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Research Article

CLINICAL STUDY AND CORRELATION OF VITAMIN D IN PATIENTS WITH LOW BACK PAIN

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A B S T R A C T

Objective Of The Study: (1) To describe the levels of serum vitamin D in patients with nonspecific low back pain(CNLBP) (2) To compare the levels of vitamin D in patients with non specific low back pain and patients with no prior history of low back pain.
Methods: Thirty patients diagnosed with chronic non specific LBP and thirty healthy subjects were enrolled in the study. A total sixty patients are included in the study.
Results: The mean age of the patients was 35.7 ± 9.7 years and control group was 40.0 ± 8.0. The scores from all the dimensions of the Short Form 36 and Beck Depression Inventory were significantly lower in the patient group. The vitamin D (25OHD3) level was also significantly lower in the patient group. According to the Oswestry Disability Scale, the daily life of the patients was observed to be limited due to LBP.
Conclusion: In the patients with chronic nonspecific LBP [CNLBP], 25OHD3 level is lower than the healthy controls. In CNLBP, increasing incidence of depression, deterioration in the quality of life, and serious functional impairment are observed. Vitamin D levels should be evaluated and any deficiency should be treated in patients with CLBP.

INTRODUCTION

A recent surge of published data on the proven or potential effects of Vitamin D has raised much interest in the medical community. The primary role of Vitamin D is the regulation of serum calcium levels within a narrow range. Vitamin D3 plays an essential role in bone formation, maintenance, and remodelling , as well as in muscle function. However, the emergence of new data suggests that the benefits of Vitamin D extend beyond healthy bones. Of great interest is the role it could play in optimizing neuromuscular functioning, reducing inflammation, and decreasing the risk of many chronic illnesses; these include a variety of cancers, autoimmune diseases, infectious diseases, and cardiovascular diseases [(1)(2)(3)(4)(5)]. Research has shown that Vitamin D exerts anatomic, hormonal, neurological, and immunological influences on pain manifestation, thereby playing a role in the aetiology and maintenance of chronic pain states and associated comorbidity[(1)(6)(7)(8)]

Low back pain is a common health problem with serious social and economic outcomes[(9)]. Experimental studies have shown that back pain may originate from various spinal structures such as the ligaments, facet joints, vertebral periostium, paravertebral muscles and fascia, blood vessels, annulus fibrosus, and spinal nerve endings. However, in 75–85% of patients with LBP, the anatomical pathology cannot be pinpointed through physical examination and diagnostic tests, and thus the condition is classified as ‘‘nonspecific low back pain’’[(10)]. Low back pain scanning studies have revealed that one in five of all back pains are chronic and the frequency of lifelong chronic back pain is 30% in the general population [(11)]. Adult bones undergo a constant state of remodeling.

Recent studies have reported that vitamin D deficiency may be associated with chronic and nonspecific musculoskeletal pain. These studies have revealed that the prevalence of hypovitaminosis D is higher among the patients with chronic nonspecific musculoskeletal pain [(10)(12)].

Decreased levels of 25(OH) D facilitate osteoclast genesis with consequent increased bone resorption[(13)]. Inadequate mineralisation of the collagen matrix due to low calcium and phosphate levels results in osteomalacia.

Vitamin D deficiency causes muscle weakness and pain in children and adults. Individuals with chronic low back pain have been found to have weaker gluteus medius muscles than control subjects without back pain [(14)]. The incidence of low back pain is associated with isometric and isokinetic trunk extensor weakness, whereas low back pain severity is associated with isokinetic trunk extensor and flexor weakness and isometric trunk extensor and flexor weakness [(15)].

Vitamin D deficiency leads to muscle weakness, pain in the extremities, and physical dysfunction. Chronic low back pain

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is a prominent symptom of osteomalacia[16]. The cause of chronic non specific low back pain in vitamin D deficiency is yet to be cleared. However, it is probable that even a mild vitamin D deficiency may result in increased bone resorption and risk of micro fractures. Also, loss of tonus in the back, abdominal, and extremity muscles, which is not manually measurable; body mechanics disorders due to endurance problems in the muscles; and low back pain secondary to this may develop in the patients with low vitamin D levels

In the present study, our aim is to investigate the vitamin D levels and the associated factors in the patients with chronic nonspecific LBP [CNLBP][1][6][7][8]

Objective of the Study

1. To describe the levels of serum Vitamin D in patients with nonspecific LBP
2. To compare the levels of vitamin D in patients with non specific low back pain and patients with no prior history of low back pain

MATERIALS AND METHODS

Source of data: The study will include outpatients and inpatients of KING GEORGE HOSPITAL during November 2019 to March 2021.

Method of collection of data

Study Design- The study was a cross-sectional cohort study of consecutive patients with non-specific low back pain

Sample and Sampling Techniques: A total of thirty patients of low back pain will be selected as cases using purposive sampling technique. Thirty patients will be selected as controls with no prior history of low back pain and no history of calcium and vitamin D supplement intake. A total sixty patients are included in the study.

Inclusion Criteria

1. 20–50 years of age
2. Complaint of low back pain
3. No specific diagnosis for the origin of the low back pain
4. Signature of the informed consent form
5. No participation in another study

Exclusion Criteria

1. Radiculopathy, neuropathy, and vertebral malformation observed in the physical examination
2. Known osteoporosis
3. History of rheumatic disease
4. Known liver and kidney disease
5. Patients with inflammatory low back pain
6. Those with congenital vertebral anomalies
7. Those with apparent causes in the X-ray [spondylolisthesis, spondylolysis, lumbarization, sacralization, lumbar spondylosis, fracture, and scoliosis]
8. Malignancy and known pregnancy
9. Those using sunscreen.

Evaluation scales

For the assessment of the quality of life in the CNLBP(chronic non specific low back pain patients) and HNC (healthy normal controls) groups, Short Form 36 [SF-36] was employed [52][53][54][55][56][57]. The depression status was assessed using the validated Beck Depression Inventory [BDI] [47][48].

The functional status of the CNLBP group was evaluated through the Oswestry Disability Scale [ODS] [49][50][51].
The pain status was evaluated using the visual analog scale [0–10 cm].

Short Form 36

The SF-36 scale consists of 36 items and they enable the assessment of eight dimensions: physical functioning [10 items], social functioning [two items], limitations of role due to physical function [four items], limitations of role due to emotional function [three items], mental health [five items], vitality[four items], bodily pain [two items], and the perception of general health [five items].

The subscales evaluate the health on a scale between 0 and 100, where 0 indicates ‘‘poor health’’ and 100 indicates ‘‘good health’’ [51][52][53][54][55][56][57].

Beck Depression Inventory

This scale measures the somatic, emotional, cognitive, and motivational symptoms observed in depression and consists of 21 questions. The highest score obtained from the four items that correspond to 1–3 points is 63. Zero to 13 points indicate the absence of depression, 14–24 points correspond to medium depression, and 25 points and above indicate severe depression (15). On this form, patients were asked to specify the sentence that best describes how they felt during the previous week including that day (16).

The Oswestry Disability Scale

The ODS consists of 10 questions where each question is worth 0–5 points. These include the pain intensity, personal care, lifting, walking, sitting, standing, sleeping, social life, traveling, and the change in the severity of the pain. The patient is asked to select the statement that most closely describes his/her condition [49][50][51]. The obtained percentages are interpreted as follows:

0–20%—the back pain causes minimal disability in the patient’s life
20–40%—the back pain causes moderate disability in the patient’s life
40–60%—the back pain causes severe disability in the patient’s life
60–80%—the patient’s daily life is totally restricted due to the LBP
80–100%—the patient is bedridden [or the symptoms are exaggerated]

Visual Analog Scale

Patients’ pain was evaluated using the 10 cm visual analog scale [VAS]. On the straight line, the patients were explained what the numbers meant: 0 stood for no pain, 5 stood for medium pain, and 10 represented the most severe pain endured in life. The patients were asked to describe the severity of their pain on this scale. The VAS assessment of the patients was carried out separately for resting and the activities of daily life.

Statistical Analysis

Descriptive Statistics- It includes expression of the study variables with categorical data in terms of number &

percentage, whereas in terms of mean & SD for continuous data.

Inferential Statistics

Chi square test was used to compare the categorical variables between the CNLBP & HNC group.

Independent Student t test was used to comparison of Laboratory values, short form 36 scores between CNLBP & HNC groups. Similar comparison was also done for gender-based & Vitamin D3 level differences in CNLBP group.

Pearson Correlation between Vitamin D3 levels and other parameters in CNLBP & HNC groups

The level of significance [P-Value] was set at P<0.05

Statistical Analysis

Statistical Package for Social Sciences [SPSS] for Windows, Version 22.0. Released 2013. Armonk, NY: IBM Corp., was used to perform statistical analysis.

RESULTS

Table 1 General Characteristics of the Non-specific Low Back Pain [CNLBP] and Healthy Normal Control [HNC]Groups

General Characteristics of the Non-specific Low Back Pain[CNLBP] and Healthy Normal Control[HNC]Groups						
Variables	**Categories**	**CNLBP**		**HNC**		**P-Value**
		N	**%**	**n**	**%**	
SEX	Males	11	36.7%	11	36.7%	
	Females	19	63.3%	19	63.3%	1.00[a]
HTN	Present	2	6.7%	11	36.7%	
	Absent	28	93.3%	19	63.3%	0.005*[a]
DM	Present	4	13.3%	8	26.7%	
	Absent	26	86.7%	22	73.3%	0.20[a]
		Mean	SD	Mean	SD	
Age (in yrs.)	Mean &SD	35.7	9.7	40.0	8.0	0.07[b]

a. ChiSquare Test
b. Independent Student t test
*- Statistically Significant

In CNLBP group of 30 patients, 11(36.7%) were males and 19 (63.3%) were females and in HNC group out of 30 individuals, 11(36.7%) were male and 19(63.3%) were females.sex ratio in CNLBP and HNC groups were similar and there was no statistical significance between the groups.

There were 11(36.7%) individuals with hypertension in HNC group compared to 2(6.7%) patients in CNLBP group with statistical significance of P value 0.005.

There was no statistical significance in two groups who were with diabetes.

Minimum age in this study was 20yrs and maximumage50yrs. Age (mean+/-SD) in CNLBP was 35.7+/-9.7 and in HNC were 40+/-8yrs.

Table 2 Comparison of Laboratory values between CNLBP & HNC groups using Independent Student t test

Comparison of Laboratory values between CNLBP & HNC groups using Independent Student t test							
Parameters	**Group**	**n**	**Mean**	**SD**	**Mean Diff**	**t**	**P-Value**
S.VIT D3 ng/ml	CNLBP	30	16.58	8.55	-5.19	-2.264	0.03*
	HNC	30	21.78	9.20			
S,PHOS mg/dl	CNLBP	30	4.09	0.61	0.24	1.413	0.16
	HNC	30	3.85	0.72			
S.CAL Mg/dl	CNLBP	30	9.34	1.28	-0.47	-1.317	0.17
	HNC	30	9.81	1.34			
PARA Pg/ml	CNLBP	30	43.97	16.87	3.60	0.852	0.40
	HNC	30	40.37	15.84			

*stastically significant
25OHD3 value was 16.58+/- 8.55 in the CNLBP group,the average 25OHD3 value in the HNC group was 1.74+/-9.2. there was significant difference between the CNLBP and HNC groups in terms of 25OHD3 values(p<0.001), although no significant difference was observed regarding the other laboratory readings (p<0.05) (Table 2).

Table 3 Clinical Characteristics of CNLBP group

Clinical Characteristics of CNLBP group			
Parameters	**Categories**	**Mean**	**SD**
VASScores	Mean & SD	6.47	1.41
	Scale	n	%
Oswestry Disability Scale	0-20	1	3.3%
	21 -40	7	23.3%
	41 -60	17	56.7%
	61 -80	5	16.7%
	81-100	0	0.0%

The average VAS score was 6.47+/-1.41 in CNLBP group. OSWESTRY DISABILITY SCORE in CNLBP group with 0-20:mild disability were 3.3%, 21-40:moderate disability were 23.3%,41-60:severe disability were 56.7%,61-80:crippled were16.7%,81-100 : bed bound were 0%.

Table 4 Comparison of Beck Depression Inventory scale between CNLBP & HNC group

Comparison of Beck Depression Inventory scale between CLBP& HNC groups using Chi square test					
BDI	CNLBP		HNC		P-Value
	n	%	n	%	
Absent	19	63.3%	29	96.7%	
Moderate	4	13.3%	1	3.3%	0.04*
Severe	7	23.3%	0	0.0%	

Cases with Moderate and severe depression in CNLBP group were 13.3% and 23.3% which was statistically significant when compared to HCN group with p value 0.004. [p<0.05] [Table4].

Table 5 Comparison of mean Short Form36 scores between CNLBP & HNC groups

Comparison of mean Short Form 36 scores between CNLBP & HNC groups using Independent Student t test							
SF–36	**Group**	**N**	**Mean**	**SD**	**MeanDiff**	**t**	**P-Value**
General Health	CNLBP	30	27.69	13.01	-50.25	-10.564	<0.001*
	HNC	30	77.94	22.57			
Physical Functioning	CNLBP	30	59.68	10.30	-13.34	-5.518	<0.001*
	HNC	30	73.02	9.73			
Role–Physical	CNLBP	30	43.33	50.40	-30.00	-2.432	0.02*
	HNC	30	73.33	44.98			
Role-Emotional	CNLBP	30	50.00	50.86	-30.00	-2.523	0.01*
	HNC	30	80.00	40.68			
Energy/ Fatigue	CNLBP	30	36.05	13.03	-35.05	-10.465	<0.001*
	HNC	30	71.10	12.91			
Emotional Well Being	CNLBP	30	29.81	17.85	-53.79	-14.423	<0.001*
	HNC	30	83.60	9.93			
Bodily Pain	CNLBP	30	28.92	22.63	-53.17	-11.234	<0.001*
	HNC	30	82.08	12.65			
Social Functioning	CNLBP	30	29.58	19.28	-50.75	-11.390	<0.001*
	HNC	30	80.33	14.97			

*- Statistically Significant
When the SF-36 scores of the CNLBP and HNC groups were compared , all the parameters were observed to be significantly lower in the CNLBP group (p<0.005)

Table 6 Gender wise comparison of certain characteristics in CNLBP group

Gender wise comparison of certain characteristics in CNLBP group using Independent Student t test							
Parameters	**SEX**	**N**	**Mean**	**SD**	**Mean Diff**	**t**	**P-Value**
S.VITD3 ng/ml	Males	11	16.64	8.39	0.08	0.025	0.98
	Females	19	16.55	8.87			
S.PHOS mg/dl	Males	11	3.95	0.56	-0.23	-1.013	0.32
	Females	19	4.18	0.63			
S.CAL(mg/dl)	Males	11	9.78	1.28	0.70	1.464	0.15
	Females	19	9.08	1.24			
PARA.pg/ml	Males	11	43.64	14.48	-0.52	-0.080	0.94
	Females	19	44.16	18.48			
VAS Scores	Males	11	6.27	1.56	-0.31	-0.567	0.58
	Females	19	6.58	1.35			
General Health	Males	11	28.18	17.65	0.77	0.154	0.88
	Females	19	27.41	9.97			
Physical Functioning	Males	11	74.17	10.90			

	Females	19	72.35	9.23	1.82	0.488	0.63
Role-Physical	Males	11	36.36	50.45			
	Females	19	47.37	51.30	-11.01	-0.570	0.57
Role-Emotional	Males	11	36.36	50.45			
	Females	19	57.89	50.73	-21.53	-1.122	0.27
Energy/ Fatigue	Males	11	38.64	17.40			
	Females	19	34.56	9.94	4.08	0.821	0.42
Emotional Well Being	Males	11	29.73	21.23			
	Females	19	29.86	16.21	-0.13	-0.019	0.99
Bodily Pain	Males	11	26.59	21.74			
	Females	19	30.26	23.60	-3.67	-0.422	0.68
Social Functioning	Males	11	29.55	23.90			
	Females	19	29.61	16.78	-0.06	-0.008	0.99

There was no statistical significance in the parameters mentioned in the above table in relation to gender in both the groups

Table 7 Gender wise comparison of Oswestry Disability Scale & Becks Depression Inventory in CNLBP group

Gender wise comparison of Oswestry Disability Scale & Becks Depression Inventory in CNLBP group using Chi Square test

Variables	Categories	Males		Females		P-Value
		n	%	n	%	
Oswestry Disability Scale	0-20	0	0.0%	1	5.3%	0.04*
	21 -40	4	36.4%	3	15.8%	
	41 -60	3	27.3%	14	73.7%	
	61 -80	4	36.4%	1	5.3%	
	81-100	0	0.0%	0	0.0%	
Becks Depression Inventory	Absent	8	72.7%	11	57.9%	0.71
	Moderate	1	9.1%	3	15.8%	
	Severe	2	18.2%	5	26.3%	

*- Statistically Significant

Females with score 0-20 –mild disability(5.3%) ,41-60-severe disability(73.7%) was compared to males with score 0-20-mild disability(0%) and 40-60-severe disability(27.3%)in CNLBP group had statistical significance (p 0.04).

Score of 21-40-moderate disability (36.4%) and 61-80-crippled (36.4%) in males compared with females with score of 21-40(15.8%) and 61-80-crippled(5.3%) had statistical significance(p0.04).

There was no statistical significance in BDI in both the sexes in CNLBP group

Table 8 Gender wise comparison of mean VitaminD3 levels [in ng/ml] in CNLBP & HNC groups

Gender wise comparison of mean VitaminD3 levels [in ng/ml] in CNLBP & HNC groups

	sex	n	Mean	SD	Mean difference	T	P-Value
CNLBP	Males	11	16.64	8.39	0.08	0.025	0.98
	Females	19	16.55	8.87			
HNC	Males	11	18.65	10.33	-4.94	-1.444	0.16
	Females	19	23.59	8.23			

When the vitaminD levels were compared based on sex in the CNLBP and HNC groups, there was no statistical significance

Table 9 Pearson Correlation betweenVitaminD3 levels and other parameters in CNLBP & HNC groups

Group	Variable	Values	S.PHOS	S.CAL	PARA.Th	VAS	ODS	BDI
CNLBP	S.VITD3	r	0.20	0.30	-0.04	-0.32	-0.30	-0.14
		P-Value	0.28	0.11	0.82	0.08	0.11	0.48
HNC	S.VITD3	r	-0.02	0.09	-0.09			-0.20
		P-Value	0.93	0.64	0.65			0.29

The correlation coefficients are denoted by 'r' Minus sign denotes negative orrelation
Correlation coefficient range
0.0-No Correlation
0.01-0.20 –Very Weak Correlation
0.21-0.40 –Weak Correlation
0.41-0.60 -Moderate Correlation
0.61-0.80 –Strong Correlation
0.81-1.00-Very Strong Correlation

There was very weak correlation of vitD3 with parameters like s.phosphorus, s.calcium and negative correlation with parathormone levels, VAS, ODS and BDI in CNLBP.

There was very weak correlation of vitamin D3 with serum calcium and negative correlation with s.phosphorus, parathormone and BDI in HNC group

Table 10 Pearson Correlation between VitaminD3 levels and other parameters in CNLBP & HNC groups

Group	Variable	Values	G.Health	Phy. Function	Role-Phys	Role-Emo	Eng/Fat	EWB	Body Pain	Soc Function
CNSLBP	S.VITD3	r	-0.05	-0.12	-0.24	-0.01	0.02	0.29	0.03	0.18
		p-value	0.80	0.54	0.19	0.97	0.92	0.13	0.89	0.34
HNC	S.VITD3	r	-0.08	0.26	0.01	0.13	0.32	0.15	0.11	0.20
		p-value	0.67	0.17	0.94	0.51	0.09	0.44	0.57	0.29

The correlation coefficients are denoted by 'r'
Minus sign denotes negative correlation
Correlation coefficient range
0.0-No Correlation
0.01-0.20 –Very Weak Correlation
0.21-0.40 –Weak Correlation
0.41-0.60 -Moderate Correlation
0.61-0.80 –Strong Correlation
0.81-1.00-Very Strong Correlation

Table 11 Comparison of patient's VitaminD3 levels with the Laboratory and clinical parameters

Comparison of patient's Vitamin D3 levels with the Laboratory and clinical parameters using Independent student t test

Parameters	Vit.D3	N	Mean	SD	MeanDiff	t	P-value
S.PHOSmg/dl	Inadequate	22	3.99	0.62	-0.38	-1.567	0.13
	Adequate	8	4.38	0.50			
S.CAL(mg/dl)	Inadequate	22	9.04	1.28	-1.12	-2.264	0.03*
	Adequate	8	10.16	0.94			
PARA.pg/ml	Inadequate	22	44.68	18.81	2.68	0.379	0.71
	Adequate	8	42.00	10.53			
VAS Scores	Inadequate	22	6.73	1.49	0.98	1.739	0.09
	Adequate	8	5.75	0.89			
ODS Scores	Inadequate	22	51.55	13.41	8.42	1.453	0.16
	Adequate	8	43.13	15.76			
BDI Scores	Inadequate	22	16.14	13.68	2.76	0.510	0.61
	Adequate	8	13.38	11.22			
General Health	Inadequate	22	28.45	10.55	2.82	0.519	0.61
	Adequate	8	25.63	18.98			
Physical Functioning	Inadequate	22	73.28	7.42	0.97	0.238	0.81
	Adequate	8	72.31	15.04			
Role-Physical	Inadequate	22	45.45	50.97	7.95	0.377	0.71
	Adequate	8	37.50	51.76			
Role-Emotional	Inadequate	22	54.55	50.97	17.05	0.807	0.43
	Adequate	8	37.50	51.76			
Energy/ Fatigue	Inadequate	22	35.83	14.56	-0.84	-0.152	0.88
	Adequate	8	36.67	8.17			
Emotional Well Being	Inadequate	22	27.11	15.21	-10.15	-1.399	0.17
	Adequate	8	37.25	23.24			
Bodily Pain	Inadequate	22	28.98	23.05	0.23	0.024	0.98
	Adequate	8	28.75	22.95			
Social Functioning	Inadequate	22	28.41	20.48	-4.40	-0.547	0.59
	Adequate	8	32.81	16.28			

*- Statistically SignificantS.calcium level were significantly low in patients with vitD3 deficiency with (p0.03)

DISCUSSION

Low back pain is a common health problem with serious social and economic outcomes. It is only rational to take measures against the known risk factors. [60] Clinical symptoms of vitamin D deficiency are various and LBP may be an indication of vitamin D deficiency.

It has been demonstrated in our study that the 25OHD3 vitamin levels in the patients with CNLBP is lower than the HNCs.

Table 12 Study of vitaminD3 deficiency in LBP patients

Study	Total patients	% of patients with vit D deficiency
Minneapolis *et al* study (2003)	150	93%
Faraj *et al* study(2003)	60	83.3%
B.Bayakaraetal study(2014)	360	83%
Present study	30	73.33%

In a study conducted in Minneapolis, low vitamin D concentrations were demonstrated in 93% of the 150patients with persistent nonspecific musculoskeletal pain[6]. In B. Baykara *et al*.study[71], the vitamin D levels were observed to be low in 83.3% of the 60 patients and these patients were prescribed vitaminD treatment

In the case reports published by Gerry *et al.* [58], it has been emphasized that physicians should suspect low vitamin D levels in the patients with LBP, and vitamin D scans may be of importance in these patients. It has been concluded that care must be taken to assess the vitaminD levels before and after vertebral surgery and that the results of placebo-controlled studies have pointed out a need for vitamin D support in the patients who have undergone vertebral surgery. [59]In a study by Farajetal. [62] conducted on 360 patients between the ages of 15 and52 in Saudi Arabia, vitamin D deficiency was detected in83% of the patients. These patients were prescribed vitamin D treatment for three months. During the evaluation at the end of this period, the 25OHD3 levels were observed to have risen to normal levels and the clinical symptoms were improved in 95% of the patients. Similarly in our study, the vitamin D levels were observed to be low in 73.3% of the patients and these patients were prescribed vitamin D treatment. However, they were not followed up for the purposes of the study. Vitamin D deficiency leads to muscle weakness, pain in the extremities, and physical dysfunction .Chronic LBP is a prominent symptom of osteomalacia. [16] The cause of CNLBP in vitamin D deficiency is yet to be cleared. However, It is probable that even a mild vitamin D deficiency may result in increased bone resorption and risk of micro fractures. Also, loss of tonus in the back, abdominal, and extremity muscles, which is not manually measurable; body mechanics disorders due to endurance problems in the muscles; and LBP secondary to this may develop in the patients with low vitamin D levels.

Table 13 Gender wise distribution

S.no	Study	VitD deficiency in LBP patients%	
		Male	Female
01	Farajetal study (2003)	87%	89.2%
02	B.Baykaraetal study(2014)	83%	83%
03	Present study	72.72%	73.68%

Similarly in our study, vitamin D deficiency was detectedin73.68% of the females and 72.72% of the males in CNLBP group. In B. Baykara *et al*.[71] study, vitamin D deficiency was detected in 89.2% of the females and 87%of the males. In Saud Al Faraj *et al.* [72] study vitamin D deficiency was detected in 83% of females and 83% of males

There was an insignificant negative correlation between the serum 25OHD3 and serum PTH levels levels in our study, there was very weak correlation with the Ca, P, and ALP. While there was an insignificant negative correlation between the serum 25OHD3 and serum PTH levels in B. Baykara *et al*.study[71],there was also an insignificant negative correlation with the Ca, P, andALP .This point was not in compliance with the previous study in terms of the PTH and Ca. In the study by Lotfi*et al.* [61], a significant negative correlation was detected between the 25OHD3 and the PTH, while there was a significant positive correlation with Ca. No significant correlation was found with ALP and P.

Recent studies have shown that routine Ca, P, and ALP readings are not reliable markers of 25OHD3 deficiency, although adequate PTH is produced in response to vitamin D deficiency[63].

The severity of the pain and the difficulty of the patients with vitamin D deficiency in performing daily tasks were higher than the patients with adequate vitamin D. In contrast, one study [64] indicated that a group of Danish people with nonspecific LBP did not have a vitamin D deficiency, and no relationships were found between those with a vitamin D deficiency and myopathy –related symptoms of weakness and paraesthesia in the legs, back pain, or leg pain intensity. The LBP patients with a vitamin D deficiency did not have different clinical characteristics compared with LBP patients with normal vitamin D levels. Studies have also shown that excessive physical activity increases LBP.

In a study by Sward *et al.* [65] conducted on 142 athletes, the ratio of LBP was 50–85%. Also, decrease in the disc height, Schmorl nodules, and configuration changes in the vertebral bodies were reported in the athletes with a36–55% correlation with the back pain [66]. One study [67]showed a vitamin D deficiency was highly prevalent in lumbar spinal stenosis patients [74.3%], and severe pain was associated with higher prevalence of vitamin D deficiency.

Table14 severity of depression in cases and controls in different studies

S. no	Study	Group	Mild depression	Moderate depression	Severe depression
01	B.Baykaraetal study(2014)	CNLBP		13.3%	23.3%
		HNC		3.3%	
02	Presentstudy	CNLBP	31.7%		25%
		HNC	20%		

Although they are not always on a level to be clinically diagnosed, depressive disorders are rather frequently observed in the patients with back pain. Studies have shown that depression accompanies chronic pain and it is the result of the pain, rather than its cause. We have detected severe depressive mood in23.3% of our patients and moderate depression in 13.3%.Inthe HNC group, we have observed moderate depressive mood in 3.3% of the HNC group. A significant part of our CNLBP group had a depressive mood. Studies have shown that anxiety, depression,
and somatoform disorders have an important place in the life of the patients with chronic LBP[68,69].

In B. Baykara *et al*.study[71],severe depressive mood in25%and mild depression in 31.7% in low back pain patients and mild depressive mood in 20% of the HNCgroup.

In the study by Gur *et al.* [70] where they investigated the effects of depression on the quality of life, the authors have observed that pain and depression have a close relationship and underlined that a psychiatric aspect maybe added to the

approach. Taking the psychological condition that is brought about by the chronic pain inconsideration during the treatment of these patients and giving psychiatric support may positively influence the results.

Table 15 Comparision of ODS

S.no	Study	Mild	Moderate	Severe	Crippled
01	B.Baykara Etal study (2014)	3.3%	23.3%	56.7%	16.7%
02	Present study	26.7%		63.3%	10%

The back pain was mildly limiting the daily life in 3.3%of our patients, moderate limitation in 23.3%, severely limiting the daily life in 56.7%, and had a complete impact on daily life in 16.7% of the patients. While in B.Baykara *et al*. study[71],the back pain was mildly limiting the daily life in 26.7% of patients, severely limiting the daily life in 63.3%, and had a complete impact on dailylifein10%ofthepatients.

However, all the parameters of the SF-36weresignificantly lower in the CNLBP group in comparison with the controls in our study. In B. Baykara etal. study[71],all the parameters of the SF-36 except for mental health were significantly lower in the CNLBP group in comparison with the controls .This result indicates that CNLBP has a serious impact on the quality of life.

CONCLUSION

Vitamin D deficiency is an important cause of CNLBP. The frequency of the mood disorder increases ,while the functional condition and quality of life deteriorate in chronic LBP. In the patients with CNLBP, the vitamin D levels must be assessed and any deficiencies must be treated.

Summary

A total of thirty patients of low back pain and thirty control with no prior history of low back pain were included in the study.

This study was undertaken to study of vitamin D deficiency in patients with non specific low back pain and to study the frequency of the depressive mood disorder , the functional condition and quality of life in chronic non specific LBP patients using BDI ,ODS,SF36 respectively.

In this study Serum vitamin D levels were observed to below in 73.3% of the patients with CNLBP. vitamin D deficiency was detected in73.68% of the females and 72.72% of the males in CNLBP group.

There was an insignificant negative correlation between the serum 25OHD3 and serum PTH levels levels in this study, there was very weak correlation with the Ca, P,and ALP.

In this study severe depressive mood in 23.3% of patients and moderate depression in 13.3% were detected in CNLBP group and moderate depressive mood in 3.3% of the HNC group was observed.

The backpain was mildly limiting the daily life in 3.3%, moderate limitation in 23.3%, severely limiting the daily life in 56.7%, and had a complete impact on daily life in16.7%of the patients in this study using ODS.

All the parameters of the SF-36 were significantly lower in the CNLBP group in comparison with the controls.

This result indicates that CNLBP has a serious impact on the quality of life.

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