Epidemiology of Low Back Pain among Nurses Working in Public Hospitals of Addis Ababa, Ethiopia

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Background: Low back pain (LBP) related to Nursing Profession, is a very common public health problem throughout the world. Various risk factors have been implicated in the etiology and LBP is assumed to be of multi-factorial origin as individual, work-related and psychosocial factors can contribute to its development. The aim of this study was to determine the prevalence and to identify the risk factors of LBP among Nurses working in Addis Ababa City Public Hospitals, Ethiopia, in the year 2015. Addis Ababa University, Black-Lion ('Tikur Anbessa') Hospital-BLH, is the country's highest tertiary level referral and teaching Hospital. The three departments in connection with this study: Radiology, Pathology and Orthopedics, run undergraduate and residency programs and receive referred patients   from   all   over   the   country.
Methods: A cross-sectional study with internal comparison was conducted throughout the period October-December, 2015. Sample was chosen by simple random sampling technique by taken the lists of Nurses from human resource departments as a sampling frame. A well-structured, pre-tested and self-administered questionnaire was used to collect quantifiable information. The questionnaire included socio-demographic, back pain features, consequences of back pain, work-related and psychosocial factors. The collected data was entered in to epiinfo version 3.5.4 and was analyzed by SPSS. A probability level of 0.05 or less and 95% confidence level was used to indicate statistical significance. Ethical clearance was obtained from all respected administrative bodies, Hospitals and study participants.
Results: The study included 395 Nurses and gave a response rate of 91.9%. The mean age was 30.6 (±8.4) years. Majority of the respondents were female (285, 72.2%). Nearly half of the participants (n=181, 45.8% (95% CI (40.8%- 50.6%))) were complained Low Back Pain. There were statistical significant association between Low Back Pain and working shift, physical activities at work; sleep disturbance and felt little pleasure by doing things.
Conclusion: A high prevalence of Low Back Pain was found among Nurses working in Addis Ababa Public Hospitals. Recognition & Preventive measures like providing resting periods should be taken to reduce the risk of Low Back Pain in Nurses working in Public hospitals

Keywords: LBP Risk factors, Low back pain, Nurses, Work-Shift, and Public Hospitals

Introduction

Low Back Pain (LBP) is defined as pain or discomfort in the spinal area between the lower costal margins and gluteal folds with or without radiation to the leg below the knee for at least one day during the past 12 months [1-3]. The lower back has been recognized as the most exposed anatomical site[4]. The past few decades witnessed many incredible advances in the medical community's regarding to understanding of the functional anatomy and biomechanics of the lumbar spine. Despite these advances, however, the prevalence of associated costs of treatment and loss of productivity continue to increase, leading to the characterization of LBP as a societal epidemic [5]. It is one of the most common causes of musculo-skeletal disorder related to working status and condition[6]. It occurs in similar proportions in all cultures which can be interferes with work performance and quality of life. This makes the problem to be a common reason for medical consultations [7, 8].

Low back pain is nearly a widespread experience among adult populations [9]. It is an extremely common health problem[10] and well recognized cause of disability in the industrialized world [11]. It is estimated that about 80% of all populations will experience LBP at some period during their lifetime. The inter-cultural differences between nationalities in pain perception or pain reporting may be an explanation for the variation in prevalence rates among different countries. It was largely thought of as a problem confined to western countries, but at the moment, it has been demonstrated that LBP is also a major problem in low and middle income countries. It is the leading cause of activity limitation and work absence. It has to believe that a numerous economic burden on individuals, families, communities and country in general [6]. LBP is a common cause of morbidity in health care workers, and Nurses are among the occupational groups within the health service that are vulnerable to LBP [11].

Nursing is among the lists of highly risky profession for the occurrence of low LBP [12]. A recent American study raveled that nurses are ranked the sixth highest with regard to lose their working days from job due to LBP [13]. The prevalence of LBP on nursing staff varies from country to country. Data with regard to the prevalence of LBP in nurses in the sub-Saharan African region is inadequate. But a study in Nigerian and Ethiopian hospitals showed that a 12-month prevalence of LBP was 74% and 60% respectively[10, 12].

The risk factors of LBP is not fully understood but is assumed to be of multi-factorial origin, indicating that individual, physical and psychosocial factors can contribute to their occurrence and persistence of LBP on nursing populations [6, 14]. Reasons for this include both extrinsic and intrinsic risk factors that are relevant to nursing profession. Extrinsic factors include environmental and physical factors, where as intrinsic factors provide for personal and ergonomic risk factors [10]. Different epidemiological studies have been done to identify and relate possible risk factors to the occurrence of LBP among nursing staffs. They found that individual factors such as age, gender, educational level, body mass index, and psychosocial factors referring to job satisfaction, work stress, and anger have been examined and related to the occurrence

of LBP. But, LBP is a complex condition with several factors contributing to its occurrence [8, 12].

Most epidemiological data concerning LBP are related to industrial countries and there are little researches about LBP in the working population which are found in developing countries. Fewer epidemiological studies have examined the prevalence and associated risk factors of LBP among nurses in developing countries like Ethiopia. To our knowledge there is only one research that studied LBP prevalence among nurses in Africa. Estimating the prevalence and identifying risk factors of LBP among nurses can assist in and contribute to the understanding of the magnitude, determinant and management of LBP on nurses. Little is known about the epidemiology of LBP in our setup. This particular finding will be used as a base line data for other researchers who have interest on this field of study area. The aim of this study was to calculate the prevalence and to identifying the risk factors of low back pain among nurses in Addis Ababa Public Hospitals, Ethiopia.

This study was aimed at determining the prevalence and identifying the risk factors of Low Back Pain among Nurses in Addis Ababa Public Hospitals in Ethiopia, in the year 2015.

Subjects and Methods:

Study Area and Period: The study was conducted in Addis Ababa Public Hospitals, Addis Ababa, Ethiopia; December, 2015. There are a total of 10 Public Hospitals in the city which are controlled by two governmental authorities; Federal Ministry of Health (fmoh) and Addis Ababa City Health Bureau (AAHB). For these hospitals a total of 2,301 Nurses are responsible for patient care.

Study Design: A facility-based cross-sectional study was conducted to estimate prevalence of Low Back pain (LBP) followed by an internal comparison study to identify socio-demographic, work-related and psychosocial risk factors related to LBP.

Source population: The source population was all permanently employed Nurses who were working in different departments of ten public hospitals prior to data collection.

Study population: The study population was all permanently employed Nurses who were working in different departments of those selected four public hospitals. Nurses who were went for education programs and Nurses on annual leave were excluded.

Sampling and Sample Size: for first objective; the sample size was calculated by using single population proportion determination formula: $n = Z_{(\alpha/2)}2 * p(1-p)/d2$ by taking the prevalence of LBP to be 60%, a research done at Jimma specialized hospital (3). The estimate of the sample in this study was desired to be precise at a confidence level of 95% and a margin of error of five percent. For the second objective; the required sample size was calculated by using mainly risk factors of LBP that includes; moving patients (68%), back exercise (82.6%), job stress (73.7%) (19); as an independent variables. By taking confidence interval 95%, power 80% and by assumption ratio 1:1 for expected prevalence of LBP in exposed: unexposed for each variables was 416.

For the population size of 2,301 nurses, the required sample size was (430) nurses after some adjustment as;

$$N_{adj.} = \frac{n}{4}\left[1 + \sqrt{1 + \frac{4}{n|p1-p2|}}\right]^2 \approx \frac{416}{4}\left[1 + \sqrt{1 + \frac{4}{416|0.737-0.595|}}\right]^2 \approx \underline{430}$$

The total number of sample size was allocated proportionally for those selected four hospitals. A simple random sampling technique was used to select target population. In the first step, four hospitals were randomly selected. In second step, the study subjects were selected by using simple random sampling (SRS) technique with computer generated random numbers and the required number of nurses from each hospital was allocated proportionally. This was done by Microsoft Excel Function after exclusion of nurses who were on annual leave and not permanently employed. This was done by taking the lists of Nurses from human resource administration departments as a sampling frame.

Data Collection Methods and Instrument: Data was collected by using a structured, pre-tested and self-administered questionnaire to measure quantifiable information. The questionnaire included socio-demographic characteristics, personal habits, back pain features, consequences of LBP, work-related and psychosocial factors. A 10-point Visual Analog Scale (VAS) was included to measure the level of LBP features, in which point one indicates absence of LBP while point number 10 indicates worst pain imaginable (35). Pre-test of the questionnaire was carried out on the first two weeks of October prior to the main study in Gandhi Memorial Hospital which was not included in the main study. Then the questionnaire was pre-tested on 20 participants of whom none was included in the study. Three questions were removed and few others were reworded after this pre-testing.

Study Variables
Dependent Variable: Low Back Pain (LBP)
Independent Variables: Three categories of factors were assessed as independent variables;
Socio-demographic Variables: age, gender, years of professional experience, work shift,
Work-related Variables: frequent bending and twisting, lifting or transferring patients, prolonged standing, physical capacity, training on ergonomics,
Psychosocial Variables: job stress, social support, job satisfaction

Data Quality Control and Management: Data quality was ensured by checking the completeness, accuracy and clarity of the questionnaires on a daily basis. Data was entered and cleaned carefully by the investigator with a unique serial number which was assigned for each subjects and a variable was stored as only one data type. The questionnaire was compiled in English, translated into Amharic and then re-translated back into English.

Data processing and Analysis: The data collection instruments were coded and data were checked and entered using Epi-Info version 3.5.4. It was cleaned and edited by simple frequencies and cross tabulation before analysis. For analysis, the data was exported from Epi-Info to SPSS Version 20 and was checked for missing values before analysis. Descriptive statistics and numerical summary measures were presented using frequencies distribution tables and graphs (diagrams) to describe the study population in relation to relevant variables. Bivariate logistic regression analysis with the help of

odds ratio along with their 95% confidence interval was used to assess the degree of association between dependent and independent variables and test significance level of association. And variables which had significant association with the outcome variable were entered into multivariate analysis to form the model. Multivariate logistic regression model using adjusted odds ratio (AOR) was applied to identify risk factors of LBP and used to control for possible confounding effects.

Ethical Considerations: Ethical approval for the research was obtained from the Addis continental institute of public health institutional research ethics review committee. Data collection was carried out after receiving ethical clearance letters from Addis Ababa health Office and respected administration offices. Informed verbal consent was obtained from each study subjects prior to data collection.

Results:

Socio-demographic Characteristics: A total of 395 out of 430 Nurses who were working in Addis Ababa Public Hospitals were participated in the study. The response rate was 91.9%. The mean age of the respondents was 30.6 (±8.4) years with minimum age of 20 and a maximum of 60. Two hundred forty nine (63%) of the participants were in the age group of 20-29 years. 285 (72.2%) of the participants were females and the rest were males. Whereas. Two hundred seventy five (69.6%) participants were orthodox followers. From the study it was observed that 197 (49.9%) of Nurses were single. Almost three-quarter of the participants (77.5%) were degree holders (Table 1).

Table 1. Socio-demographic Characteristics of Nurses in 4 Public Hospitals, Addis-Ababa, Ethiopia; December 2015

Variables		Respondents (n=395)	Percent (%)
Age (years)	20-29	249	63
	30-39	87	22.1
	40 and above	59	14.9
Gender	Male	110	27.8
	Female	285	72.2
Religion	Orthodox	279	61.6
	Muslim	41	10.4
	Catholic	4	1.0
	Protestant	75	19.0
	7th Day Adventist	6	1.5
Marital Status	Single	197	49.9
	Married	193	48.8
	Divorced	5	1.3
Educational Level	Diploma	74	18.7
	Degree	306	77.5
	Specialty	15	3.8

Personal Habits: Two hundred thirty eight (60.3%) of the participants was never go to an exercise program. Almost all participants 390 (98.7%) have never smoked cigarette. The majority of participants 331 (83.8%) have never drink alcohol. One hundred seventy two (43.5%) of the participants had worked for less than 5 years in the nursing profession. The highest percentage of the participants 320 (81.0%) had worked on indirect patient care. Among the participants, more than half of them 234 (59.2%) had worked on both day and night shifts (Table 2).

Prevalence of Low Back Pain: The point prevalence of low back pain (i.e., percentage of respondents who reported presence back pain by the time of data collection) was 179 (45.3%). Whereas, the prevalence of LBP in the previous 12-months was 181 (45.8%, 95% CI (40.8%-50.6%)

Characteristics of Low Back Pain
Among 179 Nurses who reported history of LBP at present, 119 (66.5%) nurses reported that the duration of LBP was more than four weeks. More than half 104 (58.8%) of the respondents reported that their LBP was caused by load lifting. While the severity of the pain on Visual Analog Scale (VAS) was moderate, 87 (49.7%) followed by mild-55 (31.4%). Out of the 111 (62 %) participants, who had LBP, 70 (63.1%) of them responded that their pain radiate to lower extremities mainly to their leg and foot. Eighty two (45.8%) respondents among who reported LBP were also complained of lower extremity weakness. Around 95 (53.7%) of the nurses had used pain killer to treat their pain which is followed by bed rest, 80 (45.2%)..

Table 2. Personal habits of the Nurses in Addis Ababa Public Hospitals

Variables		Respondents (n=395)	Percent (%)
Exercise program/week	Never Exercise	238	60.3
	1-2 times a week	88	22.3
	3-4 times a week	41	10.4
	5-7 times a week	28	7
Smoking status	Smoker	5	1.3
	Non-smoker	390	98.7
Alcohol	Yes	64	16.2
	No	331	83.8
Years of Experience	<5 years	172	43.5
	5-<10 years	129	32.7
	≥10 years	94	23.8
Working Department	Indirect patient care	320	81.0%
	Direct patient care	75	19.0%
Work Shift	Day shift only	156	39.5
	Night shift only	5	1.3
	Both shift	234	59.2

Table 3. Characteristics of Low Back Pain among Nurses in Addis Ababa Public Hospital December 2015.

Characteristics of Low Back Pain		Respondents (n=395)	%
Back Pain at Present	Yes	179	45.
	No	216	54.7
Duration of Low Back Pain (n=179)	<7 Days	23	12.8
	7 days- <2 weeks	18	10.1
	2 weeks – 4 weeks	19	10.6
	>4 weeks	119	66.5
Causes of Low Back Pain* (n=177)	Trauma/Injury	12	6.8
	Sudden Movement	46	26.0
	Diseases	19	10.7
	Load Lifting	104	58.8
	Bad Posture	36	20.3
	Work overload	37	20.9
Severity of Low Back Pain (n= 175)	Mild (VAS& from 1-3)	55	31.4
	Moderate (VAS& from 4-6)	87	49.7
	Severe (VAS& from 7-10)	33	18.9
Radiating Pain to Lower Extremities (n= 179)	Yes	111	62.0
	No	68	38.0
Location of Radiating Pain (n=111)	Anterior Thigh	12	10.8
	Posterior Thigh	43	38.7
	Buttock	14	12.6
	Legs/Foot	70	63.1
Lower Extremity Weakness (n=179)	Yes	82	45.8
	No	97	54.2
Medications Taken (n=177)	Pain Killer	95	53.7
	Muscle Relaxant	13	7.3
	Narcotics	8	4.5
	Bed Rest	80	45.2
	Other^	6	5.6
Occurrence of Back Pain (n=179)	Before being a Nurse	22	12.3
	After being a Nurse	157	87.7
Pain on Other body part (n=395)	Yes	118	29.9
	No	277	70.1
Knowledge on Back Ergonomics (n=395)	Yes	67	17.0
	No	326	82.5
Materials for Lifting Patients (n=395)	Yes	102	25.8
	No	293	74.2

 * The total number of respondents varies across items because respondents did not respond to all items;

 ^ Massage, Not took any medications,

 &VAS= Visual Analog Scale

Table 4. Work-related Risk Factors of Low Back Pain among Nurses in Addis Ababa

Work-related Factors		Respondents (n=395)	Percentage (%)
Frequent bending activities	Yes	293	74.2
	No	102	25.8
Heavy lifting	Yes	310	78.5
	No	85	21.5
Sustained sitting (>1/2 an hour)	Yes	185	46.8
	No	210	53.2
Prolonged standing (1 hour)	Yes	299	75.7
	No	96	24.3
Lifting/transferring patients	Yes	327	82.8
	No	17.2	82.8
Positioning of patients on bed	Yes	293	74.2
	No	102	25.8
Night shift	Yes	175	44.3
	No	219	55.4
Poor working environment	Yes	254	64.3
	No	141	35.7
Physical activities at work	Yes	222	56.2
	No	173	43.8
Inadequate rest intervals	Yes	283	71.6
	No	112	28.4
Shortage of staffs	Yes	307	77.7
	No	88	22.3
Staffs on duty	Yes	215	54.4
	No	180	45.6

Table 5. Factors of Low Back Pain among Nurses in Addis Ababa Public Hospitals 2015.

Psychosocial Factors		Respondents (n=395)	Percentage %
Perform daily activities	Yes	343	86.8
	No	52	13.2
Mental stress	Yes	178	45.1
	No	217	54.9
Sleep disturbance	Yes	123	31.1
	No	272	68.9
Bothered by feeling helpless	Yes	116	29.4
	No	279	70.6
Little pleasure	Yes	176	44.6
	No	219	55.4
Managerial support	Yes	145	36.7
	No	250	63.3
Support with Co-workers	Yes	324	82.0
	No	71	18.0
Satisfied being as a nurse	Very dissatisfied	89	22.5
	Somewhat dissatisfied	54	13.7
	Neutral	68	17.2
	Somewhat satisfied	86	21.8
	Very satisfied	98	24.8

Table 6a. The Association between Low Back Pain and Different Risk Factors among Nurses .

Variables	Low Back Pain		Crude Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
	Yes	No		
Age in years				
20-29	109 (60.2%) (65.4%)	140	1.00	1.00
30 -39	39 (21.5%) (22.4%)	48	1.04 (0.64-1.71)	0.52 (0.24-1.14)
≥40	33 (18.2%) (12.1%)	26	1.63 (0.92-2.89)	0.52 (0.24-1.14)
Years of experience				
<5 years	68 (37.6%) (48.6%)	104	1.00	1.00
≥5 years	113 (62.4%) (51.4%)	110	1.57 (1.05-2.35)*	1.55 (0.89-2.72)
Work shift				
Day shift only	64 (35.4%) (43.0%)	92	1.00	1.00
Both shifts	122 (57.0%) (64.6%)	117	1.38 (1.00-2.07)*	1.79 (1.06-3.02)**
Frequent bending activities				
Yes	145 (49.5%) (50.5%)	148	1.80 (1.13-2.86)*	1.18 (0.68-2.07)
No	36 (35.3%) (64.7%)	66	1.00	1.00
Prolonged standing				
Yes	148 (49.5%) (50.5%)	151	1.87 (1.16-3.02)*	0.86 (0.49-1.58)
No	33 (34.4%) (65.6%)	63	1.00	1.00
Night shift				
Yes	94 (53.7%) (46.3%)	81	1.77 (1.19-2.65)*	0.95 (0.56-1.61)
No	86 (39.3%) (60.7%)	133	1.00	1.00
Physical activities at work				
Yes	118 (53.2%) (46.8%)	104	1.98 (1.32-2.98)*	1.83 (1.12-2.99)**
No	63 (36.4%) (63.6%)	110	1.00	1.00

Table 6b. The Association between Low Back Pain and Different Risk Factors among Nurses.

Variables	Low Back Pain			Crude Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
	Yes		No		
Inadequate rest intervals					
Yes	138 (48.8%)		145 (51.2%)	1.53 (0.98-2.39)	0.89 (0.52-1.53)
No	43 (38.4%)		69 (61.6%)	1.00	1.00
Staffs on duty					
Yes	107 (49.8%)		108 (50.2%)	1.42 (0.95-2.12)	0.86 (0.52-1.44)
No	74 (41.1%)		106 (58.9%)	1.00	1.00
Mental stress					
Yes	147 (47.4%)		163 (52.6%)	2.25 (1.50-3.37)*	1.29 (0.78-2.14)
No	34 (40.0%)		51 (60.0%)	1.00	1.00
Sleep disturbance					
Yes	84 (45.4%)		101 (54.6%)	8.93 (5.36-14.86)*	7.39 (4.11-13.27)**
No	97 (46.2%)		113 (53.8%)	1.00	1.00
Felt helplessness					
Yes	148 (49.5%)		151 (50.5%)	3.15 (2.00-4.95)*	1.26 (0.71-2.25)
No	33 (34.4%)		63 (65.6%)	1.00	1.00
Felt little pleasure					
Yes	153 (47.1%)		173 (52.9%)	2.34 (1.56-3.51)*	1.82 (1.12-2.97)**
No	27 (39.7%)		41 (60.3%)	1.00	1.00

Key for Table 6a & Table 6b: * for p-value < 0.05 for Bivariate Analysis and ** for p-value < 0.05 for Multiple Logistic Regression,

One hundred fifty seven (87.7%) of nurses who had LBP, their pain occurred after they became a nurse. From total respondents, 118 (29.9%) had pain over other body parts.

Three hundred twenty six (82.5%) respondents had no previous knowledge on back ergonomics, and 293 (74.2%) of them had no materials for lifting patients (Table 3)

Consequences of Low Back Pain

Out of those Nurses with LBP in the previous 12- months (181), 55 (30.4%) were absent from their work, 37 (20.6%) got compensations for work days lost and 24 (13.3%) were changed their working department because of LBP (Figure 1).

Work-Related Risk Factors of Low Back Pain

Most of the respondents believed that lifting or transferring of patients 327 (82.8%), heavy lifting 310 (78.5%), shortage of staffs 307 (77.7%) and prolonged standing for more than an hour 299 (75.7%) was contributed to occurrence of LBP. Three fourth of the respondents believed that frequent bending activities 293 (74.2%), positioning of patients on bed 293 (74.2%) and inadequate rest intervals 283 (71.6%) could contributed for their LBP occurrence. Whereas, more than half of them believed that poor working environment 254 (64.3%) and around half of the respondents believed that physical activities at work 222 (56.2%), staffs on duty 215 (54.4%), sustained sitting for more than half an hour 185 (46.8%) and night shifts 175 (44.3%) contributed to the occurrence of their LBP (Table 4)

Figure 1. Consequences of Low Back Pain among Nurses in Addis Ababa Public Hospitals, December 2015.
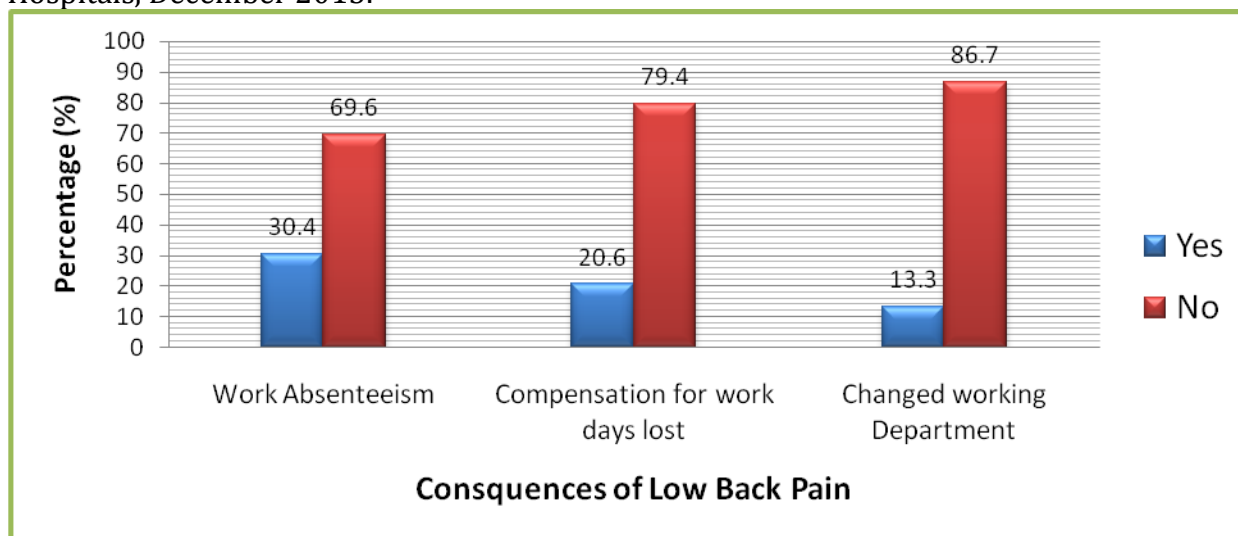
Psychosocial Risk Factors

Three hundred forty three (86.8%) of the nurses were able to perform their daily activities. Nearly half of the respondents 178 (45.1%) reported that there were mental stress at their working environment and 123 (31.1%) had sleep disturbance due to LBP. Only 116 (29.4%) of the respondents had bothered by feeling helpless and 176 (44.6%) noticed little pleasure by doing things for the past one month. Majority of the nurses 250 (63.3%), reported that they got no support from their managerial team. Three hundred twenty four (82.0%) of the nurses were supported each other with their co-workers and 143 (36.2%) were dissatisfied being as a nurse (Table 5).

Risk Factors of Low Back Pain among Nurses

According to the bivariate analysis the socio-demographic variables i.e. Age, years of experience and work shift were significantly associated with LBP. And work-related risk factors of the respondents' such as frequent bending activities, prolonged standing, night shift, physical activities at work, inadequate rest intervals and staffs on duty were significantly associated with the LBP. Whereas, psychosocial risk factors of respondents that had significant association with outcome variable relative to their respective reference group were mental stress at job, sleep disturbance, bothered by feeling helpless and felt little pleasure by doing things.

Nurses with professional years of experience of 5 years and above were 1.6 times more likely to have LBP compared to those of nurses with professional years of experience less than five years ((p-value .028; COR 1.57; 95% CI (1.05-2.35)). With regard to work-related risk factors, nurses with frequent bending activities at work were 1.8 times more likely to have LBP in relation to those who had no frequent bending activities at work (p-value .014;COR 1.80; 95% CI (1.13-2.86)). Nurses who were stand for greater than one hour were 1.9 times more likely to have LBP compared to those who were not stand for greater than one hour (p-value .010; COR 1.87; 95% CI (1.16-3.02)). Moreover, nurses who had night shift programs were 1.8 times more likely to have LBP compared to those nurses who have not night shifts (p-value .005; COR 1.77; 95% CI (1.19-2.65)). Nurses with physical activities at work were 2 times more likely to have LBP compared to those who didn't have physical activities at work (p-value .001; COR 1.98; 95% CI (1.32-2.98)) (Table 6).

In addition to psychosocial risk factors, those nurses who had mental stress at job were 2.3 times more likely to develop LBP comparing to those who didn't have mental stress at job (p-value .000; COR 2.25; 95% CI (1.50-3.37)). Nurses who had sleep disturbance were 8.9 times more likely to develop LBP compared to those nurses who didn't have sleep disturbance (p-value .000; COR 8.93; 95% CI (5.36-14.86)). Those nurses who had bothered by feeling helpless for the past one month were 3.2 times more likely to develop LBP comparing to those who didn't bothered by feeling helpless for the past one month (p-value .000; COR 3.15; 95% CI (2.00-4.95)). That is, those nurses who had felt little pleasure by doing things for the past one month were 2.3 times more likely to develop LBP in relation to those nurse who didn't felt little pleasure by doing things for the past one month (p-value .000, COR 2.34; 95% CI(1.56-3.51)) (Table 6).

In multivariate analysis work shift, physical activities at work, sleep disturbance and felling little pleasure by doing things for the past one month were the only determinant factors of LBP. Accordingly, having all variables controlled the odds of nurses who had both shift programs had 1.8 times more likely to have LBP compared to those who didn't have night shifts (p-value .030; AOR 1.79; 95% CI (1.06-3.02)). Those nurses who had physical activities at work were 1.8 times more likely to develop LBP compared to those who had not physical activities at work (P-value .016; AOR 1.83; 95% CI (1.12-2.99)). Those nurses who had sleep disturbance were 7.4 times more likely to develop LBP compared to those who didn't had sleep disturbance (p-value .000; AOR 7.39; 95% CI (4.11-13.27)). And nurses who had felt little pleasure by doing thing for the past one month were 1.8 times more likely to develop LBP in relation to those who had not felt

little pleasure by doing things for the past one month (p-value .016; AOR 1.82; 95% CI (1.12-2.97)) (Table 6).

Discussion

Low Back Pain (LBP) among nursing population has attracted attention because of its public health problems, social and economic burdens. The point-prevalence of LBP was 45.3%, which was in line with the findings of 43.5% among Nurses in Taiwan [14], 48.4% in Saudi Arabia [6] and 56.5% in Qatar [4]. It was found that the 12-month prevalence of LBP was 45.8%, which was similar to that reported in Hong Kong as 40.6% [43], Malaysia as 47.6% [19] and Tunisia as 50.1% [17]. However, the prevalence rate of LBP in this study was lower than a study done among Thai nurses which showed a one year prevalence of LBP around 61.5% [19]. Another study which showed higher prevalence than our study conducted in two selected hospitals in Nigeria and Ethiopia was 70% and 60% [5] respectively. A study conducted in Egyptian Nurses by Amany [20] had been estimated 79.3% prevalence of LBP which was higher than our estimated prevalence. The variation was due to setting difference, as the study from Nigeria and Egypt was done in only one hospital setting where us this study was done on four public hospitals.

The prevalence of LBP among younger nurses compared to Nurses' aged 30 years and older had a higher prevalence of LBP, which was 60.2%. This view was supported by Karahan et. Al [25], who found younger Nurses to have a higher prevalence of LBP than older Nurses. Another study conducted among Nurses working on operating rooms in Taif, Saudi Arabia [6], showed that there was no association between age and LBP. In contrast, different studies reviled that older age group was a risk factor for LBP on Nursing populations [5, 15, 20, 22]. The high prevalence rate in this study increases concerns about LBP, because the Nurses included in the study sample comprised a very younger work force (mean age of 30.6 years) in contrast to the ageing workforce in developed countries. That the Nursing workforce was especially young in Ethiopian workforce means that the Nurses in this study are expected to be healthier and less likely to suffer LBP because of the ageing process. This might be as a result of younger Nurses been allocated to more physically demanding works. The lower prevalence rate of LBP among Nurses older than 30 years might be due to less patient handling activities and they were more on administrative tasks. Another explanation might be that of older Nurses had increased level of knowledge regarding to injury prevention and developed better preventive mechanisms compared to younger Nurses.

This study found that prevalence of LBP was higher in females (74.0%) compared to males. This was consistent with the previously reported studies [4-7] that showed LBP symptoms were consistently more common among females. Sikur et.al [5] and Abdulbari et.al [4] Stated that the risk of LBP was higher among female Nurses because of anatomical, physiological and structural differences from males, effect of hormonal changes, gynecological problems, homemade activities and giving childbirths.

In this study, half of the Nurses (51.4%) reported the prevalence of LBP among married Nurses. Even if, the prevalence of LBP was higher among married Nurses, there was no association between marital status and LBP. This was not agreed with the study done by

Abou et. Al. [20], who reported a higher prevalence of LBP among married Nurses (86.5%) and the significant test revealed that a significant association between LBP and marital status. This higher prevalence might be because of married Nurses had higher family size and increased number of children.

There was a higher prevalence of LBP among Nurses who did have higher educational level (79.6%). This might be because of Nurse who has higher educational level involved in direct patients care and this might account higher prevalence of LBP. Karahan et. Al [25] study also suggested an inverse relationship between the prevalence of LBP and Nurses educational level. However, risk of LBP decreased when they hold a higher status as they delegate more physical care to others.

There was a higher prevalence of LBP among Nurses who did not go for an exercise program (61.3%) and not showed association with LBP. This finding was supported by a study done by Khaled et. Al [15] that exercise program was not associated with LBP. The association between exercise program and LBP among nursing staff was remained controversial in different studies[13, 15, 19]. Smoking was not a major problem among Nurses for this particular investigation. This deviance might be due to a low number of smokers among Nurses in the current study. Different studies have reported that both exercise program and smoking were either weak predictors or non-predictors of LBP prevalence among nursing populations [6, 13].

In our study, it was found that, professional years of experience were not statistically significant. A research done by Shih-Fong et. Al [14] has concluded association between more experienced professionals was prone to LBP. The higher prevalence rate of LBP among nurses with more years of professional experience might be due to direct patient care activities which involve more of physical demanding activities.

There was higher prevalence of LBP among Nurses who didn't have knowledge about back ergonomics (82.1%) than those who did have knowledge on back ergonomics. This investigation didn't support a study done in Nigeria [9] and showed a significant association between knowledge of back care ergonomics and incident of LBP. They stated that nurses who had adequate knowledge regarding to back care ergonomics were less likely to prone to LBP.

General characteristics of LBP in the present study showed that, 66.5% of the nurses who were complained of LBP reported the duration of pain was more than four weeks. A study conducted in Utah [3] described that the severity of clinical presentations, lower levels of pain and performing daily activities making those nurse had chronic LBP. In this particular study, off the LBP sufferers, 87.7% had developed symptoms of LBP after they had started to work as a nurse and in 58.8% of their LBP was occurred due to lifting loads. This result was in line with another study in Surat [13] that estimated 73.3% of doctors developed symptoms of LBP after they had became a doctor. Whereas, in Nigeria [9] causes of LBP was directly related to their occupation, domestic activities and previous trauma.

The study showed that 49.7% of the Nurse who were complained of LBP reported that the score of their pain on Visual Analog Scale (VAS) was in between 4-6 (moderate) out of a scale of 10, which can able to restrict daily activities. This Result showed a comparable result from another Greek study [23] as intensity of pain during time of survey was moderate (43%). On the contrary, a score of either 2 or 3 (70%) out of scale of 5 was presented among Nurses working in operating rooms in Taif, Saudi Arabia [6]. This difference might be due to difference regarding to pain perception or pain reporting between different cultures and societies. About 13.3% of these nurses in this study had changed working department because of LBP which was in line with a study done in Malaysia (10%) [22], but lower than a study done in Nigeria which was 35.7% [9]). In this finding work absenteeism is not a major problem of LBP. In Yemen [11], three out of 10 Nurses were took sick leave because of LBP. In different studies [6, 9, 23], LBP has been identified as one of the main causes of loss of hours and days among Nursing populations.

Despite this high prevalence of LBP among Nurses, the risk factors of LBP are not yet well understood. It was believed that LBP is a multi-factorial disorders with many possible factors contributed to its occurrence. The present epidemiological study of LBP tried to analyze various risk factors of LBP among Nurses. Many factors may have been contributed to be essential risk factors of LBP such as; socio-demographic, work related and psychosocial risk factors. The study had shown that; age, gender, BMI, marital status, educational level, exercise program, smoking, alcohol, working departments and knowledge on back ergonomics were not significantly associated with LBP in the bivariate or multivariate analysis. Working shift, physical activities at work, sleep disturbance and felt little pleasure by doing things for the past one month were found to be risk factors for occurrence of LBP.

On our study, a significant relationship was found between LBP and working shift. Nurses who had both working shift had 1.8 times more likely to have LBP compared to those who do have day shift only. This finding was supported by a study done among Korean Nurses by Kyung [24] and stated that after adjustment for confounders; risk of being affected by LBP in shift workers with high physical demands was 9.3 times more than day workers and showed that there was a significant association between LBP and shift works. This association was explained by the fact that working shift during night time decreased time and quality of sleep might leads to sleep disturbance and caused muscle strain. Also different literatures [24, 25, 42] reported that work shift had a higher risk of occupational injury and Nurses working both shift had three times higher risk of injury than daytime workers. On the other hand, Kyung [24] suggested that day shifts were a risk factor for LBP because during day shift program, Nurses perform more patient handling activities and have higher physical activities than Nurses on evening or night shifts. A study done by Josephson [42] indicated a positive relationship between night shifts and LBP and supported the hypothesis of an independent association between night shifts and LBP.

Another important finding in our study was that physical activities at work were related to occurrence of LBP among nurses. Nurses who had physical activities at work were 1.8 times more likely to develop LBP compared to those who had not physical activities

at work. Similar study conducted among Iranian nurses [37] showed that there was association between physical activities and LBP. Based on this investigation, the impact of each physical activity showed that awkward body posture, repetitive motions with hands or wrists and work pressure are associated with prevalence of LBP. They explained the relationship between physical activities and LBP as performing repetitive motions with hands or wrists, awkward posture, transferring and positioning patients, adjusting beds and bending or twisting the body were the major contributed factors. Furthermore, low control in the planning of patient-handling tasks may lead to unsuitable and strenuous work positions which might leads to occurrence of LBP [37, 42].

The results of the present study was in accordance with the findings of Choobineh et al[38] and Josephson [42], which found that high levels of perceived job-related physical activities were significantly associated with prevalence of LBP. They stated that awkward posture during physical activities at work could increase the risk of LBP among Nurses. The risk of LBP and spinal loading during physical activities at work were mainly related to knowledge on back care ergonomics which was studied in different biomechanical studies [12, 26, 32]. Some studies reviled that adequate knowledge on back care ergonomics and ergonomics intervention programs can have good results in preventing LBP among Nurses [5, 9]. On the contrary, another study done in Rwanda [38] showed that physical activities at work might prevent occurrence of LBP by creating time for leisure activities during working time.

In examining the relationship between sleep disturbance and LBP, we found that Nurses who had sleep disturbance were 6.9 times more likely to develop LBP compared to those who didn't had sleep disturbance. Similar study done in Japan by Masaya [41] showed that there was elevated prevalence of LBP when participants perceived sleep problems including both sleep duration and quality. Similarly, a study done by Stefan [39] on human and animal experimental studies indicated that the relationship between sleep disturbance and pain had got attention and showed a reciprocal relationship. They stated that sleep disturbance enhances pain sensitivity and causes pain where as pain disturbs sleep by inducing arousal and triggering all other neurological sequels of stress, which are incompatible with an undisturbed sleep. One hypothesis is that sleep disturbance leads to increased muscle tension that contributes to pain in the low back [42]. Another factor which showed significant association was felt little pleasure by doing things were 1.8 times more likely to develop LBP in relation to those who had not felt little pleasure by doing things for the past one month. Similar longitudinal study done in Iran by Habibi [40] confirmed that psychosocial factors includes; work load, job satisfaction, social support and discomfort are major determinants of subsequent LBP. Different explanations have been suggested for a combined effect of psychosocial and physical risk factors. Increased muscle tension due to strenuous psychosocial conditions, like feeling little pleasure, may lead to increased vulnerability to LBP[42].

Conclusion

The finding of this study indicates that Low Back Pain is an important major public health problem among Nurses in Addis Ababa Public Hospitals. High prevalence rate of Low Back Pain among Nurses were observed, indicating that the problem in the study

area is very significant. This study confirmed that among the risk factors; Work shift, physical activities at work, sleep disturbance and felt little pleasure by doing things for the past one month were found to be a risk factors for occurrence of LBP. Psychosocial factors are the strongest predictors of LBP among Nurses when compared to socio-demographic and work related factors. Preventive measures should be taken to reduce the risk of Low Back Pain by educational programmes and arranging proper rest periods.

Recommendations:

The following are our recommendations:
- Comprehensive Preventive measures should be taken to reduce the risk of LBP by arranging proper rest periods, healthier schedules and proper use of body mechanics.
- Improving Nurse staffing and reducing the frequency of night shifts are suggested to decrease prevalence of LBP.
- Future research might include; lifestyle at home and number of children's together with Nurses working in Governmental and Private sectors for better additional information.
- A longitudinal study is needed to produce more scientific evidence on risk factors for LBP among Nurses.
- Findings from this study may be used by the hospitals to evaluate the risk of LBP among their Nurses and to design interventions which reduce prevalence of LBP.

Acknowledgments

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