

ADDIS ABABA UNIVERSITY SCHOOL OF GRADUATE STUDIES



Prevalence of Low Back Pain and Associated Risk Factors among Taxi Drivers in Addis Ababa, Ethiopia.

By: Melaku Erjabo (BSc)¹, SAMSON WAKUMA (MSc, MPH, PHD- Candidate)², Dr. Ayele Belechew². May, 2015, Addis Ababa, Ethiopia.

Objectives: This study was aimed to determine the magnitude and associated risk factors of low back pain among taxi drivers in Addis Ababa, Ethiopia.

Methods: A cross sectional study was conducted among 422 full time taxi drivers from February to May 2015. The data were collected using questionnaire adapted from Nordic questionnaire. The questionnaire included questions about socio demographic variables, work-related, lifestyle activity and psychosocial characteristics. Prevalence of LBP was assessed as frequencies of study subject those response experiences of LBP and the data were obtained using an interview questionnaire. Bivariate analysis was used to assess the association between these variables and Multivariate analysis to control confounding variables.

Results: Prevalence of LBP was found to be 64.2%. The study found year of driving, history of back trauma, frequent load lifting, lack of rest break during work day, uncomfortable seat pan and previous job involve sitting as risk factors for LBP among taxi drivers in this study. LBP was associated significantly with history of back trauma (OR=4.014, 95% CI 2.329-6.916, $p<0.001$), driving for more than nine year duration (OR=3.668, 95% CI 1.376-10.859, $p=0.01$). Ergonomics factors like uncomfortable seat pan (OR=1.73, 95% CI 1.08-2.77, $p=0.023$), lack of rest break during work day (OR=1.906, 95% CI 1.179-3.08, $p=0.008$), characteristics of previous job involve sitting (OR=2.972, 95% CI 1.79-4.932, $p<0.001$), frequently load handling activity at work (OR=2.13, 95% CI 1.045-4.344, $p=0.039$) were found risk factors of LBP among taxi drivers in this present study.

Conclusion: These findings call for preventive strategies and safety guidelines, in order to reduce the incidence of LBP, among taxi drivers in, Addis Ababa, Ethiopia.

Introduction

Worldwide, low back pain (LBP) arising from occupational exposures was estimated to cause 21.7 million DALYs in 2010 and the 2010 Global Burden of Disease Study estimated that low back pain was among the top 10 diseases and injuries that account for the highest number of DALYs worldwide(1).

Back pain is widespread in many countries; more people are disabled especially due to back pain than any other group of diseases (2). Prevalence of LBP among Africans continent is also rising and is of concern, but the lack of information on the prevalence of LBP in developing countries a significant shortcoming (3).

The World Health Organization has characterized occupational diseases as multi-factorial to indicate that a number of risk factors (e.g., physical, work organizational, psychosocial, individual, and socio-cultural) contribute to causing these diseases (4). “Studies suggest that between 60% and 90% of people will suffer from low back pain at some point in their life and that at any one time between 15% and 42% of people are suffering (depending on the study population and the definition of back pain used)” (11).

LBP is very common across all places, types of industries and taxi drivers have been found to be at higher risk for developing LBP (7). However, statistics on LBP in Ethiopia is scarce. This lack of research plants a deep gap in what is known about low back pain in a large part of the regions. The aim of this study were to fill the knowledge gap, in terms of estimating the magnitude of the problem, to identify the risk factors of LBP, to direct prevention strategies and management modality for policy makers, based on findings. It was hoped that results of this study were provide programmer and policy makers with data on prevalence of low back pain to assist in the development of strategies to improve occupational health and safety services.

Lower back which is also known as the lumbar spine is one of the five major sections of the spine. It is a combination of strong bones, flexible ligaments and tendons, large muscles and highly sensitive nerves. The spine is designed to be very strong, protecting the highly sensitive nerve roots, yet highly flexible, providing for mobility on many different planes (18). According to European Agency for safety and health at work 2000, occupational LBP is any back pain originating in the context of work and considered clinically to have been probably caused, at least in part, or aggravated by the worker’s job (11). Low back pain is highly prevalent across all occupations, and professional drivers have been found to be at higher risk for developing LBP due to prolonged sitting and awkward posture (19).Is there any significant relationship between low back pain

and taxi drivers in Addis Ababa city? Which risk factors will be associated to these LBP among taxi drivers?

Typical occupational health and safety risks common to the work environments may be categorized as physical, ergonomic, and psychosocial. Slips, trips, falls, noise, and vibration are examples of physical risks, musculoskeletal problems resulting from repetitive activities such as lifting and carrying, or from spending long periods in one single position such as sitting are typical ergonomic risks. A study reveals this fact in Nagpur city, India, which was done to determine the prevalence of low back pain among truck drivers of good transport company, a total of 256 drivers were taken for the study and the result of the study showed that the prevalence of LBP was found to 62.10% and long driving time was associated with high prevalence of low back pain in truck drivers (20).

A cross-sectional study on musculoskeletal disorders (MSDs) among occupational drivers in- Ghana showed that stressful work contributed for increased low back pain prevalence in taxi drivers. Work-related stress was the response people may have when presented with work demands and pressures that are not matched to their knowledge and abilities and which challenge their ability to cope. So the study was done to search for prevalence of MSDs in taxi drivers and a total of 210 participants were enrolled to the study, the result showed 70.5% Prevalence of MSDs in a section of taxi drivers, prevalence of low back pain was (34.3%). And driving taxi for more than 12 hours per day, driving at least 5 days per week, who estimated their work stressful, and were unhappy with their work were contributes to increasing prevalence (21).

Professional car drivers, especially those serving urban areas, are distinct from other professional drivers with respect to their risk types for work-related low back disorders. Like, the time spent behind the work usually much longer, the comfort of the workstation, such as the seat, back support, steering wheel and the thermal comfort, regular physical activities, stressing factors like limited rest period and traffic congestion were related with high prevalent of LBP. A cross-sectional study in, Israeli was consecutively enrolled among 384 male full-time urban bus drivers and information on regular physical activity, work-related ergonomic and psychosocial stressing factors was collected and results (45.4%) prevalence of LBP (15).

Long experience to professional driving of vehicles used in public utilities is associated with an excess risk for back symptoms and disorders. A study was conducted to investigate the prevalence of LBP among professional car drivers in Dhaka city, Bangladesh, and evaluated age, stature, hour of driving per day and year of driving and these factors were responsible for increasing prevalence of low back pain, so the result demonstrated that 78% of car drivers reported LBP for at least one day during the past

12 months (16). Another Cross-sectional study in, Taiwan aimed to observe LBP in taxi drivers and its association with continued driving and other work condition. Information on personal factors, work-related physical, psychosocial factors and driving time profiles from the taxi drivers' and health study, were collected using standardized instruments. Results from 1242 drivers, 51% of taxi drivers found LBP in the past 12 months (19).

Many review articles have been published investigating the risk factors of low back disorders, including a multi-factorial of physical, psychosocial and personal risk factors. A cross-sectional study was conducted in Malaysia to determine the characteristics and associated factors of low back pain (LBP) among taxi drivers using a self-administered questionnaire. It included questions on socio-demographic data, work characteristics, LBP and awareness of ergonomics factors. Ethnicity, history of back strain, self-employment, years of driving, poor awareness of good sitting posture and more than eight hours daily working, were significantly associated with LBP among taxi drivers in Malaysia (22).

The survey was based on a hypothesis that occupational factor could be liable for ill-health amongst drivers in, Nigeria, particularly musculoskeletal complaints; however, the evidence to link psychosocial factors with low back disorders is growing, especially where they occur at the same time as the physical factors. The incidence of low back disorders has also been strongly associated with awkward postures, whole body vibration, design of vehicles, baggage handling, congested traffic, working hours and psychosocial work-related factors; low social support, low job satisfaction, way of life and psychosocial strain caused by violence and domestic stress were associated with an elevated incidence of musculoskeletal complaints compared with the general population and studies of these data support the argument that taxi driving may contain elements that contribute to reduced health (23).

The relationship between body dimensions of drivers and the form of musculoskeletal disorders were investigated, in a sample included 95 bus drivers in, Iran. As instructed, the drivers described the levels of discomfort in different parts of their bodies. In the meantime the dimensions of their bodies' were measured, and the associations between anthropometric dimensions and MSDs were investigated. The results showed that MSDs are related to the height, weight and age of drivers (24).

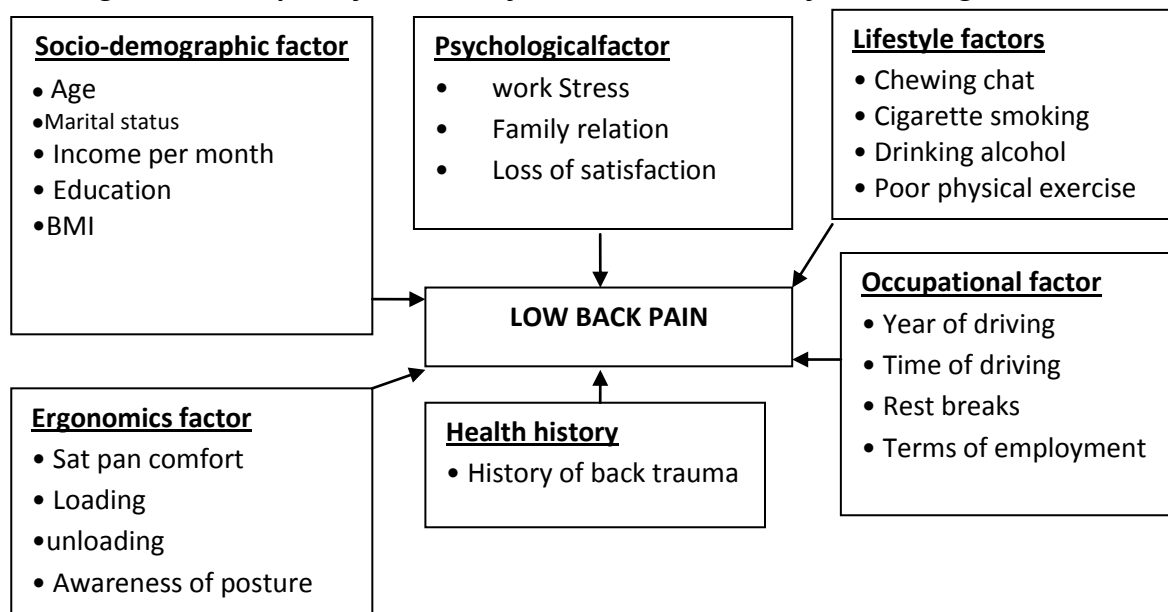
The descriptive study conducted to report on current injuries in the trucking industry from accepted compensable (time-loss) claims from 2005 to 2010 within the trucking industry in, Washington State were reviewed that Non-traumatic musculoskeletal illnesses of the neck, back and upper extremities are the most frequent injuries across all industry sectors and occupations in the trucking industry, Vehicle related claims had the highest median costs and time loss days (25).

A study was conducted in Italy among professional drivers to investigate the relation between low back pain and daily exposure of whole-body vibration (WBV). In a sample of 202 male professional drivers, who were not affected with LBP at the initial survey, LBP in terms of duration, intensity, and disability was investigated over a two-year follow-up period. Vibration measurements were made from representative samples of machines and vehicles. The cumulative incidence of LBP over the follow-up period was 38.6%. Physical work load was a significant predictor of LBP outcomes over the follow-up period (26).

A study was reviewed to describe evidence of research on the association between sitting and the presence of LBP. The systematic literature review was restricted to those occupations that require sitting for more than half of working time and where workers physical co-exposure factors such as whole body vibration and awkward postures, 25 studies were carefully selected and critically reviewed, and a Sitting alone was not associated with the risk of developing to LBP. However, when the co-exposure factors of whole body vibration (WBV) and awkward postures were added to the analysis, the risk of LBP increased fourfold (27).

A survey of taxi drivers was conducted in, Japan to determine the actual situation of drivers' low back pain. The target drivers were asked to complete a questionnaire which contains questions regarding physique of drivers, demographic features, working conditions, office environment, health conditions, the presence of low back pain, the level of low back pain based on Visual Analogue Scale and Roland-Morris Disability Questionnaire score, the results suggested that history of LBP, suffering from fatigue, diseases other than LBP and smoking habit related (28). This study used a comprehensive conceptual framework adapted from study determinants explicit connections among relevant contextual factors of low back pain.

Figure 1: Conceptual framework for the determinants of LBP among taxi drivers.



Methods

Study design

A cross-sectional study design was conducted from, February 2015 to May 2015.

Study area

The study was conducted in Addis Ababa the capital city of Ethiopia which has an area of 530.14 squares Kilometer divided into 10 sub cities. Based on 2007 Ethiopian census, Addis Ababa has a total population of 2,738,248, consisting of 1,304,518 men (9) and Population projection values of 2014 at zonal and wereda levels of 3,195,000 populations (29).

Source population

The source populations for the study were all taxi drivers in, Addis Ababa city.

Study population

The study population comprises of those full time taxi drivers, who were currently driving taxi in, Addis Ababa city, where the age of drivers' range 20-60 years were selected from source population based inclusion criteria, were the study population of this study.

Sample size determination

Considering the absence of previous data in Ethiopia in this specific study group which include only male taxi drivers and to obtain a large sample size the following assumptions were undertaken. The proportion of taxi drivers having low back pain to be 50%, with a precision level 5% and 95% confidence interval. 10% was added to compensate for non-response. Based on this assumption, the actual sample size for the study was computed using the formula for single population proportion as indicated below.

$$n = (Z_{\alpha/2})^2 p (1-p) / d^2 + 10\% \text{ non-response}$$

Where,

n = the maximum sample size

$Z_{\alpha/2}$ = standard normal distribution curve value for 95% CI which is 1.96 (where, $\alpha = 0.05$)

p = expected proportion of taxi drivers with low back pain (0.5)

d = the margin error between the sample and the population (0.05)

$$n = \frac{(1.96)^2 \cdot 0.5(1-0.5)}{(0.05)^2} = \frac{3.8416 \times 0.25}{0.0025} = 384$$

$$n = 384$$

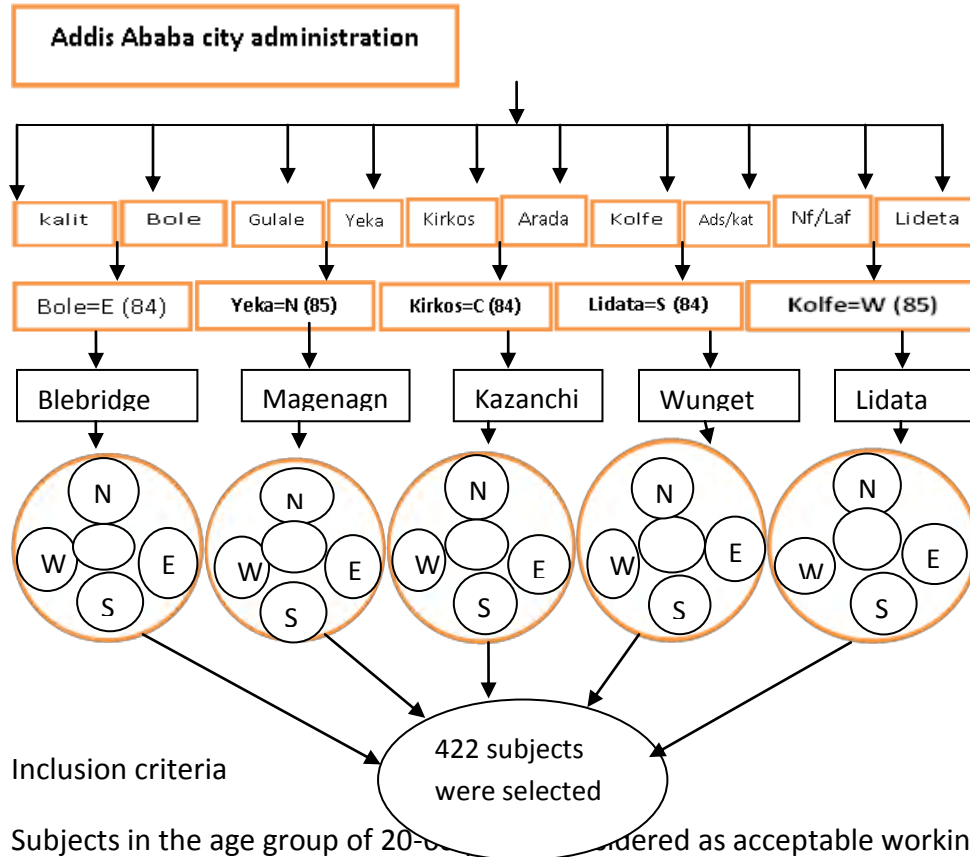
$$10\% = 38.4$$

Thus the study included 384 study subjects plus 10% non-responses, and then the data were collected from 422 taxi drivers.

Sampling procedures

Addis Ababa city administration has 10 sub cities, out of this five sub cities were randomly selected. From each selected sub cities one square in the main road were randomly selected. Then each square in main road were assigned direction from the center of main road squares to each direction (i.e. Direction from the center of main road to North (N), direction from the center of main road to south (S), and direction from the center of main road to west (W) and direction from the center of main road to east (E)). About twenty one taxi drivers in each direction from the main road squares, who was waiting for clients on taxi terminal, were randomly selected until the sample size, 422 were fulfilled.

Schematic representation of sampling procedure



Inclusion criteria

Subjects in the age group of 20-60 years were considered as acceptable working age. Having a valid driving license for a taxi and driving at least for one year, minimum year of exposure was required.

Exclusion criteria

Age greater than 60 years old were not included to control ageing effect.

Females were not included due to less number of females in taxi driving in the study area. Part time drivers were not included due to low exposure time.

Data collection procedures (Instrument and personnel)

Data was collected using a questionnaire adapted from a standardized Nordic questionnaire for the analysis of musculoskeletal symptoms (14). The questionnaire was written in English and translated to the local language Amharic, and then translated back into English to ensure its consistency. Face-to-face interviews were conducted to gather relevant information on socio-demographic factors (age, weight, height, educational background, marital status and income), life style (smoking, chewing chat, drinking alcohol and physical exercise), past medical history on back trauma, work characteristics such as daily working hours, years worked as a taxi driver, type of employment and history of a previous profession through structured questionnaires. The questionnaire also includes the issue of ergonomic, psycho-social factors and characteristics of LBP. The interview durations range between 20 to 30 minutes.

Seven data collectors (i.e. three masters of public health students, two environmental health officers and two occupational health and safety officers) and two supervisors, who were trained in questionnaire administration, data collection and in supervision procedures, were participated in data collection.

Dependent Variable (s)

The presence of LBP

Independent variables

Socio-demographic factors (age, weight, height, education, income, marital status)
Life style (smoking cigarettes, chewing chat, drinking alcohol and physical exercise)
Medical history, Work characteristics such as daily working hours, years worked as a taxi driver. Terms of employment and history of a previous profession involve sitting. Awareness of the importance of good sitting posture and Seat pan comfort without the need of any extra comforters. Psychological factors stress, satisfactions, family relation. Physical factors lifting load & unload.

Operational definitions

Low back pain (LBP) is defined as pain and discomfort, localized below the costal margin and above the inferior gluteus folds, with or without leg pain.

Prevalence of LBP is defined as frequency of study subjects who were response experiences of LBP in the past twelve months' time.

Musculoskeletal disorders (MSDs) are impairments of body structures, such as muscles and tendons, joints, cartilage, ligaments, nerves, blood vessels, the upper and lower extremities. Comfort is an acceptable environmental sensation.

Data management

Data was coded and stored in a proper area and kept confidential. During the data collection period, the collected data was checked for completeness and consistencies by the principal investigator through a close follow up. Missing values and outliers were checked using frequency tabulation and residual plotting, and then managed accordingly.

Data analysis

Statistical package for social sciences (SPSS version 20.0) was used for the data entry and analyses. The data were double checked and cleaned to ensure that the entire variables were properly documented and to detect any missing or erroneous value during data entry. Descriptive statistics were used for all the variables in the study. All continuous variables were categorized to ease analysis. The associations were described by the prevalence and odds ratio with 95% confidence interval. Multivariate logistic regression analysis was performed to obtain factors associated with low back pain among taxi drivers. All independent variables found to have significant association with low back pain on bivariate analysis were included in the multivariate logistic regression analysis. To assess the model fitting, the Hosmer-Lemeshow goodness of-fit test was conducted. The accepted level of significance was set as $p < 0.05$.

Data quality assurance

The quality of data was maintained through careful design, and use of standardized questionnaire adapted from standardized Nordic questionnaires for the analysis of musculoskeletal symptom (14). English version questionnaire was translated to Amharic and then translated back to English to insure its consistency. A pre-test was conducted among 25 respondents in Arada sub-city that was not included in the study to assure accuracy and to change any questions which were not easy to understand for respondents. The principal investigator closely observed and coordinated the overall activities of the study. Also, training was given for data collectors and supervisors about the objective of the study, questionnaire, methodology and ethical issues of the study to have a common understanding among data collectors and supervisors.

Ethical consideration

The survey was conducted after approval by the REC (Research and Ethics Committee) of Addis Ababa University, College of health science, and school of public health. Official letters were written from SPH, AAU to respective office. Informed verbal consent was obtained from respondents after giving them information about the study.

Results

Socio-demographic and life style characteristics of the respondents

A total of 422 taxi driver were included in the study and a complete response (100%) was obtained from all respondents. The mean age of the respondents was 35.28(\pm 10.059) years with the majority of them 316(75.4%) were between 20 and 40 years of age. The majority of the respondents 209(49.5%) were married and 169(40.0%) were Amhara ethnic group. Two hundred and fifty nine (61.4%) were educated to at least grade nine level and 270(64.0%) of the participants had a monthly income < 2000 Birr. Regarding the BMI of taxi drivers, 278 (65.4%) was between (18.5-24.9 kg/m²). About two hundred and fifty three (60.0%) of respondents were participated in physical exercise at least one day per week for 30 minutes. One hundred forty nine (35.3%) taxi driver had history of back pain. Drinking alcohol, chewing chat and smoking cigarettes were reported by 51.4%, 35.8% and 30.8% of respondents respectively (See table 1).

Table 1: Socio-demographic characteristics among taxi drivers in Addis Ababa, March, 2015 (n= 422)

Variables	Frequency(n)	Percent (%)
Age group(year)		
20-40	316	75.4
41-50	67	16.0
51-60	36	8.6
Marital status		
Not marred	105	24.9
Marred	209	49.5
Separated	108	25.6
Level of education		
Read &Write	64	15.2
1-8 grad	99	23.5
9 and above grad	259	61.4
Ethnicity		
Amhara	169	40.0
Tigre	82	19.4
Oromo	86	20.4
Others	85	20.1
Income/month in (Birr)		
<2000	270	64.0
2000-3000	142	33.6
>3000	10	2.4

BMI category		
18.5-24.9	278	65.9
<18.5	21	5.0
>=25.0	123	29.1
History of back trauma		
Yes	149	35.3
No	273	64.7
Cigarette smoking		
Yes	130	30.8
No	292	69.2
Drinking alcohol		
Yes	217	51.4
No	205	48.6
Chat chewing		
Yes	152	36.0
No	270	64.0
Exercise habit / week		
Not at all	174	41.2
1-4 days	180	42.7
5-7days	68	16.1

Job characteristics of the respondents

Majority of taxi drivers 379(89.8) had less than 10 years of driving experience and the mean years of driving a taxi was (6.6, ± 4.1) years. Two hundred forty (56.9%) of the respondents were driving more than eight hours a day. Most of the respondents 304(72.0%) were employed as temporarily and 118(28.0%) were self-employed to own taxi. Three hundred and nineteen (75.6%) respondents were participated in load lifting sometimes and 44(10.4%) were participated frequently. Taxi drivers who had history of another profession that involve sitting before becoming taxi drivers were 166 (39.3%), (See table 2).

Table 2: Job characteristics of the respondents in Addis Ababa, March, 2015 (n= 422)

Variables	Frequency(n)	Percent (%)
Years of driving		
<10	379	89.8
≥ 10	43	10.2
Daily working hours		
≤ 8	182	43.1
>8	240	56.9

Terms of employment		
Self-employee	118	28.0
Employee to other's	304	72.0
Previous job involve sitting		
Yes	166	39.3
No	256	60.7
Times of load lifting		
Never lift	59	14.0
Sometimes	319	75.6
Frequently	44	10.4
Rest break at working hour		
Yes	230	54.5
No	192	45.5

Prevalence and characteristics of LBP among taxi drivers

Out of 422 participants, 271(64.2%) were reported; they had LBP in the past 12 months at least for one day; of them 145(53.5%) experienced pain for 1-30 days, and 126 (46.5%) experienced it for more than 30 days. Out of two hundred and seventy one respondents with low back pain 180 (66.4%) were 1 -30days off-work. Of those who had LBP 176 (64.9%) respondents had pain spread to leg and lower parts. Regarding the nature of pain onset among participants with LBP, 116 (42.8%) was pain developed gradually and (36.2%) were reported sudden at their work activity. One hundred forty eight (54.6%) respondents with LBP remembered the immediate cause of risk factor; about 69(25.5%) of them reported heavy load lifting during their work was the cause of LBP (See table 3).

Table 3: Prevalence and characteristics of low back pain among taxi drivers in Addis Ababa, March, 2015

Variables		Frequency (n)	Percent (%)
Presence of LBP(n=422)	Yes	271	64.2
	No	151	35.8
Persistence of(n=271)	1-30 days	145	53.5
	31-60 days	42	15.5
	> 60 days	84	31.0
Severity of LBP(n=271)	High	75	27.68
	Medium	138	50.92
	Low	58	21.40
Effect of LBP on work absents(n=271)	1-30 days	180	66.42
	31-60 days	30	11.07

	> 60 days	20	7.38
	No absent	41	15.13
LBP spread to lower part(n=271)	yes	176	64.94
	No	95	35.05
Nature of LBP onset(n=271)	Gradually	116	42.80
	Sudan at work	98	36.16
	Sudan out of work	56	20.66
Immediate cause of LBP(n=271)	Load lifting	69	25.46
	Twisting	34	12.54
	Binding	45	16.61
	Not remember	123	45.38

Awareness of ergonomics and psycho-social factors

From total participants 365 (86.5%), of them stated they were aware the importance of good sitting posture. About 225 (53.3%) respondents complained that their seat pans were not comfortable. One hundred fifty six (37.0%) respondents were engaged in stressful job and 192 (45.5%) of them did not have fixed rest break in their work time (See table 4).

Table 4: Ergonomic and psycho-social factors among taxi drivers in Addis Ababa, March, 2015(n= 422)

Variables		Frequency(n)	Percent (%)
Sitting pan comfort	Comfortable	197	46.7
	Uncomfortable	225	53.3
Job satisfaction	Yes	291	69.0
	No	131	31.0
Stressful job	Yes	156	37.0
	No	266	63.0
Importance of sitting postures	Yes	365	86.5
	No	57	13.5
Present of rest break	Yes	230	54.5
	No	192	45.5

Association between low back pain and socio-demographic variables

In the bivariate analysis, BMI, and drivers with history of back trauma were found to be significantly associated with low back pain. Taxi drivers with BMI <18.5kg/m² were more likely to experience LPB compared to body mass index of 18.5 to 24.9 kg/m² (COR: 6.506, 95% CI(1.486-28.482)). Drivers with history of back trauma were more likely to experience LPB compared to those who had no such history [COR: 4.836, 95% CI (2.921-

8.005). There was no significant association between low back pain and other socio-demographic variables in this study (See table 5).

Table 5: Socio-demographic factors associated with LBP by bivariate analysis in Addis Ababa, March, 2015 (n= 422)

Variable	Present of Low Back pain		COR (95% CI)	p-value
	Yes (%)	No(%)		
Age group(years)				
20-40	199(62.8%)	118(37.2%)	1.0	
41-50	47(70.1%)	20(29.9%)	.718(.406-1.270)	.287
51-60	24(66.7%)	12(33.3%)	.843(.407-1.749)	.770
BMI categories				
18.5-24.9	163(59.1%)	113(40.9%)	1.0	
<18.5	20(90.9%)	2(9.1%)	6.506(1.486-28.482)	.008*
>=25.0	88(71.0%)	36(29.0%)	1.655(1.049-2.612)	.060
Income in Birr				
< 2000	70(57.4%)	52(42.6%)	1.0	
2000-3000	110(64.7%)	60(35.3%)	1.598(1.029-2.481)	.984
>3000	91(70.5%)	38(29.3%)	.269(.068-1.061)	.059
History of back trauma				
Yes	126(84.6%)	23(15.4%)	4.836(2.921-8.005)	<0.001*
No	145(53.1%)	128(46.9%)	1.0	
Exercise habit pre- week.				
Not at all	102(58.6%)	72(41.4%)	1.0	
1-4 day	121(67.2%)	59(32.8%)	1.448(.938-2.233)	.337
5-7 day	48(70.6%)	20(29.4%)	1.694(.927-3.095)	.247

Association between low back pain and work characteristics

Prevalence of low back pain was 2 times higher among those who had not fixed rest break during their work day compared to those who had time to rest during work day COR=2.326 95% CI (1.53-3.52). Taxi drivers whose previous job involve sitting was 3 times higher risk to develop low back pain compared to those who were not such history COR=3.268 95% CI (2.08-5.12). Drivers with driving experience ten and more years were 2 times likely higher prevalence of low back pain compared to those with less than ten years duration of driving a taxi COR=4.762 95% CI(1.832-12.376), and driving taxi for more than eight hours daily was increasing risk of low back pain compared to those who driving a taxi for less than eight hours a day COR=1.513 95% CI (1.01-2.26). Taxi drivers who uses uncomfortable taxi seats were 2 times higher prevalence of low back pain compared to those who had used a comfortable taxi seats COR=2.133 95% CI (1.423-3.199), (See table 6).

Table 6: Work factors associated with LBP by Bivariate analysis in Addis Ababa, March, 2015 (n= 422)

Variable	Present of Low Back pain		COR (95% CI)	p-value
	Yes (%)	No.(%)		
Present of rest break				
Yes	143(62.2%)	87(37.8%)	1.0	
No	128(66.7%)	64(33.3%)	2.326(1.53-3.52)	<0.001
Previous Job involve sitting				
Yea	235(64.4%)	130(35.6%)	3.268(2.08-5.12)	<0.001
No	36(63.2%)	21(36.8%)	1.0	
Year of taxi driving				
<10 years	233(61.5%)	146(38.5%)	1.0	
>=10 years	38(88.4%)	5(11.6%)	4.762(1.832-12.376)	.005
Level of sit pan comfort				
Yes	109(55.3%)	88(44.7%)	1.0	
No	162(72.0%)	63(28.0%)	2.133(1.423-3.199)	<0.001
Load lifting				
Never lift	36(61.0%)	23(39.0%)	1.0	
Sometimes	201(63.0%)	118(37.0%)	.731(.396-1.350)	.002
Frequently	34(77.3%)	10(22.7%)	1.595(.876-2.907)	.001
Respondents work stress				
Yes	106(67.9%)	50(32.1%)	.672 (.441-1.024)	.064
No	165(62.0%)	101(38.0%)	1.0	
Current job satisfaction				
Yes	181(62.2%)	110(37.8%)	1.0	
No	90(68.7%)	41(31.3%)	1.334(.860-2.069)	.198
Driving hours/day				
<=8	119(64.0%)	67(36.0%)	1.0	
>8	152(64.4%)	84(35.6%)	1.513(1.01-2.26)	.014
Awareness on importance of good sitting				
Yes	108(65.1%)	58(34.9%)	1.0	
No	163(63.7%)	93(36.3%)	1.054 (.591-1.882)	.858

Factors associated with LBP by multivariate analysis

To avoid excessive number of variables and unstable estimate in the final model, only variables with P-value less than 0.2 in the bivariate analysis were taken in the multivariate analysis. The multivariate binary logistic regression analysis identified that history of back trauma, ten and more duration of driving years, absence of rest break,

uncomfortable taxi seats and frequently load lifting activity had significant association with LBP.

Taxi drivers with history of back trauma were 4 times more probable to develop LBP compared to taxi drivers without history of back trauma[AOR:4.014, 95% CI(2.329-6.916)]. Taxi drivers with ≥ 10 years driving experiences were 3.6 times more likely to develop LBP compared to taxi driver with less than 10 years of driving experiences[AOR: 3.668, 95% CI(1.299-10.354)]. Drivers who hadn't rest break during work day were 1.9 times odds chance to develop low back pain compared to taxi drivers who had rest break during work day [AOR=1.906 95% CI (1.179-3.080)] and similarly taxi drivers who uses uncomfortable taxi seats were 1.7 times increasing risk to develop low back pain compared to who uses a comfortable taxi seats[AOR=1.730,95% CI, (1.08-2.77)].Likewise taxi drivers who lifting load frequently during work time were 2 times likely to develop risk of low back pain compared to with taxi drivers who didn't participated in frequent load lifting activities during their work time [AOR=. 2.130,95% CI (1.045-4.344)].Taxi drivers whose previous job involve sitting was 2.7 times higher risk to developing low back pain compared to taxi drivers who didn't have such history[AOR=2.792, 95% CI, (1.79-4.932)]. The total model was significant ($p < 0.001$). All the values of the standard errors in the model (.415) were below 5 which indicated no multi-co linearity among variables. The results of the Hosmer–Lemeshowtest ($p = .334$) indicated the goodness of fit of the model.

Table 7: Multivariate analysis; factors associated with LBP among taxi drivers in Addis Ababa, March, 2015 (n=422)

Variable	Presence of LBP		P-value	AOR	95% CI
	yes	no			
Year of taxi driving					
<10 years	233(61.5%)	146(38.5%)	00	1.0	Ref
≥ 10 years	38(88.4%)	5(11.6%)	.010	3.668	(1.376-10.859)**
BMI categories					
18.5-24.9	163(59.1%)	113(40.9%)	00	1.0	Ref
<18.5	20(90.9%)	2(9.1%)	.005	9.538	(1.977-46.850)**
≥ 25.0	88(71.0%)	36(29.0%)	.128	1.514	.887-2.584
History of back pain					
Yes	143(62.2%)	87(37.8%)	<0.001	4.014	(2.329-6.916)**
No	128(66.7%)	64(33.3%)	00	1.0	Ref
Present of rest break					
Yes	143(62.2%)	87(37.8%)	00	1.0	Ref
No	128(66.7%)	64(33.3%)	.008	1.906	(1.179-3.080)**
Level of sit pan comfort					

Yes	109(55.3%)	88(44.7%)	00	1.0	Ref
No	162(72.0%)	63(28.0%)	.023	1.73	(1.08-2.77)**
Load lifting					
Never lift	36(61.0%)	23(39.0%)	00	1.0	Ref
Sometimes	201(63.0%)	118(37.0%)	.766	1.119	.534-2.345
Frequently	34(77.3%)	10(22.7%)	.039	2.130	(1.045-4.344)**
Previous Job involve sitting					
Yea	235(64.4%)	130(35.6%)	<0.001	2.972	(1.79-4.932)**
No	36(63.2%)	21(36.8%)	00	1.0	Ref
Driving hours/day					
<=8	119(64.0%)	67(36.0%)	00	1.0	Ref
>8	152(64.4%)	84(35.6%)	.060	1.584	.981-2.560

CI = confidence interval, AOR = adjusted odds ratio, Ref= referents, **=significant level

Discussion

This study found that the twelve month prevalence of LBP among taxi drivers in Addis Ababa, Ethiopia was 64.2%.

The twelve month prevalence (64.2%) rate of LBP as a result of driving reported in this present study was close to the 65% prevalence rate among truck drivers in the Nagpur City, India (20), 64.8% occupational drivers in, Nigeria (38), 58.8% among commercial minibus drivers in Accra, Ghana (31), but lower than 73.5% Prevalence of low back pain among professional drivers in Kano, Nigeria (39) and 78.0%, among professional car drivers in Dhaka city, Bangladesh. It is however higher than 34.3% in the previous study among occupational drivers in, Ghana (21). These variations could, be due to differences in methodology, sample size and population.

Increased odds of developing LBP with increased years of driving were observed among the participants in this study, driving ≥ 10 years was significantly associated with increased risk of LBP. This study result was consistent with previous study that found duration of employed as a taxi driver was significantly related to LBP among drivers (21, 22, 32, and 34).

In this study, higher prevalence of LBP was found among those who had history of low back trauma compared to those without such history, so previous back trauma was found to increase the risk of low back pain among taxi drivers. This finding supported, by studies reported a strong relationship between increased risk of LBP and driving taxi (22, 28, and 40). This is probably aggravated the prior health condition in drivers low back that was caused by any factors from their past.

In the present study, an uncomfortable seat was associated with a higher prevalence of LBP among taxi drivers. Taxi drivers often maintain awkward body postures for extensive periods during their work. These postures include leaning on one side, bending and twisting, and excessive stretching. Drivers might adopt awkward postures to avoid discomfort caused by a poor ergonomic chair. These positions, combined with an uncomfortable chair, can place mechanical stress upon the spine and its surrounding soft structures and ultimately cause LBP. This finding is consistent to a cross-sectional study done in, Israel (15).

Frequently load lifting activity was significantly associated with a higher prevalence of LBP; taxi drivers spend most of their time in static posture in a confined environment, this restricts chance for muscle relaxation. So in absence of muscle relaxation frequent load lifting may cause muscle injury on low back. This is consistent to the fact that, LBP accounts for more sick leave and disabilities due to load lifting activity during work time (23, 32, 33, and 35).

And also previous job involved sitting was, found significantly associated with LBP; this result is in agreement with the study conducted in Israel among professional bus drivers (15). Sitting itself did not increase the risk of LBP, but sitting for more than half a workday, combined with whole body vibration and/or awkward postures, did increase the likelihood of having LBP and/or sciatica, and it is the combination of those risk factors that leads to the greatest increase in LBP (3)

Also this present study found high prevalence of low back pain in taxi drivers who had inadequate rest period during the working day. This result is in line with, studies conducted among drivers in mineworkers on low back pain (35 and, 8, 21,34).

In this study, other factors such as age, driving hour per day, work stress, job satisfaction, physical activity, cigarette smoking, alcohol consumption, terms of employment and awareness of good sitting posture were not significantly associated with LBP.

The mean age of the taxi driver in this study was (35.3, \pm 10.1). Age was not significantly associated with LBP in this study however previous cross-sectional study on prevalence and determinants of low back pain conducted in Malaysia among taxi drivers with mean age (46.8, \pm 8.9) found that age is significantly associated with LBP. This is probably due to the age difference between the two study groups. The aging effect may have affected the LBP in Malaysian study. Failure to find association between age and LBP in this study did not necessarily mean the absence of effect of age on LBP; instead it could be due to involvement of more healthier taxi drivers and less taxi drivers with LBP due to sick leaves or medical treatment during data collection period, may have resulted in underestimation of the risk associated with the LBP in this study.

Strengths and limitations of the study

This research addressed one of the major occupational health problems among neglected group of workers. No study has been conducted on this topic before this study. This study reported for the first time the prevalence of LBP among taxi drivers in Addis Ababa, Ethiopia. However, the finding needs to be interpreted with cautions. It is also a cross-sectional study design, in which the temporal occurrence of low back pain outcomes cannot be proved and the study also lack comparison group.

Conclusion

The prevalence of LBP among taxi drivers in this study was 64.2%. The study found ten and more years of driving taxi, history of back trauma, load lifting activity, lack of rest break at work day, uncomfortable seats and previous job involve sitting before becoming taxi driver were risk factors for low back pain among taxi drivers. So the results of this study indicated that low back pain is an important health problem for taxi driver.

Recommendation

Further study with alternative design is recommended to investigate other risk factors of low back pain such as; the whole body vibration and, type of seat. Awareness campaign program should be organized for drivers on the importance of proper ergonomics to reduce the risk of LBP. Collaboration between health policy makers and road transport authority is highly important in order to formulate prevention strategies and initiate proper medical intervention at the right time when early symptoms of LBP manifested. This will assist in mitigating the potential hazards.

References

1. Driscoll T, Jacklyn G, et al. The global burden of occupationally related low back pain: estimates from the Global Burden of Disease study, Clinical and epidemiological research; 2010. Available on <http://dx.doi.org/>.
2. Damian H, Christopher B. A Systematic Review of the Global Prevalence of Low Back Pain: American College of Rheumatology; 2012.
3. Quinette A Louw, et al. The Prevalence of low back pain in Africa: a systematic review BMC Musculoskeletal Disorders; 2007. Available on: <http://www.biomedcentral.com/1471-2474/8/105>.
4. WHO. Identification and control of work-related diseases. World Health Organization, WHO Technical Report Series 714: Geneva Switzerland; 1985.
5. Solidaki E, Chatzi L. Work-related and psychological determinants of multisite musculoskeletal pain.Scand J Work: Environ Health; 2010.

6. Welch L, Haile E. Musculoskeletal disorders among construction roofers' physical function and disability. *Scand J Work: Environ Health*; 2009.
7. Sternbach, R.A. Survey of pain in the United States, the Nuprin pain report: *Clinical Journal of Pain*; 1986.
8. Saumya S. Occurrence of musculoskeletal problems with special reference to health hazards in taxi drivers. *Scientific and Technical Research: International Journal of Advanced*; 2014. <http://www.rspublication.com>
9. CSA. Summary and statistical report of the 2007 population and housing census, Ethiopia 2007.
10. Sub-Saharan Africa Transport Policy Program. The World Bank and Economic Commission for Africa. *Urban Mobility in Three Cities Addis Ababa, Dares Salaam, Nairobi: SSATP Working Paper*; 2002.
11. European Agency for Safety and Health at Work. *Research on work-related low back disorders*. Luxembourg; 2000; <http://europa.eu.int>.
12. Guo HR, Tanaka S. et al. Back pain among workers in the United States. *National estimates and workers at high risk: Am J Ind Med*; 1995.
13. Liira JP, Shannon HS. Long-term back problems and physical work exposures in the 1990 Ontario Health Survey. *Am J Public Health*; 1996.
14. Lenka G. *Low Back Pain and Risk Factors for Low Back Pain in Car Drivers*. Institute of Sound and Vibration Research; 2008. Available from: www.eprints.soton.ac.uk.
15. Alperovitch-Najenson D. *Low Back Pain among Professional Bus drivers. Ergonomic and occupational-psychosocial risk factors: IMAJ*; 2010. Available from <http://www.ncbi.nlm.nih.gov/>.
16. Begum Nurun N, Ahsan GU. Prevalence of low back pain and associated risk factors among professional car drivers in Dhaka city, Bangladesh. *South East Asia Journal of Public Health*; 2012.
17. The Federal Democratic Republic Of Ethiopia, Central Statistical Agency. *Statistical Report on the 2014 Urban Employment Unemployment Survey, Addis Ababa 2014*.
18. Peter F, Ullrich MD. *Spinal Anatomy and Back Pain*; 2009. Available from www.spin-health.com.
19. Jiu-Chiuan C, Wen-Ruey C. Occupational factors associated with low back pain in urban taxi drivers. *Occupational medicine*; 2005. Available from <http://occmed.oxfordjournals.org/>.
20. Borle A, Agawane S. Study of occupational factors associated with low back pain in truck drivers of Nagpur City, India. *International Journal of Medical and Health Sciences*; 2012. Available from <http://www.ijmhs.net>.

21. Abledu JK, Offei EB. Occupational and Personal Determinants of Musculoskeletal Disorders among Commercial Minibus Drivers in, Ghana. *Advances in Epidemiology*; 2014. Available from: <http://dx.doi.org/10.1155/2014/517259>.
22. Sami Abdo R. Prevalence and determinants of low back pain among taxi drivers in Malaysia. *Design for Scientific Renaissance: Journal of Advanced Medical Research*;2012.
23. Ambrose Alli University. Musculoskeletal Illness in, Nigeria Drivers. *Advances in Life Science and Technology: A Psychosocial and Physical Factors Perspective*, Ekpoma Nigeria; 2012.Available fromwww.iiste.org.
24. Faculty of Health;Gonabad University of Medical Sciences,Gonabad IR Iran. The relationships between musculoskeletal disorders and anthropometric indices in public vehicle drivers. *International Journal of Collaborative Research on Internal Medicine & Public Health*; 2012.
25. Smith CK, Williams J. Work related injuries in Washington State’s Trucking Industry, by industry sector and occupation. *Accident Analysis and Prevention*; 2014. Available at Science Direct www.elsevier.com/locate/aap.
26. Clinical Unit of Occupational Medicine, Department of Reproductive, Developmental and Public Health Sciences, University of Trieste. A Longitudinal Study of Low Back Pain and Daily Vibration Exposure in Professional Drivers. *Industrial Health: Centro Italy*; 2010.
27. Lis A M, Black K M. Association between sitting and occupational LBP. *Eur Spine J* (2007): Springer-Verlag; 2006.
28. Masabumi M, Shunsuke K. Epidemiological study of low back pain and occupational risk factors among taxi drivers. M MIYAMOTO et al:*Industrial Health*; 2008.
29. Federal Democratic Republic of Ethiopia,Central Statistical Agency.Population Projection of Ethiopia for All Regions:AtWereda Level from (2014 – 2017); 2013.
30. Rozali A, MComm M. Low Back Pain and Association with Whole Body Vibration among Military Armored Vehicle Drivers in Malaysia. *Health Services & Division of Malaysian Armed Forces*, Kuala Lumpur 2009.
31. J. K. Abledu, E. B. Offei,Predictors of Work-Related Musculoskeletal Disorders among Commercial Minibus Drivers in Accra Metropolis,Ghana.Hindawi Publishing Corporation. Available in; <http://dx.doi.org/10.1155/2014/384279>.
32. Brendstrup T. Effect of fork-lift truck driving on low-back trouble by.*ScandJ Work Environ Health* 1987.This article in PubMed: www.ncbi.nlm.nih.gov/pubmed/2963374
33. Françoise P, Annette L, et al. Low-back pain in commercial travelers. *Scandinavian Journal of Work, Environment & Health*, 1992. Available: <http://www.jstor.org/stable/40965966>

34. T. sakakibara et al. Effects of driving on low back pain. Published by Oxford University Press on behalf of the Society of Occupational Medicine, 2006. Available from:<http://occmmed.oxfordjournals.org>
35. S Morten, T Ljudmila. Low back pain among mineworkers in relation to driving, cold environment and ergonomics. Ergonomics, 2014. Available from: <http://dx.doi.org/10.1080/00140139.2014.904005>
36. Porter, J.M., and Gyi, D.E. The prevalence of musculoskeletal troubles among car drivers. Occupational Med, 2002.
37. S. B. M. Tamrin, K. Yokoyama. "The association between risk factors and low back pain among commercial vehicle drivers in peninsular Malaysia: a preliminary result," Industrial Health, 2007.
38. A. O. Akinpelu, O. O. Oyewole. "Prevalence of musculoskeletal pain and health seeking behavior among occupational drivers in Ibadan, Nigeria," African Journal of Biomedical Research, 2011.
39. A. A. Rufa'i, I. Sa'idu. "Prevalence and risk factors for low back pain among professional drivers in Kano, Nigeria," Archives of Environmental & Occupational Health, 2013.
40. AjeetJaiswal. Low back pain and work-related risk factors among drivers of pondicherry. International Journal of Scientific, Footprints; 2013.
41. K. Aranjan Lionel. Risk factors for chronic low back pain. Lionel, J community medicine & health education; 2014. Available on;<http://dx.doi.org/10.4172/2161-07>