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Prevalence and Determinants of Low Back Pain among Lecturers: A Quantitative Approach

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Authors' contributions

This work was carried out in collaboration among all authors. Author OFO conceived and designed the study, performed the statistical analysis and wrote the first draft of the manuscript. Authors OYH and AOI managed the analyses of the study. Author KAA managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: Lower back pain is one of the most common work-related problems among teaching professionals in both developed and developing nations and it often leads to absenteeism or early retirement of workers. Thus the aim of this study was to investigate the prevalence and associated risk factors of low back pain among academic staff.
Methods: An institutional based cross-sectional study was adopted. Five faculties were randomly selected in Ekiti State University, Nigeria and a self-structured questionnaire was purposively administered; depending on interest and availability of the respondents. The data was explored and Chi-square analysis alongside binary logistic regression was applied in order to evaluate the relationship between low back pain and some associated factors. Analysis was carried out in SPSS version 20.
Results: This study comprises 127 lecturers with a mean age of (41.95±9.42). There were more males (55.9%) than females. More than thirty six percent of the lecturers had teaching experience below 5 years while 44.9% had 5 to 10 years and 18.9% had above 10 years of teaching experience. The results show that age, gender, prolonged sitting and prolonged standing significantly (p-value <.05) associated with occurrence of low back pain among lecturers while mixed teaching posture serves a protective against low back pain.

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Conclusion: The results reveal a very high prevalence of low back pain. Findings show that female gender, old age and inappropriate work postures are the risk factors of low back pain. It is suggested that effort should be to ameliorate occupational stress among academic staff.

Keywords: Lecturers; low back pain; prevalence; prolonged sitting; teaching posture.

1. INTRODUCTION

Pain is an unpleasant state felt in the mind but perceivable as arising in a part of the body while back pain is any pain felt in the human back that may come from the muscles, bones, nerves, joint or any other structure in the spine. The pain may be constant or intermittent, stay in one place or refer or radiate to other areas. It may be a dull ache or a sharp or burning sensation. Low back pain (LBP), more accurately called lumbago or lumbo sacral Pain, occurs below the 12th rib and above the buttocks. It is one of the most prevalent musculoskeletal conditions and a common cause of disability in both developed and developing countries [1]. A meta-analysis conducted elsewhere on LBP shows that it is more prevalent among adult than the younger ones and among females than males [2,3]. Various works show that lifetime prevalence of LBP is very high even in developed countries. Meanwhile, it incurs billions of dollars in medical expenditures each year [3]. Africa is not spared as the prevalence is also increasing at alarming rate. About 46% was reported for out-patients in a particular hospital, western part of Nigeria [4] while higher proportions have also reported across different countries and professions [5,6,7,8,9]. Moreover, various risk factors have been noted and among them are smoking, anxiety or depression and lack of support at work, and psychosocial factors are also of concern [8]. Categorized the risk factors for LBP into individual, physical and psychosocial factors. The individual factors include variations like age and gender. Though, LBP is highly prevalent among both genders [6]. Age is regarded as a constant contributing factor to LBP among societies. It is considered that as long as the population is ageing, the global population of people with lower back pain would tend to increase substantively [2]. Physical activities that are also peculiar with lecturers such as prolonged standing during lecture, weakness of the lower limbs due to awkward posture and sitting for long periods mostly with computer contribute significantly to sustaining LBP. Majority of the members within the active population are more affected by LBP due to the deterioration of disc bones [2]. Emphasizes people with lower back pain stand a higher chance of missing work, among different working age groups, including teachers or lecturers. Globally, 37% of LBP are attributed to occupational hazard related causes [10]. It is therefore noted that the risk of getting LBP could be higher in workers who do heavy physical work which may be common among those working in laboratory, or whose posture is awkward during work [10].

It is obvious that the work of lecturers are not only limited to class work, but that the occupation involves holding as well as body movements such as frequent bending, twisting, sudden movement, and working in bent-over postures: these are almost unavoidable while reading or preparing note or during field work and they are found to have a significant potential for producing lower back pain. According to [11], workers involved in high energy activities such as gymnastics and sports activities at school are at higher risk of developing a more chronic LBP injury, which often result in permanent disability hence untimely retirement. More so, a study conducted among Irish identified musculoskeletal problems, including LBP, as one of the leading causes of ill health cause-specific retirement among lecturers [7]. Despite this, extensive investigation into school environment with regard to general working atmosphere and likely causative factors for LBP is more than necessary. Hence, recommendation sequel to our findings could be invaluable to policy makers and the target population in particular. Therefore, this study aims at determining the prevalence as well as the major risk factors associated with low back pain among lecturers in Ekiti State University, Nigeria.

2. MATERIALS AND METHODS

2.1 Sample

In this cross sectional study, five faculties were randomly selected out of eleven within Ekiti State University, Ado-Ekiti campus. The University is structured into 11 Faculties, three of which are embedded in College of Medicine (Faculties of Basic Medical Sciences, Basic Clinical Sciences

and Clinical Sciences). Others are: Agricultural Sciences, Arts, Education, Engineering, Law, Management Sciences, Science and the Social Sciences. The data collection took place between January 2017 and March 2017. Due to an envisaged difficulty in accessing some of our potential respondents, a required and optimum sample size was estimated thus:

The target population as found in the school website was 555; the sample size estimated is given below:

$$n = \frac{n_0}{1+\frac{1}{N}(n_0-1)} \quad \text{(i)}$$

$$And\ n_0 = \frac{Z\alpha^2 P(1-P)}{d^2} \quad \text{(ii)}$$

Where, 'n', 'n_0', 'N', 'Z_α', 'P' and 'd' are: the required sample size, the optimum sample size, target population size, the standard variate at α level of significance, the prevalence of low back pain (worst case scenario due to irregular reports in the literature) and the precision respectively.

Z= 1.96, d= 10%= 0.1, p=50%=0.5, N=555

Therefore $n_0 = \frac{Z\alpha^2 P(1-P)}{d^2}$ =97 & n= $\frac{no}{1+\frac{1}{N}(no-1)}$ = 82

2.1.1 Inclusion criteria

- Lecturers that are permanently employed in the University.
- Lecturers with a work experience of at least 6 months.
- Lecturers who consented to the understanding of the research.

2.1.2 Exclusion criteria

- Lecturers with a history of LBP due to trauma such as road accidents.
- Lecturers with recent surgical operation.
- Pregnant women

2.2 Ethical Consideration

A note on procedure and the objectives of the study was attached to the questionnaire and informed consent implied by voluntarily completing and returning the questionnaire. Every information provided was treated with utmost confidentiality.

2.3 Measurements

Primary data used in this research was obtained from a well-developed self-administered questionnaire. The questionnaire was designed to collect information on individual demographic data (Age, gender, working experience, sex etc.), work conditions (duration of employment in current work, average working hours per day etc.), it also comprises questions that assess the functional disability of a client which are: sitting, standing, walking and lifting. Each of the four sections had five questions.

2.4 Logistic Regression Model

The response variable is: ever experience low back pain in the last twelve months, denoted by Y. The variable is dichotomous with options either 'Yes' or 'No', assigned with probability $\pi_i = P(Y_i = 1|X)$ or $P(Y_i = 0|X)$ respectively. The logistic regression is given by:

$$\pi_i = \frac{e^{\beta_0+\beta_1 x_{i1}+\beta_2 x_{i2}+..+\beta_p x_{ip}}}{1+e^{\beta_0+\beta_1 x_{i1}+\beta_2 x_{i2}+..+\beta_p x_{ip}}} \quad \text{(iii)}$$

And can be equivalently expressed with logit link function as:

$$\log it(\pi_i) = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + ...\beta_p x_{ip} \quad \text{(iv)}$$

Where, i=1,2,3…n, j = 1, 2,…p and x_{ij} are the predictors, β_0 is an intercept and β_j's are the coefficients of the predictor variables.

2.5 Estimation of the Parameters

The likelihood of an individual/participant experience LBP can be likened to a likelihood function L(Y|X,β) which can be defined as the joint probability distribution f(y|X,β) of the respective independent observation vector of size n with regression parameter β and design matrix X. This can be expressed mathematically as:

$$L(Y \mid X, \beta) = \prod_{i=1}^{n} \left(\frac{e^{\beta_0+\beta_1 x_{i1}+\beta_2 x_{i2}+..\beta_p x_{ip}}}{1+e^{\beta_0+\beta_1 x_{i1}+\beta_2 x_{i2}+..\beta_p x_{ip}}} \right)^{y_i} \left(\frac{e^{\beta_0+\beta_1 x_{i1}+\beta_2 x_{i2}+..\beta_p x_{ip}}}{1+e^{\beta_0+\beta_1 x_{i1}+\beta_2 x_{i2}+..\beta_p x_{ip}}} \right)^{1-y_i} \quad \text{(v)}$$

It signifies how likely an individual observed LBP prior to the study time given the parameters. The

parameters estimation is based on maximum likelihood method, with Newton-Rapson iterative search algorithm to maximize the likelihood function or its logarithmic transformation. Luckily, this procedure is machine driven that can be found in most statistical packages such as SPSS we applied in this work.

2.6 Data Analysis

Completed data was captured on a spreadsheet using the Microsoft Excel program in preparation for analysis. The data was recoded from question responses into meaningful prevalence variable. Thereafter, data was transferred into the Statistical Package for the Social Sciences (SPSS) IBM Version 20. Descriptive statistics were employed to summarize the demographic data of the study sample and presented using frequency tables and expressed as percentages, means and standard deviations. Chi-square was applied to determine if any association exists between categories of low back pain and physical activities as well as the demographic variables. All tests were done at 5% level of significance except during preliminary analysis where 10% was adjudged significant for variables selection. However, logistic regression was used to determine the predictors' relationship with low back pain. The choice of this model was based on the fact that the dependent variable is dichotomous and measured independently.

3. RESULTS

Displayed in Fig. 1 are the categories of prevalence of LBP in the results. About 7% (n=127) revealed to be having symptoms of low back pain as at the point of interview. Fifty (39.4%) indicated to have had the experience within the last six months to the time of investigation and a year prevalence of 53.50% was similarly observed (Table 1). Meanwhile, 76 participants, representing 59.8%, had had low back pain at a time in their life as revealed in the result.

A total number of 200 questionnaires were administered within the selected faculties with an attrition rate of 36.5% due to the usual hectic nature of the job of our study population. Average age of the study group was (41.95±9.42) and among the 127 Lecturers that responded and met the inclusion criteria, 56 (44.1%) were females and 71(55.9%) were males. Majority were identified to have married (n=100; 78.7%) and 43 (33.9%) were in the age group 40 - 49 years. Also, a notable proportion (n = 68; 53.5%) possessed second degree (MSc). More than thirty six percent of the lecturers had teaching experience below 5 years while 44.9% had teaching experience between 5 and 10 years inclusively and 18.9% had above 10 years of teaching experience. About a quarter taught more than 2classes per day. With regards to their posture, many of the respondents preferred to stand while teaching.

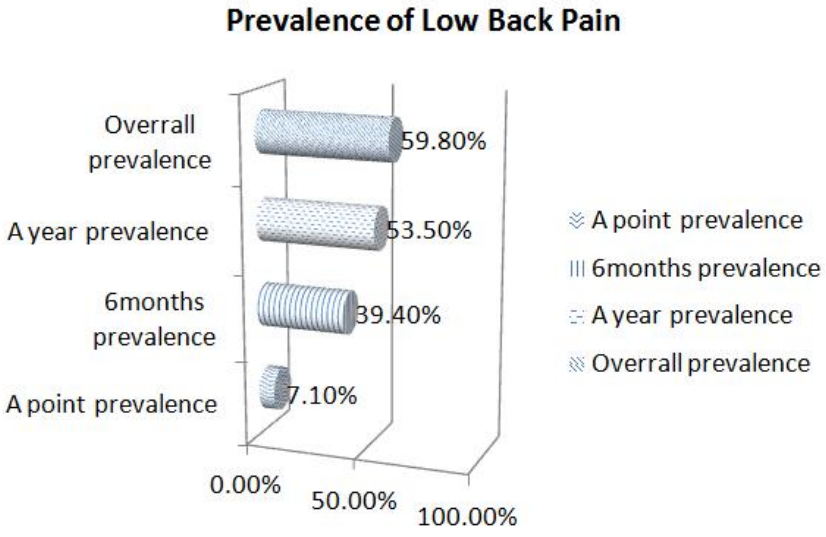

Fig. 1. Various episodes of low back pain among lecturers

Table 1. Distribution of socio-demographic characteristics (N=127)

Variables	Frequency	Percentage (%)
Gender		
Male	71	55.9
Female	56	44.1
Age		
20-29	14	11.0
30-39	38	29.9
40-49	43	33.9
50 and above	32	25.2
Marital Status		
Single	27	20.3
Married	100	78.7
Working Experience		
Below 5 years	46	36.2
5 – 10 years	57	44.9
10 years and above	24	18.9
Academic Qualification		
BSC	6	4.7
MSC	68	53.5
PHD	53	41.7
Average class taught per day		
Below 3classes	93	73.2
3 or above	34	26.8
Working posture		
Often sitting	25	19.7
Often standing	102	80.3

Table 2. Multiple logistic regression of low back pain and Its associated factors

	B	S.E.	Wald	df	P-Value	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Sex (male)	-.714	.446	2.562	1	.109	.490	.204	1.174
Age	2.053	.849	5.843	1	.016	7.788	1.474	41.142
Work experience (in years)	1.480	.651	5.160	1	.023	4.391	1.225	15.740
Prolong Sitting	1.133	.481	5.544	1	.019	3.105	1.825	5.283
Prolong Standing	1.487	.742	4.012	1	.045	4.424	2.053	5.827
Walking ≤ 1km per day	.371	.688	.290	1	.590	1.449	.376	5.580
Heavy weight lifting	.632	.464	1.852	1	.174	1.881	.757	4.675
Teaching posture (Sitting)	-.381	.704	3.851	1	.049	.251	.063	.998
Constant	2.671	2.706	.974	1	.324	14.447		

In order to streamline the variables to be recruited into the logistic model, a Univariate Chi – square test was conducted at 10% level of significance. The results show that age, gender, years of work experience together with other physical musculoskeletal activities are associated with occurrence of low back pain.

Multiple logistic regression was applied to jointly evaluate the influence of sex, age and job related factors. The model explained about 49% of the variances in ever experience LBP in the last 12months among the participants and 81% of the cases were correctly classified. Table 2 shows the relationship between low back pain and some potential risk factors among respondents. After adjusting for other variables, a unit increase in age increases the odds of experiencing LBP by 7.788(P=.016). Similarly, a unit increase in lecturing years of experience, prolong standing, as well as prolong sitting consequently increase the odds of having a low back pain by 4.391 (P= .023), 3.105 (P= .019) and 4.424 (P= .045) respectively. Elevated occurrence of LBP is also

observed among respondents who arbitrarily stand throughout lecture without creating an interlude for few minutes sitting. This category of lecturers is found to be 3.98(1/0.251, P=.049) times likely to experience LBP than their counterparts that intermittently sit during lectures: holding all other independent variables in the model constant. Influence of gender, indulgence in daily exercise like some minutes' walk, and heavy weight lifting on LBP could not be substantiated statistically at 5% level of significance.

4. DISCUSSION

The current study investigated the prevalence of low back pain and its associated risk factor among lecturers. Different categories of prevalence were considered depending on the retrospective time frame. That is, a-point, six months, a year and a life-time prevalence. However, the current study pivots a year prevalence as an indicator for comparison. It is evident that the prevalence is strikingly high among the respondents. Actually, a relatively high prevalence has been reported in other related studies especially among primary health care visitors [6] and teachers [5,7]. These findings are similar to other studies carried out in Africa as well as in high income countries particularly among nurses and in general population. For instance, [12] reported 45.6% prevalence of lower back pain among teaching staff in a research conducted in China while another study showed that 55.7% of Botswana school teaching staff [8]. It was concluded that LBP is rising and is becoming a general concern for occupational health. [3] Carried out a systematic review about low back pain prevalence in Africa and the result showed that a year prevalence of low back pain was 67%. A study on the prevalence of LBP among nurses in Nigeria identified a significantly high incidence of LBP (73.53%) amongst nurses working in a typical Nigerian reputable hospital [9]. In contrast, lower prevalence had been reported elsewhere [2,13,14]. The situation in Malaysia is no different to that of Turkey [13] that reported a 40.4% prevalence of LBP among teaching staff. Although prevalence of low back pain among lecturers in Africa has not been widely explored, results of the few available studies including the current results show that it is high. Lecturers in other developed countries may be working under improved condition which is most likely not the case under which lecturers in most African countries practice. Therefore, lecturers in Africa, particularly in Nigeria where the study was conducted might be at higher risk of suffering from low back pain than those in other developed countries hence a need for review of scoping strategy. The results of this current study will hopefully contribute to the scanty information available in Africa. Moreover, in line with the current study, literature reveals that LBP is more prevalent among females than their counterparts [2,5,6,8,13]. The cause of this variation may be related to disparity in body chemistry as women tend to have a lower pain threshold than men and other predisposing factors other than work-related variables considered in this study. Increase in LBP with age was observed in this study. This is in tandem with the findings in other study [7] meanwhile it was elevated among the middle age (35-44 years) in another setting [15]. Perhaps, the unusual hike within this age group could be a result of physical hitches rather than age. The odds ratio shows that occurrence of LBP increases with years of working experience. This receives a boost from a previous study conducted in Egypt [14]. Moreover, there is virtually a correlational interplay between age and work experience which might be responsible for the relationship. Lecturers job include reading, writing, marking and working with computer. These occupational postures may lead to prolong sitting which may contribute to experience of low back pain. Our findings shows that LBP increases with prolonged sitting just like the report from a similar research among teachers in Malaysia [5,13]. Prolonged standing also reflects a congruent effect as those that stand longer at work tend to surfer LBP more. This posture is common among lecturers particularly the junior ones who frequently indulge in activities like sustained standing when teaching and it could post a lot of challenges like LBP. Unfortunately, most schools in this part of the world lack the facilities that could aid preferred postures of lecturers. Other classroom posture that shows a significant relationship with low back pain is mixed teaching posture. It has been shown that intermittent sitting while teaching serves a protective role against low back pain. We suggest that this habit should be encouraged as much as possible.

5. CONCLUSION

This study showed that a point prevalence of low back pain is 7.1% and a-year prevalence is 53.5% among the lecturers. It affects female lecturers than their male counterparts. Low back pain was found to increase with age, work

experience, prolong sitting and prolong standing. Often sitting for some minutes during played a protective role against LBP. A risk as this is a pointer that lecturers are also exposed to occupational hazard since LBP could contribute to early retirement.

CONSENT

As per international standard written participant consent has been collected and preserved by the authors.

ETHICAL CONSIDERATION

A note on procedure and the objectives of the study was attached to the questionnaire and informed consent implied by voluntarily completing and returning the questionnaire. Every information provided was treated with utmost confidentiality.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Woolf A, Pfleger B. Burden of major musculoskeletal conditions. Bull World Health Organization. 2003;81(9):646-656.
2. Hoy D, Bain C, Williams G, March L, Brooks P, Blyth F, Buchbinder R. A systematic review of the global prevalence of low back pain. The American College of Rheumatology. Arthr Rheum. 2012;64(6): 2028–2037. [PubMed]
DOI: 10.1002/art.34347
3. Louw QA, Morris LD, Grimmer-Somers K. The prevalence of low back pain in Africa: A systematic review. BMC Musculoskeletal Disorders; 2007a.
Available:https://doi.org/10.1186/1471-2474-8-105
4. Ogunbode AM, Adebusoye LA, Alonge TO. Prevalence of low back pain and associated risk factors amongst adult patients presenting to a Nigerian family practice clinic, a hospital-based study. African Journal of Primary Health Care & Family Medicine. 2013;5(1):441.
Available:https://dx.doi.org/10.4102%2Fphcfm.v5i1.441
5. Nur Farahwahida Mohd Anuar, Irniza Rasdi, Suhainizam M. Saliluddin, Emilia Zainal Abidin. Work task and job satisfaction predicting low back pain among secondary school teachers in Putrajaya. Iran J Public Health. 2016;45(1): 85-92.
Available:http://ijph.tums.ac.ir
6. Bener A, Dafeeah EE, Alnaqbi K, Falah O, Aljuhaisi T, Sadeeq A, Schlogl J. An epidemiologic analysis of low back pain in primary care: A hot humid country and global comparison. Journal of Primary Care and Community Health; 2013.
DOI:10.2147/JPR.S40740
PMCID: PMC3569050
7. Beyen TK, Mengestu MY, Zele YT. Low back pain and associated factors among teachers in Gondar Town, North Gondar, Amhara Region, Ethiopia. Occup Med Health Aff. 2013;1(5):1-8.
DOI: 10.4172/2329-6879.1000127
8. Patience N. Erick, Derek R. Smith. Low back pain among school teachers in Botswana, prevalence and risk factors. BMC. 2014;15(359).
DOI: 10.1186/1471-2474-15-359
9. Sikiru L, Hanifa S. Prevalence and risk factors of low back pain among nurses in a typical Nigerian hospital. African Health Sciences. 2010;10(1):26-30.
Available:https://www.ncbi.nlm.nih.gov/pubmed/20811521
10. Ehrlich GE. Low back pain. Bulletin of the World Health Organization. 2013;81(9): 6716.
11. Lemoyne J, Laurencelle L, Lirette M, Trudeau F. Occupational health problems and injuries among Quebec's physical educators. Applied Ergonomics. 2007; 38(5):625-634.
Available:http://dx.doi.org/10.1016/j.apergo.2006.06.004
12. Yue PP, Liu FF, Li LL. Neck/shoulder pain and low back pain among school teachers in China, prevalence and risk factors. Public Health. 2012;12(1):789-797.
13. Samad NIA, Abdullah H, Moin S, Tamrin SBM, Hashim Z. Prevalence of low back pain and its risk factors among school teachers. American Journal of Applied Sciences. 2010;7(5):634-639.

14. Ebtesam Mo'awad El-Sayed Ebied. Work-related musculoskeletal pain among primary school teachers: A recommended health promotion intervention for prevention and management. World Journal of Nursing Sciences. 2015;1(3):54-61.

15. Rajan Balakrishnan, Martin Ebenezer Chellappan, Thenmozhi. Prevalence of low back pain and its risk factors among secondary school teachers at Bentong, Pahang. International Journal of Physical Education, Sports and Health. 2016;3(2): 35-40.

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