ASSOCIATION OF "HYPOVITAMINOSIS D" WITH PERSISTENT NON-SPECIFIC MUSCULOSKELETAL PAINS

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ABSTRACT

Objective: The study was conducted in Pakistani population to find association of vitamin D deficiency with persistent non-specific musculoskeletal pains by comparing with pain free controls.
Study Design: Case control study.
Material and Methods: Patients aged 12 years or more presenting to Medical OPD with persistent nonspecific musculoskeletal pains for more than 3 months were selected as cases, while healthy individuals served as controls.
Results: A total of 60 cases (patients with persistent non-specific pains) presenting to medical outpatients department at Military Hospital Rawalpindi and 60 controls were studied. Mean age of cases was 43.9 ± 14.0 years and amongst controls were 33.2 ± 17.8 years. Mean serum vitamin D level of 32.8 nmol/L was reported in cases whereas mean serum vitamin D level amongst controls was 26.7 ± 17.8 nmol/L. Hypovitaminosis D amongst cases and controls was 86.6% and 95% respectively. The proportion of vitamin D deficiency did not differ significantly as compared to controls. There was non-significant difference in proportion of deficiency amongst cases and controls.
Conclusion: Overall there was no association between persistent non-specific musculoskeletal pains and vitamin D deficiency.

Keywords: Age groups, Chronic nonspecific musculoskeletal pains, Hypovitaminosis D, Pakistan.

INTRODUCTION

Persistent nonspecific musculoskeletal pains are frequently seen in medical and chiropractic clinics. Chronic non-specific musculoskeletal pain (CNSMSP) is defined as the pain of more than three days duration per week for more than three months. Hypovitaminosis D is defined by most experts as 25 hydroxyvitamin D level of <20 nanogram per milliliter[1] and is affected by season, veiling technique of body, obesity and socioeconomic conditions.

In recent time association of vitamin D deficiency with various kinds of pains, especially persistent non-specific musculoskeletal pains is focus of interest. Although recent studies reveal Pakistani, Asian, Indian and Middle Eastern population to be severely vitamin D deficient[2] with an estimated 76.6 to 92% deficiency amongst healthy Pakistani population[3,4] and a similar level of deficiency amongst immigrants of Pakistani origin residing in western countries[5], however, no data exists on Vitamin D deficiency in Pakistani population with persistent non-specific musculoskeletal pains.

Although most of studies reveal deficient vitamin D levels in patients of diffuse muscle pain[6,7]. However, other case control studies do not support this[8,9] yet a positive association was shown between 25 (OH) D deficiency and skeletal pains in case control studies conducted by Heidari et al[10] and McBeth et al[11].

The rationale of doing this study was to find association between hypovitaminosis D in patients of persistent non-specific musculoske-

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letal pains in comparison with healthy pain free controls from different areas of Pakistan, since different studies done in western countries especially immigrants from South Asia, showed increased prevalence of vitamin D deficiency in patients of non-specific musculoskeletal pains without comparing pain free controls amongst immigrants from Pakistan[12].

MATERIAL AND METHODS

The present case control study was conducted in the department of Medicine, Military Hospital Rawalpindi (Pakistan). Blood samples were analyzed at Armed Forces Institute of Pathology, Rawalpindi, by following the ethical guidelines of Military Hospital, Rawalpindi, Pakistan, from February 2012 to August 2012 over a period of 6 months. The sample size was calculated by WHO sample size calculator, as sixty patients from each group (cases and controls), by keeping confidence level of 95%, with anticipated population proportion (P1) of 93% and (P2) 76% with power of test 80. Consecutive non probability purposive sampling was selected during analysis. Inclusion criteria included all patients aged more than 12 years presenting to medical OPD, Military Hospital Rawalpindi, with persistent non-specific musculoskeletal pains for more than 3 months, while healthy asymptomatic individuals were declared as control. Exclusion criteria included patients with clinical stigmata of osteoarthritis, rheumatoid arthritis, hypothyroidism/ hyperthyroidism, fibromyalgia, having liver enzymes more than three times upper limit of normal, blood urea more than two times upper limit of normal, using vitamin D supplements or anticonvulsants and patients having diarrhea of more than six months duration.

From each patient after obtaining verbal informed consent, serum was collected for measurement of vitamin D levels by chemiluminescent immunoassay (CLIA) using Liaison Diasorin Italy 2229 machine, at Armed Forces Institute of Pathology, Rawalpindi. Data were analyzed using SPSS version 14. Descriptive statistics were calculated for both qualitative and quantitative variables. Qualitative variables were gender and hypovitaminosis D and were presented as frequency/percentages. Quantitative variables included age and vitamin D levels and these were presented as mean ± SD. Tables and charts were made for qualitative variables. Chi square test and Fisher's exact test was applied where necessary. A *p*-values <0.05 were considered significant.

Table-I: Mean serum 25 (OH) D and frequency of hypovitaminosis D in cases (chronic non-specific musculoskeletal pains) compared with asymptomatic controls.

Group	n	Mean age (Years)	Mean vitamin D levels (nmol/L)	*With hypovitaminosis D	*Without hypovitaminosis D
Cases	60	43.9 ± 14.0	32.8 ± 14.5	52	08
Control	60	33.2 ± 17.8	26.7 ± 17.8	57	03

*Using Chi-square test, *p*-value= 0.11 (non-significant).

Table-II: Gender wise distribution of frequency of serum 25 (OH) D deficiencies (<50nmol/L) in cases (Persistent nonspecific musculoskeletal pains) and controls.

Group	Gender	With hypovitaminosis D	Without hypovitaminosis D
Cases	*Female	52	08
Control	Female	51	03
Cases	**Male	0	0
Control	Male	06	0

*Using Chi square test, *p*-value=0.16 (non-significant among the females of both cases and control).

** The comparison was not possible due to exclusion of males in cases.

RESULTS

Serum vitamin D levels of sixty cases (persistent non-specific musculoskeletal pains for more than 3 months) with mean age of 43.9 ± 14.0

years and sixty asymptomatic individuals mean age 33.2 ± 17.8 years, serving as controls was carried out. Mean serum vitamin D amongst cases was 32.8 ± 14.5 nmol/l, and in controls it was 26.7 ± 17.8 nmol/l. Frequency of hypovitaminosis D (defined as less than 50 nmol/L) amongst cases was 86.6% and amongst controls it was 95%. There was non-significant (p>0.05, table-I) difference between vitamin D level and hypovitaminosis D among cases and control.

Gender wise distribution revealed all cases were females and controls included 54 females and 6 males. There was non-significant (p>0.05, table-II) difference between vitamin D level and hypovitaminosis D during gender wise comparison among females. However, there was severe hypovitaminosis D among males of control group. There was no male entry in case group.

Patients were stratified according to age groups and were compared with age matched controls. Three patients presented in age group 13-19 years and were compared with 6 age matched controls. Ten cases and 21 age matched controls were studied in age group 20-29. In age group 30-39 years, 17 cases and 21 age matched controls were studied. There were 13 cases and 4 age matched controls in age group 40-49 and 12 cases and 4 age matched controls in age group 50-59 years. In age group 60-69 years, there were 3 cases and 4 age matched controls. There were only 2 cases in age group 70-79 years and no age matched controls were available. The results of stratification have been described in tabulated form in table-III. The results show non-significant association between cases and control at 95% probability level.

Table-III: Comparison of age wise distribution of mean Serum 25 (OH) D and frequency of serum 25(OH) D deficiency (<50nmol/L) in cases (Persistent nonspecific musculoskeletal pains) and controls.

Age Years	Group	n	Vit. D nmol/L	No. with deficiency		Vit. D deficiency	**Association
				Yes	No		
13-19	Cases	3	28.0 ± 12.5	2	1	66.67%	p=0.33
	controls	6	13.8 ± 2.8	6	0	100%	
20-29	Cases	10	32.4 ± 2.4	9	1	99%	p=0.32
	controls	21	22.0 ± 2.5	21	0	100%	
30-39	Cases	17	29.2 ± 2.0	17	0	100%	p=0.492
	controls	21	29.1 ± 2.8	19	2	90.47%	
40-49	Cases	13	35.1 ± 3.2	11	2	88.23%	p=1
	controls	4	25.6 ± 5.9	4	0	100%	
50-59	Cases	12	40.1 ± 4.6	7	5	68%	p=0.245
	controls	4	26.7 ± 7.2	4	0	100%	
60-69	Cases	3	22.0 ± 1.7	3	0	100%	p=0.429
	controls	4	60.1 ± 22.0	2	2	50%	
70-79	Cases	2	25.5 ± 1.8	2	0	100%	p=1
	Controls	0		0	0		

*Cut off limit of <50 nmol/L.
**the associations were determined from Fisher's exact test, at 95% significance level.

DISCUSSION

The study revealed that there was overall deficiency of vitamin D amongst cases and controls and that indicates healthy Pakistani population has severe hypovitaminosis D. This was the reason of non-association between 25 (OH) D levels and CNSMSP as indicated from statistical tests.

Prevalence of severe vitamin D deficiency in healthy asymptomatic controls in our study i.e. mean serum vitamin D 32.8 nmol/l in cases, and 26.7 nmol/l in controls, and hypovitaminosis D of 86.6% in cases and 95% in controls correlates with studies done in different parts of Pakistan, where Sheikh et al[3] revealed deficiency of 84.3% (defined by <30 ng/dL) and Zuberi et al[4] found vitamin D deficiency of 92%.

The results of this study correlate with our hypothesis that persistent non-specific musculoskeletal pains is not associated with vitamin D deficiency, and support the findings of Warner and Arnspiger, Merlo et al[13], Block[8] and Helliwell et al[14], who found no association between Vitamin D deficiency and musculoskeletal pains and supports findings of Hicks et al[15] who found association between musculoskeletal pains in older patients >65 years, however a weak association is found in our study. Similarly, our study correlates with study of Plotnikoff et al[16] on patients of persistent non-specific musculos-keletal pains in Minneapolis who found out that overall 93% cases had deficiency of vitamin D; however no controls were included in the study.

The findings of severe vitamin D deficiency amongst patients of Study conducted at Oslo et al[17] showed an overall 58% prevalence of vitamin D deficiency in patients presenting with non-specific musculoskeletal pains, headache and fatigue including 83% deficiency amongst South Asian immigrants, however no controls from asymptomatic South Asians immigrants were studied. Helliwell et al[14] in Bradford revealed high levels of persistent pain biochemical osteomalacia, and disability especially amongst immigrants from Mirpur area of Pakistan, which was unrelated to diagnosis, biochemical status or treatment with calcium or vitamin D. The larger randomized placebo-controlled trials, preferably by stratification with baseline vitamin D status and response to treatment with vitamin D should be carried out in Pakistani patients presenting with persistent non-specific musculoskeletal pains. Moreover future studies on vitamin D in Pakistani population should focus on comparison of vitamin D deficiency in different conditions with controls rather than simply finding frequency of vitamin D deficiency.

CONCLUSION

The study concluded that there was no association between 25 (OH) D levels and chronic non-specific musculoskeletal pain.

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CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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