Journal of
Modern Rehabilitation

July 2017, Volume 11, Number 3

Research Paper: Associated Risk Factors Causing Low Back Pain Among Office Workers in Iran

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Citation: Olyaei Gh, Arslan SA, Hadian MR, Bagheri H, Yekaninejad MS, Talebian S. Associated Risk Factors Causing Low Back Pain Among Office Workers in Iran. Journal of Modern Rehabilitation. 2017; 11(3):181-188.

doi:

Article info:
Received: 05 Jan. 2017
Accepted: 14 May 2017

Keywords:
Low back pain, Prevalence, Risk factors

ABSTRACT

Introduction: Low back pain is the leading cause of activity limitation and work absence throughout the world among workers.

Materials and Methods: Data were collected by using a self-administered questionnaire containing individual and work ergonomic items. The 11-point numeric scale (NPRS) was used to assess the pain intensity from the office workers at the time of the survey. Bivariate logistic regression analysis was used for predicting the risk factors of low back pain.

Results: Demographic, personal, work ergonomic and psychosocial characteristics of office workers showed high prevalence of low back pain. The Point prevalence of LBP among the office workers of TUMS was 32.3% and the lifetime prevalence among them was 74.5%.

Conclusion: High prevalence of LBP was reported among the office workers. Different individual as well as work related risk factors are worsening this condition which needs proper protective measures.

1. Introduction

Low back pain is a symptom rather than a disease which can have many causes. The most common form of low back pain is non-specific low back pain (LBP). This term is used when the pathoanatomical cause of the pain cannot be determined [1]. LBP patients are the most common and frequent visitors at medical centers as 70% to 80% of the general population experience LBP at least once in lifetime [2]. It is the leading cause of activity limitation and work absence throughout the world causing an enormous economic burden on individuals, families, communities, industry and governments [3]. The global burden of disease study has listed LBP as a major cause of disability among musculoskeletal conditions and ranked it in the top five conditions contributing to loss of disability-adjusted life years. LBP has gained increasing attention in developing countries because of its impact on productivity and activities of daily living [4]. Some studies were also done regarding work related musculoskeletal problems in Iran that showed high prevalence of the musculoskeletal symptoms in different work settings such as automobile fac-

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tories, rubber factories, carpet mending operations, and health care settings [5]. A National Health Survey was also conducted in Islamic Republic of Iran to examine the relationship between sociodemographic factors, smoking, obesity, and low back pain in Iranian people, in which respondents (n=25307) participated and the prevalence of low back pain was 29.3% of the studied sample. High age, female sex, being married, obesity, low-economic index, being smoker, in a rural residence, and low educational attainment, all increased the odds of low back pain [6].

Previously, many epidemiological studies have attempted to identify and relate risk factors to the prevalence of LBP among blue collar workers. Individual factors such as gender, age, educational level, body mass index (BMI), and psychosocial factors referring to job satisfaction, work stress, and anger have been examined and related to the incidence of LBP. Fewer epidemiological studies have examined the appearance and associated risk factors of LBP among office workers [7]. Few studies had focused on the role of occupational factors on the high prevalence of LBP among office workers in Iran showing too high (58%) [8] or low (13.7%) [9] prevalence of LBP.

One similar research conducted at Baqiyatallah University of medical sciences, Tehran, Iran in 2006 showed that point prevalence of LBP was 13.7% among office workers [9]. Because the National Health Survey had shown 29.3% of LBP among general population in 2012, which was much more compared to the 13.7% of LBP among office workers of Baqiyatallah University of medical sciences, Tehran, Iran in 2006. Therefore, another such research was much needed to confirm the latest extent of LBP among office workers in Iran. The purpose of this research was to reconfirm the latest extent of LBP with its associated risk factors among office workers in Iran.

2. Materials and Methods

Present study was conducted at Tehran University of Medical Sciences (TUMS), to find the prevalence & associated risk factors of LBP among the office workers. After the approval from ethical committee, a self-administered questionnaire containing individual and work ergonomic items was constructed based on already published valid and reliable data in the scientific literature [10]. The construct and content validity was assessed after translating it into Persian language. Different included variables were gender, age, weight, height, marital status, smoking habit, education level, exercise, number of exercise sessions in a week, sleep disturbance, work experience, sitting time, computer using duration, forward bent body position for more than 2 hours while sitting, standing time, frequently of bending during work, computer screen distance from the body, characteristics of chair (back support, adjustable back support) and job satisfaction. The 11-point Numeric Pain Rating Scale (NPRS) ranges from '0' representing one pain extreme (e.g. "no pain") to '10' representing the other pain extreme (e.g. "pain as bad as you can imagine" or "worst pain imaginable" [11] was used to assess the pain intensity from the office workers at the time of the survey.

For sample size, a proportion formula of sample size estimation with 5% margin of error was used and questionnaires were distributed among 500 office workers aged between 18 to 60 years with at least 1 year of work experience. Based on exclusive criteria like any recent surgery, trauma, fracture, rheumatic and systemic diseases, congenital problems and pregnancy 400 questionnaires were considered valid for further analysis.

Using Statistical Package for the Social Sciences (SPSS-21), data were analyzed by examining the frequency distributions of responses, cross-tabulations of different variables in relation to reported LBP prevalence. Chi-square and $P<0.05$ were used for group differences and to find the significant values. Associations among predisposing factors and LBP were articulated by adjusted Odd Ratio (OR) with 95% Confidence Interval (CI) and significant determinants were considered to predict point and lifetime prevalence of LBP ($P<0.05$).

3. Results

Among the 400 office workers at TUMS, majorities were females (58.8%) and married (66.8%). The minimum age of the subjects was 20 years and maximum age was 60 with standard deviation (std.) of ±8.99. The mean Basic Mass Index (BMI) of the concerned population was 24.54 with std. of ±3.84. Most of the office workers were married (66.8%) and graduates (47.3%). Half of the office workers had the habit of exercising and maximum of them used to exercise twice or thrice a week. Sleep disturbance was not a major problem among the office workers as only 21.7% had sleep disturbance and majority (92%) of them were also non-smokers. Almost half of the workers (46.3%) had less than 10 years of working experience. More numbers of sitting hours and less numbers of standing hours were stated among office workers. Many of them (44%) had the habit of forward bending while performing their usual work and 60% of them used to sit in the forward bend position for more than 2 hours. Half of the study population (45.5%) was

Table 1. Demographic, personal, work ergonomic and psychosocial characteristics of office workers from TUMS

Characteristics		Sample Size		Point Prevalence of LBP		Lifetime Prevalence of LBP	
		No.	%	POS %	P	POS %	P
Gender	Male	165	41.3	29.7	0.360	70.3	0.107
	Female	235	58.8	34		77.4	
Marital status	Single	133	33.3	19.5	<0.001	61.7	<0.001
	Married	267	66.8	38.6		80.9	
Body Mass Index (BMI)	Non-obese	361	90.3	31.3	0.217	74	0.452
	Obese	39	9.8	41		79.5	
Education level	Intermediate	73	18.3	43.8	0.023	76.7	0.286
	Graduation	189	47.3	32.8		70.9	
	Masters & PhD	138	34.5	25.4		78.3	
Exercise	No	200	50	37.5	0.025	80.5	0.006
	Yes	200	50	27		68.5	
Number of exercise sessions / week	1x/week	30	7.5	33.3	0.161	80	0.009
	2x/week	66	16.5	30.3		69.7	
	3x/week	63	15.8	23.8		66.7	
	>3x/week	44	11	22.7		59.1	
Sleep disturbance	No disturbance	273	68.3	24.5	<0.001	70.7	0.079
	1-2x/week	65	16.3	40		81.5	
	3x/week	21	5.3	47.6		81	
	No Sleep	41	10.3	63.4		85.4	
Smoking habit	Non-smokers	368	92	31.8	0.508	73.6	0.181
	Smokers	32	8	37.5		84.4	
Work experience	≤10 Years	185	46.3	22.2	<0.001	66.5	0.002
	10-19 years	118	29.5	43.2		78.8	
	≥20 years	97	24.3	38.1		84.5	
Sitting time	≤4 hours	59	14.8	16.9	<0.001	69.5	0.627
	4-8 hours	262	65.5	30.9		75.2	
	≥8 hours	79	19.8	48.1		75.9	
Standing time per day	1-2 hrs	248	62	34.7	0.585	74.6	0.528
	2-4 hrs	102	25.5	27.5		76.5	
	4-6 hrs	38	9.5	28.9		65.8	
	>6 hrs	12	3	33.3		83.3	
Forward bending	No	224	56	26.8	0.08	70.5	0.049
	Yes	176	44	39.2		79.5	

Characteristics		Sample Size		Point Prevalence of LBP		Lifetime Prevalence of LBP	
		No.	%	POS %	P	POS %	P
Back support in chair	No	218	54.5	33	0.716	72.5	0.310
	Yes	182	45.5	31.3		76.9	
Back adjustment	No	104	26	31.7	0.927	86.5	<0.001
	Yes	78	19.5	30.8		64.1	
Usual body position	No forward bending	160	40	23.1	<0.001	65.6	<0.001
	Bending >2 hrs	240	60	38.3		80.4	
Daily computer use	≤3 hours	106	26.5	22.6	0.023	69.8	0.148
	3-6 hours	145	36.3	32.4		72.4	
	≥6 hours	149	37.3	38.9		79.9	
Body distance from computer screen	≤50 cm	160	40	37.5	0.217	77.5	0.656
	50-100 cm	195	48.8	30.3		71.8	
	≥100 cm	27	6.8	22.2		74.1	
Satisfaction level of job	None	25	6.3	64	<0.001	84	0.026
	Little	73	18.3	45.2		82.2	
	Enough	218	54.5	28.9		75.2	
	Very Much	67	79.8	20.2		63.1	

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using back support for their chairs but only 19.5% had the ability to adjust their back supports according to the ergonomic settings.

The Point prevalence of LBP among the office workers of TUMS was 32.3% and the lifetime prevalence among them was 74.5%. Point and lifetime prevalence of LBP was considered if the worker reported LBP at the time of survey and any episode of LBP in the whole previous life, respectively. Demographic, personal, work ergonomic and psychosocial characteristics of office workers in the TUMS are shown in Table 1.

Significant individual and work related risk factors for predicting point prevalence of LBP included marital status, sleep disturbance, more work experience, sitting for long duration, bending for >2 hours and satisfaction level of job. For lifetime prevalence of LBP significant predictors were marital status, work experience, back adjustment, usual body position and satisfaction level of job. Bivariate logistic regression analysis was used for predicting the risk factors of low back pain among TUMS office workers with respect to predisposing factors as shown in the Table 2.

4. Discussion

The findings of this research are conflicting to that reported by Rezaee et al. in 2006 at Baqiyatallah University of medical sciences, Tehran, Iran [9], but similar to the National Health Survey of Iran. According to the National Health Survey, the Prevalence of LBP among the general population of Iran was 29.3% [6], and chances of high LBP prevalence among office workers increases because of the unique working environment in the offices where the office workers sit for long duration in bad posture. Present study have reported 32.3% point prevalence of LBP among the office workers of TUMS which is much more than reported earlier (13.7%) among the office workers of Baqiyatallah University of medical sciences, Tehran, Iran. Lifetime prevalence of LBP among office workers was 74.5% and previous researchers had also reported the lifetime prevalence of LBP from 75 to 84% among the general population which also included working individuals [12]. Lifetime cumulative prevalence estimate may substantially understate the true lifetime risk because the participant had fallen under different age groups. For example, a study conducted on health sciences students showed lifetime LBP prevalence

Table 2. Significant risk factors as predictors for LBP prevalence in TUMS office workers

	Factors	OR (Adjusted)	95% CI	P
Marital status	Married (Reference)			
	Single	0.428	0.238–0.770	0.005
Sleep disturbance	No sleep disturbance	0.20	0.092–0.442	<0.001
	1-2 times	0.438	0.175–1.096	<0.001
	3 times	0.515	0.156–1.704	0.078
	No sleep (Reference)			
Age	≤30	0.206	0.060–0.707	0.012
	30-45	0.345	1.31–0.905	0.031
	≥45 (Reference)			
Education level	Intermediate	1.904	0.937–3.872	0.075
	Graduate	1.879	1.067–3.308	0.029
	Master & PhD (Reference)			
Computer using time	≤3 hours	0.628	0.301–1.307	0.213
	3-6 hours	0.925	0.510–1.676	0.797
	≥6 hours (Reference)			
Work experience	≤10 years	1.897	0.681–5.279	0.220
	10–19 years	2.841	1.110–7.275	0.029
	≥20 years (Reference)			
Sitting hours	≤4 hours	0.223	0.082–0.611	0.003
	4–8 hours	0.464	0.245–0.876	0.018
	≥8 hours (Reference)			
Exercise	No	1.690	1.037–2.752	0.035
	Yes (Reference)			
Usual body position	No Forward bending	0.745	0.435–1.279	0.286
	Forward bending ≥2 hours (Reference)			
Forward Bending	No	0.540	0.324–0.898	0.018
	Yes (Reference)			

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of 56.6% [13] while another study which also included seniors showed lifetime LBP prevalence of 79.2%, (95% CI, 77.3-81.0) [14].

Demographic characteristics had shown different LBP prevalence depending on the changed conditions of the participants. Females reported higher (34%) LBP prevalence than males (29.7) which might be due to biological, psychological, heightened pain sensitivity and sociocultural factors [15] but the results were not significant. Prevalence of LBP was higher among married (38.6), as compared to the single (19.5) office workers which was very similar to the other studies conducted on the Iranian population [6] and results were significant too. Shiri et al. reported that obesity is a risk factor for LBP in both cross-sectional and cohort studies and declared it as bidirectional; that is, obesity may cause low back pain, or obesity can be a consequence of LBP [16].

Present study also stated more LBP prevalence among obese office workers (41%) than non-obese (31.3%) but statistically the results were not significant. Low educated office workers constantly remain under stress due to over work which ends into high prevalence of LBP among such workers [5] as the results showed in present study. Higher prevalence of LBP (37.5%) was noted among those office workers who did not have the habit of exercising and it was least among those who used to exercise thrice or more than thrice in a week. Other researchers have also stated that exercise reduces the risks of LBP and associated disability, and a combination of strengthening with either stretching or aerobic exercises performed 2–3 times/week can reasonably be recommended for prevention of LBP in the general population [17]. Similar to present study, another study reported that adults with chronic LBP were more likely to report sleep disturbances to a health care provider (ORadj 3.90 [95% CI 3.22–4.73]; P<0.0001) and there was also significant association between sleep disturbance & LBP in present study. Smokers showed more LBP prevalence but the results were not significant which was inconsistent with a 2010 meta-analysis that reported a positive association between smoking and low back pain [18].

Work related associated risk factors also had variable figures regarding LBP. Previous studies have found the highest incidence of low back pain in the third decade [19] and these finding are comparable with the results of present study where highest percentage (43.2%) of LBP was observed among office workers with 10-19 years of work experience and significant association was also found between work experience and LBP.

Those office workers who used to sit for longer duration and stand for lesser time showed highest prevalence of LBP; significant association was found only for point prevalence in sitting category and other studies have also confirmed that sitting for more than 3 hours daily could be a risk factor for LBP [20]. Forward bending was a risk factor for LBP and bending for more than 2 hours a day presented with significantly higher proportion of LBP for point and lifetime prevalence of LBP; increased spinal load due to forward bending can cause LBP [21]. In accordance with other studies, the adjustable back support in present study was associated with decreased rates of LBP [22]. Satisfaction level of job, a psychological risk factor showed a positive association with point prevalence of LBP in present study similar to other studies [23], but many researchers have not concluded the psychosocial determinants as the cause of LBP [21, 24].

Present study also have certain limitations; it was conducted in a medical university where workers might had the awareness regarding health issues, therefore, the results may not be applicable to the general office workers in non-medical or non-educational environment; cross-sectional design of present study was able to show only association and not causation between the risk factors and prevalence of LBP. As a conclusion of this research, high prevalence of LBP was reported among the office workers of TUMS and different individual as well as work related risk factors are worsening this condition. Preventive strategies are much needed by educating and providing better work facilities to the office workers.

Acknowledgements

TUMS had supported this study by a research grant and we are very thankful to the concern authorities.

Conflict of Interest

The authors declared no conflicts of interest.

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