

Frequency of Vitamin B12 Deficiency Amongst Elderly Patients Presenting with Dementia

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ABSTRACT

Background: A persistent and chronic illness called dementia is associated with cognitive decline, changes in personality, poor thinking, and problems with executive function. Various studies linked vitamin B12 deficiency with the dementia in elderly patients.

Objective: To find out the frequency of vitamin B12 deficiency amongst elderly patients presenting with dementia

Methodology: The current study was descriptive cross-sectional carried out at the Medicine Department, Fauji Foundation Hospital, Peshawar Cantt for duration of six months from January 2022 to June 2022. All the data like age, sex and other relevant information were recorded in the pre-designed Performa. IBM SPSS version 23 was used for the statistical analysis of the data.

Results: In the current study, totally 250 patients were enrolled. There were 188 (75.2%) males and 62 (24.8%) females with the mean (\pm SD) age of 81 (\pm 2.99) years. Vitamin B12 deficiency was observed amongst 95 (38%) patients while it was not observed amongst 155 (62%) patients. Based on the stratification of vitamin B12 level in serum with the age and gender, no significant association was observed ($p > 0.05$).

Conclusion: In the current study we observed that the frequency of vitamin B 12 deficiency in elder patients with dementia was 38%. Other studies in multiple centers with large number of dementia should be carried out to get better results.

Key words: Vitamin B12 deficiency; Elderly patients; Dementia

INTRODUCTION

A persistent and chronic illness called dementia is associated with cognitive decline, changes in personality, poor thinking, and problems with executive function. As people become older, they are more likely to get dementia, which affects 20–40% of those over 85 years¹. Although dementia is often gradual and permanent, there are several known reversible causes of dementia. Therefore, it is essential to make an early diagnosis of the reversible and triggering variables that cause dementia in order to halt the course of the disease and, if at all possible, to restore cognitive function. A simple treatment option for dementia that is reversible is deficiency of vitamin B12².

Congenital abnormalities, neurological and behavioral disorders are linked to vitamin deficiencies, especially vitamin B12 deficiency. In old age people increased plasma homocysteine levels and a high frequency of insufficient B vitamin levels are linked to cognitive dysfunction and incident dementia³. Dementia and other neurological problems, as well as mental abnormalities like dementia, may be linked to vitamin B12 insufficiency, which has long been linked to hematological illnesses. But it is still not clear how a vitamin B12 shortage relates to dementia. In some studies, people with Alzheimer's disease (AD) had normal blood cobalamin levels, while in other investigations; there was evidence of deficiency of vitamin B12⁴. In medical care, vitamin B12 inadequacy is often ignored, yet it is a prevalent cause of psychiatric conditions in older individuals. According to estimates, vitamin B12 deficiency affects up to 40% of older persons, with community rates being lower and institutional settings having higher rates. The prevalence rates can vary for people of different ages, socioeconomic backgrounds, and eating habits⁵. As a result of the extensive practice of vegetarianism, the frequency of deficiency of vitamin B12 is very high (49%) in India, while in China, 19.7% of people over the age of 60 are affected by the condition⁶. It has also been hypothesized that deficiency in vitamin B12 may induce a reversible dementia that may be separated from Alzheimer's disease by neuropsychological screening. However, some writers contend that there is insufficient data to establish a unique pattern of cognitive problems related to deficiency of vitamin B12. Low vitamin B12 levels have been linked to more severe cognitive impairment in patients with Alzheimer's disease⁵. Dementia in elderly people is said to often be caused by a vitamin B12 deficiency. The most of cases are caused by mal-absorption. A lack of vitamin B12 has been linked to neurologic, mood, cognitive and psychotic problems, in addition to therapy resistance in certain cases. Because present treatment may be inadequate at recognizing instances resulting in neuropsychiatric sequelae, physician awareness should be improved to effectively evaluate and treat early defects to avoid irreparable structural brain damage. In this respect, the goal of the current research is to quantify the prevalence of vitamin B12 insufficiency in older dementia patients. The lack of prior research on this topic in our area is a key rationale for our study. The results of this study have implications for clinical practice that will draw attention to the problem and help our community to better manage this significant public health concern. The findings will be presented to several medical facilities in order to enhance diagnoses and improve the treatment of such aged people.

MATERIALS AND METHODS

The current study was descriptive cross-sectional carried out at the Medicine Department, Fauji Foundation Hospital, Peshawar Cantt. The duration of study was six months from January 2022 to June 2022. The study approval was properly taken from hospital ethical and research committee. By non-probability consecutive sampling technique, a total of 250 patients were selected in the current study. The inclusion criterion for our study was all the patient of both the sex, having age ranged from 60-90 years presenting with dementia whereas the criterion for exclusion was all the patients' alcohol abuse history, Parkinsonism and multi-infarct dementia. The study was explained in detail to all the participants and then informed consent was taken in written. All the patients were examined clinically and their detail history was taken. Dementia was diagnosed on the basis of radiological and clinical assessments of the brain of patients. Under aseptic condition, 5ml blood was taken from all the participants and then sent to the diagnostic laboratory of the hospital on the same day to determine the level vitamin B12. All the laboratory examinations were done by expert pathologist. All the data like age, sex and other relevant information were recorded in the pre-designed Performa. IBM SPSS version 23 was used for the statistical analysis of the data. For variables like dementia and age, means and standard deviations were determined while for categorical variables such as level of vitamin B12 and gender, frequencies and percentages were calculated. In order to see the effect modification, stratification of vitamin B12 level in serum was done amongst both the gender and sex. Chi-square test was used and p value of less than 0.05 was taken as significant.

RESULTS

In the current study, totally 250 patients were enrolled. Based on gender wise distribution, there were 188 (75.2%) males and 62 (24.8%) females. (Figure 1) Mean (\pm SD) age was 81 (\pm 2.99) years. Amongst 250 patients, 62 (24.8%) patients were age group 60 to 70 years, 105 (42%) patients in age group 71 to 80 years and 83 (33.2%) patients were observed in age group 81 to 90 years. (Figure 2) The mean (\pm SD) vitamin B12 level in the serum was 164 (3.75) mol/l. The range of vitamin B12 level in the serum was 100-150 mol/l in 95 (38%) patients whereas vitamin B12 level in the serum was >150 mol/l in 155 (62%) patients. (Figure 3) Vitamin B12 deficiency was observed amongst 95 (38%) patients while it was not observed amongst 155 (62%) patients. (Figure 4)

Based on the stratification of vitamin B12 level in serum with the age and gender, no significant association was observed ($p > 0.05$). (Table 1 and 2)

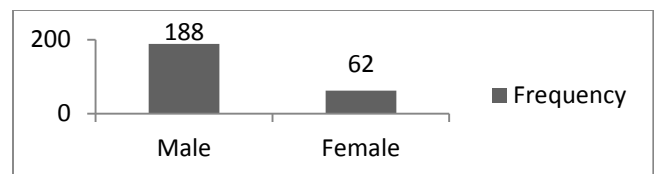


Figure 1: Gender wise distribution of patients

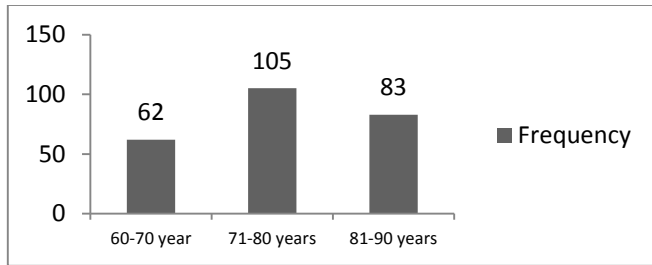


Figure 2: Age wise distribution of patients

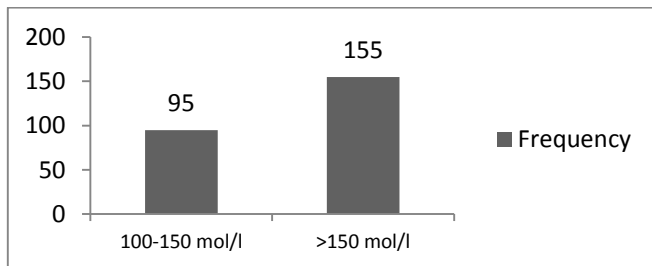


Figure 3: Distribution of patients on the basis of range of vitamin B12

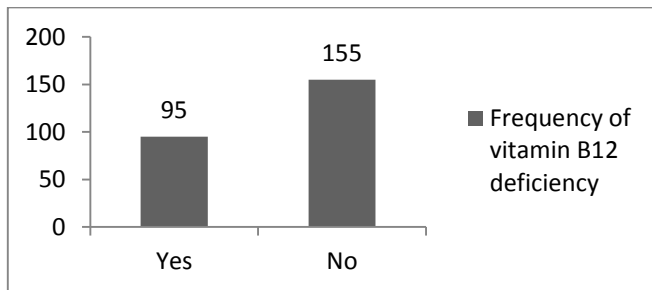


Figure 4: Distribution of patients on the basis of deficiency of vitamin B12

Table 1: Stratification of vitamin B12 deficiency with respect to age groups

Age group	Frequency of vitamin B12 deficiency	
	Yes	No
60-70 years	25	37
71-80 years	45	60
81-90 years	25	58
P value	0.0781	

Table 2: Stratification of vitamin B12 deficiency with respect to gender

Gender	Frequency of vitamin B12 deficiency	
	Yes	No
Male	72	116
Female	23	39
P value	0.0621	

DISCUSSION

Dementia, commonly referred to as senility, is a wide spectrum of brain illnesses that result in a long-term, frequently slow decline in thinking and memory to the point that it significantly impairs everyday functioning^{7, 8}. Emotional difficulties, language problems, and a decline in motivation are prominent symptoms, although a person's level of consciousness is not often impaired by the condition⁹. Patients suffering with dementia may have difficulty with cognitive processes like memory, speaking, thinking, planning, recognizing, or distinguishing other people or things in their environment. With the increase in age the probability of dementia increases. Most cases of dementia develop after 30 years, often beyond age 65¹⁰. Alzheimer's disease (AD) is the most prevalent form of the more than 100 illnesses that fall under the general term "dementia." Over 35 million individuals globally were projected by Alzheimer's disease International to have dementia in 2010. Between 15-20% of dementia cases are caused by vascular dementia, while between 50 and 70 percent of dementia cases are caused by Alzheimer's disease. According to the facts and statistics on Alzheimer's disease from 2011, between sixty percent and eighty percent of people with dementia have Alzheimer's disease¹¹.

In the current study, totally 250 patients were enrolled. Based on gender wise distribution, there were 188 (75.2%) males and 62 (24.8%) females. Mean (±SD) age was 81 (±2.99) years. Vitamin B12 deficiency was

observed amongst 95 (38%) patients while it was not observed amongst 155 (62%) patients. In accordance with our findings another study from Pakistan reported 40% prevalence of vitamin B 12 deficiency in patients with dementia¹².

Similar findings were reported in a previous carried out by Lachner C et al. and they reported 40% prevalence of vitamin B 12 deficiency¹³.

According to the findings of other research conducted in the past, the prevalence of vitamin B12 deficiency in older persons is believed to be as high as 40%, with lower rates being seen in the community and greater rates being observed in institutional settings. Prevalence rates vary depending on eating habits, age, and socioeconomic level^{14, 15}.

Another study carried out by Karnaze DS et al. in india reported 49% frequency of vitamin B 12 deficiency which is high than our findings. This high incidence of vitamin B 12 deficiency might be due to high vegetarianism in India¹⁶. Another study done in china reported only 19.7%¹⁷.

It has also been hypothesized that deficiency in vitamin B12 may induce a reversible dementia that may be separated from Alzheimer's disease by neuropsychological screening. However, some writers contend that there is insufficient data to establish a unique pattern of cognitive problems related to deficiency of vitamin B12. Low vitamin B12 levels have been linked to more severe cognitive impairment in patients with Alzheimer's disease⁵.

Another study carried out by Cole MG et al. reported comparable results. They reported that the prevalence of deficiency of vitamin B 12 was ranged from 29-47% in patients with dementia¹⁷.

Another study carried out by Martin DC et al. also reported comparable results. They reported that frequency of vitamin B12 deficiency was 44% in patients presenting with dementia¹⁸.

Based on the stratification of vitamin B12 level in serum with the age and gender, no significant association was observed (p>0.05). Similar results were also reported in a recent study from Pakistan¹².

CONCLUSION

In the current study we observed that the frequency of vitamin B 12 deficiency in elder patients with dementia was 38%. Other studies in multiple centers with large number of dementia should be carried out to get better results.

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