ORIGINAL ARTICLE

Depression Linked With Serum Serotonin Levels among Fibromyalgia Patients: Cross -Sectional Study

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ABSTRACT

Background: Fibromyalgia is a common condition characterized by long-term, body pains mainly due to vitamin-D deficiency resulting in depression.
Aim: To assess the role of vitamin-D deficiency in the development of depression among fibromyalgia patients.
Study Design: Cross-sectional analysis.
Methodology: With a sample of 92 patients the present project was carried from January to July 2019 in the Dept. of Pharmacology, Allama Iqbal Hospital, Lahore following the Hospital's Ethical Committee approval. Vitamin D and serotonin blood levels were done. Patients were treated with vitamin D with calcium at 1000mg daily dose.
Results: Out 92 patients, 58(63%) were males and 34(37%) were females. In 87% fibromyalgia patients were over-weight and obese. Results indicated that that the mean serotonin levels were significantly higher in patients with normal vitamin D levels as compared to vitamin D deficient groups with p-value <0.001*
Conclusion: It was concluded that vitamin-D deficiency developed fibromyalgia and depression with low serotonin levels especially among females.
Keywords: Vitamin D, Fibromyalgia, Depression and Serotonin.

INTRODUCTION

Fibromyalgia is a global health issue nowadays due to various nutritional deficiencies. Its signs and symptoms include chronic persistent pain with fatigue, sleep disturbance and joint stiffness[1,2]. Musculoskeletal system, daily routine, and mood of the sufferer is badly affected by it[3]. Severe fibromyalgia can result in depression and anxiety[4]. Its prevalence is between 3% and 6% with females (90%) being the common victims (fibromyalgia results see tables). Its symptoms usually appear between 20-50 years of age bu. its incidence rises with age[5].

Serotonin (5-HT), is produced by the central nervous system[6]. It acts as a controller of behavior, cognitive performance, emotional aspect, and mood swings[7]. Hence, its lower levels results in depression and aggressive behavior. Therefore, stress, serotonin and vitamin D deficiency played vital role in fibromyalgia development[8]. In the light of this increasing burden, we planned the current study to assess the role of vitamin-D deficiency in the development of depression among fibromyalgia patients**.**

METHODOLOGY

This cross sectional study with a sample of 92 patients the present project was carried from January to July 2019 in the Department of Pharmacology, Allama Iqbal Hospital, Lahore following the Hospital's Ethical Committee approval. Vitamin D and serotonin blood levels were done. Patients were treated with vitamin D with calcium at 1000mg daily dose. Both genders (28-65 years) with signs and symptoms of fibromyalgia were enrolled[8].

Data Analysis: The data were analysis by using SPSS 22. Mean ±SD was given for age, BMI and serotonin level. Frequency and percentage were given for gender, vitamin deficiency. Chi square was used to determine the association of vitamin.

RESULTS

Baseline features like age, gender, BMI of enrolled patients were summarized in Table-1. Prevalence of Stress/ depression and vitamin D levels were shown in table-2. There was significant association of Fibromyalgia score with vitamin D levels and stress as showed in table-3. Mean serotonin levels were significantly higher with normal vitamin D levels as compared to vitamin D deficient groups among enrolled subjects as shown in table 4.

Table 1: Gender, BMI and routine activity limitation

Variables	Categories	Frequency	%age
Gender	Male	58	63.0
	Female	34	37.0
BMI Categories	Normal weight	12	13.0
	Overweight	36	39.1
	Obese	44	47.8
Pain limiting the daily routine activity	Yes	70	76.1
	No	22	23.9
Age(years)	Mean ± SD 43.5 ± 8.6		

Table 2: Prevalence of Vit. D and stress among enrolled subjects

Variables	Categories	Frequency	%age
Vitamin D	Deficient	23	25.0
	Insufficient	42	45.7
	Normal	27	29.3
Stress/ Depression	No	37	40.2
	Mild	12	13.0
	Moderate	23	25.0
	Severe	20	21.7

Table-3 Vitamin D Association With Fibromyalgia & Stress

Variable	Categories	Fibromyalgia			p-value
		Below average disability	Average disability	Severely disability	
Vitamin D	Deficient	3 (13%)	6 (26.1%)	14 (60.9%)	< 0.001*
	Insufficient	5 (11.9%)	10 (23.8%)	27 (64.3%)	
	Normal	12 (44.4%)	12 (44.4%)	3 (11.1%)	
Stress	No	12 (32.4%)	10 (27.0%)	15 (40.5%)	0.262
	Mild	3 (25%)	5 (41.7%)	4 (33.3%)	
	Moderate	4(17.4%)	7(30.4%)	12(52.2%)	
	Severe	1(5%)	6(30%)	13(65%)	

Table 4: Relationship between serum vitamin-D and serotonin levels

Vitamin D	n	Serotonin level (ng/mL)
Deficient	23	57.0 ± 16.6
Insufficient	42	75.9 ± 28.2
Normal	27	127.9 ± 34.2
P-value		<0.001*

***** Significant P-value

DISCUSSION

In current project, an association between serum levels of vitamin D and serotonin with fibromyalgia were assessed. Our results depicted that there is significant association between FMS and vitamin D levels with P-value of < 0.001*. This finding corresponded with the work done by one researcher, which found significant relationship with P-value of < 0.05[9].

Our results highlighted an association between obesity and fibromyalgia among the enrolled patients. Among enrolled subjects only 13% fibromyalgia patients had normal body weight whereas rest of patients were either over-weight or obese (Table 1). This finding was in line with many previous medical studies[10]. This phenomena of increased BMI in association with lack of exercise can be due to stress or depression[11].

Findings revealed that the mean serotonin levels were significantly higher in patients with normal vitamin D levels as compared to vitamin D deficient groups (Table 4). Our findings were in line with the findings of previous studies that showed a vitamin D is a precursor molecule for the development of neurotransmitter like serotonin. Therefore, fibromyalgia due to dietary vitamin-D deficiency as well as minimal sunlight exposure by patients results in decreased serotonin levels and depression[12].

Similarly, subjects (76.1%) in present study had limited daily routine life activities of various grades. Lower the levels of vitamin-D and serotonin caused greater limitation of daily routine activity due to pain and stress. Our findings were in line with many previous studies that depicted similar results[13].

CONCLUSION

Lower levels of vitamin-D and serotonin were observed among fibromyalgia patients. Therefore, a relationship exists between serotonin levels and fibromyalgia. Hence, concluded that measuring serum serotonin levels can be a helpful tool in diagnosing fibromyalgia with depression. Moreover, supplementation with Vitamin-D and serotonin must be a routine in-order to overcome this illness among patients.

Limitations: We admit that financial constrains, limited resources and lack of other serum markers with genetic study were the limitations in present study.

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