of partial edentulousness.* Objective: *1) To find out the prevalence of systemic diseases and oral diseases among elderly. 2) To assess the association of oral health with systemic diseases in elderly.* Materials and Methods: *A cross sectional quantitative study was conducted at keechalam village at Thiruthani taluk with 275 elderly people [60 years and above] oral examination was conducted using WHO oral assessment form [1997] self reports, clinical signs and health questionnaire. Subjects were interviewed about their previous medical and dental histories, medication history, socio demographic status. Each participant received full mouth examination, including counting the number of natural teeth remaining, recording the gingival health by modified gingival score. CPTN Probes were not used in this study to record attachment loss. People who are not willing to participate and lesser than 60 years were excluded from this study. Descriptive analysis for prevalence and Bivariate analysis were evaluated by the chi-square test and Fisher's exact test using SPSS Version 20 package.* Result: *Elders who completed the interview and oral examination had a mean age of 66 years, Sample ranged from the age of 60 -90. The majority were women(70%).Older people from the rural population of age group of 60-70 years with lower income groups /no income had higher prevalence of oral diseases(dental caries, missing teeth) and systemic conditions(diabetes and hypertension). Modified gingival score (MGI)was i.e. 34 participants was normal with prevalence rate of 12.36% others had very mild-3%, mild 51%, moderate 28%, severe gingival disease6%.Prevalence of oral diseases among the 275 elderly people- Dental caries-72%, bleeding gums-11%, Generalized attrition -31.2%, missing teeth:38.1%, tooth mobility:21%. Prevalence of systemic disease among them were Diabetes:20%, HT-24%, Hypotension-3.6% CVD-3.6% ,thyroid-1.5% Stroke 1% Anaemia -3.6%, osteoporosis-8% gastrointestinal ulcers-2%, asthma 1.5% Chi-sq test was applied and found that there is an association between oral health variables such as missing teeth, bleeding gums ,tooth mobility, modified gingival score[gingival health] with diabetes, and generalized attrition with hypertension.* Conclusion: *Findings of this study indicate direct relationship with oral health and diabetes and hypertension. Some systematic diseases doesn't show relationship with oral health which can be further explored with larger sample to find more associations and probability of risks to estimate between oral health and systemic conditions.*

Keywords: oral health, systemic health, systemic conditions, elderly people.

1. Introduction

Aging is a natural phenomenon which increases the vulnerability and susceptibility to chronic disease development. In humans, aging is associated with lowered overall functioning and increased mortality out of the risk for various age-related diseases. (1). Research has demonstrated that the association between oral inflammation and systemic inflammation may be the key to understanding the deleterious effects on multiple organ systems. A healthy mouth may help you to ward off several medical disorders. The flip side? An unhealthy mouth especially if you have gum disease may increase your risk of health problem .We need to understand the importance of oral health and its connection to overall health .For eg: A swab of saliva can tell your doctor volumes about what's going on inside your body. Oral health acts a window into what's going on rest of our body often it serves as a vantage point for detecting early signs and symptoms of systemic disease. Infact according to the Academy of general dentistry more than 90% of all systemic disease produce oral signs and symptoms.(2) Mean plasma CRP levels were higher in the periodontitis patients. Patients with severe periodontitis had significantly higher CRP levels than mild-periodontitis patients, and both had significantly higher levels than the controls. Oral pathology leads to local inflammation may lead to increase C reactive protein, fibrinogen, and circulating white blood cells which are recognized by inflammatory markers, may increase the risk of hypertension and other diseases (3) Diabetic conditions weakens the synthesis of collagen and glycosaminogly can's by the gingival fibroblast which results in loss of periodontal fibres and supporting alveolar bone leading to an increased mobility of teeth. Subjects with diabetes mellitus are 2.8 times more likely to have destructive periodontal disease (Emrich, Schlossman & Genco in 1991) and 4.2 times more likely to have significant alveolar bone loss (Taylor, Burt, Becker, Genco & Shlossman, 1998). In 1778 john hunter a surgeon from England wrote the diseases of the teeth are likely to produce diseases in the neighbouring parts , may be with serious consequences. In 1879 WD Miller from the university of Pennsylvania dental school travelled to berlin at Koch's institute looked into the relationship between oral bacteria and systemic diseases. In series of articles published by miller he stated that pathogenic germs from the oral cavity produced disorders of the body.(4)

Similar studies have been done among institutions The present study was carried out in the community setting in rural Indian population among the elderly to assess the prevalence and association between oral health and systemic

disease, as elderly people are more prone to systemic diseases and it can help in educating the community about the importance of oral health and its effects on systemic conditions when it is poorly maintained. Hence it provides early detection of oral diseases/ conditions among the examined elderly people.

2. Materials and Methods

The study was conducted on elderly people in the rural population, the participants were diverse in terms of age, though more or less of similar socio economic status and education. Majority of them were from lower or no income groups and are illiterate or with minimal school education. The age ranged from 60-90 years. Subjects were interviewed about their previous medical and dental histories, medication history, socio demographic status. Each participant received full mouth examination, including counting the number of natural teeth remaining, recording the gingival health by modified gingival score. CPTN Probes were not used in this study to record attachment loss. People who are not willing to participate and lesser than 60 years were excluded from this study. Descriptive analysis for prevalence and Bivariate analysis were evaluated by the chi-square test and Fisher's exact test using SPSS package.

Selection of Participants: Systematic sample was used to select the participants till reaching a sample of 275 using left hand rule among the rural population during summer vacation within a period of one month time. The data was collected through a personal interview conducted by the author who completed the questionnaire. The patients were asked if they had any specific medical condition(s). The patients were asked to provide a Yes or No answer to questions about specific medical conditions. The patients were grouped according to the system involved under the following headings.

Systemic health problems: Endocrine, Hypertension, CVD, Respiratory system, Hematological disorders, osteoporosis, Stroke, gastrointestinal ulcers, Healthy elderly. (Participants with no systemic illness).

Oral Examination: Oral examination was conducted using WHO oral assessment form (1997) for recording of oral health variables. It was done using torch light, ice cream sticks, mouth mirrors. CPI probes were not used as it was restricted in this study, dental caries, missing tooth, bleeding gums, tobacco chewing, tooth mobility were recorded using clinical signs and self reports. Gingival health was also recorded using standard MGI score. All these oral health variables were recorded using clinical signs, self-reports, dental history, medications.

Oral Health Variables: Dental caries, missing tooth, bleeding gums, tooth mobility, gingival health(MGI score), generalized attrition, tobacco chewing.

Statistical Analysis: The participants who were interviewed and examined were divided into various groups depending upon oral and systemic diseases. Prevalence was calculated using descriptive analysis. Association for oral health variables and systemic disease variables were computed using chi- sq analysis taking Elderly participants with no systemic illness as a basis for comparison with elderly participants who had systemic diseases and their associations with oral health conditions.

3. Results

Elders who completed the interview and oral examination had a mean age of 66 years .Sample ranged from the age of 60 -90 years. The majority were women (70%). The participants were subdivided into three age groups (60-70, 71-80, 81-90). Prevalence of systemic diseases and oral diseases were highly significant among 60-70 year age group than the participants in other two elderly groups. Older people from the rural population of age group of 60-70 years with lower income groups /no income had higher prevalence of oral diseases (dental caries, missing teeth) and systemic conditions. (diabetes and hypertension).**(Table 1.2)** shows that Modified gingival score (MGI) was normal with 34 participants which makes the prevalence rate of 12.36% others had very mild-3% mild 51%, moderate 28%, severe gingival disease.6%prevalence of oral diseases among the 275 elderly people- Dental caries-72%, bleeding gums-11%,Generalized attrition -31.2%, missing teeth:38.1%, tooth mobility:21%. Prevalence of systemic disease among them wereDiabetes:20%, HT-24%,Hypotension-3.6% CVD-3.6% ,thyroid-1.5% Stroke 1% Anemia -3.6%, osteoporosis-8% gastrointestinal ulcers-2%, asthma 1.5% Chi-sq test was applied using SPSS we found from(**table 2.1**) that p value(0.05) is lesser for some oral health and some systemic disease variables(endocrine disorder-diabetes) (CVD-Hypertension), There is an association between oral health variables such as missing teeth, bleeding gums, tooth mobility, modified gingival score[gingival health] with diabetes, and generalized attrition with hypertension. Some of the oral health and systemic health variables were found to be greater than [0.05] which indicated no significant relationship. **Table 2.2** shows that elderly participants who had systemic conditions have more oral health diseases comparatively than the elderly participants who had no systemic conditions even when (n) is lesser in the group who had systemic conditions. Hence this indicates significant relationship between oral health and systemic disease among elderly people .These results are authentic if study is performed under the same settings.

4. Discussion

The findings of the present study to find out the prevalence of oral health and systemic diseases and to evaluate the association of the oral health and systemic diseases among the rural elderly population. The current study had high prevalence of dental caries 72% and missing tooth 38%,and healthy elderly people i.e. participants with no systemic illness tend to have better oral health more compared to those with systemic disease. Similar to a study reported from India by Manjittalwar (4). The study also reported that the

dental caries and missing tooth can be regardless of the systemic health could possibly be due to lack of awareness , importance of oral health and the ability to access oral health care services and restorative care(4). Since the current population group in this study belong to low socioeconomic status as well as high in illiteracy level lack of awareness and ability to access for services in a rural population is quite common. In this current study we found that oral health had an significant association with diabetes and hypertension and their prevalence was also higher compared to other systemic diseases and hypertension being a risk factor of cardiovascular diseases. Manjittalwar in his study has similar significant associations with oral health and systemic diseases like diabetes, hypertension. Glycated haemoglobin (a measure of diabetic control) was found to be elevated in people with several periodontal diseases and type 2 diabetes mellitus. (11) The relationship between type 2 diabetes mellitus and periodontal disease was evaluated in 2,878 Pima Indians of the south western United States. Two independent measures of periodontal disease, probing attachment loss and radiographic bone loss, were used to compare prevalence and severity of periodontal disease in diabetic and nondiabetic subjects. In all age groups studied, subjects with diabetes had a higher prevalence of periodontal disease, indicating that diabetes may be a risk factor for periodontal disease in a study by shlossman et al. (11). Cardiovascular disease and periodontal disease have a number of characteristics in common. For example, both diseases are more likely to occur in persons who are older, male, of lower educational status, have fewer financial resources, who smoke and are hypertensive, stressed and socially isolated. These commonalities suggest that periodontal disease and heart disease may also share a similar causative pathway. For example, a number of case control studies have shown an association between cardiovascular disease and indicators of poor oral health.ref (12, 15)

5. Limitations of the Study

Some of the limitations in this study is less generalizbilty. Further research should be done using a larger sample to explore more significant relationships between oral and systemic diseases. The measures used to collect the data through self-reports limited by the fact that it rarely can be independently verified. In other words we have to take what participants says, whether in interview, questioners, at face value. Self reported data can contain several potential sources of bias. CPTN probes were not used, attachment loss are not recorded in this study. Since the gathered data inhibited the ability to conduct thorough analysis of the results. Prevalence rate of the diseases may vary according to environmental risk factors, individual risk factors, global changes, evolution of disease , number of incident cases, deaths, recoveries .

6. Acknowledgement

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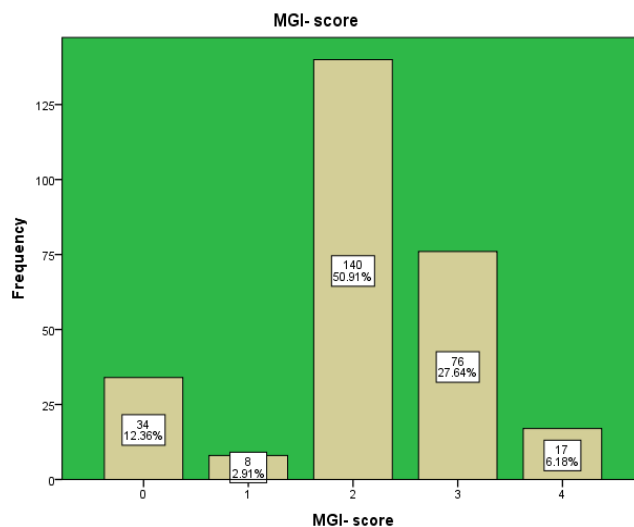
Annexure:
A. Pathway Flowchart
B. Charts/ Graphs
C. Tables

Annexure: A
Source: Panagakos, Fotinos & Scannapieco, Frank. (2011). Periodontal Inflammation: From Gingivitis to Systemic disease.
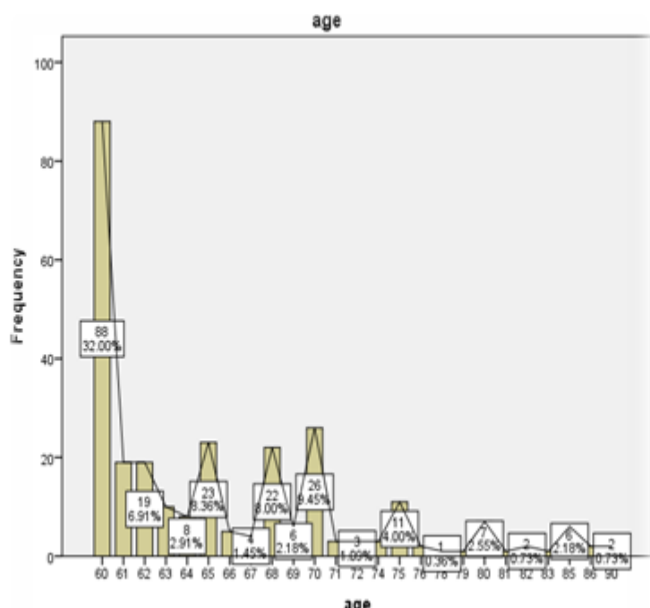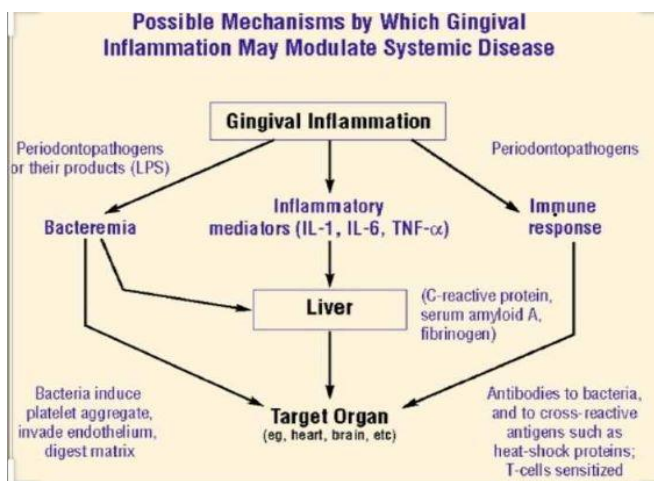
Age distribution of the population

Modified gingival score

MGI- SCORE
Score 0 is normal ie 34 participants was normal with prevalence rate of 12.36% others had very mild-3% mild 51% , moderate 28% , severe gingival disease.6% . Score 1 is mild inflammation, slight change in color, little change in the texture of any portion of gingival unit, Score 2 is mild inflammation of entire gingival unit. Score3 is moderate inflammation of gingival unit. Score4 is severe inflammation of gingival unit

Annexure C

Table 1.1: Prevalence of Systemic Diseases

S.No	Systemic Disease	No. of Participants Who Had Systemic Diseases	Prevalence %
1	**Endocrine** Diabetes mellitus, thyroid	DIABETES- 55 THYROID-4	20% 1.5%
2	**CVD** Hypertension Hypotension	10 67 10	3.6% 24% 3.6%
4	**Respiratory System** Asthma, COPD	ASTHMA-4	1.5%
5	HEMATOLOGICAL DISORDERS Anemia, Deep vein thrombisis, Raised prothrombin time	ANEMIA- 10	3.6%
6	Osteoporosis	21	7.6%
7	Stroke	3	1%
8	Gastrointestinalulcers	5	2%

Table1.2: Prevalence of Oral Diseases

S. No	Oral Disease/ Conditions	No. of Participants Who Had Oral Disases/ Conditions	Prevalence %
1	Dental Caries	199	72%
2	Missing Teeth	105	38%
3	Bleeding Gums	29	10.5%
4	Generalized Attrition	85	31%
6	Tooth Mobility	59	21.5%
7	Tobacco Chewing	89	31%

Table 2.1: Chi-Square Analysis to find the association between oral health and systemic diseases

Variables Of Interest	P-Value	Odds Ratio with upper and lower limits
Missing teeth &diabetes	.002	2.548 [4.652,1.396]
Bleeding gums& diabetes	.011	2.806 [6.357,1.238]
Tooth mobility & diabetes	.008	2.375 [4.563,1.236]
Generalized attrition & diabetes	.050	1.832 [3.374,.994]
Generalized attrition & Hypertension	.005	2.256 [3.995,1.273]
MGI score & diabetes	.030	-

Table 2.2

Elderly Participants Who Had Systemic Disease vs No Systemic Disease		Oral Disease/ Conditions With Systemic Diseases	Oral Disease / Conditions With No Systemic Diseases	P-Value
SD	NSD	SD	NSD	
n =31	n= 45	DC- 107	Dental Caries- 92	.054
n =76	n =94	Missing Teeth-62	Missing Teeth-43	.021
n =120	n =126	Bleeding Gums-18	Bleeding Gums-11	.176
n =82	n =107	Generalized Attrition-56	Generalized Attrition-28	.001
n = 100	n =116	Tooth Mobility-38	Tooth Mobility-21	.014
n =90	n =99	Tobacco Chewing- 48	Tobacco Chewing- 38	.208
n=138	n = 137	Gingival Health (MGI-Score)131	Gingival Health (MGI-score)110	.002