A Study of Vitamin D Deficiency Prevalence in Patients of Acute Myocardial Infarction A Study from Central India

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Abstract: Vitamin D deficiency is highly prevalent worldwide and is also noted to be high in India [1-3]. Low levels of 25(OH)D the principle circulating storage form of vitamin D is present in as many as one third to one half of otherwise healthy middle aged to elderly population. Methods: It was a cross-sectional study conducted at Chirayu Medical College and Hospital Bhopal for the period of 2 year from September1, 2013 to August 31, 2015. Information of the patients admitted for Acute Myocardial Infarction in the ICCU was collected through chart abstraction, detailed patient interviews, and serum samples. All the participants will be provided written informed consent. Results: In our study, out of total 100 subjects 66 (66%) were males and 34 (34%) were females. Mean age was 51.72 years with a range of 27 – 73 years. Vitamin D deficiency was found in 24(36%) of male subjects, whereas 10(29.4%) of the female subjects were deficient in vitamin D. Conclusion: In conclusion, our study shows a high prevalence of vitamin D deficiency among patients of acute MI. Severe vitamin D deficiency was associated with risk of acute MI even after adjusting for conventional risk factors. Awareness of high deficiency of vitamin D must be created and people should be educated through campaigns and IEC (Intervention Education and Communication) activities. [T Jalaly, Natl J Integr Res Med, 2018; 9(2):22-25]

Key Words: Acute MI, Coronary Artery Disease, Vitamin D deficiency.

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Introduction: Vitamin D deficiency is highly prevalent worldwide and is also noted to be high in India[1-3]. Low levels of 25(OH)D the principle circulating storage form of vitamin D is present in as many as one third to one half of otherwise healthy middle aged to elderly population[4-6].

Limited cutaneous synthesis due to inadequate sun exposure or pigmented skin and inadequate dietary intake are the principle causes of low 25 (OH) D levels. Although the best characterized sequelae of vitamin D deficiency involve musculoskeletal system, growing evidence suggests that vitamin D axis affects vascular smooth muscle cell proliferation, endothelium cardiomyocytes, inflammation, vascular calcification, renin–angiotensin system (RAS) blood pressure and LVH[7-12].

Vitamin D deficiency is a prevalent condition and it is emerging as a new risk factor for coronary artery disease. Notably, hypovitaminosis D has been reported to be common in patients with acute myocardial infarction, and preliminary studies indicate a possible association with short-term and long-term morbidity and mortality[13].

All of which affect the risk of cardiovascular diseases and myocardial infarction. However, the prevalence of vitamin D deficiency as well as the characteristics associated with it in patients presenting with acute myocardial infarction is unknown.

There is an important gap in knowledge, because vitamin D deficiency is readily treatable and, if common in patients with AMI, can identify an opportunity to recognize, initiate treatment, and potentially improve the outcomes of deficient patients.

This was a prospective study undertaken at tertiary health center Chirayu Medical College and Hospital Bhopal (M.P.) to assess the prevalence of vitamin D deficiency at the time of admission for acute myocardial infarction.

Methods:

Study design: It was a cross-sectional study conducted at Chirayu Medical College and Hospital Bhopal for the period of 2 year from September1, 2013 to August 31, 2015

Sample size: A sample size of 100 was calculated by using the formula from the prevalence of vitamin D deficiency (46%) taken from the study conducted by Patil S, Prajapati P, Gandhi S, et al. in Maharashtra in 2017.

Formula: $4pq/l^2$
P: Prevalence (46%)
q: 1-P (54%)
l: Precision (10%)

Inclusion criteria:

- Age ≥ 20 years
- Biomarker evidence of myocardial injury (elevated troponins or CKMB),
- supporting evidence of AMI (prolonged ischemic signs or symptoms, electrocardiographic ST-segment changes), and
- Patients presenting within 24 h of symptoms onset.

Exclusion criteria: Those patients with prevalent cardiovascular diseases and kidney diseases (Serum creatinine N 1.3) and those who did not give the consent were not included in the study.

Ethical Clearance: Ethical clearance was taken from the Institutional Ethical Committee before performing the study.

Procedure: Information of the patients admitted for Acute Myocardial Infarction in the ICCU was collected through chart abstraction, detailed patient interviews, and serum samples. All the participants will be provided written informed consent. Detailed medical history examination and laboratory assessment of vascular risk factors were performed. Patient data included demographics, age, gender, marital status, and education. Collected clinical variables included smoking, alcohol consumption, hypertension, diabetes mellitus, hypercholesterolemia, peripheral arterial disease, previous stroke, family history of coronary artery disease (CAD), chronic lung disease, chronic renal failure, chronic heart failure, previous angina, previous PTCA, and CABG. Hypertension was defined as systemic BP ≥ 140 mm of hg, diastolic BP ≥ 90 mm of hg, or use of anti hypertensive therapy[14]. Criteria for diabetes mellitus were fasting glucose ≥ 126 mg/dl or use of insulin or hypoglycaemic medications[15]. Current smoking denoted regular use of cigarettes in the preceding year. Hypercholesterolemia is defined as total cholesterol N 200 mg % and LDL cholesterol N 100 mg%[16]. Hyper-triglyceridemia is defined as TGL N 150 mg. The serum samples were obtained as soon as the patient got admitted to the hospital and before initiating medication (treatment). Data collected included, complete hemogram, random blood sugar, glycosylated haemoglobin, renal function tests, lipid profile, cardiac enzymes, troponins, CKMB, calcium, phosphorous and 25 (OH) D levels. The serum 25(OH) D was determined by enzyme linked immune-floroscence assey by Minivildas analyzer.
We classified the patients as below:

Serum 25 (OH) D (ng/l)	Vitamin D status
≤20	Deficient
21–29	Insufficient
≥30	Sufficient

Results: In our study, out of total 100 subjects 66 (66%) were males and 34 (34%) were females. Mean age was 51.72 years with a range of 27 – 73 years. Vitamin D deficiency was found in 24(36%) of male subjects, whereas 10(29.4%) of the female subjects were deficient in vitamin D. Vitamin D insufficiency was found in 06(9%) of male subjects, whereas 04(11.7%) of the female subjects had insufficient levels of vitamin D.

Table no. 1: vitamin D deficiency and insufficiency or sufficiency.

Variables	VIT-D< 20 ng/mL	VIT-D 21-29 ng/mL	VIT-D ≥ 30 ng/mL	Total
Age				
Men (n=66)	24(36.3%)	06(9.0%)	30(45.4%)	66
Women(n=34)	10(29.4%)	04(11.7%)	20(58.8%)	34
Smoking(n=16)	08(50%)	02(12.5%)	06(37.5%)	16
Alcohol(n=22)	01(4.5%)	02(09%)	19(86.5%)	22
Diabetes mellitus(n=30)	08(26.6%)	08(26.6%)	14(46.8%)	30
Hypertension(n=34)	12(35.2%)	08(23.5%)	14(41.1%)	34
Total cholesterol (high) (n=37)	17(45.9%)	10(27.0%)	10(27.0%)	37

In our present study, out of total 100 subjects 16(16%) were smokers and 08(50%) out of total 16 smokers had vitamin D deficiency. There were 22 diabetics in the study and 11(50%) had vitamin D deficiency. In our study, out of total 34 (34%) hypertensives 12 (35.5%)

had vitamin D deficiency. The level of cholesterol was found high in 37(37%) subjects and 17(45.9%) of them were vitamin D deficient. The levels of vitamin- D deficiency and insufficiency in different study parameters is shown in table no. 1.

Discussion: The high prevalence of vitamin D deficiency found in this study is consistent with other studies from India. A study from Andhra Pradesh similarly reported a very high prevalence of vitamin D deficiency[17]. The levels of vitamin D deficiency (<30 ng/ml) was 88% and 94% in urban males and females respectively.

A study from Delhi, in healthy individuals above 50 years of age, revealed deficiency [serum 25 (OH) vitamin D < 20 ng/ml] in 91.2% including severe deficiency [serum 25 (OH) vitamin D < 10 ng/ml] in 62% and vitamin D insufficiency [serum 25 (OH) vitamin D levels 20–<30 ng/ml] in additional 6.8% of the population[18].

The causes for high prevalence of Vitamin D deficiency in Indians is attributed to dark-skin, lack of adequate direct skin exposure to sunlight and lack of vitamin D in predominant Indian diet.

In our present study, out of total 100 subjects 16 (16%) were smokers and 08 (50%) out of total 16 smokers had vitamin D deficiency and out of total 22 (22%) alcoholics only 01 (4.5%) were found deficient in vitamin D. In a similar type of study conducted by Satish Karur et al in Karnataka in 2014, 53% of the smokers had vitamin d deficiency[19].

There were 22 diabetics in the study and 11 (50%) had vitamin D deficiency and 34 (34%) were hypertensives out of which 12 (35.2%) were vitamin D deficient. In a study conducted by Anita A et al in Italy in 2015 vitamin D deficiency was found in 30.9% of the total diabetics in the study whereas 64.2% of the hypertensives had vitamin D deficiency[20].

Conclusion: In conclusion, our study shows a high prevalence of vitamin D deficiency among patients of acute MI. Severe vitamin D deficiency was associated with risk of acute MI even after adjusting for conventional risk factors. Awareness of high deficiency of vitamin D must be created and people should be educated through campaigns and IEC (Intervention Education and Communication) activities.

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