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Prevalence and Risk Factors of Low Back Pain among Office Workers in Lebanon

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ABSTRACT

Low back pain (LBP) is a widespread musculoskeletal disorder worldwide. It causes disability that influence work performance in individuals. The aim of this study was to evaluate the prevalence and risk factors of LBP in the middle-aged office workers in the Lebanese Population. In this observational, cross-sectional study performed in 2013, overall, 250 office workers aged between 20 and 64 years from different Lebanese companies and banks filled out a questionnaire containing various predictor individual and occupational factors. Our results show that 112 (44.8%) of the recruited population suffer from back pain. Females are the most affected (68%) versus males (32%) (P=0.023). The logistic regression showed that LBP was positively associated with backbone crookedness (P=0.003), knee pain (P<0.001), wrist pain (P=0.002), contractions (P=0.014), numbness (P=0.009), previous treatment for back pain (P<0.001), doctor consultation (P=0.029), household work for 3-6 hours (P=0.001), maintaining same posture for > 5 hours (P=0.024), fear of changing job (P=0.036) and higher BMI (P=0.005). However, use of ergonomic chair, job advancement satisfaction, making radiography was negatively associated with LBP with P value=0.072, 0.022, 0.005 respectively. LBP has an important prevalence among office worker in Lebanon. This study might help to estimate low back problems in office workers and emphasize healthy lifestyle, ergonomic measurement and holding educational programs.

KEYWORDS: *Low Back Pain, Office Worker, Lebanese Population*

INTRODUCTION

Low back pain (LBP) is one of the most important worker musculoskeletal disorders [1]. It is a frequently recurring pain and is classified as chronic pain since it intermittently affects individual over a long period of time [2].

The prevalence of LBP is reported to be over 30% [2-3]. LBP leads to high expenses in industrialized countries due to treatment costs and sick leaves [1]. It causes activity limitation in young people; it is an important reason for frequent physician consultation, leads to hospitalization and in some cases to surgical intervention [4-5]. The rate of LBP elevates especially in middle aged women [6].

Despite the huge number of studies done worldwide, the etiology of LBP is still not fully understood but is assumed to be of multi-factorial origin, indicating that individual, physical and psychosocial factors can contribute to their development and persistence [7]. Different factors have been shown to be risk factors for the occurrence of LBP including gender [8], level of education [9], smoking [10], sleep deprivation [11] and prolonged driving [12]. Besides, many work-related risk factors increased the development of LBP like accumulated computer usage [13]. In addition, sitting for a long period in combination with awkward postures, working in a forward bent position or in poor ergonomic conditions increased the risk of LBP [14-15]. These occupational risk factors are due to certain working situations such as maintaining same posture for a long period of time,

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carrying heavy objects and other uncomfortable postures or movements required during work [16]. Various psychosocial problems, such as high stress [17], low job satisfaction [15], low social support [18] and effort-reward imbalance [19] also increased LBP occurrence.

In addition, clinical factors such as scoliosis [20], low back muscle endurance [21], poor lumbar stability [22] and abnormal trunk mobility [23], have been shown to increase the risk of LBP. Chronic LBP and history of LBP affect individual general health [24-25]. This latter leads to important socio-economic consequences due to sick leave, instability in work, medications, doctor consultation, physiotherapy, hospitalization and surgery and [26-27]. Among the many professionals affected by LBP are office workers [28], drivers [16], school and healthcare staff [11-26] and scaffolders [29].

In Lebanon, previous study has explored relationships between LBP prevalence and different individual, psychological and occupational risk factors. This study was limited to staff in Sacré Coeur hospital [26]. However, no data on the prevalence of the LBPin office workers in Lebanon are available. The aim of the present observational, cross sectional study, was to determine the prevalence of LBP and to evaluate individual, physical, psychological, occupational and especially health related variables association with the risk of LBP occurrence among middle aged office worker in Lebanon.

MATERIALS AND METHODS

Population: This study was done on adults aged between 20 and 64 yr from both sexes by means of a questionnaire. The choice of people was taken randomly from different regions of Lebanon and from different professions, all being office workers.

Design and Duration of the study: This is a pilot epidemiological cross-sectional study performed during a period of three months (February till May 2013) in different Lebanese regions.

Criteria for the participation in the study:

a) *Inclusion criteria:* Participants to be included in the study were adults that have been office workers for at least one year before starting this study.

b) *Exclusion criteria:* Only pregnant women were excluded from the study.

Development of the questionnaire: The whole study was done by means of questionnaire which we have developed according to the bibliographic review. This questionnaire was presented in local Arabic language, in order to be easily understood by people of all educational levels. It included 74 questions and required almost 5 minutes to be filled. This questionnaire was used to collect information and it was divided into many parts including: Subject demographic characteristics, educational level, physical, occupational, psychological status, sport practice, smoking habits as well as medical history. A pre-survey was conducted among small sample in different companies to test the understanding and acceptability issues. Following this pre-survey, some questions were reworded**.**

Data Collection and Analysis: The participants in this study were questioned by face to face interviews. The study was limited to private sector workers. Different companies, banks, universities, and offices from all Lebanese regions were approached to gain permission to conduct the research. Participants were approached in a way where no interference in their duties or normal schedules occurs. Ethically, anonymity was maintained. Also, people were asked to give their informed consent to participate in this research after explaining the purpose of this study.

Statistical Analysis: Statistical analysis was done by the use of SPSS version 20 (Chicago, IL, USA). One way frequency tables (reporting percentages and counts) were used to describe categorical responses from the questionnaire. Quantitative responses were described using means and standard deviations. Prevalence and 95% confidence intervals were depended on in this study.

Associations between categorical variables and LBP prevalence were assessed using chi square tests as well as Fisher Exact where appropriate (Dichotomic and categorical variables). Student's t-tests were used with quantitative variables. Statistical associations was considered significant when P-value<0.05. Multi-variate analysis using binary logistic regression was utilized for the analysis of variables that have shown statistical significance according to the bi-variate analysis.

RESULTS

Socio- demographic characteristics of the studied population: In this pilot research, the sample under study of 250 participants was composed of 151 females (60.4%) and 99 males (39.6%) aged between 20 and 64 and with mean age of 33.9 (Sd =11.3).

As shown in Table 1, 113 (45.2%) of the studied population suffer from LBP. Females have recorded approximately twice-higher percentage of those suffering from LBP (68.1%) than males (31.9%). Gender is significantly associated with LBP (P=0.023). No significant association between LBP with either educational level (P=0.136), marital status (P=0.977) or age (P=0.994) was found. However, BMI in those suffering from LBP (26.0 kg/m^2 +8) is higher than those with no back pain (23.7 kg/m^2+2.5). BMI has a significant correlation with LBP (P=0.009).

Table 1. Characteristics of the studied population and prevalence of LBP

Characteristics	No back pain N=137 (54.8%)		With back pain N=113 (45.2%)		
	n(%)	Mean(sd)	n(%)	Mean(sd)	*P value
Gender					0.023
Male (n=99)	63(46)		36(31.9)		
Female (n= 151)	74(54)		77(68.1)		
Educational level					0.136
Secondary	21(15.3)		26(23)		
University	88(64.2)		59(52.2)		
Advanced	28(20.4		28(24.8)		
Marital status					0.977
Single	66(48.2)		57(50.4)		
Married	60(43.8)		47(41.6)		
Divorced	8(5.8)		7(6.20		
Widowed	3(2.2)		2(1.8)		
Age (year)		33.9(11.3)		33.9(10.71)	0.994
BMI (Kg/m^2)		23.7(2.5)		26.0(8.0)	0.009

*P-value detected by Chi^2 test for categorical variables, shows significant difference between both groups

Health status: As shown in Table 2, 43.8% of those with no back pain and 49.6% of those with back pain (P=0.363) have a family history of pain. Wearing orthopedic insoles did not show significant association with LBP (P=0.07). However, in the group showing LBP, 15.9% also has crooked backbone versus 2.9% in those with no back pain (P<0.001). Similarly, individuals with LBP also suffer from other musculoskeletal disorder like; knee pain 37.2% versus 16.8% in those with no back pain (P<0.001), hip pain 13.3% versus 5.1%, (P=0.023) wrist pain 18.6% versus 8.8% (P=0.022), contractions 20.4% versus 9.5% (P=0.015), numbness 39.8% versus 18.2% (P<0.001) and finger puncture 14.2% versus 7.3% (P=0.077)as presented in Table 2, where the highest percentages of those variables were recorded for participants suffering from LBP.

Previous exposure to spinal surgery in person with no back pain (1.5%) and with LBP (4.4%), has not shown significant association with back pain (P=0.249). However, of those with no back pain 1.5 % had previous treatment against 24.8 % with LBP (P<0.001), 11.7% have had physiotherapy against 27.4% (P=0.002), 5.8% have used muscle relaxants against 15% (P=0.016) and 15.3% have done radiography against 30.1% (P=0.005). Doctor consultation has also show significant association with LBP (P<0.001) where 26.3% with no back pain participant had doctor consultation versus 55.8% with LBP. Insomnia, chronic disease were not significantly associated with LBP (P=0.575 and 0.28, respectively)

In addition, the reason of pain was hard work for 30.7 % of participants with no back pain and 49.6% in those suffering from back pain (P<0.001) as shown in Table 2.

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Table 2. Low back pain and health-related variables

Characteristics	No back pain N=137		Back pain N=113		
	n	%	n	%	*P* value
Family history of pain	60	43.8	56	49.6	0.363
Backbone crookedness	4	2.9	18	15.9	<0.001*
Use of orthopedic insoles	3	2.2	9	7.7	0.07
Knee pain	23	16.8	42	37.2	<0.001*
Hip pain	7	5.1	15	13.3	0.023*
Wrist pain	12	8.8	21	18.6	0.022*
Contractions	13	9.5	23	20.4	0.015*
Numbness	25	18.2	45	39.8	<0.001*
Finger puncture	10	7.3	16	14.2	0.077
Previous spinal surgery	2	1.5	5	4.4	0.249
Previous treatment	2	1.5	28	24.8	<0.001*
Physiotherapy	16	11.7	31	27.4	0.002*
Muscle relaxants	8	5.8	17	15.0	0.016
Radiography	21	15.3	34	30.1	0.005*
Doctor consultation	36	26.3	62	55.8	<0.001*
Insomnia	38	27.7	35	31.0	0.575
Chronic disease	24	17.5	26	23	0.28
Raison of pain (Hard work)	42	30.7	55	49.6	<0.001*

*****Significant value $P<0.05$

Occupational and Psychological variables: Significant association between maintaining proper posture (32.7%; *P*-value=0.004) in addition to household>3 hours (21.2%; *P*-value=0.001) with LBP was found as presented in table 3. Whereas, maintaining same posture for more than 5 hours and use of ergonomic chair tend to be significant (*P*=0.054 and 0.073, respectively). While all other work-related characteristics such as means of transportation, daily driving hours, weekly working hours, weekly work days, work years, overtime, weekly overtime hours, children care, standing duration, prolonged sitting duration, and using a comfortable table, computer work hours, break duration, physical strength, heavy lifting, using ergonomic chair, maintaining same posture, stressed shoulders, and work environment showed no significance association with LBP (*P*-value>0.05)

Besides, having a stressful life (46%; *P*-value=0.021), gaining respect (76.1%; *P*-value=0028), and unsatisfied job advancement (41.6%; *P*-value=0.008) as well as fear of changing job (37.2%; *P*-value=0.012), have shown significant association with LBP as shown in table 3; whereas all other psychological variables such as job satisfaction, job safety and security, and reflection of qualification level were non-significantly associated with the pain under study with *P*-values>0.05 (Table 3).

Table 3. Effect of Occupational and Psychological variables on back pain

Characteristics	No back Pain N= 137		Back pain N=113		
	n	%	n	%	*P*-value
Maintaining proper posture	70	51.1	37	32.7	0.004*
Maintaining same posture $\geq$ 5hours	23	16.8	28	24.8	0.054
Use of ergonomic chair	75	54.7	49	43.4	0.073
Household work>3h	7	5.1	24	21.2	0.001*
Having very stressful life	40	29.2	51	46.0	0.021*
Gain respect	120	86,9	85	76.1	0.028*
Satisfied job advancement	80	58.4	46	41.6	0.008*
Fear of changing job	31	22.6	42	37.2	0.012*

*****Significant value $P < 0.05$

Sports and smoking habits: Surprisingly, variables related to performing physical activity and smoking habits have shown no significant association with LBP.

Multivariate analysis: By the use of binary logistic regression, we calculated the odds ratio (OR) of the risk factors influencing low back pain. First, it was shown that backbone crookedness increases ten times the risk of back pain {OR=9.983, 95% CI [2.221; 44879]}. Also, having knee pain and wrist pain increase with back pain in the following respective manner

{OR= 4.797, 95% CI [2.045; 11.251] and OR= 5.931, 95% CI [1.922; 18.302]}. People suffering from contractions and numbness increased three times in those having back pain with {OR=3.838, 95% CI [1.317; 11.182] and OR=3.164, 95% CI [1.338; 7.478]}. In addition, participants who have previously been treated for back pain have shown increasing risk of recurrence of back pain {OR=43.543, 95% CI [7.414; 255.734]}. Doctor consultation has also shown an association with LBP {OR=2.465, 95% CI [1.095; 5.549]}. Moreover, participants that work for a duration of 3-6 hours in household work are around twelve times more risky to suffer from back pain {OR=12.844, 95% CI [2.860; 57.685]}, also maintaining same posture for 5 hours or more are 3 times risky of having back pain {OR= 3.648, 95% CI [1.183; 11.253]} fear of changing job increases twice {OR= 2.344, 95% CI [1.057; 5.195]} and BMI increases once this risk {OR=1.110, 95% CI [1.033; 1.194]}. However, sitting on ergonomic chair, being satisfied in job advancement as well as making radiography have shown to decrease the risk of back pain with respective values {OR=0.513, 95% CI[0.248; 1.061]; OR=0.418, 95% CI[0.198; 0.881]; OR=0.305, 95% CI [0.097; 0.957]} as presented in Table 4.

Table 4. Multivariate analysis for Low back Pain

Characteristics	OR	(95% CI)	*P*-value
Dependent variable: Low back pain*			
Backbone crookedness	9.983	(2.221–44.879)	0.003
Knee pain	4.797	(2.045; 11.251)	<0.001
Wrist pain	5.931	(1.922; 18.302)	0.002
Contractions	3.838	(1.317; 11.182)	0.014
Numbness	3.164	(1.338; 7.478)	0.009
Previous treatment	43.543	(7.414; 255.734)	<0.001
Doctor consultation	2.465	(1.095; 5.549)	0.029
Household work 3-6h	12.844	(2.860; 57.685)	0.001
Maintaining same posture ≥5h	3.648	(1.183; 11.253)	0.024
Fear of changing job	2.344	(1.057; 5.195)	0.036
BMI	1.110	(1.033; 1.194)	0.005
Ergonomic chair	0.513	(0.248; 1.061)	0.072
Satisfied job advancement	0.418	(0.198; 0.881)	0.022
Radiography	0.305	(0.097;0.957)	0.005

*Nagelkerke R^2=0.579, Hosmer–Lemeshow P=0.528

DISCUSSION

In this pilot study, we found that among office worker in the Lebanese population the prevalence of LBP reaches (45.2%). In the literature, LBP prevalence ranges from 37.3% [28] to 70-85% [2] and 60% in scaffolders [29]. Females have recorded 68.1% of those suffering from back pain. This is probably due to their higher responsibilities as being workers in addition to spending longer duration in household work and children care. Other studies performed in USA and China, back and spine impairments were found to be more common in women [2, 6].

Our results also show a significant difference in the mean of BMI between people suffering from back pain and those that do not. This shows that heavier people are more at risk of having LBP. The association between BMI and LBP are controversial, some studies show similar results [26, 28]**.** However, some others find that neither height nor weight is significantly associated with the risk of occurrence of LBP [6].

We have shown that chronic diseases are not significantly associated with LBP. However, backbone crookedness increased 10 times the risk, knee pain increased 2 times the risk, and hip pain as well as wrist pain increased 6 times the risk. Suffering from contractions, and numbness are almost 3 times more risky, while finger puncture tends to be significantly associated. This may suggest a link in the skeletal system where any back pain influences the whole skeleton so the parts will be affected altogether. In addition, we found that 12% of the person suffering from LBP has other musculoskeletal disorders such as neck and shoulder pain (data not shown). All these finding are original and not previously studied.

Considering age, our sample has shown no significant difference between those suffering from back pain and those who are not. In other studies, a significant association between LBP and increased age is reported [28]. Moreover, the literature presented an association between LBP and the educational level [9], which contradicted our finding. However, the hereditary factor concerning LBP was not previously mentioned in the literature and our results have not recorded any significant association. In addition, insomnia showed no significant association with back pain in our results, which contrasts a cross-sectional study, performed

among office workers and has shown to be significant [11]. In the literature, the relationship between physical activities and LBP are controversial. In concordance with a study done in Iran [28], our study reported no significant association with LBP of the variables concerning sports, however other study reported that exercise will decrease the incidence of LBP [22]. Smoking affects the musculoskeletal system through blood flow and oxygenation reduction of the spinal structures, hypoxia, or chemical changes leading to muscle, joint and disc degeneration [26]. In opposite to previous work [26], smoking habits in our study reported no relation between all items dealing with smoking and LBP in agreement with another study [28].

As for occupational variables, driving was not significantly associated with LBP, contradicting literature that recorded a causal link between prolonged driving and back disorders [12, 30]. Weekly workdays, weekly working hours, work years, overtime, in addition to weekly overtime hours and standing duration have shown no significant association with LBP. However, this contrasts the results of the Lebanese study performed on hospital staff [26]. Participants who maintained proper posture did not suffer from back pain, while those who spend long domestic working hours have increased the risk to have this type of pain (OR= 12.8). In addition, sitting duration has shown no significance in contrary to previously mentioned results showing that prolonged sitting provokes back pain [14, 28]. In contrary to the literature reporting that accumulated computer usage has been linked to increased risk of LBP [13, 28], our study showed no significant association. Heavy lifting is a variable that shows no significant association with LBP in our study. However, in a previous study, authors found significant influence leading to back disorders [16], this controversial idea is due to the very low percentage of our participants that lift heavy objects or performs work requiring physical strength. Maintaining same posture for a long period increased 3 times the risk LBP, whereas stressed shoulders was not associated with LBP. Our results agree with a previous study reporting that maintaining posture for prolonged time is accompanied with LBP [26].

Concerning psychological parameter such as having a stressful life, gaining respect at work, satisfied job advancement as well as fear of changing job due to back pain have shown significant association with LBP. This shows the influence of the psychological state on the physical health. These findings agree with previous study reporting the influence of psychological factors on LBP [2].

Consistent with our results, previous study have shown no correlation between wearing orthopedic insoles and back pain [26], this is maybe due to the small percentage of participants are using insoles. In addition, logically previous exposure to spinal surgery was not associated to LBP, may be because it eradicates the reason of this pain. Whereas previous treatment showed 43 times more risk, this is in agreement with a previous study [3]. In addition, Physiotherapy and doctor consultation seem twice risky. Previous treatment, physiotherapy and doctor consultation do not eradicate the symptoms and are significantly associated with LBP recurrence.

The only type of drugs that demonstrated a significant association with LBP was muscle relaxants since a very high percentage of participants suffering from back pain use those drugs as a cure, previous studies reported that muscle relaxants have very limited role [31]. We showed a significant association between LBP and radiography, which is normal since each patient, will be exposed to imaging in order to diagnose this pain. Declared osteoporosis showed no association with LBP and this is might be because a very low percentage of our participants have diagnosed osteoporosis. This contradicts the literature reporting that low bone mineral density or osteoporosis has been identified as a major cause of chronic backache especially in postmenopausal women [6]. This is maybe due to that, our population is young and that our research was not restricted to women.

First, our study was limited to private sector and this may be a limitation in the study since it may be considered non-representative to the whole population. Another possible limitation of the study is the use of self-reported measures of all variables. In addition, self-administrated historical questionnaire has the limitation of participants failing to remember previous symptoms or any previously taken drugs, which is a recall bias.

CONCLUSION

Lebanese office workers are exposed to LBP that affected their performance and their income. Some risk factors associated with LBP were identified, including BMI, backbone crookedness, household work, maintaining same posture for a long period of time and stressful life. This pain is usually accompanied with other musculoskeletal disorder. In spite of being a handicap, LBP has economic impact such as sick leave, doctor consultation, radiography making and medications. Some other factors have shown to be protective including sitting in ergonomic chair and job satisfaction. These findings have important implications for the development of health education and health promotion. Although, back pain complaints are not a disease but a constellation of symptoms and a prolongation of such pain may

be iatrogenic in many instances. Finally and as previously recommended by the European guidelines (COST B13) for the management of LBP, educational and behavioral therapy programs on these topics should be proposed and evaluated in CLBP [32].

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The authors declare that there is no conflict of interests.

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