RESEARCH NOTE

A cross sectional study to determine the prevalence and risk factors of low back pain among public technical institute staff in Kurdistan Region, Iraq [version 1; peer review: 2 approved with reservations]

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Abstract

There is a lack of quantitative data regarding exposure response relationships between low back pain (LBP) and associated risk factors among institute staff in Kurdistan Region, Iraq. This study explored such associations in an analytic cross-sectional study. Data collection was carried out with a self-administered questionnaire. A total of 70 (90%) institute staff from Koya Technical Institute (KTI) participated in this study. The findings indicated that 61.4% of KTI staff report LBP. Independent variables significantly associated with reporting LBP (P value <0.05) during past 12 months were smoking (OR=10.882; 95%CI=1.301-90.995) and job tenure (OR=3.159; 95% CI=1.072-9.312). In conclusion, LBP is significantly associated with smoking and years worked; therefore, workers should be educated on the effects of smoking not only as it relates to LBP, but also how it affects the whole body and how to quit it. This can be done through health promotion campaigns and programs sponsored by the university.

Keywords

prevalence, low back pain, risk factors, institute staffs, Kurdistan Region

Open Peer Review

Approval Status ? ?

	1	2
version 1
23 Feb 2017	view	view

1. **Md Mizanur Rahman**, Universiti Malaysia Sarawak, Kota Samarahan, Malaysia
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Any reports and responses or comments on the article can be found at the end of the article.

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Competing interests: No competing interests were disclosed.

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Introduction

Low back pain (LBP) has become one of the major public health issues in recent years. It is one of the most prevalent work-related musculoskeletal disorders, about 70% of adult in United Kingdom experienced at least one episode of LBP in their life, which lead to modifications in their work and lifestyle¹. The burden of LBP can be defined as a pain or discomfort located below the margin of the 12th rib and above the inferior gluteus fold, with or without leg pain². The economic loss due to LBP does not only affect the quality of a workers' social life, but also the organisation and society as a whole due to reduction of working capacity, decreased production, and early retirement³. Estimates of frequency, a measure of the proportion of a population with LBP during a specified period, differ between developing and industrially developed countries, between industrially developed countries, and within industrially developed countries, according to diverse studies and across diverse regions within countries⁴. Many international studies among university staff have reported high prevalence of LBP⁵. It has been well-known that LBP is amongst the most common cause of physical disability in the European adult population. At any one time, eight in every ten adults experience LBP⁶, accounting for long periods of absence from work, and the greater this period the lower the chances of going back to work⁷.

According to Mehra *et al.* (2011), every year about 3.6 million outpatient visits in the United States are attributed to LBP, and it is responsible for the second most common neurological disease, as well as the fifth most common cause for physician visits⁸. Demographic, occupational and individual factors are recognised as important risk factors associated with an increasing burden of LBP^{9–11}. In Koya Technical Institute (KTI; Koya district, Erbil Governorate, Iraq), different job positions exist; academicians, administrators, cleaners, bus drivers, and secretaries, as well as various levels of support staff. In the different positions, workers spend much time on their work, which requires standing and sitting for a long time to teach, using computers, driving, lifting heavy loads, etc. Due to the activities the workers engage in, the prevalence of LBP has increased. For instance, being a member of academic staff does not only involve teaching students, but also preparing lessons, evaluating and grading students' coursework, examinations, laboratory work, undertaking personal research projects and actively contributing to the institution's research profile, writing up research paper and arranging it for publication, supervising student's study activities, and managing administrative tasks associated to the department (such as new student admissions, and at a senior level this may involve the role of head of department). Furthermore, the administrative staff of KTI are exposed to a prolonged use of computers, which predisposes the employees to static work posture and awkward body posture, and prolongs sitting; this is because the Kurdistan government has applied the use of computer in most daily tasks, especially among office workers. Until now no studies have been carried out concerning the relationship between factors associated to LBP in a representative sample of institute staff in Kurdistan Region, Iraq. Thus, it is clear that there is a need to identify the risk factors associated with LBP in this country.

KTI has a labour force of approximately 77 academic and non-academic staff, belonging to different areas of specialization in different departments. These employees in their different areas of specialization may be exposed to a number of occupational, individual and psycho-social factors, which may result LBP. Whereas a significant body of research has discovered the association between working in office and university with LBP in developed countries, there is still limited study with regards to the institute population in Iraq especially about LBP. With this rationale, the present study was undertaken among public technical institute staff that aimed to determine the prevalence and risk factors of LBP among workers.

Methods

Recruitment of participants

This cross-sectional study was conducted among KTI staff from 10th February to early March 2016. A list with the names of the workers (academic and non-academic) was obtained from the KTI Office and used for the purpose of this study. In this study, the inclusion criteria was all KTI staff who have worked at least ≥ 12 months in KTI and with no history of LBP due to accident. Participants who are on leave during the study period and refused to answer the survey questions were excluded. The sampling for this study was done in two phases. In the first phase, information about the whole population of KTI staff, for instance the number of employees in each department, type of occupation, were obtained from each department. In the second phase, the researcher divided workers into two homogeneous subgroups (Strata) according to type of occupation: academic and supportive staff, which include administrative staff, bus drivers, cleaners and technicians. In the third phase, a simple random sampling technique was used to select 70 participants based on the inclusive criteria.

Initially, a self-administered questionnaire was distributed to all participants by four institute students. After a few days the students returned to collect the completed questionnaire. The average response rate across all staff was 87.5%.

Questionnaire survey

The survey ([Supplementary File 1](#) and [Supplementary File 2](#)) was a self-administered questionnaire, which was composed of three sections to collect information on socio-demographic and occupational factors, as well as on LBP. *Section A*: Participants' socio-demographic factors, which included age, gender, education level and smoking status. *Section B*: A modified Nordic questionnaire was used to collect information about LBP among the participant population¹². *Section C*: Participants' occupational characteristics, which included type of job, duration of employment, standing and sitting work posture. For better understanding for the participants, the questionnaire was translated from English to the Kurdish language.

Statistical analysis

The collected data were entered in to SPSS for Windows version 21. Univariate analysis was used to examine the characteristics

of KTI staff and the prevalence of LBP. Bivariate analysis (χ^2 test) was used to determine associations between risk factors and LBP, and logistic regression analysis was used to determine the adjusted odds ratio (OR) with a 95% confidence interval (CI).

Ethics

This study was approved by the Ethics Committee of Koya Technical Institutes in October 2015 (ref: KTI 24015). Interviews were carried out after obtaining written informed consent of the respondents.

Results

Quantitative data (frequency, percentage, median, inter quartile range [IQR]) of participants are listed in Table 1. Out of 80 self-administrated questionnaires which were distributed, 70 of them agreed to participate, giving an 87.5% respondent rate. Median cut-off points were used to dichotomize the continuous variables. In total, 50% of respondents who participated in the study were ≤ 37 years and 50% were > 37 years, with a median of age of 33.5 years (IQR, 12 years). In all, 54.3% were female, 31.4% had an education level up to college diploma or equivalent, 78.6% were non-smokers, and 82.9% were academic (as opposed to supportive) staff. A total of 48.6% had a duration of employment of > 6 years (median, 6; IQR, 6), 52.9% stood for ≤ 3 hours/working day (median, 3; IQR, 2), and 57.1% sat for ≤ 2 hours/working day (median, 2; IQR, 2).

The prevalence of LBP among KTI staff in the past 12 months was 61.4%. The distribution of socio-demographic characteristics and working conditions for the groups with LBP and without LBP are shown in Figure 1. The statistical analysis revealed that there was significant association between smoking, job tenure and LBP ($P < 0.05$). However, age, gender, education level, type of job, standing and static work posture was not significantly associated with LBP.

Variables with $P < 0.05$ in the bivariate analysis were analysed together by multiple logistic regression to determine how well the effects of independent variables on LBP were associated (Table 2). The results showed that KTI staff that smoke were 10 times more likely to have LBP (OR, 10.882; 95% CI, 1.301-90.995) than non-smoking staff. In addition, staff with job tenure of > 6 years were 3 times more likely to develop LBP (OR, 3.159; 95% CI, 1.072-9.312) compared with staff with job tenure ≤ 6 years.

Discussion

This study found that the prevalence of LBP among KTI staff during the past 12 months was 61.4%. The reported prevalence of LBP among KTI in Kurdistan region (Iraq) was slightly higher compared to other study findings, which reported the prevalence of LBP among school teachers China in 2012 as 45.6%¹³. It is also much higher compared with results reported among Adam Hospital medical college staff in Ethiopia (41.4%)¹⁴, as well as a studies conducted in European countries (with a point prevalence of 21.5%)¹⁵ and among university staff in Thailand (22.3%)⁵. However, it is much lower than the annual prevalence of LBP reported among nurses (73.5%) in Nigeria¹⁶. The high prevalence of LBP might affect the working life of KTI staff through decreased productivity, absenteeism and increased medical cost. LBP have

Table 1. Staff demographics and occupational factors.

Factors	N (%)	Median (IQR)
Age, years		33.5 (12)
≤ 33.5	35 (50.0)	
> 33.5	35 (50.0)	
Gender		
Male	38 (54.3)	
Female	32 (45.7)	
Level of education		
Primary school	2 (2.9)	
Intermediate school	1 (1.4)	
Secondary school	7 (10.0)	
College diploma or equivalent	22 (31.4)	
Bachelor degree	17 (24.3)	
Master's degree	21 (30.0)	
Smoking status		
Smoker	15 (21.4)	
Non-smoker	55 (78.6)	
Type of job		
Academic staff	58 (82.9)	
Supportive staff	12 (17.1)	
Job tenure, years		6.0 (7.0)
≤ 6 years	36 (51.4)	
> 6 years	34 (48.6)	
Static posture (standing; median cut off), hours		
≤ 3	37 (52.9)	3.0 (2.0)
> 3	33 (47.1)	
Static posture (sitting; median cut off), hours		
≤ 2	40 (57.1)	2.0 (2.0)
> 2	30 (42.9)	

been found by numerous researchers to be related with various factors, both occupational factors (duration of employment, static work posture, awkward posture) and individual factors (smoking, obesity, exercise)^{6,12}.

According to this study, KTI staff who were smoke are 10 times more likely to have LBP compared with non-smoking staff. Similar outcomes have been demonstrated by a study conducted among school teachers¹⁷. This could be explained as scientists have shown that there is an association between cigarette smoking and musculoskeletal disorders. Firstly, cigarette smoking may cause a decrease in the amount of blood perfusion to bones and to almost all tissues of the human body, which leads to low production of bone-forming cells (osteoblasts)¹⁸. Another explanation is that cigarette smoking

Figure 1. Distribution of socio-demographic characteristics and occupational factors in staff with and without LBP. $**P < 0.05$ by χ^2 test. LBP, low back pain.

Table 2. Multiple logistic regressions of predictors of lower back pain.

Variables	B	S.E	Sig.	Adjusted OR	95% Confidence interval
Smoking status					
Smoker	2.387	1.080	0.028	10.882	1.301-90.995
Non-smoker	-	-	-	1	-
Job tenure					
≤ 6 years	-	-	-	1	-
> 6 years	1.150	0.552	0.037	3.159	1.072-9.312

SE = standard error; Sig. = significance (P value); OR = odds ratio.

causes calcium deficiency by reducing the absorption of the quantity of calcium from diet, which the body needs for building strong bones¹⁹. Moreover, cigarette smoking has a negative effect on the growth of the lungs and it is also detrimental to the well-being of the lungs, such that it results in shortness of breath and a decrease in the quantity of oxygen made available to the muscles²⁰. In addition, KTI staff with job tenure >6 years were 3 times more likely have LBP than those who worked ≤6 years. Similar outcomes have been demonstrated by a study conducted among university workers²¹. This finding suggests that an increased risk of LBP occurs during advanced (after 6 years) employment in the institute. An association between LBP and job tenure was also reported in a study conducted by Noroozi *et al.* (2015)²² among medical sciences office workers of Ahvaz Jundishapur University. Thus, the longer staff work in KTI, the higher the risk of developing LBP. LBP is cumulative ailment and over time may result from frequent exposure to risk

factors with insufficient recovery²³. The same body part is activated for long periods of time if the institute staff often repeat similar tasks for several months or years. As a result, internal tolerance of tissues is exceeded when accumulation of loading occurs, due to exposures of long duration²⁴.

The results also showed that there were not a significant association between LBP and age, gender, level of education, type of job, and static work posture. This study was a cross-sectional study where the association between risk factors and LBP at a particular point in time could be determined. The finding was relied on self-reported questionnaire and there was no medical test to confirm the presence of LBP. Recall bias may also have occurred, and information bias happened during the completion of the questionnaire, due to the different understanding of participants based on their opinion and judgment.

Conclusions

Overall, LBP was found to be common among staff at KTI. Thus, there is need for an awareness to be created among staff through strategic prevention programs. The workers should be educated on the effects of smoking not only as it relates to LBP but, also on all the whole body parts and how to quit it. This can be done through health promotion campaigns and programs sponsored by the university, in order to reduce the prevalence and prevent the risk of LBP among KTI staff.

Data availability

Raw datasets have not been made available at the request of the Ethics Committee in order to maintain participant confidentiality. This data is stored at the Department of Preventive Health, Koya Technical Institute and is available upon request. Please contact the first author Karwan Mahmood Khudhir (karwan85.mahmud@gmail.com) for further information.

Supplementary materials

Supplementary File 1: The questionnaire in English.

[Click here to access the data.](#)

Supplementary File 2: The questionnaire in Kurdish.

[Click here to access the data.](#)

Author contributions

KMK conceived the study. KMK, KAH, KKS designed the experiments. MH performed the data analysis. All authors were involved in the revision of the draft manuscript and have agreed to the final content.

Competing interests

No competing interests were disclosed.

Grant information

The author(s) declared that no grants were involved in supporting this work.

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Version 1

Reviewer Report 18 April 2017

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Rusli Bin Nordin

Jeffrey Cheah School of Medicine and Health Sciences, Monash University Malaysia, Johor Bahru, Malaysia

TITLE: Too long. Summarize as: Prevalence and risk factors of low back pain among public technical institute staff in Kurdistan Region, Iraq.¹

ABSTRACT: Sample size (n=70) is rather small, potentially leading towards possible spurious associations (wide confidence intervals). P values should be presented with exact values, not $p < 0.05$. Should include limitation of the study due to small sample size. Add keywords.

INTRODUCTION: Accepted. Please correct typos.

METHODS: Study design is accepted. Sampling was flawed: initially it appeared to be sampling from two populations (academic and support staff) but later only simple random sampling was applied. Sample size estimation was not done; hence, the sample size obtained (n=70) is very much an under sampling error, leading to possible spurious associations. Questionnaire validation was not done properly: back translation from Kurdish to English language was not done. Statistical Analysis: Too short. Need to elaborate on the logistic regression modelling approach.

RESULTS: Table 1 is accepted. Figure 1 is incomplete (asterisks for significant associations were not indicated on the figure). Table 2 on logistic regression should include the Naegelkerke's R square.

DISCUSSION: Generally accepted. However, need to mention the limitation of the study and the possible spurious association between smoking status, job tenure, and LBP. Since there was no mention of the variance explained by the two independent variables on LBP, there should be a short discussion on other possible determinants of LBP among these workers.

CONCLUSIONS: Generally acceptable. However, need to emphasize the importance of ensuring adequate sample sizes in future studies to avoid under sampling and associated statistical issues.

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1. Khudhir K, Mahmood K, Saleh K, Hossain M: A cross sectional study to determine the prevalence and risk factors of low back pain among public technical institute staff in Kurdistan Region, Iraq. *F1000Research*. 2017; **6**. [Publisher Full Text](#)

Is the work clearly and accurately presented and does it cite the current literature?

Partly

Is the study design appropriate and is the work technically sound?

Partly

Are sufficient details of methods and analysis provided to allow replication by others?

Partly

If applicable, is the statistical analysis and its interpretation appropriate?

Partly

Are all the source data underlying the results available to ensure full reproducibility?

No

Are the conclusions drawn adequately supported by the results?

Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Environmental and occupational health

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Reviewer Report 24 March 2017

<https://doi.org/10.5256/f1000research.11653.r21214>

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Md Mizanur Rahman

Department of Community Medicine and Public Health, Universiti Malaysia Sarawak, Kota Samarahan, Malaysia

Title: rewrite the title and make it short

Abstract: Add background of the study. Accepted

Introduction: Accepted

Methodology: Accepted

Analysis and results: Multiple logistic regression, It is actually binary logistic regression analysis. Figure 1, it is not well fitted. Either delete it or present in cross-table. Insufficient description of logistic regression analysis, please, add model fitting information, sample size, GOF etc. Relationship between LBP and smoking appeared to be spurious because of very wide 95% confidence interval. Please, recheck smoking status and LBP in cross table to see the optimum cell frequency.

Conclusion: Accepted.

Is the work clearly and accurately presented and does it cite the current literature?

Partly

Is the study design appropriate and is the work technically sound?

Partly

Are sufficient details of methods and analysis provided to allow replication by others?

Partly

If applicable, is the statistical analysis and its interpretation appropriate?

Partly

Are all the source data underlying the results available to ensure full reproducibility?

Partly

Are the conclusions drawn adequately supported by the results?

Partly

Competing Interests: No competing interests were disclosed.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

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