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Original Article

Chronic non-specific musculoskeletal pain – prevalence, assessment and association with serum vitamin D in adults

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ABSTRACT

Chronic pain is a cause of physical, mental and economic burden to the society. The origin of chronic non-specific musculoskeletal pain is unknown. The aim of the study was to assess the pain and its relationship with serum vitamin D, in adult patients suffering with chronic non-specific musculoskeletal pain. The study was carried out on 370 adult patients. Pain score was assessed for the patients. The mean pain score of all the respondents was 6.34 ± 2.02 on the scale of 0-10. More than half of the respondents reported no specific reason for increase in pain. Majority of the patients reported sleep disturbance, fatigue, decreased physical ability and negative mood alterations due to pain. Patients with higher pain scores had low serum vitamin D levels. It can be concluded that pain affects the life of the sufferers and that vitamin D deficiency can exacerbate pain.

Keywords: Chronic, Pain, Vitamin D, Physical Ability, Quality of Life, Fatigue

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INTRODUCTION

Chronic nonspecific musculoskeletal pain (CNMP) is a pain of unknown origin often seen in the general practice of physicians and rheumatologist [1]. A clear pathogenesis of CNMP has remained indefinable. CNMP affects mental health, physical health [2], and social life [3]. The patients not only suffer on the physical aspect but also economical and emotional [4]. As the etiology of CNMP is not well understood, it is difficult to diagnose, prevent or treat. About a quarter of patients suffer with pain of specific origin among the patients with chronic pain, for rest the etiology is unidentified [5].

Chronic widespread pain as been defined as , "pain present in two contralateral quadrants of the body above and below the waist and in the axial skeleton that has been present for at least three months [6]. The International Association for the Study of Pain (IASP) defines chronic pain as ''pain that has persisted beyond normal tissue healing time''. This is taken (in absence of other criteria) to be 3 months [7].

There can be variety of causes for chronic pain. It can be produced due to some damage of nerves, tissue inflammation or some neural alterations. This alteration in nervous system produces pain that arises without any apparent peripheral stimulus as well as a hypersensitivity to peripheral stimuli. Chronic pain is very common health problem. In a review study it was found that the prevalence of chronic pain in non-cancer patients was about 20% [8].The prevalence of benign chronic back pain alone has been estimated to be between 2% and 40%, depending on the population studied [9].

Objectives of the study are:

1. To assess pain in patients suffering with CNMP.
2. To assess serum levels of vitamin D in patients suffering with CNMP.
3. To assess causative factors associated with pain in patients suffering with CNMP.
4. To assess the association between CNMP and serum levels of vitamin D.

Therefore this study was aimed to assess the pain and accompanying factors in adult patients suffering with CNMP and to assess its relationship with serum vitamin D.

MATERIALS AND METHODS

The study was carried out in an orthopaedic clinic in Jaipur city (Rajasthan, India). Three thousand patients with complaint of vague pains were screened for CNMP, with the help of an orthopaedician. Three one-day camps were also organized to invite patients with vague pains. After following definition for CNMP and the inclusion-exclusion criteria, 370 patients were found to be suffering with CNMP and meeting the criteria of the study. The prevalence of CNMP were 12.33% among the adult patients suffering from chronic vague pains.

The inclusion criteria included residents of Jaipur City, adults aged 21-60 years, CNMP > 3 months and patients with haemoglobin > 9g/dl. The exclusion criteria included pregnancy, patients ≤ 20 and >60 years of age, use of vitamin D or calcium supplements in last 3 months and patients suffering with hypothyroidism, cancer, reported osteoporosis, autoimmune diseases, rheumatic diseases, migraine, intervertebral disc herniation, patients on steroid therapy or anaemic (haemoglobin < 9g/dl).

Pain was assessed using a customized pain assessment tool. Pain score was assessed using combination of a standard Visual Analog Scale (VAS) and Numeric Rating Scale (NRS), on the scale of 0-10, where 0 was no pain and the 10, the highest [10]. Pain score 2, 4, 6, 8 and 10 was categorized as Grade 1,2,3,4 and 5 respectively. The tool comprised of questions on pain intensity and duration, time of occurrence of worst pain, factors that increase or relieve pain and the effect of pain on alteration of mood. Ethical clearance was obtained before conducting the study.

Among the 370 patients suffering with CNMP, 120 patients gave consent for the biochemical tests of serum vitamin D and serum calcium.

Statistical analysis was performed using SPSS Software (SPSS ver. 16 inc. Chicago, USA). The data were tabulated and computed. Frequencies and percentages were calculated. Mean and standard deviations were calculated for univariate parameters.

RESULTS

In the study, there were 65% women and rest men. The mean age was 42.43 ± 9.77 years. Although there were more women in the study than men, their distribution among the various age groups was similar, indicating a similar pattern of occurrence of disease, age wise. Forty percent of patients suffered from grade 3 category of pain, 28% suffered from grade 4 and 16% patients had pain of grade 2. Almost 9% of the patients suffered with an extreme level of pain with pain score 10 and least number of patients (6%) had a pain of grade 1. More than three quarter of the patients (77%) had pain score ≥ 6 (Grade 3). The mean pain score of all the respondents was 6.34 ± 2.02. There was a

similar trend of occurrence of pain in both men and women.

Pain duration: The pain duration of the patients ranged from 3 months to 10 years. Sixty percent of the patients were suffering from pain since last 3-6 months. Similar number of patients were suffering from pain since past 7 months–1 year (20%) and 1 year- 10 years (20%). There were two patients suffering from pain since last 10 years.

Occurrence of pain: Thirty six percent of the patients reported that there was no specific time their pain would get worst. Twenty four percent of the patients reported having maximum intensity of pain at night while 14% reported that they suffered from worst pain twice a day. Among the patients with pain of grade 1, most of the patients (65%) reported no specific time of occurrence of worst pain. Among the patients suffering with Grade 2 category of pain, 41% reported that there was no specific time their pain would aggravate. Almost 30% of the patients from Grade 2 category suffered their worst pain at night.

Factors increasing pain: More than half (54.59%) of the respondents reported that they found no specific reason for increase in pain. Causes for increase in pain as reported by patients were exertion or heavy work (16%), resting (9%), stress (8%), walking (5%) and structured exercise (5%). Other factors that could increase the pain were discontinuing medicines (analgesics), discontinuing physiotherapy or winter season.

Practices for relieving pain: About one fourth (24%) of respondents reported that there was no specific activity that would have helped in relieving pain. Measures adopted by patients to relieve pain were use of analgesics (19%), regular household working (16%), resting (14%), massaging the paining area - oil/dry (13%) and hot fomentation (20%). Other practices followed for relieving the pain amongst the group was physiotherapy, exercise, yoga, using crepe bandage, diverting their mind from pain, using Ayurveda medicine or acupressure.

Sleep: CNMP caused deterioration of sleep in terms of quality or duration or both in 59% patients. Forty percent of the respondents reported no change in sleep pattern. Increase in pain score caused increase in sleep disturbance. Majority of patients (91%) reporting decrease in sleep quality or duration, belonged to pain scores more than 6. Thus it could be evident that patients suffering from higher intensity of pain had decrease in sleep duration or quality. A total no of 4 patients reported insomnia. Two out of these were suffering from pain score 8 and the other 2 from pain score 10.

Mean pain score of patients reporting decreased sleep and insomnia (7.05 ± 1.74) and 9.00 ± 1.15) respectively was higher than the patients reporting no change in the sleep (5.18 ±1.86).

Fatigue: As the pain score increased, percentage of respondents feeling fatigued increased. Mean pain score of the patients feeling fatigued was higher (6.75 ± 1.85) than those not feeling fatigued (5.85± 2.10). More women (57.74%) complained of fatigue as compared with men (48 %).

Physical Ability: More than 2/3rd of the patients (67.5%) experienced decreased physical ability. Majority (82.8%) of the patients reporting decreased physical ability were suffering from pain score more than 6. The mean pain score of patients with decreased physical ability was higher (6.65 ± 1.97) than those who reported normal physical activity (5.68 ± 1.96). Decreased physical ability due to CNMP was reported more by women (70%) as compared to men (63%).

Alterations in mood: Negative alterations in mood were reported by 60% patients while others reported no alterations. The effects as reported by patients could be being angry or irritable (25%), low confidence level (20%), irritability but no anger (12%) or stress (8%). Other forms of mood alterations were poor concentration, crying, memory loss, dizziness, depression or low appetite. Respondents with low pain scores of 2 - 4 had fewer mood alterations. Mood disturbances like crying and low appetite was only observed in patients with extreme pain score of 10.

Association between CNMP and serum vitamin D: As displayed in Figure 4, the mean serum calcium of patients in almost all the pain categories were similar. When the mean serum vitamin D of patients was analysed, among the different pain categories it was observed that the patients with low intensity of pain had a better mean serum vitamin D levels. The patients with moderate intensity of pain had a lower mean serum vitamin D than the ones with low intensity of pain. The patients with severe intensity of pain had the least mean serum vitamin D among all the patients.

When the relationship between mean pain score and serum vitamin D was analysed, it was observed that highest mean pain score was correlated with the least level of serum vitamin D.The mean pain score of the group was 6.08 ± 2.05. The mean pain score of patients having deficient vitamin D was highest. The mean pain score of patients with serum vitamin D in the range of 0 – 15 ng/ml was 6.48, whereas in the range of 45-60 ng/ml it was 4.0. As the serum levels of vitamin D improve, there is a linear reduction in the mean pain score.

DISCUSSION

In the present study, there were more women reporting CNMP than men, but there was a similar pattern of occurrence of pain in both the gender, and no difference between the age groups. In a study carried out on 644 community-dwelling seniors, a larger proportion of women (66.5%) than men (56.1%) reported pain in multiple locations [12]. Assessing the time since pain onset is critical for classification of chronic pain accurately. Attention should be given to factors that ameliorate or exacerbate pain. Such factors should be evaluated as they can affect understanding of human behavior in pain and can have implications in diagnosis and treatment [13].Pain can cause a disturbance in sleep. More patients reported disturbance in sleep than those reporting no change. In our study, it is evident that with increase in the intensity of pain, there is increase in the number of patients reporting feeling fatigued. This is shown by the mean pain score of patients feeling fatigued being higher than those not feeling fatigued. More women complained of fatigue than men. The effect of pain on the physical functioning may become more profound after a certain level of pain perceived [12]. More than 2/3rd of the patients in the study reported decreased physical ability, among which the majority had pain of higher intensities. Assessment of physical functions should be an important component while assessing pain as it was observed that the physical functions of patients with chronic persistent pain was decreased owing to the pain [14]. Scudds and Robertson (1998) stated similar findings [15].Chronic pain is often associated with emotional distress, particularly depression, anxiety, anger, and irritability[16].In the study, 60% of the patients reported disturbance in their mood due to the corresponding pain.

Vitamin D deficiency is postulated to be one potential contributor to CNMP [1-3, 17-20]. As the mean pain score of the patients with severely low levels of serum vitamin D was the highest, it could imply that vitamin D deficiency could be a cause of CNMP. Manoharan et al (2016) reported that 40.2% of CNMP patients attending orthopaedic department were vitamin D deficient [21]. Serum (OH) D level was reported to be inversely associated.Matossian-Motley et al (2016)reported that serum 25(OH)D level was inversely associated with CNMP patients with serum vitamin D levels <20 ng/mL [22, 23]. The results of present study also showed that mean serum vitamin D levels in patients with high pain scores were low. Thus it can be said that for the effective treatment of CNMP, comprehensive assessment of pain is important. The present study encompassed factors varying from duration and intensity of pain, to physical ability to behavioral aspects. Since pain is an internal private experience, self-reported measures have become the gold standard for the assessment of patients reporting pain.A comprehensive assessment is needed that addresses biomedical, psychosocial, and behavioral domains, as each contributes to chronic pain and related disability[11].

CONCLUSION

The mean pain score of the group was 6.34 ± 2.02 on a scale of 0-10. More women were suffering with pain as compared to men. Patients suffering with pain experienced disturbance in sleep, a decrease in physical ability and reported being fatigued. Patients also reported some form of behavioural alterations. Vitamin D deficiency could possibly be related to chronic nonspecific musculoskeletal pain.

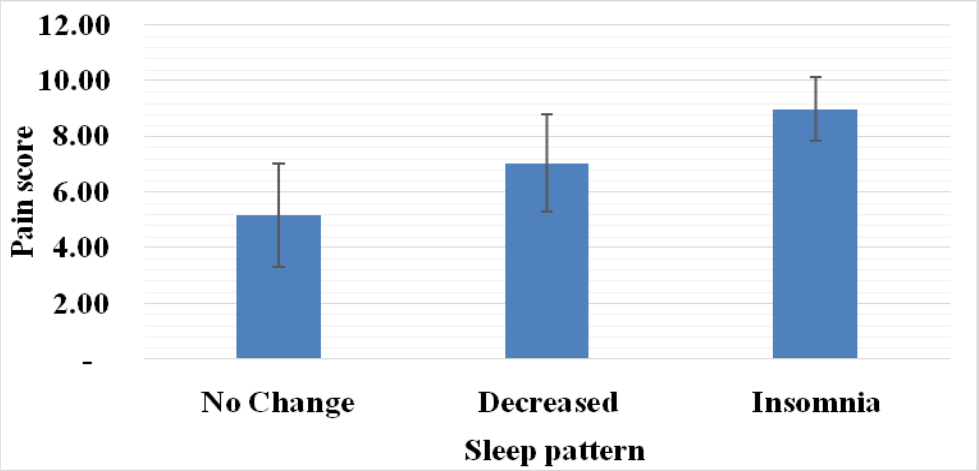

Fig I: Mean pain score according to sleep pattern

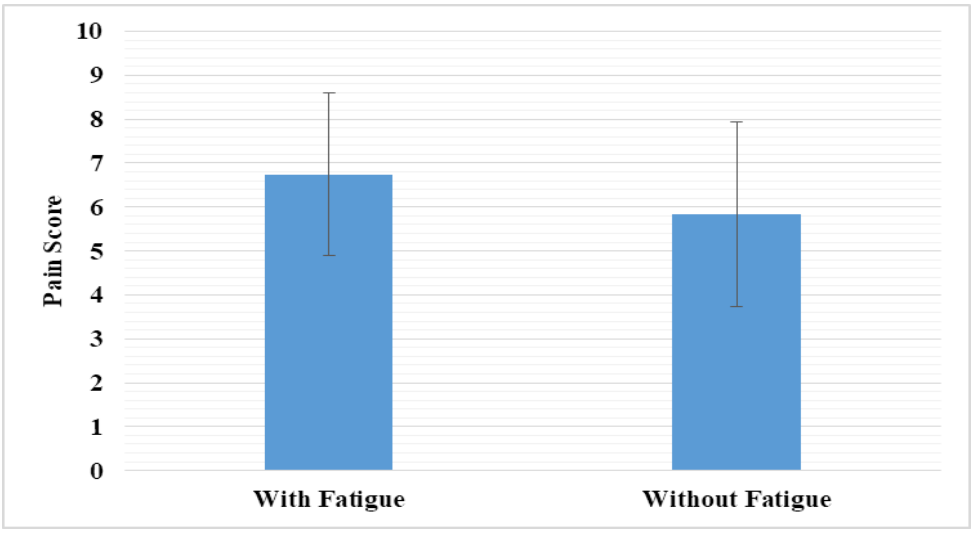

Fig II: Association of pain score and fatigue

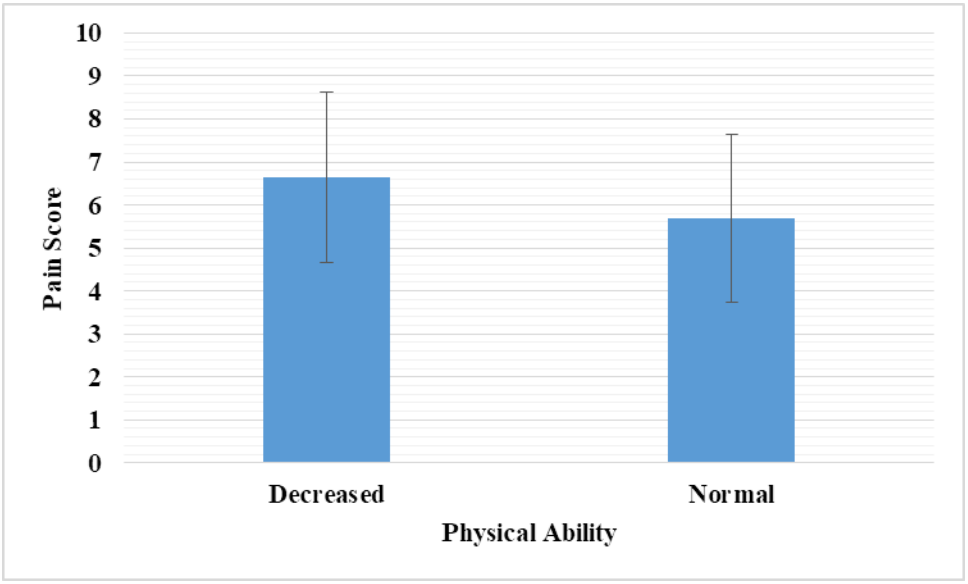

Fig III: Association of pain score and physical disability

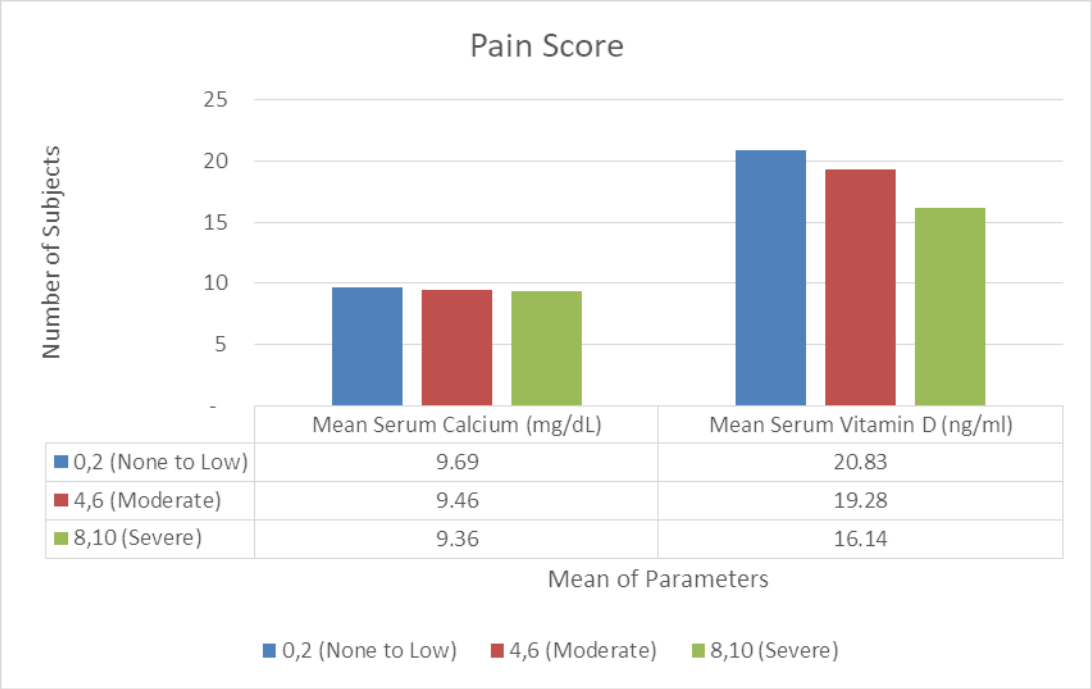

Fig IV: Association of pain score with mean serum calcium and mean serum Vitamin D

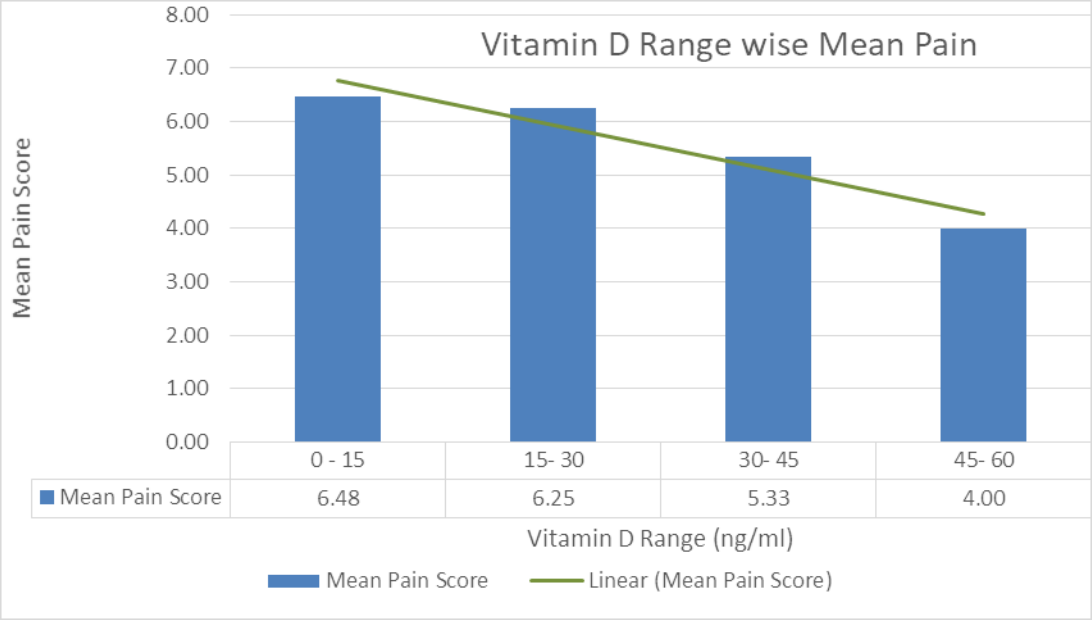

Fig V: Association of vitamin D range with mean pain scores

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