ORIGINAL ARTICLE

Determinants of depression and somatisation symptoms in low back pain patients and its treatment: global burden of diseases

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Abstract

Objective: To determine the prevalence of Low Back Pain in primary care setting population and to examine its association with symptoms of depression and somatisation.

Methods: The cross-sectional study was conducted at 13 Primary Healthcare Centres (throughout Qatar from March to December, 2012. A General Health Questionnaire was used to identify the probable cases. A specially designed questionnaire with three parts was used for data collection: socio-demographic information of the studied subjects, modified version of the Roland-Morris scale for evaluating back-related functional disability, and Symptom Cheklist-90-Revised for depression and somatisation subscales.

Results: A representative sample of 2,600 patients was approached and 1,829(70.0%) of them participated in the study. The prevalence of low back pain in the study sample was 56.5%. There were statistically significant differences between subjects with and without low back pain in terms of body mass index ($p<0.025$), gender ($p<0.003$) and housing condition ($p<0.001$). There was a significant difference between subjects with and without the pain in terms of all aspects of functional disability. Somatisation disorder in low back pain was 203 (19.6%) and depression disorder was 265 (25.4%). Most of the patients with LBP reported pain in the arms and legs ($p<0.001$); shortness of breath ($p<0.028$) palpitations ($p=0.004$); gastrointestinal complaints such as abdominal pain ($p<0.001$), diarrhoea ($p<0.001$) and vomiting ($p<0.001$); feeling tired ($p<0.001$); trouble with sleeping ($p<0.001$); headache ($p<0.001$) and fainting ($p=0.043$). The mode of treatment taken by the patients for relief were bed rest 695 (67.2%) followed by warm compression 480 (47.6%), physiotherapy 491 (47.5%), regular exercise 414 (40%), and back plasters 346 (33.5%).

Conclusion: The present study showed that the symptoms of depression and somatisation were prevalent among low back pain patients. Functional disability was higher in the patients. Recognising this problem may lead to better patient-treatment matching and improved clinical outcomes.

Keywords: Somatisation, Symptoms, Psychiatric disturbance, Treatment, Low back pain, Primary health care. (JPMA 65: 473; 2015)

Introduction

Low back pain (LBP) is prevalent worldwide[1] and LBP disability has reached epidemic proportions[2] in many industrialised[1,3,4] and newly developing societies.[2,5-8] LBP is ranked first as a cause of disability and inability to work and is expected to affect most adults at some point during their lifetime[2,3] and it is a symptom commonly presented to general practitioners. It is an important clinical and public health problem, being the most ubiquitous illness among humans after the common cold. In general populations, LBP is the most prevalent form of chronic musculoskeletal pain, often leading to disability.[3] It has been established that LBP is the second most frequent cause of disability in adult population in Europe. Eight in every ten adults experience LBP at some point in their life.[4]

LBP is a complex condition produced by multiple factors and it was reported[5,9] that LBP can have a substantial negative impact on quality of life and that psychological distress is common in patients with LBP. It was reported that the risk of LBP increases rapidly with greater amounts of physical work and psychological distress. Primary prevention studies are important to identify the risk factors predictive of LBP before additional interventions can be developed. A previous study[4] reported that LBP has high impact in the general population, as psychological disorders are very common. Also, a recent study[6] observed a high rate of co-morbidity of somatisation, depression, anxiety and stress was found in the studied population and indicated a strong association between these psychological disorders in patients.[3-10] The

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aim of this study was to determine the prevalence of LBP in primary care setting population and to examine its association with the symptoms of depression and somatisation.

Subjects and Methods

The prospective cross-sectional study was conducted from March to December 2012 at 13 Primary Healthcare Centres (PHCs) across Qatar which are frequented by all levels of the general population as a gateway to specialist care. The study comprised subjects aged 15 to 65 years who came to any of the 13 PHCs; 10 in urban areas and 3 in semi-urban. Approval was obtained from the Hamad Medical Corporation Institutional Review Board for conducting the study.

Qualified nurses were trained to interview the patients and complete the questionnaires. The sample size was computed based on 50% prevalence of LBP in the UAE,[7,8] assuming 2% bound on error estimation, and taking 99% confidence level, the required minimum sample size for this study was 2600. The survey instrument was tested on 100 patients who visited the health centres and thus validated the questionnaire. General Health Questionnaire (GHQ-12)[9,10] was used to identify the probable cases. The study excluded patients aged below 15 years and above 65 years, patients with any cognitive or physical impairment and those who refused to give consent to take part in the study.

A specially-designed questionnaire with three parts was used for data collection: socio-demographic information of the studied subjects, modified version of the Roland-Morris scale for evaluating back-related functional disability, and Symptom Cheklist-90-Revised (SCL-90-R) for depression and somatisation subscales.

The Roland-Morris disability questionnaire (RDQ)[11,12] is constructed by choosing statements from the sickness impact profile (SIP), which is a 136-item health status measure covering a range of aspects of daily living about physical and mental function.[5,11,12] We used a modified 24-item version of the Roland-Morris Scale for evaluating back disability. The scale consists of 21 yes/no items related specifically to physical functions to specifically assess the disability from LBP. The physical functions considered included walking, bending over, sitting, lying down, dressing, sleeping, self-care and daily activities. Patients were asked whether the statements apply to them that day (i.e. the preceding 24h). In the scale, one point is given for each item. The RDQ score can be obtained by adding up the number of items checked. The final score ranges from 0 (no disability) to 21 (severe disability). The questionnaire is self-administered by the patient. It can be completed in a maximum of 5min, and an un-weighted score can be calculated in less than 1min.

A variety of outcome measures are used for LBP. Among the most common instruments developed to assess the functional status of patients with LBP is the Roland-Morris Disability Questionnaire (RMDQ).[2,5,11] This questionnaire as well as the criteria for back-related disability-specific quality of life defined in litereature[11-14] were used. This is a modified 24-item version of the Roland-Morris Scale[15] for evaluating back disability. For the purposes of this study, three items were removed for the sake of simplicity and to avoid overlap of meanings on translation into Arabic. For each question, there were two options; 1 for "Yes" and 2 for "No".

In the depression and somatisation part of the questionnaire, there were 10 items for depression and 7 items for somatisation.[14] Respondents were asked to indicate how often they had depression and somatisation symptoms. For all these items, there were response options scored from 0 to 4 for "not at all", "a little bit", "moderately", "quite a bit", "extremely". Mean scores for depression and somatisation was calculated by taking the average over the relevant items. When less than four answers in the first section or three answers in the second section were missing, the raw scores for each of the questions of a section were totalled and this sum was divided by the number of non-missing answers.

The procedure of translation and back translation used for the RMDQ scale was followed. An Arabic version of the questionnaire was revised by a bilingual co-investigator and translated by a bilingual general practitioner unacquainted with the original English version. Both translators met and made necessary corrections, modifications and rewordings after considering the minor differences and discrepancies.

Use of descriptors of LBP functional disability and depression, somatisation symptoms was identified, selecting the responses with frequency of more than 50% among LBP patients when applying instruments 2 and 3, matching corresponding descriptors with WHO,[15] International Classification of Functioning, Disability and Health (ICF) Core-Set for the component of activity limitation and for body functioning.

Data was analysed using SPSS 20. Student-t test was used to ascertain the significance of differences between mean values of two continuous variables and confirmed by non-parametric Mann-Whitney test. Chi-square and the Fisher's exact test (two-tailed) were performed to test for differences in proportions of categorical variables between two or more groups. Kruskal Wallis one-way

analysis of variance (ANOVA) was employed for comparison of several group means and to determine the presence of significant differences between group means. The factor structure of the somatisation and depression symptoms which were examined using a principal components analysis with a varimax rotation. The factor analysis divided the items into three factors for the somatic and depression symptoms. Internal consistencies of each factor with percentage variance were calculated using Cronbach's alpha coefficients. The level p<0.05 was considered significant.

Results

A representative sample of 2,600 patients was approached but 1,829(70%) agreed to participate in the study.

There were statistically significant differences between subjects with and without LBP in term of body mass index (BMI) (p=0.025), gender (p=0.003) and housing condition (p=0.001) (Table-1).

There was a significant difference between subjects with and without LBP in terms of all the aspects of functional disability. Significant higher proportion of subjects with LBP compared to those without LBP reported, "staying at home most of the time" [238(23%) vs. 111(14%); p<0.001], "changing position frequently to make back and legs comfortable" [743(71%) vs. 310(39%); p <0.001], "walking slowly than usual because of back pain" [480(46%) vs. 211(27%); p <0.001], "dressing more slowly than usual" [318(31%) vs. 141(18%); p <0.001], "more irritable and bad tempered with people" [373(36%) vs. 189(24%); p <0.001], and "staying in bed most of the time" [414(40%) vs. 183(23%); p <0.001] (Table-2).

Somatisation disorder in LBP was 203 (19.6%) and depression disorder was 265 (25.4%). Occupation was significantly associated with both depression and somatisation symptoms. LBP patients with sedentary professions represented highest mean score for depression 4.79±1.24 (95% CI 4.31-5.27). Similarly, subjects with army/police profession scored highest on somatisation scale (mean 3.27±1.26; 95% CI 2.75-3.79) while on the other hand housewives or unemployed men scored lowest on the somatisation scale (mean 2.56±1.12; 95% CI 2.33-2.79) (Table-3).

Most of patients with LBP reported pain in the arms and legs (p<0.001); shortness of breath (p<0.028) palpitations (p=0.004); gastrointestinal complaints such as abdominal pain (p<0.001), diarrhoea (p<0.001) and vomiting (p<0.001); feeling tired (p<0.001); trouble with sleeping (p<0.001); headache (p<0.001) and fainting (p=0.043)

Table-1: Socio-demographic characteristics (n=1829).

Variable		With LBP n=1034 n(%)	Without LBP n=795 n(%)	P-Value
Age Group				
	<35	149(14.4)	111(14.0)	0.919
	35-44	234(22.6)	171(21.5)	
	45-55	345(33.4)	273(34.3)	
	>55	306(29.6)	240(30.2)	
BMI Group				
	<25	297(28.7)	245(30.8)	0.025
	25-30	402(38.9)	339(42.6)	
	>30	335(32.4)	211(26.5)	
Gender				
	Male	496(48.0)	438(55.1)	0.003
	Female	538(52.0)	357(44.9)	
Ethnicity				
	Qatari	533(51.5)	404(50.8)	0.757
	Non-Qatari	501(48.5)	391(49.2)	
Marital Status				
	Single	83(8.0)	50(6.3)	0.247
	Married	893(86.4)	707(88.9)	
	Widow	58(5.6)	38(4.8)	
Level of Education				
	Illiterate	151(14.6)	141(17.7)	0.317
	Elementary	209(20.2)	158(19.9)	
	Intermediate	223(21.6)	159(20.0)	
	Secondary	247(23.9)	171(21.5)	
	University	204(19.7)	166(20.9)	
Occupation				
	House wife/not working	339(32.8)	253(31.8)	0.974
	Sedentary & Professional	170(16.4)	135(17.0)	
	Manual	351(33.9)	267(33.6)	
	Businessman	99(9.6)	77(9.7)	
	Arm/ Police	75(7.3)	63(7.9)	
Monthly Household Income				
	Less than $2,000	72(7.0)	53(6.7)	0.826
	$2,000-$3,999	356(34.4)	271(34.1)	
	$4,000-$5,999	366(35.4)	297(37.4)	
	>$6,000	240(23.2)	174(21.9)	
Place of living				
	Urban	986(95.4)	756(95.1)	0.793
	Semi-Urban	48(4.6)	39(4.9)	
Housing condition				
	Villa	366(35.4)	299(37.6)	0.001
	semi-villa	490(47.4)	412(51.8)	
	Apartment-flat	138(13.3)	60(7.5)	
	mud house/traditional	40(3.9)	24(3.0)	
Type of Air Condition				
	Unit	723(69.9)	534(67.2)	0.208
	Central	311(30.1)	261(32.8)	

LBP: Low back pain. BMI: Body mass index.

Table-2: Functional disability (n=1829).

Functional disability	With LBP n=1034 n(%)	Without LBP n=795 n(%)	P-Value
1. I Stay at home most of the time	239(23.1)	111(14.0)	<0.001
2. I Change position frequently to make my back or leg comfortable	743(71.9)	310(39.0)	<0.001
3. I Walk more slowly than usual because of back or leg pain.	480(46.4)	211(26.5)	<0.001
4. I am not doing any of the jobs that I usually do.	374(36.2)	152(19.1)	<0.001
5. Because of my back problem, I use handrail to get upstairs.	381(36.8)	170(21.4)	<0.001
6. I have to hold onto something to get out of an easy chair.	430(41.6)	166(20.9)	<0.001
7. I get dress more slowly than usual.	318(30.8)	141(17.7)	<0.001
8. I stand for only short periods of time	525(50.8)	228(28.7)	<0.001
9. I try not to bend or kneel down.	609(58.9)	238(29.9)	<0.001
10. I find it difficult to turn over in bed.	404(39.1)	184(23.1)	<0.001
11. My back or leg is painful almost all the time.	314(30.4)	135(17.0)	<0.001
12. I walk only short distance.	411(39.7)	157(19.7)	<0.001
13. I sleep less well.	506(48.9)	327(41.1)	<0.001
14. I avoid heavy jobs around the house or work.	587(56.8)	267(33.6)	<0.001
15. I am more irritable & bad tempered with people.	373(36.1)	189(23.8)	<0.001
16. I go upstairs more slowly than usual.	346(33.5)	166(20.9)	<0.001
17. I stay in bed most of time.	414(40.0)	183(23.0)	<0.001
18. My sexual activity decreased	252(24.4)	127(16.0)	<0.001
19. Rubbing or holding areas of hurt or any uncomfortable.	536(51.8)	231(29.1)	<0.001
20 I am doing less work than I would usually do.	472(45.6)	200(25.2)	<0.001
21 I often express concern to other people due my health	398(38.5)	158(19.9)	<0.001

LBP: Low back pain.

Table-3. Back-related disability and its correlates with depression and somatization among low back pain by socio-demographic characteristic (n=1034).

Variable	n	Depression symptoms			Somatization Symptoms		
		Mean±SD	95% CI	P value	Mean±SD	95% CI	P value
Age Group							
<35	149	3.97±1.28	3.41-4.53	0.351	3.02±1.20	2.62-3.42	0.854
35-44	234	4.12±1.20	3.72-4.52	2.88±1.14	2.6-3.17		
45-54	345	4.38±1.17	4.04-4.71	2.91±1.12	2.67-3.15		
>54	306	3.99±1.18	3.63-4.35	2.81±1.13	2.55-3.07		
Educational Level							
Illiterate	151	4.25±1.26	3.73-4.76	0.904	3.11±1.19	2.72-3.49	0.566
Elementary	209	4.22±1.22	3.78-4.65	2.87±1.15	2.57-3.17		
Intermediate	223	3.98±1.22	3.54-4.42	2.71±1.15	2.41-3.02		
Secondary	247	4.12±1.20	3.73-4.51	2.83±1.14	2.56-3.11		
University	204	4.22±1.23	3.77-4.67	3.10±1.17	2.67-3.34		
Occupation							
House wife & Not working	339	3.68±1.18	3.33-4.02	0.003	2.56±1.12	2.33-2.79	0.015
Sedentary & Professional	170	4.79±1.24	4.31-5.27	3.21±1.18	2.86-3.56		
Clerks	351	4.30±1.17	3.96-4.64	2.97±1.13	2.73-3.22		
Businessman	99	3.93±1.30	3.34-4.52	2.87±1.23	2.42-3.32		
Arm/ Police	75	4.36±1.38	3.61-5.11	3.27±1.26	2.75-3.79		
Duration of low back pain							
< 6 weeks	422	3.90±1.17	3.72-4.43	0.003	2.86±1.12	2.58-3.23	0.005
≥ 6 weeks	612	4.68±1.67	4.33-4.96	3.49±1.86	3.23-3.78		

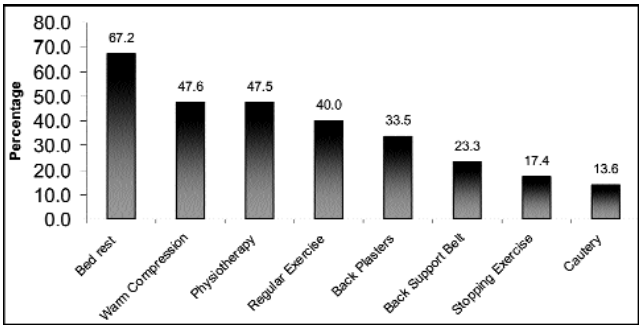
Table-4: Lifetime Prevalence of Somatisation Symptoms (n=1829).

Symptom	With LBP n=1034 n(%)	Without LBP n=795 n(%)	P-Value
Pain			
Back Pain	396(38.3)	227(28.6)	<0.001
Joint pain	214(20.7)	114(14.3)	<0.001
Pain in Arms and legs	227(22.0)	121(15.2)	<0.001
Pain anywhere else	234(22.6)	128(16.1)	<0.001
Cardiopulmonary			
Chest Pains	277(26.8)	189(23.8)	0.159
Shortness of breath	240(23.2)	128(16.1)	<0.001
Palpitations	225(21.8)	130(16.4)	0.004
Dizziness	226(21.9)	169(21.3)	0.775
Gastrointestinal			
Abdominal Pain	290(28.0)	180(22.6)	0.010
Nausea	183(17.7)	120(15.1)	0.145
Gas or indigestion	158(15.3)	91(11.4)	0.019
Diarrhoea	385(37.2)	236(29.7)	<0.001
Intolerance	224(21.7)	148(18.6)	0.114
Vomiting	257(24.9)	111(14.0)	<0.001
Pseudoneurologic			
Trouble in walking	181(17.5)	168(16.6)	0.612
Unconscious	124(12.0)	94(11.8)	0.912
Weakness	187(18.1)	130(16.4)	0.332
Blurred Vision	260(25.1)	184(23.1)	0.323
Lifestyle			
Feeling tired or having low energy	285(27.6)	148(18.6)	<0.001
Trouble sleeping	278(26.9)	155(19.5)	<0.001
Fainting	236(22.8)	150(18.9)	0.043
Headache	411(39.7)	198(24.9)	<0.001

LBP: Low back pain.

(Table-4).

Factor analysis divided the items into three factors for the somatic and depression symptoms. Factor one consisted of seven items related to psychosomatic problems, factor two had six items related to hopelessness and lack of interest, and in factor three only four items were present which were related to low energy and restlessness (Table-5).



*** Multiple choices.**

Figure: The management and treatment of low back pain patients for relief (n=1034)*

Table-5: The factor structure of somatisation and depression items, using a principal components analysis with a varimax rotation (Rotated component matrix).

Somatic and depression symptoms	Factor 1	2	3
A lump in your throat	0.752		
Feeling weak in body	0.697		
Heavy feelings in your arms or legs	0.674		
Numbness or tingling in parts of your body	0.492		
Hot or cold spells	0.480		
Feeling that is an effort	0.457		
Trouble getting your breath	0.404		
Blaming yourself for thing		0.724	
Worrying too much about things		0.646	
Feeling of guilt		0.636	
Feeling hopeless for future		0.633	
Feeling of worthlessness		0.613	
Feeling no interest in things		0.579	
Feeling low in energy			0.749
Feeling of lonely or blue			0.706
Faintness or dizziness			0.645
Sleep is restless or disturbed			0.489

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 8 iterations.

Most of the subjects had taken bed rest 695(67.2%) followed by warm compression 480(47.6%), physiotherapy 491(47.5%), regular exercise 414(40%) and back plasters 346(33.5%) (Figure).

Discussion

LBP is a common problem affecting most adults at some point during their lifetime.[2-5] At any one time, around 1 in 5 adults will report symptoms of LBP.[16-18] High levels of functional impairment and the presence of back pain radiating to the leg have been cited as factors associated with a poor prognosis among primary care patients with LBP.[17,18] The characteristics associated with both the development and the persistence of LBP include psychological factors such as depression and anxiety.[5,18-21] Functional disability was higher in our studied patients with LBP as earlier reported among men and women.[5]

Multiple studies have documented a strong association between chronic LBP and psychopathology, including personality disorders, depressive disorders, anxiety, and somatoform disorders along with non-specific issues such as emotion, anger and drug dependency.[22,23] This is consistent with the current study. However, still, depression, anxiety and somatisation appear to be crucial.

There is growing evidence that pain problems increase the risk of depression.[5,6,9,24,25] Patients with depression present somatic symptoms including general aches and pains. The presence of physical symptoms or painful complaints of unknown aetiology is a fairly common occurrence in populations. The somatoform disorders are a group of psychological disorders in which a patient experiences physical symptoms despite the absence of an underlying medical condition that can fully explain their presences.[26]

A study[27] evaluating the relationship of psychopathology and chronic LBP in 200 patients showed that depressive disorders accounted for 49% of current prevalence and 68% of lifetime prevalence in chronic LBP patients, whereas anxiety disorders were present in 15% of the patients. Also, a study[28] found high rates of psychopathology in chronic LBP group with higher rates of major depressive disorder, and personality disorders than the patients with acute LBP. However, acute patients were also diagnosed with more anxiety disorders.[5-22,23]

Apart from clinical disorders such as depression, generalised anxiety disorder and somatoform disorder, the influence of personality on pain experience has long interested clinicians working with individuals having chronic pain.[22,23] Many of the early theories of chronic pain also maintain that personality played an important role in the development and maintenance of chronic pain conditions.[22,23,29,30]

It is a common clinical observation that patients with LBP also manifest concurrent psychiatric illnesses, most commonly depression and somatisation. The association between LBP and depression and somatisation remain a complex subject.[5,27] Previous studies reported that chronic LBP duration was related to development of depression symptoms.[5,16,26,31] Furthermore, a study[16] on patients from primary care practices found that the pain was associated with severity of depression. This is consistent with the present study that there are clear relationship between the LBP and depression.

The present study identified that psychological distress was associated with increased risk of LBP. Positive correlation was seen with elevated scores and positive diagnosis of depression and somatisation. Hence, it may be prudent to evaluate most, if not all patients with chronic LBP presenting to interventional pain management for psychopathology. It is worth noting that significant association was observed in studied subjects with LBP with elevated scores of depression and somatisation. In a Qatari study the prevalence of somatisation (19.6%), depression (25.4%) was higher in LBP patients compared to their healthy counterparts.[24] Our results are in line with a study[23] that showed a significant proportion of patients in chronic LBO group presented with depression (30%), generalised anxiety disorder (20%), and somatisation (20%). The analysis of other studies indicated that those with LBP scored significantly higher on depression than those without.[2-5,22] In another study,[17] anxiety presented with the highest correlations, followed by somatisation, then by depression. This pattern of findings suggests that psychological factors play an influential part in the development of LBP. In an Australian study,[23] depression was associated with LBP. The psychological factors associated with LBP shows that the distress may aggravate the pain. Iranian LBP patients[32] have an increased occurrence of co-existent psychological distress, as has been shown in the current study.

Conclusion

Patients with LBP frequently have serious psychiatric disturbances and most often depression and somatisation. The study revealed that the symptoms of depression and somatisation were more prevalent among LBP patients. Also, functional disability was higher in LBP patients. Clinicians should take care of depression and somatisation symptoms with LBP treatment. These symptoms cannot be neglected or ignored because of its relationship with LBP. Further research is needed to identify practical interventions to reduce this burden from LBP.

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References

1. Wedderkopp N, Leboeuf-Yde C, Andersen LB, Froberg K, Hansen HS. Back pain reporting pattern in a Danish population-based sample of children and adolescents. Spine 2001; 26: 1879-83.
2. Bener A, El-Rufaie OF, Siyam A, Abuzeid MSO, Toth F, Lovasz G. Epidemiology of low back pain in the United Arab Emirates. J Rheumatol 2004; 7:189-95
3. Walker BF, Miller R, Grant WD. Low back pain in Australian adults: prevalence and associated disability. J Manipulative Physiol Ther 2004;27:238-44
4. Maniadakis N, Gray A. The economic burden of back pain in the UK. Pain 2000; 84: 95-103
5. Bener A, Kamran S, El-Rufaie OF, Georievski AB, Sabri S, Farooq A, et al. Disability, Depression and Somatization in low back pain patients. APLAR J Rheumatol 2006; 9: 257-63.
6. Bener A, Al-Kazaz M, Ftouni D, Al-Harthy M, Dafeeah EE. Diagnostic Overlap of Depressive, Anxiety, Stress, and Somatoform Disorders in Primary Care: Prevalence and Comorbidity. Asia Pac Psychiatry 2013; 5: E29-38
7. Licciardone JC, Gatchel RJ, Kearns CM, Minotti DE. Depression, Somatization, and Somatic Dysfunction in Patients with Nonspecific Chronic Low Back Pain: Results from the OSTEOPATHIC Trial. J Am Osteopath Assoc 2012; 112: 783-91.

8. Bener A, El-Rufaie OF, Siyam A, Abuzeid MSO, Toth F, Lovasz G. Epidemiology of low back pain in the United Arab Emirates. J Rheumatol 2004; 7:189-95
9. Bener A, Verjee M, Dafeeah EE, Falah O, Aljuhaisi T, Schlogl J, et al. Psychological Factors: Anxiety, Depression and Somatisation Symptoms in Low back Pain Patients. J Pain Res 2013; 6: 95-101
10. Kroenke K, Spitzer RL. The PHQ-9: a new depression diagnostic and severity measure. Psychiatr Ann 2002; 9: 1-7.
11. Roland M, Fairbank J. The Roland-Morris Disability Questionnaire and the Oswestry Disability Questionnaire. Spine 2000; 25: 3115-24.
12. Maaroufi H, Benbouazza K, Fa?k A. Translation, adaptation, and validation of the Moroccan version of the Roland Morris Disability Questionnaire. Spine 2007; 32: 1461-5
13. Patrick DL, Deyo RA, Atlas SJ. Assessing health-related quality of life in patients with sciatica. Spine 1995; 20: 1899-909
14. Dionne C, Koepsell T, Kroff MV Deyo RA, Barlow WE, Checkoway H. Formal education and back-related disability. Spine 1995; 20: 2721-30.
15. World Health Organization, International Classification of Functioning and Health. WHO, ICF, Geneva, 2001.
16. Dunn KM, Croft PR. Epidemiology and natural history of low back pain, Eura Medicophys 2004; 40: 9-13
17. Von Korff M, Simon G. The relationship between pain and depression. Br J Psychiatry 1996; 30: 101-8.
18. Croft PR, Papageorgiou AC, Ferry S, Thomas E, Jyson MIV, Silman AJ. Psychologic distress and low back pain. Evidence from a prospective study in the general population. Spine 1996; 20: 2731-7.
19. Kroenke K, Spitzer RL, deGruy FV, Swindle R. A symptom checklist to screen for somatoform disorders in primary care. Psychosomatics 1998; 39: 263-72.
20. Ghuloum S, Bener A, Abou-Saleh MT. Prevalence of Mental Disorders in Adult Population Attending Primary Health Care Setting. J Pak Med Assoc 2011; 61: 216-21.
21. Dickens C, Jayson M, Creed F. Psychological correlates of pain behaviour in patients with chronic low back pain. Psychosomatics 2002; 43: 42-8
22. Manchikanti L, Fellows B, Pampati V, Beyer C, Damron K, Barnhill RC. Comparison of psychological status of chronic pain patient and the general population. Pain Physician 2002; 5: 40-8
23. Manchikanti L, Pampati V, Beyer C, Damron K, Barnhill RC. Evaluation of psychological status in chronic low back pain: comparison with general population. Pain Physician 2002; 5: 149-55.
24. Bener A, Ghuloum S, Al-Mulla AAK, Al-Marri S, Hashim MS, Elbagi IEA. Prevalence of somatization and psychologisation among patients visiting primary health care centers in the State of Qatar. Libyan J Med 2010; 5: 5266-73
25. Bener A, Ghuloum S, Burgut FT. Gender Differences in Prevalence of Somatoform Disorders in Patients Visiting Primary Care Centers. J Prim Care Community Health 2010; 1: 37-42
26. Rush AJ, Polatin P, Gatchel RJ. Depression and chronic low back pain. Spine 2000; 20: 2566-71.
27. Bener A, Alwash R, Gaber T, Lovasz G. Obesity and low back pain. Coll Antropol 2003; 27: 95-104.
28. Kinney RK, Gatchel RJ, Polatin PB, Fogarty WT, Mayer TG.. Prevalence of psychopathology in acute and chronic low back pain patients. J Occup Rehabil 1993; 3:95-103.
29. Woodforde JM, Merskey H. Personality traits of patients with chronic pain. J Psychosom Res 1972; 16:167-72
30. Weisberg JN, Keefe FJ. Personality disorders in the chronic pain population: Basic concepts, empirical findings, and clinical implications. Pain Forum 1997; 6:1-9.
31. Bacon NM, Bacon SF, Atkinson JH, Slater MA, Patterson TL, Grant I, et al. Somatization symptoms in chronic low back pain patients. Psychosom Med, 1994; 56: 118-27.
32. Mirzamani-Bafghi SM, Sadidi A, Sahrai J. Psychological aspects of low back pain. Arch Iranian Med 2003; 6: 91-4.