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RESEARCH ARTICLE

ASSOCIATION OF OSTEOPOROSIS WITH PERIODONTAL DISEASES

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ABSTRACT

Introduction: Osteoporosis and periodontal diseases are silent diseases which are caused due to loss of bone minerals triggered by local and systemic factors. The present study designed to establish the relationship between osteoporosis and periodontal diseases.

Methods: This is a descriptive observational study done on 100 patients from June'2013 to November'2013in department of medicine, Comilla medical college hospital, Comilla. All patients had age 40 years or more having symptoms suggestive of osteoporosis were selected. Detailed information was collected according to protocol.BMD was done on lumbar spine and neck of femur with Dual Energy X-ray absorptiometry (DEXA). BMD T-score -2.5 or less is considered osteoporosis and selected for study. Orthopatomogram (OPG) and periodontal examination was done.

Results: Among the 100 collected samples mean age was 58.91(±8.02) years. There is negative correlation between probing depth and BMD (r-values -0.61 & $p<0.001$) for femoral neck and (r-values -0.55, $p<0.001$) for lumber spines was statistically significant. This study also showed femoral neck and lumbar spine T-score have statistically significant relation with missing teeth, [-3.91(±0.58) and -3.41(±0.43) respectively ($p <0.001$)]. There is negative correlation between clinical attachment loss with Femoral neck and Lumbar spine BMD (r-values -0.66, $p<0.001$) and (r-values -0.55,$p<0.001$) respectively.

Conclusion: There is significant correlation between probing depth, missing teeth and clinical attachment Loss with osteoporosis. Osteoporosis is a risk factor for periodontal diseases and its progression.

INTRODUCTION

Osteoporosis is a skeletal disease characterized by reduction in bone mass and micro architectural changes in the bone, which leads to an increased bone fragility and an increased risk of fracture (Kanis and Melton, 1994). It is one of the most important health concerns, which affect a large number of men and women with incidence increasing with advancing age (Wactawski –Wende, 2001). Prevalence of both osteoporosis and tooth loss increase with advancing age in both women and men(Carranza, 2002). Periodontitis is the major cause of alveolar bone resorption and loss of tooth attachment leading to loss of tooth and bone resorption. Osteoporosis may in increase the risk of periodontal disease. It causes loss of bone mineral density(BMD) throughout the body, including maxilla and mandible. resulting rapid loss of alveolar crest height and density which leads to be more susceptible to resorption by co-existing or subsequent periodontal infection and inflammation (Garcia, 2000). It can also the host response thereby affecting the disease prevalence, progression and severity (Mascarenhas *et al*., 2003). The association between osteoporosis and periodontal diseases remains an argument of debate. Both osteoporosis and periodontal diseases are bone resorptive diseases; it has been hypothesized that osteoporosis could be a risk factor for the progression of periodontal disease and vice versa. Many studies have explored and identified a connection between periodontal disease and tooth loss with osteoporosis (Braz, 2003). A study conducted at the University of New York at Buffalo in 1995 concluded that post-menopausal women who suffered from osteoporosis were 86% more likely to also develop periodontal disease .7 Several human studies have assessed the relation between skeletal BMD of spine or femoral neck and radiographic measurements of alveolar bone height (Garcia *et al.,* 2000). Suggestion have been made that panoramic radiograph or OPG that show progressive alveolar bone and tooth loss with endosteal resorption of the mandibular inferior cortex MIC may indicate general osteoporosis (Cooper and Melton Melton, 1996 and WHO, 2003). In periodontal disease OPG (Orthopatomogram) and MCI (mandibular cortical index) is done to see loss of attachment, tooth loss which leading to gingival recession and pathologic periodontal probing depth.[7] In the present study an attempt is made, to determine the effect of osteoporosis on the periodontal status.

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MATERIALS AND METHODS

This is a descriptive type observational type of study from June'2013 to November'2013in department of medicine, Comilla medical college hospital, Comilla. All these patients have age 40 years or above of both sex with symptoms suggestive of osteoporosis with no history of tooth loss due to trauma was selected for this study.Patients with secondary osteoporosis were excluded from this study.After collection of all the data, BMD was done on lumbar spine and both hips with dual energy X-ray absorptiometry (DEXA) Scan. Before DEXA Scan patients were prepared with no prior radionuclide or barium contrast studies for 2 weeks and no metal in clothing prior to the study. The amount of calcium correlates with bony content and with bone strength. The amount of calcium in bone was compared to a database of normal patients, with standard deviations from normal reported as a T-score. Based on WHO criteria, patients who has got a t-score of less than -2.5 is considered osteoporosis. Only the patients with osteoporosis was finally selected for this study. Orthopatomogram (OPG x-ray) and periodontal examination was done. Total 100 patient's data was selected for analysis by using SPSS (statistical package for social science) software win version 17. Quantitive data were expressed as mean and standard deviation and qualitative data was expressed as frequency and percentage. Comparison was done by chi-square test and unpaired t test where necessary. A probability value of $p<0.05$ was considered significant.

RESULTS

Table 1. Age group distribution of the study population

Age group	Frequency	Percent
41-50 years	15	15.0
51-60 years	44	44.0
61-70 years	34	34.0
> 70 years	07	07.0
Total	100	100.0
Mean ±SD	58.91(±8.02)	43-74 years

Table 1 shows mean age was 58.91(±8.02) years minimum age was 43 years and maximum age was 74 years

Table 2. Sex distribution of the study population

Sex	Frequency	Percent
Male	35	35.0
Female	65	65.0
Total	100	100.0

Table 2 shows female was predominant 65% were female and 35% were male

Table 3. Mean BMD score

BMD findings	Mean ±SD	Range (min-max)
Femoral neck T-score	-3.49(±0.65)	-4.64 to -2.60
Lumbar spine T-score	-3.22 (±0.42)	-3.93 to -2.60

Table 3: shows mean femoral neck, lumbar spine T-score -3.49(±0.65) and -3.22 (±0.42) respectively.

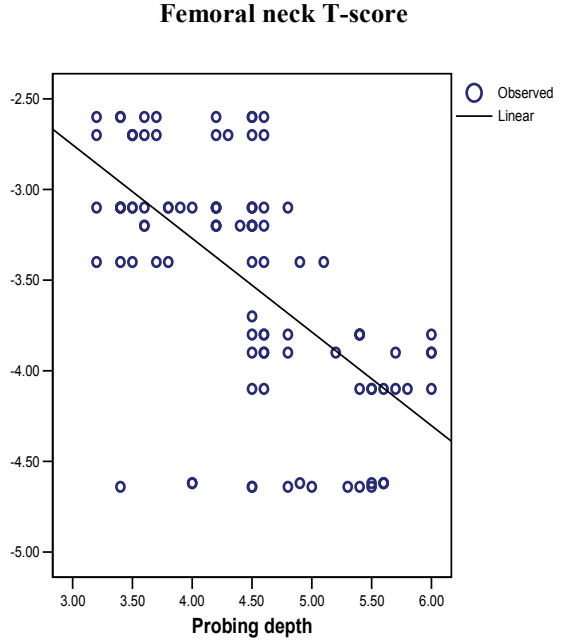

Figure 1. Correlation between probing depth and BMD (Femoral neck t-score)

Figure 1 show the correlation between probing depth and BMD (Femoral neck t-score). The r-values -0.61 indicating negative correlation and 'P' values <0.001 indicates statistically significant.

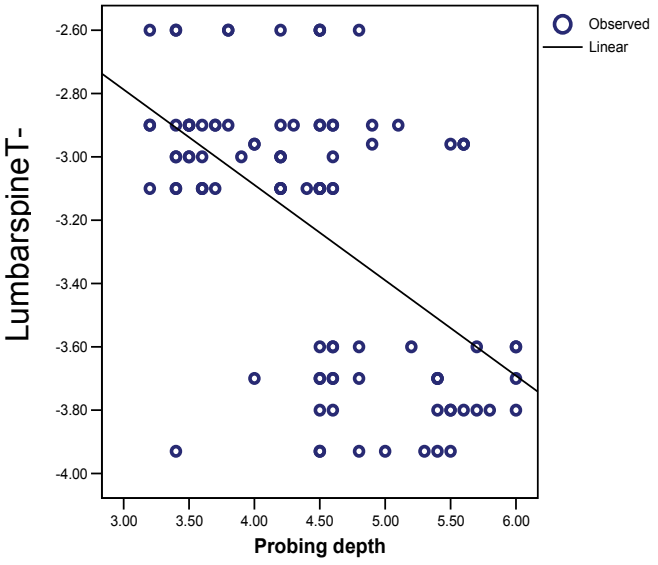

Figure 2. Correlation between probing depth and BMD (Lumbar spine T-score)

Figure 2 shows the correlation between probing depth and BMD (Lumbar spine t-score).

The r-values -0.55 indicating negative correlation.

The 'P' values are <0.001 was statistically significant.

Table 4. Relation between BMD with missing teeth

BMD	Missing teeth Mean ±SD	No missing teeth Mean ±SD	P value
Femoral neck T-score	-3.91(±0.58)	-3.03(±0.35)	<0.001
Lumbar spine T-score	-3.41(±0.43)	-3.0(±0.27)	<0.001

P value measured by unpaired't' test

Table 4. shows statistically significant relation (p <0.001) between femoral neck and lumbar spine T-score with missing teeth.

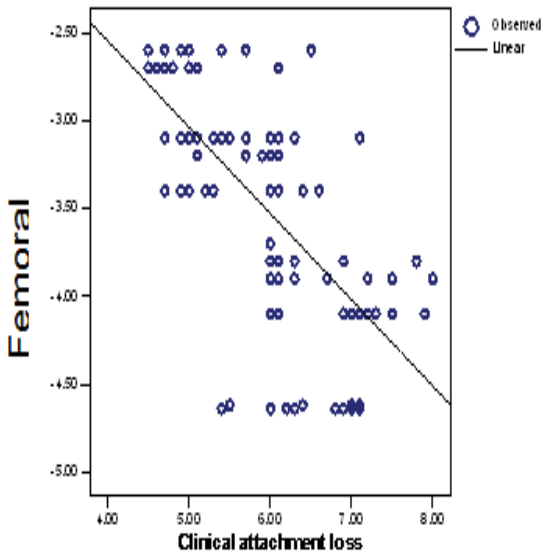

Figure 3. Correlation between clinical attachment loss and BMD (Femoral neck T-score)

Correlation between clinical attachment loss and BMD (Femoral neck T-score) was determined in Figure 3. The r-values -0.66 indicating negative correlation. The 'p' values are statistically significant (<0.001).

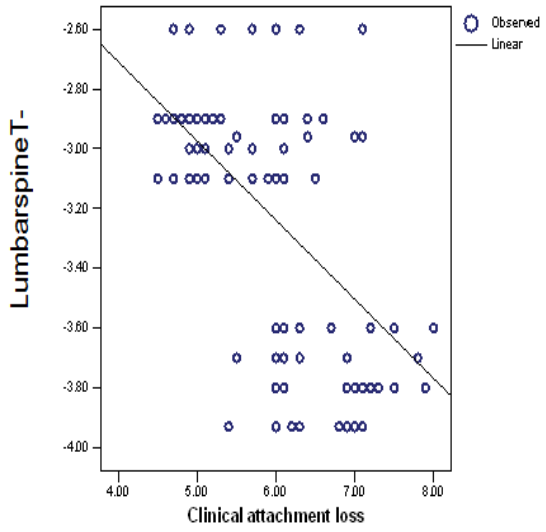

Figure 4. Correlation between clinical attachment loss and BMD (Lumbar spine T-score)

Figure 4 shows the correlation between clinical attachment loss and BMD (Lumber spine T-score) was determined. The r-values -0.55 indicating negative correlation. The 'p' values are <0.001 which was statistically significant.

DISCUSSION

Possibility of osteoporosis and periodontal diseases could be related because they share common etiological agents, which could affect or modulate their natural history, should be looked (Garcia *et al*., 2000; Yoshihara *et al*., 2004). This study shows femoral neck and lumbar spine T-score have significantly related (p <0.001) to missing teeth. Numerous studies have looked at the relationship between osteoporosis or bone density with number of missing teeth although some studies (Elders *et al*., 1992; Mohammed *et al*., 1999; Weyant *et al*., 1999 and Taguchi *et al*., 2005) failed to detect significant correlations between tooth loss and BMD. Kribbs (Kribbs, 1990) reported greater number of tooth loss in females with diagnosed vertebral-compression fractures. Another study by Aström *et al*. (Aström, 1990) also reported that a low number of teeth can be used to predict hip fractures in elderly males and females. These contradictory findings between these studies could be due to the fact that tooth loss is highly influenced not only by periodontal disease, but also by local practices of dental community as well as other factors related to oral health. In present study shows significant negative correlation between probing depth and BMD A negative correlation means that probing depth decreases, as the BMD increases. The probing depth recorded at three sites on the buccal and lingual surfaces of the teeth allows for the fact that the disease is not missed (Soben Peter, 1999). The negative correlation between the BMD values and the probing depth was also observed in some studies done in different part of the world (Elders *et al*., 1992; Kribbs *et al.,* 1990; Ward and Manso, 1973). On the contrary to this Philips and Ashley (Phillips and Ashley, 1973) found a positive association between BMD and mesial probing depth. A positive association was also observed in kribb's *et al*. 1990 study wherein mandibular bone density was correlated, thereby accounting for different results. In present study shows negative correlation between clinical attachment loss and BMD. A negative correlation means that attachment loss decreases, as the BMD increases. Study by (Weyant *et al*., 1999; Tezal *et al*., 2000; Hildebolt *et al.,* 1997) found similar patterns of association like our study but another study by Wactawaski-Wende *et al*. (Hildebolt *et al*., 1997) failed identify similar association. Study on relationship between clinical attachment level and spine and hip BMD shows if bone health of the skeleton increases, the soft tissue health of the mouth increases (Pilgram *et al*., 2002)**.** Many authors used clinical attachment loss as a most dependent variable to represent periodontal disease. All the authors credited significantly for the completion of this study.

The limitations of the studies were as follows:

- This study was conducted in only one centre.
- The sample size was small and study period was short. Large scale prospectus study in multiple centre is needed on this issue.

Our recommendation is to do a large scale, multicentre study should be taken for conclusive opinion.

Conclusion

Study concludes that there is significant negative correlation between probing depth, missing teeth and clinical attachment loss with osteoporosis. Osteoporosis should be considered a risk factor for periodontal disease progression.

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