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Prevalence of Vitamin D among Women of North Nazimabad, Karachi, Pakistan Suffering from Osteopenia

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Abstract: The aim of current study is to investigate the concentration of Vitamin D in women suffering from osteopenia. The present study was performed at Dr. Essa Laboratory & Diagnostic center, Karachi, Pakistan. The subjects were informed about the procedure of study and consent was obtained. Total 200 women were included in this study, Dexa scan was performed and out of 200 subjects eighty subjects were selected for the vitamin D analysis based on the Dexa scan score. Subject's weight and heights were recorded for BMI determination. Vitamin D assay was performed using electro-chemiluminescence technique. Results showed that out of two hundred subjects eight women were suffering from osteopenia. Significantly decreased level of vitamin (18.32 ± 2.14 ng/mL) was found (P<0.001)as compared to the control participant's (22.72 ± 2.86 ng/mL).The average ages of women were 43.81 ± 8.33 and their mean BMI was 28.14 ± 3.27.Current findings proposed that patients with rheumatoid arthritis particularly in osteopenia supplementation of Vitamin D may protect elderly women suffering from osteopenia.

Keywords: Vitamin D; Osteopenia; DEXA Scan; Rheumatoid Arthritis;

1. INTRODUCTION

The function of vitamin D in mineralization of bone and physiological balance of mineral is well documented in literature. Nowadays, function of vitamin D deficit in a series of diseases has arisen, composed with the indebtedness that vitamin D shortage may be globally. The main base of Vitamin D in human is internal amalgamation in the skin after experience to ultraviolet radiations of light from sun, and other main cause of vitamin D supply is diet. (Junaid, 2019)Vitamin D deficiency may be because of mix type of life style such as most of time spend indoor when sunlight at its peak. Use of several sunlight blockers in the form of cosmetics which late produce skin cancer in some cases and worldwide ecological pollution might have burden to the extensive surge in vitamin D Deficiency. Literature survey found that in Pakistan both gender male and female patients have high vitamin D deficiency prevalence. (Sheikh, *et al*; 2012).

Deficiency of vitamin D is not properly documented prevalent disorder in the world. Importantly in areas where sunlight is much more effective on environment such as Pakistan, India and Saudiaarabia. Literature evident that vitamin D deficiency is highly increased in hyper-pigmented peoples like Asians because of lack of capability to synthesize vitamin D in their skin. Therefore impacts of vitamin D deficiency on public health are insightful. (Mogili, *et al*; 2018).

Globally, vitamin D deficiency is a huge risk for human health because of it's highly dominance. Probably more than one billion humans from worldwide are suffering from Vitamin D poor or inadequate. Countries from Middle East and South Asia having rich in sunlight sources have the maximum quantity of Vitamin D insufficiency. The occurrence of vitamin D deficiency in the common peoples in South Asia is documented to be in series of 67-83% and in the Middle East approximately 20-80%. (Harinarayan, *et al*; 2011).

It is indicated in literature that receptors of vitamin D control the gene participated in metabolism of glucose, regulation of blood pressure and breakdown of lipid, Moreover signifying a function of vitamin D shortage in the metabolic disorders pathogenesis. Type II diabetes and vitamin D insufficiency is positively correlated in a study on women with diabetes and vitamin D deficiency and insulin resistance (Pinelli, *et al*; 2010).

For peoples well-being vitamin D is essential. Naturally, vitamin D deficiency is recognized for its impact on growth disorders, bone mineralization and irregularities in skeleton of children and poo muscle growth is adults. Conversely, many latest perceptions about vitamin D have come to know with high results being connected with its deficiency. Cancer, cardiovascular disease, diabetes mellitus, stroke,

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depression and many more syndromes are correlated with the deficiency of vitamin D. (Autier, *et al*; 2014).

Since last decade, no any other mineral or nutrient has attained and continued immense attention in the area of public health, biomedical and human health research as vitamin D. Once it was believed that vitamin D deficiency was a minimum in South Asia. After that in 2000 a research was performed in Delhi India on healthy humans, its results showed that occurrences of vitamin insufficiency D up to 90% and afterwards many studies from various parts of Indian exhibited that prevalent vitamin D deficiency in all ages of Indians. (McMichael, 2005).

Diet and sunlight are the two important sources of vitamin D. classically; low vitamin D quantity was found in natural fruits therefore supplements required for homeostasis maintained. Deficient nutritional provisions of calcium and vitamin D where food material are not invigorated.Hyperparathyroidism, breakage of bones, development of osteoporosis, rickets, osteomalacia, significant myopathy are related with the deficiency of vitamin D. Latest research indicated that vitamin D has vital function as an modulator of immune system suppressor of tumor. (Gu, *et al* 2019).

Deficiency of vitamin D is mostly occurs because of poor food, problems with digestion and absorption and due to minimum experience to sunlight. Exercise and physical actions may also impacts on quantity of vitamin D. This is correlated with body mass index (BMI) ecological components (altitude, meteorological conditions and altitude) and pigmentation of skin, among all experience to sunlight is the vital factor for vitamin D balance.(Foo, *et al*; 2019).

Table 1 Anthropometric index of menopausal women.

Age (years)	weight (Kg)	BMI	BMD
43.81 ± 8.33	70.5 ± 4.47	29.652 ± 4.895	- 1.60±0.17

Values are presented in Mean ± standard deviation

2. MATERIAL AND METHODS

The study was conducted on the women attending Dr. Essa Laboratory & Diagnostic center Shahrah-e-Jahangir north Nazimabad Karachi, from December 2018 to January 2020. Ethical review board of Dr. Essa laboratory & Diagnostic center has accepted the designed study and permitted for conducting the research.Overall 200 women were selected for the study on the basis of inclusion and exclusion criteria. Those women qualified for the study were informed about the procedure of test for their consent.

Exclusion criteria

Sign and symptoms of any metabolic disease, Taking any medication which upset the vitamin D level, Pregnancy,Above 50 years age, Any liver or kidney disease

Inclusion criteria

Healthy women, suffering from osteopenia

Before blood samples and Dexa scan weight and height was measured for body mass index calculation, BMI was determined using the method weight in Kg divided by height in meter^2.

DEXA Scan

Primarily Dexa Scan was performed to all selected 200 participants using DEXA scan machine (Hologic, Korea). The scanning instrument determined the T and Z-score automatically. The instrument was run by qualified and skilled technologist. Instrument takes only ten minutes for whole procedure.

Vitamin D assessment

For vitamin D analysis total eight women were selected from 200 based on the T and Z-score calculated by DEXA scan. Blood samples were taken from eight women suffering from osteopenia. 25-hydroxyvitamin D was selected as the suitable present source for the determination of Vitamin D level. Vitamin D assay was performed using electrochemiluminescence technique, using Cobas e411 (Roche Diagnostics, Rotkreuz, Switzerland)

Statistical analysis

Statistical test was performed using SPSS (Statistical Package for Social Sciences (SPSS) version 20

3. RESULTS

The current study was conducted on osteopenial women of North Nazimabad, Karachi Pakistan. Total of 200 women were participated in present research. The average ages of women were 43.81 ± 8.33 and their mean BMI was 28.14 ± 3.27. On the basis of T Score and Z score were classified as osteopenia and was selected for the further vitamin D analysis. Out of two hundred women eight **(Fig. 1)** subjects was selected for vitamin D analysis and 100 women were considered as control subjects for comparison.In women suffering from osteopenia the concentration of vitamin D (18.32 ± 2.14 ng/mL) was found significantly ($P<0.001$) lower as compared to the control participant's (22.72 ± 2.86 ng/mL) **(Fig. 2)**

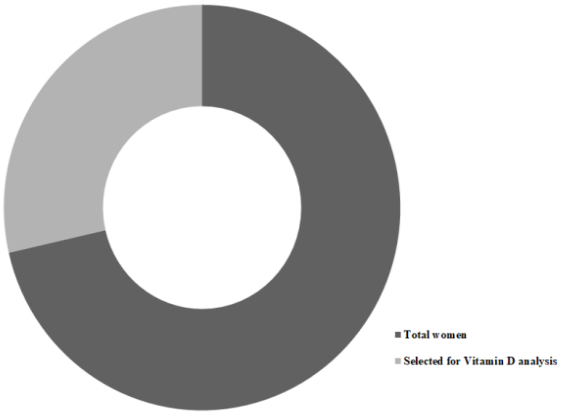

Fig. 1. Total and selected women, for vitamin D analysis subjects were selected on the basis of Dexa scan score

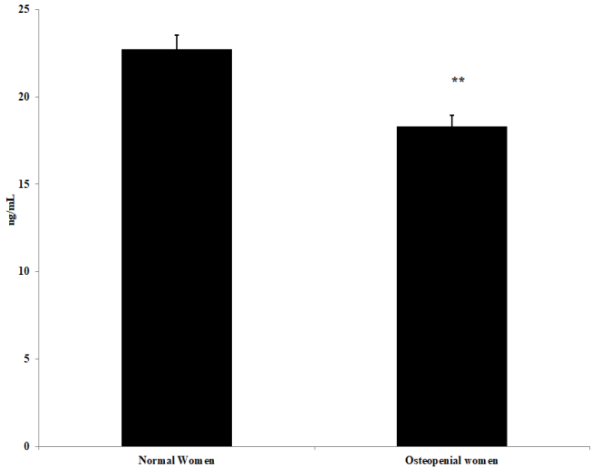

Fig..2 Concentration of vitamin in normal and osteopenial women. ** P<0.001

4. DISCUSSION

Incidence of Hypovitaminosis D was shockingly high (76%) among sound subjects in Pakistanis living in Karachi in spite of plentiful daylight consistently. Present study disclosed the very interesting results regarding the concentration of vitamin D in women suffering from osteopenia. Our results showed that that vitamin D deficiency in Karachi as prevalent as inChina, Iran, Turkey, Lebanon, India, Jordan, Tunisia and Saudi Arabia have high commonness running from 44-95%.In a portion of these examinations the high pervasiveness of hypovitaminosis was credited to multiparity and dietary elements apparel factor, confinement and shirking of daylight exposure andenvironmental pollution which forestalls enough UV B beams infiltration. (Vojinovic, *et al*; 2017) In indigenous populace shirking of daylight because of dread of obscuring of skin and covering of entire body strictly or just uncovering face and hands generally particularly in female subjects while going outside were the principle ascribing factors.Nutritional element was additional factor of the study concerning high incidence as most of our member were taking small quantity of vitamin D rich nutrition.(Peelen, *et al*; 2012) Vitamin D ingestion was not likely due to illiteracy concerning amount of consuming diet by members and absence of food configuration catalogue for Vitamin D used in Pakistan.Furthermore there is no Vitamin D food protection in Pakistan and no past of use of calcium and Vitamin D supplements.Environmental contamination is additional ascribing element of hypovitaminosis D. (Hossein-nezhad, *et al;* 2013) The estimation of serum 25(OH)D gives fractional knowledge into D hormone status in light of its close physiologic mechanism. The insufficiency of the hormonal dynamic type of Vitamin D and of its forerunner 25(OH)D is very normal, in any event during winter, in all Europe and especially in Northern nations like a quiet regular prevalent (Aslam, *et al*; 2019).

Though a few components are engaged with the Vitamin D deficient rheumatoid arthritis peoples, the relationship between illness action and deficient Vitamin D levels appears to stay a factually huge reality as affirmed by late meta-investigation. A few investigations demonstrated that serum Vitamin D levels can impact malady result estimates which contain rheumatoid arthritis persistent reports, for example, HAQ and DAS28 (Kostoglou-Athanassiou, *et al*; 2012). Specifically, 25(OH)D serum levels, b16 ng/ml, have been seen as related with generously less leg muscle work.Vitamin D levels have been considered in rheumatoid arthritis. Vitamin D inadequacy might be related with an expanded hazard for the advancement of rheumatoid arthritis. The Iowa Women's Health Study by Merlino and partners broke down information from an imminent companion investigation of ladies matured 55–69 years (Merlino, *et al;* 2004). Recently, the mix of antirheumatic drugs with nutrient D has been recommended for rheumatoid arthritis. Patients with rheumatoid arthritis are inclined to osteoporosis and experience the ill effects of torment when the ailment is in flare. Vitamin D supplementation has been proposed for patients with rheumatoid arthritis for the avoidance and treatment of osteoporosis just as for its potential impacts on condition action. (Varenna, *et al*; 2012).

Vitamin D has been appeared to go about as a key player in the beginning and pathogenesis of rheumatoid arthritis. The pervasiveness of rheumatoid arthritis has been found to diminish in people with high admission of Vitamin D with mutually nutritional and additional types of Vitamin D [129]. Epidemiological information have uncovered that a critical number of rheumatoid arthritis subjects (30-63%) have low Vitamin D levels (Merlino, *et al,* 2004). Vitamin D administration is conversely connected with rheumatoid arthritis movement.Extreme insufficiency of Vitamin D has been

accounted for in early provocative joint pain. An investigation led on 4,793 Japanese rheumatoid arthritis patients detailed an extreme insufficiency of Vitamin D in rheumatoid arthritis patients and showed a converse relationship between levels of Vitamin D and rheumatoid arthritis related clinical side effects. Additionally, another investigation led on European rheumatoid arthritis patients detailed similar the predominance of Vitamin D inadequate in Beijing immature young ladies was initially referenced by Australia researchers in 2001. (Park, *et al*; 2015; Furuya, *et al*; 2013)

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