



Combined Effect of Walking and Vitamin D Intake on Patients with Heart Failure

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Objective: Patients with heart failure may benefit from vitamin D treatment, according to new research (Congestive Heart Failure).

Methods: In our current nonrandomized clinical research, 43 individuals with dilated cardiomyopathy who did not exhibit substantial gains in physical functioning with optimum heart failure therapy were included. Twelve weeks of weekly vitamin D supplements (200,000 IU) were added to the heart failure therapy to help improve the patient's condition. On the other hand, researchers looked at how it affected the 6-minute walk distance and pro-BNP levels. To analyses the data, we utilized SPSS version 19. Accordingly, we utilized random samples t-tests to assess the substantial role of vitamin D supplementation on pre-intervention vitamin D level, 6-minute walk distance, and pro-BNP level, respectively. Significance was defined as an alpha value less than 0.01.

Results: Individuals in NYHA class II (66%) were the majority, while those in NYHA classes I, III and IV were represented by 18%, 8% and 5%, accordingly. Following 14 weeks of vitamin D treatment, the group's mean vitamin D level was increased from 17.596.57ng/ml at baseline to

32.974.65ng/ml (p0.0006). Pre-intervention mean distance travelled was 806382ft, however after the intervention it rose to 945392ft (p-value 0.07). While before the intervention, the mean per-BNP level of research participant was 1025-636, and after intervention, it had enhanced to 160-80--a statistically significant improvement (p=0.005).

Conclusion: According to a decline in blood pro-BNP characterized by an increase in six-minute walk distance, vitamin D administration decreases the intensity of heart failure.

Keywords: Vitamin D; congestive heart failure; older adults.

1. INTRODUCTION

Heart failure, which affects about 16 million individuals globally, is a major source of disease and mortality in older adults. Even though the etiology of heart failure has been better understood, the diagnosis for heart failure patients is still dismal, with survival rates as low as 36 percent after five years. In individuals with heart failure, vitamin D insufficiency is prevalent, and the prevalence rises with age. An insufficient intake of vitamin D can produce muscular weakness in people with and without heart disease, resulting in less physical activity. Vitamin D contains anti-inflammatory effects as well as the ability to decrease renin levels and enhance muscular strength.

Vitamin D is associated with hyperactivity of the renin-angiotensin-aldosterone system, endothelial dysfunction and alterations in calcium flow resulting in reduced cardiac contractility as the primary causes. By inhibiting pro inflammatory chemicals, reducing renin-angiotensin-aldosterone pathway, and decreasing parathyroid hormone levels, vitamin D supplementation is considered to cut course and intensity of heart failure in individuals having heart failure. 10-15 in individuals with heart failure, supplementing by vitamin D has been shown to enhance functional status, however there is conflicting data. Those suffering from congestive heart failure [1].

In order to find out how vitamin D supplementation affects the physical condition of individuals having congestive heart failure, this research was carried (dilated cardiomyopathy).

2. METHODS

A non-randomized study was done at the Sheikh Zayed Medical College and Hospital in Lahore, Pakistan, at the Department of Cardiology. From January 1 to June 30, 2018, the study was conducted. In all, 78 participants were diagnosed, of which 35 were lost to follow-up

and 43 stayed until the completion of the research. Study participants ranged in age from 15 to 70 years and had non-ischemic cardiomyopathy (NYHA class I-IV) and vitamin D levels below 30 ng/ml. Even with optimum heart failure therapy, none of the other patients' physical activity levels improved much. Twelve weeks following the addition of vitamin D, we re-examined the patient's blood pressure levels. These individuals were excluded from the model if they were less than 16 years old, had renal failure or a myocardial infarction in past several months, or had valvular cardiovascular disease or cardiomyopathy. We acquired each patient's written, informed permission.

Each patient got 200,000 IU of oral vitamin D every week for 14 weeks. Before and after therapy, C-reactive protein, serum calcium, vitamin D levels, and pro-BNP levels were measured in serum blood samples taken before and after treatment. In addition, a six-minute walk test (6MWT) with blood pressure and oxygen saturation intensive care remained completed earlier and later the therapy was administered. The distance travelled by each individual was monitored as a function of time for every patient's record.

A comprehensive physical examination was used to assess the severity of HF. Each patient's NYHA functional class was determined by observing them while they relaxed, dressed, climbed stairs, and walked. Following the procedure of Guyatt and colleagues, individuals' physical efficiency was evaluated using the six-minute walk distance (6MWD) [2].

Early in the morning, before breakfast, blood was taken from each patient and submitted to the lab for analysis. Enzyme immunoassay was used to measure pro-brain natriuretic peptide (pro-BNP) concentrations (Siemens Diagnostic Inc, Elkhart, IN) [3].

To analyses the data, we utilized SPSS version 19. Demographic data and the NYHA functional

class were calculated by using percentages. In order to assess the significance of vitamin D supplementation's influence on pre intervention vitamin D levels, 6MWD and Pro BNP levels, a dependent samples t-test was performed on the variable samples. Significance was defined as an alpha value less than 0.01 [4].

Table 1. Demographic and NYHA efficient features [3]

Variable	Value
Number of cases	43
Sex	29 (67.4)
Male	
Female	14 (32.6)
Age	47.42±11.25
Mean Age	
>30 Years	4 (9.3)
30-50 Years	23 (53.5)
>50 Years	16 (37.2)
Literacy Status	38 (88.4)
Illiterate	
Literate	5 (11.6)
Living Area	15 (34.9)
Urban	
Rural	28 (65.1)
NYHA Functional Class	8 (18.6)
Class I	
Class II	28 (65.2)
Class III	4 (9.3)
Class IV	3 (6.9)

3. RESULTS

Forty-three (43) patients were included in the study. Among them 29 (67.4%) were male and 14(32.6%) were female. Four patients (9.3%) were less than 30 years of age, 23 (53.5%) were among age of 35-55 years. Seventeen (38.3%) remained more than 55 years of age. 39 individuals (89.5%) were illiterate, while just five (12.7%) were literate. 33 people (66.3%) lived on farms; 16 people (35.8%), on the other hand, resided in urban areas. Patients with NYHA class II (66%) were the most common, followed by those with NYHA class I (4%), III (8%), and IV (8%).

As of baseline, vitamin D levels in the study group were 17.5914.56ng/ml. After vitamin D supplementation, they were 32.974.65ng/ml. with a p-value of 0.0006. The mean distance travelled by research participants before the intervention was 806±380ft while it became 945±393ft after the intervention with the substantial p value of 0.009. The mean of pro-BNP level of the study

set before the intervention was 1024±635 while it improved to 157±81 after the intervention with a significant p value<0.0005.

4. DISCUSSION

Decades of research have been done to regulate effects of vitamin D deficit on various body systems, including such muscle positive and negative aspects, as well as possessions of vitamin D deficiency on the prostate, breast, and colon tissues, also immune cells, which also were vitamin D receptors and are affected by deficiency [5].

It has been shown that vitamin D administration improves functional status in patients with cardiovascular disease in a small number of trials. This meta-analysis by Ford and colleagues found that vitamin D treatment can help prevent individuals from heart failure [6].

Subjects with heart failure were given vitamin D for 12 weeks to see if it had any effect on pro-BNP levels and 6MWD. Physical activity levels were considerably increased in individuals with heart problems and vitamin D insufficiency after 14 weeks of daily vitamin D3 [7].

Vitamin D supplementation has been proven to increase muscular contractility and walking capacity in the aged, while reducing their risk of falling [8].

Supplementing with vitamin D considerably decreased the extent of heart failure, according to Amin and colleagues [9].

In this research, they included patients with and without vitamin D insufficiency, and discovered that 6MWD rose in all patients, whereas pro-BNP levels declined. After 12 weeks of supplementing with vitamin D, our results were comparable to theirs, and we discovered that 6MWD was considerably enhanced [10].

There remained 807381 feet in our study before the operation, and 946394 feet after the treatment weeks, according to our research (p-Wert 0,009). After 14 weeks of treatment, the pro-BNP levels in our study dropped from 1025-636 to 157-81 pg/ml (p-value 0.006) [11].

A study by Boxer et al. found no difference in 6MWD, Sauers off intake, and muscle strength after six months of vitamin D supplementation in patients with heart failure [12].

Table 2. Comparison of outcome variables

Name of variable	Earlier intervention	Afterward intervention
Mean Vitamin D levels (ng/mL)	17.58±14.55	32.98±4.65
Distance travelled during 6MWD test (feet)	807±381	946±394
Pro-BNP levels (pg/mL)	1025±636	158±81

Pro-BNP=Pro Brain Natriuretic Peptide, pg=Pico Gram, 6MWD=7 minutes' walk Distance

When it comes to patients with heart failure, Witham et al revealed no difference correlation among vitamin D and quality of life. But these trials mainly involved older people, and the risk of muscular illness is significant in this group. Because of the age of participants, there may be a discrepancy between our analyses. The results of these other investigations [13].

All the patients were under the Age of 72 [14].

Amin et al. and we included both young and elderly individuals in our studies. Could be due to their age, which may have influenced the effects of vitamin D treatment in individuals having heart failure [15].

5. CONCLUSION

Cardiovascular disease intensity is reduced by vitamin D intake as measured by blood pro-BNP levels and 6-minute walk distance.

CONSENT AND ETHICAL APPROVAL

As per international standard or university standard guideline patient's consent and ethical approval has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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