

## Original Research Article

# Prevalence of vitamin D deficiency in patients with established coronary artery disease

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## ABSTRACT

**Background:** Vitamin D deficiency is widely prevalent in this part of the country, in spite of the fact that there is ample sunshine and the economic status of the people is good. Several studies have suggested possible link between vitamin D deficiency and cardiovascular disease risk. Hence authors evaluated the patients with established coronary artery disease attending cardiology department of super speciality hospital, Government Medical College Jammu, for their vitamin D status.

**Methods:** The study was conducted in the department of Biochemistry Government Medical College Jammu and data of established cases of coronary artery disease patients attending cardiology department of super speciality hospital, government medical college Jammu was analyzed for vitamin D levels during the period from January 2019 to February, 2020.

**Results:** A total of 200 established cases of coronary artery disease comprising of 130 male patients and 70 female patients were analyzed in the study, out of 200 cases, 190 (95%) were found to be having low levels of vitamin D in their blood (<30 ngm/dl). 123 (94.6%) out of a total of 130 male patients had vitamin D deficiency as compared to 67 (95.7%) out of 70 females patients.

**Conclusions:** The study has revealed a very high prevalence of vitamin D deficiency in established cases of coronary artery diseases. More detailed prospective studies are required to unravel the association of vitamin D and its role in prevention of coronary artery diseases in the absence of well-established risk factors like smoking, Diabetes, Hypertension and dyslipidaemias.

**Keywords:** Coronary artery disease, Prevalence, Vitamin D, Vitamin D deficiency

## INTRODUCTION

Jammu and Kashmir is a mountainous area of the country and people have good physical activity in their day to day life but surprisingly the number of patients attending cardiology department of government medical college is ever increasing and the number of interventional procedures has increased to save the life of patients. One more unexpected thing has been noticed that many of

these patients don't have any established risk factors for coronary artery disease.

Vitamin D which is known as sun shine vitamin has been linked with many extra skeletal disorders. Adequate intake of vitamin D is associated with a lower risk of cancer, including colorectal cancer, breast cancer, cardiovascular diseases, autoimmune disease, neurological disorder and diabetes.<sup>1-8</sup> There is growing

concern about pandemic situation of vitamin D deficiency and its association with poor health. There are very few studies on vitamin D status in patients with established coronary artery diseases in Jammu; hence this study was undertaken with the aim to evaluate vitamin D status of coronary patients in this hilly union territory of India.

## METHODS

The study was conducted in the department of Biochemistry Government Medical College Jammu and data of established cases of coronary artery disease attending cardiology department of Superspeciality Hospital Government, Medical College Jammu was analyzed for vitamin D status from the month of January 2019 to February 2020. A total of 200 established cases of coronary artery disease screened were identified for their vitamin D (25 OH - D) status.

Vitamin D level of all these patients was estimated in the superspeciality biochemistry laboratory of department of biochemistry government medical college Jammu by using Abbott architect chemiluminescent micro particle immunoassay.<sup>9</sup> The cut off value of vitamin D (25 OH - D) levels below 20 ngm/ml (<50 nmol/L) was considered as severe vitamin D deficiency, 20-30 ngm/ml (50 to 75 nmol/L) as insufficiency levels and levels more than 30 ngm/ml (>75 nmol/L) was taken as vitamin D sufficiency.

Data of Patients with associated clinical history of smoking, diabetes mellitus, thyroid disorder, metabolic bone disorder were excluded from this study. Only cases confirmed by biochemical investigations, ECG findings, Echo reports and proven cases on coronary angiography were included in this study. The results were analyzed by applying standard statistical procedures.

## RESULTS

A total of 200 established cases of coronary artery disease were identified who were screened for vitamin D (25 OH- D) levels in their blood and 190 (95%) of these cases were found to have low levels of vitamin D (<30 mg/dl), whereas 164 (82%) patients had Vitamin D levels below 20 ngm/ml, the mean level was 11.8 ngm/ml, 26 (13%) patients had levels between 20 - 30 ngm/ml, with a mean level of 22.7 ngm/ml.

Only 10 out of 200 (5%) of established cases of coronary artery disease had levels above 30 ngm/ml with the mean value 32.3 ngm /ml.

Amongst 200 established cases of coronary artery disease 130 were male patients and 123 out of 130 (94.6%) were having low levels of vitamin D and 70 were female established cases of coronary artery disease and 67 out of these 70 (95.7%) were found to have levels less than 30 ngm/ml (Table 1).

**Table 1: Prevalence of vitamin - D deficiency among patients with established coronary artery disease.**

Study subjects	25 (OH) D status		
	Deficient <20 ngm/nl	Insufficient 20-30 ngm/ml	Sufficient >30 ngm/ml
Total subjects N=200	164 (82%)	26(13%)	10(5%)
Mean value 25 (OH) d ngm/ml	11.8	22.7	32.3
Male N=130	102 (78.4%)	21 (16.1%)	07(5.3%)
Female N=70	62 (88.5%)	5 (7.1%)	03 (4.2%)

## DISCUSSION

Vitamin D deficiency is pandemic and prevails widely all over the Indian sub-continent, there are many studies showing that low vitamin D status adversely affects cardiac functions. Vitamin D receptors are ubiquitous in nature and are also present in heart.<sup>10</sup> Vitamin D deficiency leads to elevated levels of matrix metalloproteins (MMPs) which may be involved in the pathophysiology of cardiac diseases arising from vitamin D deficiency.<sup>11,12</sup> Uysal et al, have shown that vitamin D supplementation lowers blood levels of MMP -9 and MMP -2 and reversal of cardiomegaly by calcium and vitamin D supplementation has been described in children with rickets.<sup>13</sup> From the remarkable observation made that many of the cases of coronary heart disease attending department of cardiology, superspeciality hospital, Government Medical College Jammu were not having the well-established risk factors like smoking, diabetes, hypertension, dyslipidaemia and many of them were having normal body mass index and practicing healthy lifestyles. Hence this study was undertaken to assess the vitamin D status in established cases of coronary artery diseases to evaluate the link between coronary artery disease and vitamin D status of these patients.

In this study a total of 200 established cases of coronary artery disease were identified who were screened for vitamin D (25 OH- D) levels in their blood and 190 (95%) of these cases were found to have low levels of vitamin D in their blood. In accordance with these findings, The Flamingham study has shown that the rate of major cardio vascular diseases was 53%-80% higher among those with low levels of vitamin D.<sup>14</sup> In this study 164 (82%) patients had severe Vitamin D deficiency with levels below 20 ngm/ml, similar observations have been made in an analysis of 27000 patients from Intermountain Health Care system, where the prevalence of Vitamin D deficiency was 60% and this deficiency was associated with highly significant increase in the prevalence of type 2 diabetes mellitus, hypertension and dyslipidemia, and myocardial infarction, heart failure,

and stroke as well as total mortality.<sup>15</sup> This study group had 123 male patient out of 130 (94.6%) with low levels of vitamin D in their blood as compare to 67 out of 70 (95.7%) female patients having vitamin D deficiency, this difference in the prevalence of vitamin D deficiency between two genders was statistically not significant. Similar observation was made by Haider W et al, who concluded that there is deficiency or insufficiency of vitamin D irrespective of age and gender.<sup>16</sup> As observed by others, this study also has shown an increased incidence of coronary artery disease with low levels of vitamin D.<sup>17,18</sup>

## CONCLUSION

Vitamin D deficiency is widely prevalent across the globe and appears to be involved in the pathogenesis of coronary artery disease by modulating cellular processes. More detailed large-scale well randomized controlled trials are required to unravel the association of vitamin D and its role in prevention of coronary artery diseases in the absence of well-established risk factors like smoking, Diabetes, Hypertension and dyslipidaemias and to recommend to take vitamin D supplements on regular basis and to add it to the preventive program as a part of primary health care.

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