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PREVALENCE OF VITAMIN D DEFICIENCY AMONG THE PATIENTS PRESENTING WITH CHRONIC FATIGUE

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Abstract

Objective:
To determine prevalence of Vitamin D deficiency among patients presenting with chronic fatigue syndrome (CFS).

Methods:
This study employed a cross-sectional design, involving 138 participants aged between 18 and 65 years, inclusive of all genders. All participants had a confirmed diagnosis of CFS persisting for at least four weeks. A sample of three milliliters of blood was collected from each participant for vitamin D testing. Individuals were classified as vitamin D deficient if their blood vitamin D concentration was below 20 nanograms per milliliter.

Results:
The mean age of patients was 39.5±11.9 years. The mean duration of their illness was 3.4 ± 1.3 months. Male participants numbered 117, comprising about 69.6% of the total patients. Out of 168 patients, 124 (73.81%) had vitamin D deficiency.

Conclusion:
There is a high prevalence of vitamin D deficiency in patients presenting with CFS. Therefore, vitamin D screening should be conducted in all patients with CFS.

INTRODUCTION

Chronic fatigue syndrome (CFS) is a complex and debilitating condition primarily characterized by persistent, extreme fatigue that cannot be alleviated through rest.[1] Individuals with CF experience a wide array of symptoms, including headaches, swollen lymph nodes, sore throats, sleep disturbances or insomnia, impaired cognitive function, muscle and joint pain, and post-exertional malaise—an exacerbation of symptoms following physical or mental exertion.[2] This condition can occur in people of any age, race, or socioeconomic background, with prevalence estimates ranging from 0.2% to 1%.[3] Although CFS can impact anyone, it is notably more common among middle-aged adults and women. Research by Zdunek M et al. highlights the substantial negative effects of CFS on various aspects of life, including social interactions, family dynamics, and job performance.[4] It is important to note that

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aside from advanced systemic diseases or acute illnesses, the majority of individuals experiencing fatigue display no clear medical explanation for their condition.[5]

In addition to its role in calcium regulation and maintaining bone health, Vitamin D plays a crucial part in various cellular processes.[6] The human body primarily obtains 80 to 90% of its Vitamin D through exposure to ultraviolet B rays from sunlight, with the remainder coming from dietary sources rich in Vitamin D. Several factors contribute to Vitamin D deficiency, including limited sun exposure, insufficient dietary intake, and numerous malabsorption issues.[7] A lack of Vitamin D can lead to significant bone disorders such as osteomalacia, osteopenia, and osteoporosis, along with decreased muscle strength.[8] Numerous studies have highlighted the high incidence of Vitamin D deficiency within the general population. In healthy individuals, low Vitamin D levels often manifest as fatigue, likely due to its effects on the optimal functioning of skeletal muscles. Additionally, Vitamin D may influence fatigue through its roles in modulating cytokines, managing mitochondrial energy production, and regulating serotonin synthesis.[9] Many individuals with Vitamin D deficiency report experiencing fatigue, and there is evidence suggesting that supplementation can alleviate these symptoms.[10] This study aimed to assess the prevalence of Vitamin D deficiency among patients suffering from CFS.

METHODS:

This study employed a cross-sectional design, involving 138 participants aged between 18 and 65 years, inclusive of all genders. All participants had a confirmed diagnosis of CFS persisting for at least four weeks. Individuals were excluded if they had a history or medical evidence indicating pregnancy, breastfeeding, cancer, or chronic kidney or liver conditions. Additionally, those already receiving vitamin D supplementation were not included in the study. Prior to data collection, informed consent was obtained from each participant.

A sample of three milliliters of blood was collected from each participant for vitamin D testing. The analysis was conducted at a centralized laboratory using liquid chromatography-tandem mass spectrometry, a highly accurate method. Individuals were classified as vitamin D deficient if their blood vitamin D concentration was below 20 nanograms per milliliter.

RESULTS:

The initial characteristics of the study participants revealed an average age of approximately 39.5 years, with a variability of 11.9 years. Male participants numbered 117, comprising about 69.6% of the total patients, whereas females totaled 51, representing 30.4%. The mean duration of their illness was 3.4 months, with a standard deviation of 1.3 months. Regarding health statuses, 28 individuals, or 16.7%, were identified as obese, and 23 participants, accounting for 13.7%, had additional health complications (Table 1).

Out of 168 patients, 124 (73.81%) had vitamin D deficiency (Figure 1).

Table 1. Baseline Characteristics.

Age	39.5 ± 11.9
Gender (Male/Female)	117 (69.6%) / 51 (30.4%)
Duration of illness (months)	3.4 ± 1.3
Obesity	28 (16.7%)
Hypertension	23 (13.7%)

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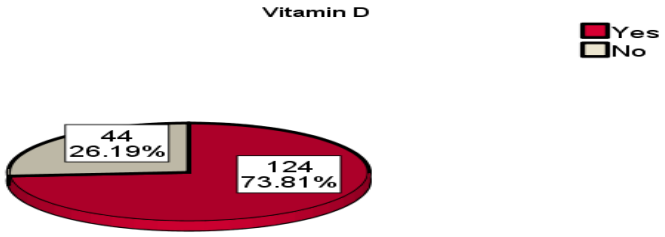

Figure 1. Frequency of Vitamin D Levels.

DISCUSSION:

This study shows a high rate of vitamin D deficiency among CFS patients. The findings support earlier research highlighting vitamin D's roles beyond skeletal health, particularly in musculoskeletal and neuromuscular functions.[11, 12]

Vitamin D deficiency has emerged as a significant global health concern, impacting over one billion individuals across different demographics, including age, gender, and geographic location.[13] In the current study, we found that more than half of the participants had insufficient levels of vitamin D, which aligns with research by Mithal et al., highlighting that even individuals living in sunny areas may experience high rates of deficiency due to various lifestyle and dietary influences.[14] Moreover, the prevalence of deficiency was notably higher among female participants, likely due to factors such as limited outdoor activity, cultural practices concerning clothing, and nutritional deficiencies.[15]

Roy S et al enrolled patients (18-75 years), of both genders, with chief complaint of fatigue with stable chronic medical conditions. The authors found that prevalence of low vitamin D was 77.2% in a total of 171 patients.[16] In a study by Khan RR et al, 100 patients, males and females both, presenting with easy fatigability were enrolled. They neither had a known disease, physical or psychological nor any sleep disorder. Out of 100 patients, 92 (92%) were found to have low Vitamin D levels.[17]

Researchers Plotnikoff and Quigley made comparable findings in their investigation, which involved patients suffering from unexplained musculoskeletal pain and fatigue. They noted that these individuals experienced considerable relief from their symptoms following the treatment of vitamin D deficiency.[18] Furthermore, vitamin D receptors are found in both muscle and nerve tissues, indicating the vitamin's involvement in cellular energy processes and neuromuscular communication. This could provide insight into the fatigue linked to low levels of vitamin D.[19]

Vitamin D levels show a significant inverse relationship with the severity of fatigue, meaning that lower levels tend to be associated with worse fatigue. Additionally, higher vitamin D levels are linked to greater grip strength, highlighting the importance of screening for vitamin D deficiency in patients experiencing vague symptoms such as tiredness and muscle weakness. These subtle neuromuscular signs, often overlooked, could serve as early warning signs of vitamin D deficiency, emphasizing the need for regular assessment in clinical practice.[20]

This research encountered certain limitations due to its cross-sectional methodology, which makes establishing cause-and-effect relationships difficult. The study did not account for seasonal fluctuations that affect vitamin D production and dietary consumption, nor did it assess other influencing factors such as serum calcium levels, parathyroid hormone levels, or thyroid function. Despite these constraints, the results offer meaningful insights into the potential advantages of early identification and treatment of vitamin D deficiency in individuals with CFS.

CONCLUSION:

There is a high prevalence of vitamin D deficiency in patients presenting with CFS. Therefore, vitamin D screening should be conducted in all patients with CFS.

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