Does vitamin D level predict inflammation in prediabetes?

Poster · December 2020

DOI: 10.13140/RG.2.2.17251.68646

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Does vitamin D level predict inflammation in prediabetes?

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BACKGROUND

Chronic subclinical inflammation is one of hall marks in the development of diabetes from prediabetes. In adults with prediabetes, low vitamin D were found (1). Vitamin D acts as an immuno-modulator (2). So, an inverse relationship between vitamin D and inflammatory markers are expected in prediabetes. But their relationship in prediabetes is controversial and needs to be explored in our population.

OBJECTIVE

Determination of the relationship of serum vitamin D, TNF-α and hs-CRP among adults with prediabetes.

MATERIALS and METHODS

- **Study design:** Cross sectional observational study
- **Place of study:** Department of Endocrinology, BSMMU
- **Period of study:** January, 2018 to July, 2019
- **Sample size:** According to American Diabetes Association, 2018 criteria 91 untreated adults with prediabetes
- **Sampling method:** Purposive, consecutive sampling Sociodemographic & vitamin D-related histories were taken, physical examinations were performed. Venous blood was collected in the fasting state to measure for 25(OH) vitamin D (high performance liquid chromatography), hs-CRP (immunoturbidimetric method) and TNF-α (ELISA) in the prediabetic adults.

RESULTS

Table 1: Socioeconomic demographic characteristics of the subjects (N=91)

Parameter		Frequency (%)
Gender		
	Male	16 (17.6)
	Female	75 (82.4)
Residence		
	Urban	69 (75.8)
	Rural	22 (24.2)
Occupation		
	Managerial & professional	13 (14.3)
	Non-manual	5 (5.5)
	Manual	7 (7.7)
	Manual unskilled	61 (67.0)
	Institutionalized, retired, unemployed	5 (5.5)
Education		
	Primary	23 (25.3)
	Secondary	30 (33.0)
	Higher secondary	14 (15.4)
	Graduate and above	24 (26.4)
Socioeconomic status		
	Lower	57 (62.6)
	Middle	27 (29.7)
	Higher	07 (7.7)

Table 2. Clinical and biochemical characteristics of the study population (N= 91)

Variables	Prediabetes (N=91)
	Mean±SD
25(OH)D (ng/ml)	21.66±11.13
TNF-α (pg/ml)	21.73±16.69
hs-CRP (mg/L)	5.96±6.03

Table 3. Simple linear regression showing the predictive association of vitamin D with hs-CRP (N=91)

R^2	0.06
Beta	-0.006
p	0.019
CI	-0.208, -0.026

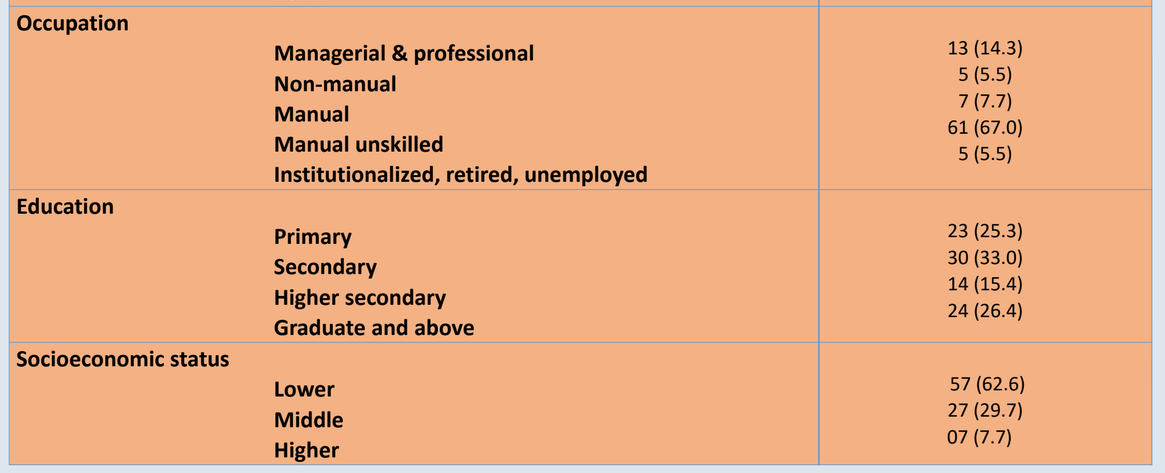

Figure 1. Vitamin D status of the study population (N= 91) (2, 3)

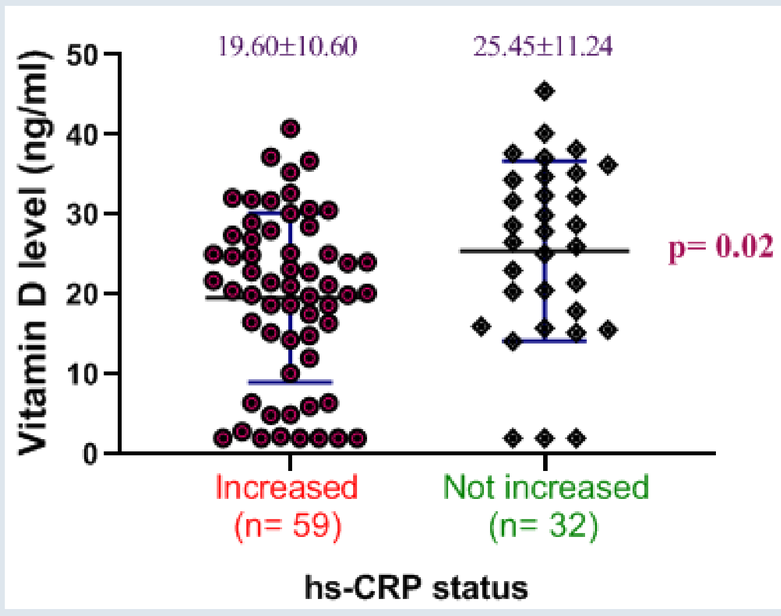

Figure 2. Serum vitamin D level according to hs-CRP status (N=91)

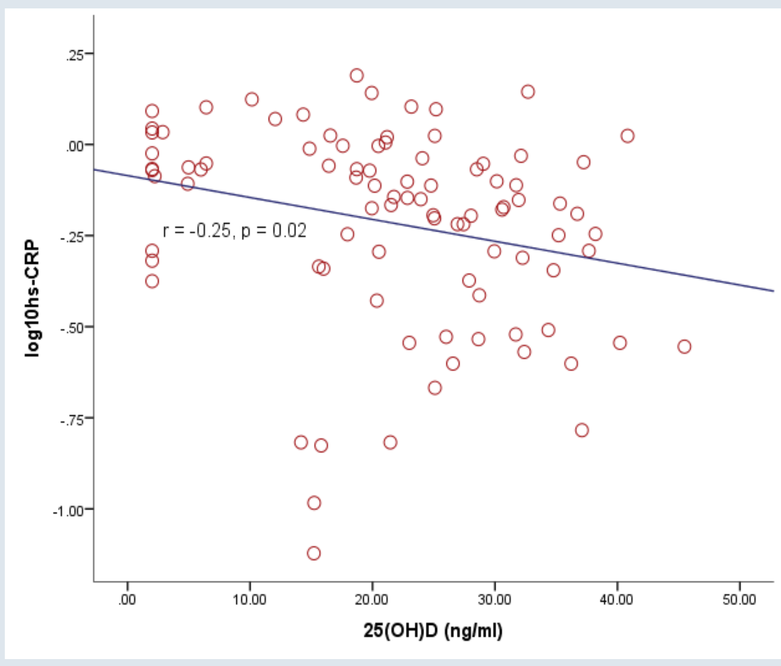

Figure 3. Correlation of serum vitamin D and hs-CRP (N=91)

DISCUSSIONS

Majority of the study participants had low vitamin D (74.7%) and vitamin D deficiency was present in 39.6%. Similar findings were also observed by Dutta et al. and Hetta et al. (73.27% with low vitamin D and 32% with deficiency) (5, 6). Mean vitamin D was lower in hs-CRP elevated group. de Oliveira et al. (7) also observed similar findings in the prediabetes group with hypovitaminosis D.

There was an inverse relationship between vitamin D and hs-CRP. These finding are similar to the observations by Beilfuss et al. (8). There was no significant correlation between vitamin D levels & TNF-α (r = -0.053, p = 0.617) which was contrary to the findings by Dutta et al. (5).

CONCLUSIONS

A substantial proportion of the study participants with prediabetes had low vitamin D. There was an inverse relationship between vitamin D and hs-CRP among participants with prediabetes.

ACKNOWLEDGEMENT

Beximco Pharmaceuticals Ltd.
For financial support to measure Vitamin D.

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