VOLUME-9, ISSUE-4, APRIL -2020 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Medicine

PREVALENCE OF HYPOVITAMINOSIS D & ITS ASSOCIATION WITH CHRONIC NON-SPECIFIC LOW BACK PAIN.

Dr Nazar Hussain MD Consultant Physician, District Hospital Poonch, J&K.

ABSTRACT

Introduction: Vitamin D is frequently associated with a number of musculoskeletal disorders including chronic non-specific low back ache. However, there is limited available literature from our region on the subject. **Objective:** This study was conducted with an aim to study the association between Vitamin D levels and chronic low back pain of idiopathic nature. **Results:**There were a total of 150 patients in our study with chronic non-specific low back ache. The mean age was 43.4 years with a range of 23-76 years. There were eighty-three females in our study (55.33%) and the remaining were males (44.66%). The mean Vitamin D level was 17.83ng/ml.The levels of vitamin D were deficient (< 20ng/dL) in 72% of the females compared to 55% in males and were insufficient in 17% of females compared to 22% in males. **Conclusion:** Vitamin D deficiency is frequently associated with chronic non-specific low back pain and should be considered as contributing factor in people with idiopathic low back ache.

KEYWORDS :- LBA, Vitamin D, Low back pain.

Introduction:

Vitamin D is an essential component of calcium and phosphrous homeostasis. It augments the intestinal absorption of calcium and phosphorus [1,2] helps bone mineralization and, prevents rickets and Osteomalacia. Vitamin D insufficiency can lead to softness, thinning and brittleness of bones, diffuse muscle and bone pains, fatigue, muscular weakness and gait disturbances. Muscle tissue has vitamin D receptors [3], which could account for the association between vitamin D insufficiency and proximal muscle weakness.[4] Diffuse bone and muscle pain, is poorly responsive to NSAIDS and opioids. It is frequently associated with chronic non specific low back ache as well. The possible theories of association propose that vitamin D deficiency causes diffuse pain in muscle and bone, weakness with paraesthesia& secondly decreased vitamin D levels causes decrease in anti-inflammatory cytokines and increase in pro-inflammatory cytokines which leads to increased chances of inflammation in end plates of vertebrae& back ache [5,6].Vitamin D deficiency is associated with inadequate exposure to sunshine, insufficient dietary intake of vitamin D, increased skin pigmentation, renal and hepatic function impairment in converting vitamin D to its active form [7,8] as well as lack of vitamin D supplementation. Vitamin D insufficiency is common worldwide irrespective of latitude of countries.In the present study we planned to find prevalence and severity of vitamin D deficiency in patients with chronic non-specific low back ache.

Material & Methods:

This study was conducted in a district level hospital of between January 2018 to March 2019.All patients between 16-80 years of age complaining of lower back pain of idiopathic nature for less than 6-month duration were enrolled in the study. The patients with an obvious cause like disc prolapse, spinal stenosis, and trauma were excluded from the study. Patients who had a mechanical cause for the back pain or with clinical features suggestive of neurologic involvement were excluded.Patients with deranged renal function due to renalparenchymal disease, abnormal thyroid function, liver disease, history of cancer, Patients on regular therapy with a phosphate bindingantacid, estrogen replacement therapy within the previous12 months, therapy with any other drug that affectskeletal system like steroids, anti-convulsant and anticoagulants were excluded from the study. Those taking vitamins D supplements, known hypocalcaemia patients, metabolic bone disease patients and pregnant & lactating women were also excluded from the study. All those who were fulfilling the inclusion criteria were explained the purpose of study and written informed consent was then obtained. Investigations were carried out to assess haematologicalparameters and ESR, serum calcium, serum phosphorus,serum vitamin D, serum TSH, serum alkaline phosphatase,serum PTH, lipid profile, creatinine and fasting sugar.Routine radiographs as required were done. Serum 25-hydroxy vitamin D was estimated using chemiluminescentimmunoassay and other biochemical parameters usingspectrophotometric analysis.We defined vitamin D deficiency using Holickclassification [8](a) Vitamin D deficiency is considered when there is avitamin D level ≤ 20 ng/mL,(b) Vitamin D insufficiency is defined as vitamin D level 21to 29 ng/mL, and(c) Normal vitamin D levels are defined as ≥30 ng/mL. Microsoft Excel was used for the statistics.

Results:

There were a total of 150 patients in our study with chronic non-specific low back ache. The mean age was 43.4 years with a range of 23-76 years. There were eighty-three females in our study (55.33%) and the remaining were males (44.66%). The mean Vitamin D level was 17.83ng/ml. Among the females 74 (89.15%) had vitaminD levels below normal range while 09 (10.84%)had vitamin D levels in the normal physiological range. Among males 52 (77.61%)had low vitamin D levels& the remaining 15 (22.38%) had normal level of vitamin D. The levels of Vitamin D in patients of chronic nonspecific low back pain are given in Table 1.

Table 1: Vitamin D levels in patients of Non-specific LBA.

Vitamin D levels	Males	Females
< 20 ng/dL	37 (55.22%)	60 (72.28%)
20-30 ng/dL	15 (22.38%)	14 (16.86%)
>30 ng/dL	15 (22.38%)	09 (10.84%)

The levels of vitamin D were deficient (< 20ng/dL) in 72% of the females compared to 55% in males and were insufficient in 17% of females compared to 22% in males.

Discussion:

Vitamin D is mandatory for calcium absorption and thus is also vital for bone health. The importance of vitamin D deficiency is related primarily to bone integrity. Vitamin D is required for calcium homeostasis, secondary hyperparathyroidism may develop in patients with vitamin D deficiency [9-12]. With increasing severity of hypovitaminosis D and secondary hyperparathyroidism, patients progress from states of increased bone turnover and decreased bone mass to states of impaired, and ultimately absent, mineralization with generalized osteomalacia [13-15].Decreased calcium leads to increased parathyroid secretion which causes increased bone resorption [16].

Indeed, in patients who are vitamin D deficient, no more than 15 % of dietary calcium is absorbed, whereas in persons who are notvitamin D deficient 30 – 80% of dietary calcium is absorbed [17-19].Rickets, osteomalacia, osteoporosis arelinked with vitamin D deficiency, which is also linkedwith myopathy, aches and pains. All these conditionsin turn can lead to low back pain [20-22]. Vitamin D has anti-inflammatory properties as well and loss of thiscan cause musculoskeletal pain. There is scarcity of research on the role of vitamin Ddeficiency in low back pain. In our study 84% of patients with low backache had vitamin Dlevels below normal range with 65% having deficient levels, lower than 20 ng/dL (Holick A). Although low vitamin D levels were constantly associated with lower back pain it doesn't mean it's the cause and further research is needed in this direction. However frequent association of low vitamin D levels and its association with chronic low back pain (non-specific) and improvement with supplementation indicates a possible aetiology.

A studyby Faraj SA et al on association of chronic low back pain patientsshowed 83% had vitaminD deficiency. In another study by Siddique & Malikon low backache patients in Islamabad also showed81% patients having sub-optimal vitamin D levels[9,10]. Another study fromEgypt also showed that 81% of low backpain patients had below normal vitamin D levels.Similar findings were obtained from different studies across theglobe [23-34].In our study we found that vitamin D deficiency (< 20 ng/ml) is quite common in India (64%) as has been reported by various other studies Arya et al (2004) reported an incidence of 66.3% using 15 ng/ml as the cut-off point [26]. Using 20 ng/ml they reported an incidence of more than 78 %.

In addition to its effect on the skeletal system, low vitamin D levels may affect other organ systems adversely, resulting in muscle weakness and pain [35], progression of osteoarthritis, [35,36] or impaired macrophage activation.[34] Our study indicates very high incidence of vitamin D deficiency among patients of chronic non-specific low back ache. The high incidence of chronic low back ache in elderly population with vitamin D deficiency probably is partly because of changed bone mass and partly because of poor muscular control because of pain and muscle weakness.Our results are restricted to a specific set of patients presenting to a district levelhealthfacility which may not be representative of general community. An adequately powered community-based study is expected to provide better answer to the research question.

Conclusion:

Vitamin D deficiency is frequently associated with chronic non-specific low back pain and should be considered as contributing factor in people with idiopathic low back ache.

References:

[1] Bilezikian JP, Silverberg SJ. The role of parathyroid hormone and vitamin D in the pathogenesis of osteoporosis. In: Marcus R, Feldman D, Kelsey J, editors. Osteoporosis 2nded.San Diego CA: Academic Press; 2001. Pp.71-84.

[2] Lips P. How to define normal values for serum concentrations of 25-hydroxyvitamin D? An overview. In: Feldman D, Pike JW, Glorieux FG, editors. Vitamin D 2nd ed. San Diego CA: Academic Press; 2005. pp. 1019-28.

[3] Simpson RU, Thomas GA, Arnold AJ. Identification of 1, 25-dihydroxyvitamin D3 receptors and activities in muscle. J BiolChem 1985; 260(15):8882–91.

[4] Glerup H, Mikkelsen K, Poulsen L, et al. Hypovitaminosis D myopathy without biochemical signs of osteomalacic bone involvement. Calcif Tissue Int 2000; 66(6):419–24.

[5] Nellen J, Smulders YM, Frissen PHJ, Slaats EH, Silberbusch J. Lesson of the week—Hypovitaminosis D in immigrant women: Slow to be diagnosed. BMJ 1996; 312(7030):570–[6] Bischoff-Ferrari HA, Dawson-Hughes B, Willett WC, Staehelin HB, Bazemore MG, Zee RY, et al. Effect of Vitamin D on falls: a meta-analysis. JAMA. 2004; 291:1999-2006.

[7] Cauley JA, LaCroix AZ, Wu L. Serum 25-Hydroxyvitamin D Concentrations and Risk for Hip Fractures. Ann Intern Med. 2008; 149(4):242-250.

[8] Horlick MF. Vitamin D deficiency. N Engl J Med. 2007; 357(3): 266-281.

[9]Faraj SA, Mutairi KA. Vitamin D deficiency and chronic low back pain in Saudi Arabia. Spine 2003; 28:177-9.

[10] Sheikh A, Saeed Z, Jafri SAD, Yazdani I, Hussain SA. Vitamin D levels in asymptomatic adults-a population survey in Karachi, Pakistan. PLoS One 2012; 7:e33452. doi:10.1371/journal. pone.0033452.

[11] Simonelli C. The role of vitamin D deficiency in osteoporosis and fractures. Minn Med 2005; 88:34–6.

[12] Goswami R, Gupta N, Goswami D, Marwaha RK, Tandon N, Kochupillai N. Prevalence and significance of low 25-hydroxyvitamin D concentrations in healthy subjects in Delhi. Am J Clin Nutr 2000; 72: 472-75.

[13] Algol F, Shihadeh Y, Boztepe H, Tanakol R, Yarman S, Azizlerli H, Sandalci O. Sunlight exposure and vitamin D deficiency in Turkish women. J Endocrinol Invest 2000;23: 173-77.

[14] Nakamura K, Nashimoto M, Matsuyama S, Yamamoto M. Low serum concentrations of 25-hydroxyvitamin D in young adult Japaneese women: a cross sectional study.Nutr2001; 17: 921-25.

[15] Du X, Dreenfield H, Fraser DR, Ge K, Trube A, Wang Y. Vitamin D deficiency and associated factors in adolescent girls in Beijing. Am J ClinNutr 2001; 74: 494-500.

[16] Villareal DT, Civitelli R, Chines A, Avioli LV. Subclinical vitamin D deficiencyin postmenopausal women with low vertebral bone mass. J Clin Endocrinol Metab1991; 72:628-34.

[17] Omdahl JL, Garry PJ, Hunsaker LA, Hunt WC, Goodwin JS. Nutritional status in a healthy elderly population: vitamin D. Am J ClinNutr1982; 36:1225-33.

[18] McKenna MJ. Differences in vitamin D status between countries in young adults and the elderly. Am J Med 1992; 93:69-77.

[19] Goldray D, Mizrahi-Sasson E, Merdler C, et al. Vitamin D deficiency in elderly patients in a general hospital. J Am GeriatrSoc1989; 37:589-92

[20] Holick MF, Chen TC. Vitamin D deficiency: a worldwide problem with health consequences. Am J Clin Nutr 2008; 87:1080S–6S.

[21] Factors involved in building and maintaining skeletal health throughout life.health-care.net: July 2005.

[22] Parfitt AM. Osteomalacia and related disorders. In: Avioli LV, Krane SM, eds. Metabolic bone disease. 3rded. San Diego, Calif.: Academic Press, 1998:327-86.

[23] Hollick MF, Vitamin D: the underappreciated D-lightful hormone that is important for skeletal and cellular health. Curr Opin Endocr Diab. 2002; 9; 87-98.

[24] Holick MF, Krane SM, Potts JT Jr. Calcium, phosphorus, and bone metabolism: calcium regulating hormones. In: Fauci, AS, Braunwald E, Isselbacher KJ, et al, eds. Harrison's principles of Internal Medicine. New York: McGraw-Hill. 1998:2214-27.

[25] Marcus R. The mechanism of exercise effects on bone. In: Bilezikian JP, Raisz LG, Rodan GA, eds. Principles of Bone Biology. San Diego: Academic press. 1996:1435-45.

[26] Arya V; Bhambri R, Godbole M, Mithal A: Vitamin D status and its relationship with bone mineral density in healthy Asian Indians; Osteoporosis International. 2004; 15 (10: 56-61(6).

[27] Boonen S, Aerssens J, Dequeker J. Age-related endocrine deficiencies and fractures of the proximal femur. II. Implications of vitamin D deficiency in the elderly. J Endocrinol1996; 149:13-7.

[28] Baker MR, McDonnell H, Peacock M, Nordin BEC. Plasma 25-hydroxy vitamin D concentrations in patients with fractures of the femoral neck. BMJ 1979; 1:589.

[29] Chapuy MC, Arlot ME, Duboeuf F, et al. Vitamin D3 and calcium to prevent hip fractures in elderly women. N Engl J Med 1992; 327:1637-42.

[30] Chapuy MC, Arlot ME, Delmas PD, Meunier PJ. Effect of calcium and cholecalciferol treatment for three years on hip fractures in elderly women.BMJ 1994; 308:1081-2.

[31] Marwaha RK, Tandon N, Reddy D. Vitamin D and bone mineral density status of healthy school children in northern India. Am J Clin Nutr 2005; 82:477-82.

[32] El-Hajj Fuleihan G, Nabulsi M, Choucair M. Levels of vitamin D in patients with low backache Gomal Journal of Medical Sciences July-September 2014, Vol. 12, No. 3 Hypovitaminosis D in healthy school children. Pediatrics 2001; 107:e53.

[33] McGrath JJ, Kimlin MG, Saha S, Eyles DW, Parisi AV. Vitamin D insufficiency in south-east Queensland. Med J Aust. 2001; 174:150-1.

[34] Javed R, Malik SY, Yaqub S, Ghafoor F, Asim M. Levels of 25-OH Vitamin D in Healthy Asymptomatic Adults: Pilot Study. Pak J Med Res 2012; 51:82-6. 155

[35] Gloth FM III, Tobin JD. Vitamin D deficiency in older people. J Am GeriatrSoc1995; 43:822-8.

[36] McAlindon TE, Felson DT, Zhang Y, et al. Relation of dietary intake and serum levels of vitamin D to progression of osteoarthritis of the knee among participants in the Framingham Study. Ann Intern Med 1996; 125: 353-9.