

To Find Out the Association of Vitamin D with Cardiometabolic Syndrome

To Explore the Link Between Vitamin D and Cardiometabolic Syndrome

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ABSTRACT

Objective: To explore the link between vitamin D levels and the risk of developing cardiometabolic syndrome.

Study Design: Cross sectional study

Place and Duration of Study: This study was conducted at the Dept. of Medicine at Hayatabad Medical Complex Peshawar. Duration: December 2019 to April 2020.

Materials and Methods: Subjects were recruited according to the inclusion criteria. Patients were divided into two cohorts; Patients with Cardiometabolic Syndrome (CMS Group) and a Non Cardiometabolic Syndrome group (Control group). Blood for Vitamin D Levels was taken and analysed at the Hospital Lab. Blood Pressure readings in mm Hg via Yamasu mercury sphygmomanometer. Height, Weight and Waist Circumference were also noted. Data was analysed using SPSS 26.0.

Results: Mean and Standard Deviations (SD) for the levels of vitamin D (ng/mL) recorded as 31.77 ± 6.18 for control group and 21.91 ± 8.15 for CMS Group.

Conclusion: Our study found a positive link between lower vitamin D levels and an increased risk for developing Cardiometabolic Syndrome.

Key Words: Vitamin D; Vitamin D Deficiency; Cardiometabolic Syndrome

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INTRODUCTION

Vitamin D plays a vital role in optimal functioning of many body tissues and organs; including amongst other the cardiovascular system. ¹ Over the last two decades cardiometabolic syndrome (CMS) have seen a drastic rise in incidence, making it a major cause of disease and death. ^{2,3,4}

A wide range of cardiometabolic conditions are caused due to the presence of Metabolic Syndrome. This is characterized by the presence of various pathological conditions i.e., Obesity, dyslipidemias, hypertension, raised triglycerides, and deranged blood glucose. ⁵⁻⁸

Vitamin D (fat-soluble steroid pro-hormone) is produced in the body as cholecalciferol (D3). When sunlight is exposed to the skin it is activated. ⁹

This form (vitamin D) is then transported to the liver for hydroxylation to produce 25-hydroxyvitamin D. It is next converted in the Kidney to the biologically potent form 1,25 hydroxyvitamin D. ^{10,11}

Vitamin D has a role in the extra skeletal properties including cardiovascular functions, nervous functions and immunity amongst others related to calcium and phosphate balance of the body. ¹² Keeping this in sense growing evidence of scientific works investigating the physio-pathological mechanisms behind development of cardiometabolic disorders has revealed that lower levels of vitamin D play a key role in the development of CMS. ^{13,14}

It is therefore of utmost importance to determine if vitamin D levels are linked with cardiometabolic syndrome. There have been many interventional studies that recorded and examined the effect of vitamin D levels to cardiometabolic syndrome.

There have been many interventional studies that recorded and examined the effect of vitamin D levels to cardiometabolic syndrome. Still, many systemic reviews, meta-analysis and level I evidence studies are going on to understand the medical condition. It is therefore adamant to explore and find out the association and correlation of vitamin D levels in cardiometabolic syndrome patients.

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MATERIALS AND METHODS

This study was performed in the Dept. of Medicine at Hayatabad Medical Complex in Peshawar from Dec 2019 to April 2020. Inclusion criteria included patients older than age 20, of both sexes, diagnosed cardiometabolic syndrome (diagnosis made by consultant keeping both clinical and haematological values of the variables in account). Exclusion criteria included patients with kidney disease, secondary hypertension, thyroid, liver or parathyroid related medical conditions. These were excluded.

Subjects were recruited according to the inclusion criteria. Subjects were divided into two cohorts; Patients with Cardiometabolic Syndrome (Group I N=40) and a Non Cardiometabolic Syndrome group (Control group N=40). Blood for Vitamin D Levels was taken and analysed at the Hospital Lab via Cobas 6000 E 501 analyzer. 8.2 ng/ml was kept as the cut off for vitamin d deficiency. Blood Pressure readings in mm Hg via Yamasa mercury sphygmomanometer. Height, Weight and Waist Circumference were also noted. Written informed, voluntary consent was obtained. The Institutional Review and Ethics Board approved the study. Bias will be controlled by following strict inclusion criteria for patient selection, diagnosis of new cardiometabolic syndrome patients with measurable operational definitions and using same methods and parameters for cardiometabolic syndrome and vitamin D levels. All the data were collected on a research proforma for this study's protocol. Data was analysed on SPSS 26.0. (Armonk, NY: IBM Corp.).

RESULTS

Mean and standard deviations for age were recorded as 37.5 ± 10.1 for the Control Group while 29.5 ± 10.1 for the CMS Group. Mean and Standard Deviations (SD) for the levels of vitamin D (ng/mL) recorded as 31.77 ± 6.18 for control group and 21.91 ± 8.15 for CMS Group with a mean difference of 12.59 ng/mL.

MEAN VITAMIN D LEVELS (ng/mL) FOR BOTH GROUPS



Figure. 1 shows the levels the vitamin D for both groups; Cardiometabolic Syndrome Group and a second group that included healthy individuals as the control group (C)

CMS=Cardiometabolic Syndrome Group, C=Control Group (Healthy individuals)

Table No. 1: Shows vitamin D levels, Age and Weight both groups; Cardiometabolic Syndrome Group and a second group that included healthy individuals as the control group (C).

	Control (N=40)	CMS (N=40)	Mean difference	p-value
Vitamin D (ng/mL)	34.5 ± 10.1	21.91 ± 8.15	12.59	0.015
Age (years)	37.5 ± 10.1	29.5 ± 10.1	(+)8.00	0.000
Weight (kg)	92.09 ± 5.46	74.36 ± 3.41	(+)17.73	0.000

DISCUSSION

The current study sought to elucidate whether Vitamin D plasma levels are linked to the risk of developing CMS. It is therefore of utmost importance to determine if vitamin D levels are linked with CMS or not. There have been many interventional studies that recorded and examined the effect of vitamin D levels to CMS.

A study showed that lower levels of vitamin D are inversely linked to CMS.¹⁵ It was also observed in a similar study that the ratio of CMS was found to be higher in patients with low vitamin D levels in comparison to patients with normal vitamin d levels.¹⁶ Likewise in our study the Vitamin D Levels showed a mean difference of 12.59 ng/mL between CSM Group and the Control Group. (p=0.015).

Another study found out that low levels of vitamin D are linked with increased risk for CMS. Around 2/3rd of the obese or overweight patients (CMS) were deficient of vitamin D vs when the levels were compared to healthy individuals.¹⁸ This study was carried out on more than 6000 adults. It reported that lower vitamin d levels were linked with not only an increased risk of CMS but also a higher waist circumference, deranged triglyceride levels, deranged blood glucose (fasting) and increased insulin resistance (followed up at 5 years).¹⁸

We observed in our study that lower levels of vitamin D were found in the CMS Group. The CMS Group showed lower than normal levels of vitamin D (Mean) on average. The mean difference to the Control group was 12.59 ng/mL. (Fig. 1 and Table. 1).

CONCLUSION

Our study found out that relation exists between lower vitamin D levels and increased risk of developing CMS. Vitamin D has a protective role. Systemic reviews, meta-analysis and level I evidence studies are required for not only to understand the medical condition but also establish a possible link and to further help us understand the pathophysiology governing this risk of developing CMS with the variation in the vitamin D levels.

Author's Contribution:

Concept & Design of Study: Najma Fida
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Conflict of Interest: The study has no conflict of interest to declare by any author.

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