Occupational risk factors for low back pain among drivers of three-wheelers in Sri Lanka

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Background: Approximately 5% of all households in Sri Lanka operate a three-wheeler as their primary source of income. However, very little is known about the occupational health risks associated with driving these vehicles.

Objectives: The aim of this study was to assess occupational risk factors, including the number of hours worked associated with the 4-week prevalence of low back pain (LBP) among drivers of three-wheelers.

Methods: Questionnaires were administered to 200 full-time drivers of three-wheelers from the Galle District in Sri Lanka. Occupational, psychological, socio-demographic, lifestyle, and anthropometric variables were collected. Univariate and multivariate analysis were used to investigate the correlation between occupational risk factors of the prevalence of LBP.

Results: 15.5% of respondents reported experiencing LBP in the previous 4 months. Univariate analysis revealed that the number of hours worked per week, feeling pressure to compete with other drivers, and perceived stress scale scores were significantly associated with the 4-week prevalence of LBP. Multivariate analysis found that the number of hours worked per week and engine type were significantly associated with LBP.

Conclusions: LBP is common among drivers of three-wheelers in Sri Lanka. Long work hours and two-stroke engines were significantly associated with LBP. Results from this study point towards a role for educational, behavioral health, and policy interventions to help prevent and reduce LBP among these drivers.

Keywords: Low back pain, Musculoskeletal pain, Occupational health, Sri Lanka, Vibration, Informal sector

Introduction

Approximately half of the economically active population in low to middle-income countries works in the informal sector where healthcare and social protection mechanisms are uncommon.^{1–3} Despite their long work hours and challenging occupational conditions, research on the health of such occupational groups is sparse.^{1,4–6}

Three-wheelers, also referred to as *tuk-tuks* or auto-rickshaws, are a popular mode of public transportation in low- to middle-income countries. In Sri Lanka, the number of three-wheelers doubled between 2005 and 2010, with approximately 530 000 vehicles registered in 2010. They represent 14% of overall traffic in the country, making them the second most common vehicle on the road after motorcycles.^{7,8} Approximately 5% of all households in Sri Lanka own and operate a three-wheeler as their primary source of income.⁹ Despite

being common, the three-wheeler industry is mostly unregulated in Sri Lanka. Although operators are required to register their vehicle, possess a license and vehicle insurance, they are part of the informal economy. Vehicles are privately owned and operated, drivers provide services in exchange for cash, and they typically do not pay tax on their income.⁹ Current research on these drivers' health in Sri Lanka is limited and has primarily focused on driving behavior or work-related injuries/accidents.^{10,11}

This study, which is part of a larger study that aims to better understand the health status and health concerns of drivers of three-wheelers in Sri Lanka, focuses on the prevalence of low back pain (LBP) among these drivers. Globally, 37% of LBP is attributed to occupational risk factors.¹² Previous research with four-wheel taxi drivers and bus drivers has found a high prevalence of LBP among these occupational groups (12-month prevalence: 38.6–60.0%).^{13–16} In a preliminary qualitative study with drivers of three-wheelers in Sri Lanka, LBP was often raised as a concern.¹⁷ One occupational risk

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factor for LBP of particular interest, given its modifiable nature, is the number of hours worked among these drivers. Hours worked can be considered a proxy for exposure and duration to vibration and a seated posture. A recent review suggests exposure to vibration, especially the duration, is a key risk factor for occupational LBP.¹⁸ Prior research has reported a correlation between exposure to vibration and the prevalence and severity of LBP among four-wheel taxi drivers.^{14,15,19} The role of vibration may be particularly relevant among drivers of three-wheelers because the engine of the vehicle is often beneath the driver's seat. Furthermore, vibration has been found to exacerbate the effect of sitting on LBP.^{18,20} Current evidence exploring sitting as a risk factor for LBP is limited and inconsistent.²¹

The aim of this study was to identify the modifiable occupational risk factors of LBP among drivers of three-wheelers in Sri Lanka, the primary focus being on the association between number of hours worked and the prevalence of LBP. We tested the hypothesis that longer work hours, a proxy for the duration of exposure to vibration and a sitting posture, are associated with a higher 4-week prevalence of LBP. We also investigated the association between other occupational factors, including engine type, feeling pressure to compete, number of years working as a driver, setting a daily target income, adequacy of income, working night shifts, and year of manufacture of the vehicle, with the prevalence of LBP.

Methods

Study setting and design

A cross-sectional study of 200 drivers of three-wheelers was conducted in Galle District, Sri Lanka, between January and February 2013. The district has a population of 1 061 999, with approximately 25 000 three-wheelers on the road, and is located in the Southern Province of Sri Lanka.²² Ethical approval for the study was obtained from the Institutional Review Boards of the University of Ruhuna and the National University of Singapore.

Sampling and selection strategy

Participants were recruited from administrative regions in the Galle District. Of the 19 administrative regions, five regions were excluded due to travel distance. Depending on the size of the region, one or two park sites where drivers of three-wheelers congregate to pick up passengers were selected for recruitment. A total of 19 park sites were selected for this study. These were major park sites close to a large transit site (e.g. bus or railway station) or the town center, and introduced to the researchers by local residents. Convenience sampling was used to recruit study participants.

Drivers of three-wheelers in each park site were approached and asked if they were willing to

participate in the study by Sinhala speaking medical graduates from Ruhuna University. In order to be eligible, drivers had to be older than 18 years and working as a full time (more than 30 hours a week) driver of a three-wheeler for a minimum of six months with no other competing job that exceeded 30 hours a week. Written consent was obtained from eligible participants willing to participate in the study.

Questionnaire content and administration

The questionnaire, designed based on findings from a preliminary qualitative study and knowledge from current literature in this field, consisted of a combination of previously validated questions and scales as well as newly developed occupation-specific questions.¹⁷ We included questions on occupational health risks, including number of hours worked and type of engine, psychological factors assessed using the Perceived Stress Score (PSS), socio-demographics factors, lifestyle/health behaviors, and musculoskeletal pain with a particular focus on LBP.^{9,11–13,15,16,23–29}

All documents were originally written in English and then translated into Sinhala by a medical school graduate from the University of Ruhuna. Documents were then back translated into English by a Sinhala speaking researcher and compared with the original English version for accuracy. After resolving any inconsistencies, the questions were pilot tested on drivers of three-wheelers in Sinhala.

The same graduates who recruited participants administered the questionnaires at the park sites in Sinhala. After completing the questionnaire, anthropometric measurements (height, weight, and waist circumference) were collected. The same weighing scale, stadiometer, and measuring tape were used at each park site to minimize bias. Drivers were compensated with 500 Sri Lankan rupees for their participation in the study, an amount comparable to their potential earnings for driving during the 30–45 minutes it took to complete the questionnaire and measurements.

Predictor and outcome variables and covariates

The main predictor variable, work hours per week, was calculated from the drivers' reported daily work hours and the number of work days per week. Responses were categorized into quartiles (<71 hours; 71–81 hours; 82–91 hours; and >91 hours) for analysis. Other occupational factors were also investigated as predictor variables including: engine type, feeling pressure to compete, number of years working as a driver of three-wheelers, setting a daily target income, adequacy of income, working night shifts, and year of manufacture of the vehicle. Although concerns about exhaust and noise pollution led to a ban on the import of two-stroke engine models in Sri Lanka in 2008, this engine type was assessed because we hypothesized that

it may have an effect on the vibration and comfort levels of the drivers.³⁰

The presence of LBP in the past 4 weeks was the dichotomous outcome variable. LBP diagnosis was based on the definition provided through a modified Delphi study.²⁴ Participants who reported experiencing LBP in the previous 4 weeks were shown an illustration of the human body to confirm the location of LBP and for drivers who reported LBP in the past 4 weeks, the duration, frequency, perceived causes, and pain severity were also assessed. Duration of pain was asked as recommended in the modified Delphi study and questions about the frequency and perceived causes of LBP were from a previous study on musculoskeletal symptoms among female garment factory workers.^{24,31} Pain severity was evaluated using the Wong Baker Faces Pain Rating Scale.³² For our analysis, LBP was defined as “experiencing lower back pain in the 4 weeks before the study that was not associated with fever or with pain traveling down the leg.” The frequency and severity of pain were not included in the definition of LBP because the authors of the modified Delphi study do not provide corresponding cutoff points.

Psychological variables, including the PSS score and satisfaction with work hours, were investigated as covariates because the effect of psychological health on the occurrence of musculoskeletal pain is controversial.^{14,27–29} Socio-demographic variables, including age, highest level of education, and per capita household monthly income, lifestyle factors including smoking status, alcohol use, and physical activity, and anthropometric variables including body mass index (BMI) and waist circumference, were also considered as covariates. Anthropometric parameters were incorporated to control for the potential effect of obesity on musculoskeletal pain.^{33–35}

Statistical analysis

Data were analyzed using SAS version 9.2. Descriptive statistics of the occupational factors and covariates were performed. The proportion of drivers of three-wheelers who reported LBP in the past 4 weeks in each quartile of hours worked per week was determined and differences across categories were tested using Pearson's Chi-squared test. Pearson's Chi-squared test was also performed to ascertain the association of 4-week prevalence of LBP with each of the other occupational factors and covariates.

The relative odds of having LBP in the past 4 weeks were calculated by the number of hours that drivers worked. Data for drivers who worked for <71 hours per week, 82–91 hours per week, and >91 hours per week, were compared to drivers who worked between 71 and 81 hours per week using a logistic regression model. The same analytical method was used to assess

the odds of LBP in the past 4 weeks for each of the other occupational factors and covariates.

Multiple logistic regression was used to test for associations between variables that were significant in the univariate analysis at a level of $P < 0.10$ and the 4-week prevalence of LBP. 95% confidence intervals (CIs) were calculated for all odds ratios (ORs), and a P -value of 0.05 was used for all tests of significance.

Results

Driver profiles

A total of 206 drivers were approached and five declined to participate. The remaining 201 drivers were screened, and one was excluded based on age. Descriptive statistics for the 200 drivers included in the study are presented in Table 1. All of the participants were men, 47% drove three-wheelers with a two-stroke engine and they had a mean age of 38.6. The mean PSS score of 15.0 was in the upper range of the middle category (“average”), out of a total of five categories used to interpret the PSS score.³⁶

Descriptive statistics revealed that the most common location of pain was the back, with the reported 12-month prevalence of back pain being 17.5%. The 4-week prevalence specific to the lower back was 15.5%, which meant the majority of drivers who complained of back pain had pain in the lower back. The descriptive statistics on the characteristics of LBP are presented in Table 2.

Univariate analysis

Participants reported working on average 81 hours per week, of which 34 were spent driving (Table 1). Univariate analysis revealed a significant U-shaped association between work hours per week and LBP. LBP was least frequently reported among drivers working between 71–81 hours/week (Table 1). Using drivers working between 71 and 81 hours a week as the comparison group, drivers working either more or less hours were more likely to report experiencing LBP. No significant association was found between age and LBP prevalence in this population, even when age was assessed as a continuous variable. The association of engine type, pressure to compete with other drivers, and PSS score were all significantly associated with the prevalence of LBP at the $P < 0.10$ level and were therefore included in the multivariate analysis as covariates.

Multivariate analysis

The ORs of experiencing LBP was 1.5 (95% CI: 0.33–6.9), 2.4 (95% CI: 0.57–10), and 5.3 (95% CI: 1.3–22) times greater for those who worked for <71 hours per week, 82–91 hours per week, and >91 hours per week relative to those who worked for 71–81 hours per week. Drivers of three-wheelers with two-stroke engines were 2.9 times more likely to report experiencing LBP

Table 1 Characteristics of drivers of three-wheelers, proportion of drivers with low back pain (LBP) and univariate association between driver characteristics and LBP

Characteristics of drivers of three-wheelers	Frequency (%) [†] (N=200)	Frequency [proportion with LBP in past 4 weeks (row%)] [‡]	OR of LBP (95% CI) univariate logistic regression
OCCUPATIONAL			
Work hours/week (hours/week) (80.5 ± 17.8)*		<i>P</i> =0.013 [§]	
<71	57 (29)	6 (11)	1.5 (0.34–6.2)
71–81	40 (20)	3 (7.5)	<i>Ref</i>
82–91	61 (31)	9 (15)	2.1 (0.54–8.4)
>91	42 (21)	13 (31)	5.5 (1.4–21)
Engine type		<i>P</i> =0.083	
Two-stroke	94 (47)	19 (20)	2.0 (0.91–4.4)
Four-stroke	106 (53)	12 (11)	<i>Ref</i>
Feeling pressure to compete		<i>P</i> =0.008	
Yes	37 (19)	11 (30)	3.0 (1.3–7.1)
No	163 (82)	20 (12)	<i>Ref</i>
Years worked as driver of three-wheelers (years) (10.2 ± 6.5)		<i>P</i> =0.90	
First quartile (0–5)	56 (28)	9.0 (16)	1.4 (0.45–4.2)
Second quartile (6–9)	44 (22)	7.0 (16)	1.4 (0.42–4.4)
Third quartile (10–14)	51 (26)	9.0 (18)	1.5 (0.50–4.7)
Fourth quartile (>14)	49 (25)	6.0 (12)	<i>Ref</i>
Setting a daily target income		<i>P</i> =0.61	
Yes	57 (29)	10 (18)	1.2 (0.54–2.8)
No	143 (72)	21 (15)	<i>Ref</i>
Adequacy of income		<i>P</i> =0.190	
Enough to just enough	148 (74)	20 (14)	<i>Ref</i>
Some/much difficulty to meet expense	52 (26)	11 (21)	1.7 (0.76–3.9)
Working night shifts		<i>P</i> =0.83	
Yes	35 (18)	5.0 (14)	0.89 (0.32–2.5)
No	165 (83)	26 (16)	<i>Ref</i>
Year of manufacture		<i>P</i> =0.47	
2005 or earlier	67 (36)	12 (6.4)	1.4 (0.60–3.0)
2006 or later	122 (65)	17 (9.0)	<i>Ref</i>
PSYCHOLOGICAL			
Perceived stress scale (15.0 ± 5.1)		<i>P</i> =0.014	
Average or below (≤15)	111 (56)	14 (13)	1.1 (0.41–2.8)
Slightly higher than average (16–20)	59 (30)	7.0 (12)	<i>Ref</i>
Much higher than average (≥21)	30 (15)	10 (33)	3.7 (1.2–11)
Satisfied with work hours		<i>P</i> =0.12	
Yes	103 (52)	12 (11.7)	<i>Ref</i>
No	97 (49)	19 (20)	1.9 (0.84–4.0)
SOCIO-DEMOGRAPHIC			
Age (years) (38.6 ± 10.7)		<i>P</i> =0.38	
18–30	46 (23)	4.0 (8.7)	<i>Ref</i>
31–40	77 (39)	15 (19)	2.5 (0.73–8.6)
41–50	52 (26)	7.0 (14)	1.9 (0.54–6.8)
>51	25 (13)	5 (20)	2.3 (0.66–8.1)
Highest level of education		<i>P</i> =0.22	
Grade 1–10	69 (35)	14 (20)	2.0 (0.87–4.6)
O-level	106 (53)	12 (11)	<i>Ref</i>
A-level	25 (13)	5 (20)	2.0 (0.62–6.2)
Per capita income (Rs./month) (5832.2 ± 2642.6)		<i>P</i> =0.31	
4000 and below	63 (32)	8 (13)	1.1 (0.29–3.8)
4001–6000	59 (30)	8 (14)	1.1 (0.32–4.1)
6001–8000	45 (23)	11 (24)	2.4 (0.67–8.2)
>8000	33 (17)	4.0 (12)	<i>Ref</i>
LIFESTYLE**			
Smoking status		<i>P</i> =0.94	
Yes (4.6 ± 3.7 sticks/day)	82 (41)	13 (16)	1.0 (0.5–2.4)
		5 (15)	0.99 (0.32–3.0)
No	85 (43)	13 (15)	<i>Ref</i>
Alcohol use		<i>P</i> =0.14	
Yes (74 ± 161 units/month, med. 23)	132 (66)	24 (18)	1.9 (0.79–4.8)
No	68 (34)	7 (10)	<i>Ref</i>
Physical activity		<i>P</i> =0.80	
Yes (17 ± 15 hours/month)	125 (63)	11 (15)	0.90 (0.41–2.0)
No	75 (38)	20 (16)	<i>Ref</i>
ANTHROPOMETRIC			
BMI (kg/m²), Asian categories (23.4 ± 3.9)		<i>P</i> =0.86	
<18.5	24 (12.0)	3 (12.5)	<i>Ref</i>
18.5–22.9	72 (36)	10 (14)	1.1 (0.28–4.5)
23.0–27.4	77 (39)	14 (18)	1.6 (0.41–6.0)
≥27.5	27 (14)	4 (15)	1.2 (0.24–6.1)

Table 1 Continued

Characteristics of drivers of three-wheelers	Frequency (%) [†] (N=200)	Frequency [proportion with LBP in past 4 weeks (row%)] [‡]	OR of LBP (95% CI) univariate logistic regression
Waist circumference (cm) (89.1 ± 11.0)		<i>P</i> =0.973	
Low metabolic risk (<85)	64 (32)	10 (16)	<i>Ref</i>
High metabolic risk (≥85)	136 (68)	21 (15)	0.99 (0.44– 2.2)

Note: OR, odds ratio; CI, confidence interval; LBP, low back pain; Rs.=rupees; BMI, body mass index.

*The mean ± SD for continuous variables is shown in parentheses.

[†]Reflects the column %, the denominator being 200 drivers.

[‡]The % shown is the row%, reflecting the proportion within each category who reported 4-week prevalence of LBP.

[§]*P*-values reported for each variable was obtained by Pearson's chi-squared test. Those significant at *P*-value <0.05 has been bolded.

^{||}OR reported were obtained with reference to categories labeled *ref*.

**Smoker refers to current smokers, alcohol use was considered if there was any consumption in the last 30 days, and physical activity was based on engagement in any physical activity in the past 30 days.

compared to drivers of vehicles with four-stroke engines (Table 3).

Discussion

Similar to studies of other drivers, results indicated that LBP was the most common musculoskeletal pain reported by drivers of three-wheelers in the Galle District of Sri Lanka. Findings confirmed the hypothesis that longer work hours per week, a proxy for the duration of exposure to vibration and a seated posture at work, were associated with 4-week prevalence of LBP among these drivers. However, both the univariate and multivariate analysis revealed that the relationship between weekly work hours and LBP was not linear, but U-shaped, with the prevalence or odds of having LBP being the lowest for those who worked for 71–81 hours per week relative to those who worked more or less hours. Given the cross-sectional nature of the study, this could reflect reverse causation, or in other words, LBP could have resulted in some drivers reducing their work hours, resulting in the higher

occurrence of LBP among drivers who worked less than 71 hours per week compared to drivers who worked between 71 and 81 hours per week.

Furthermore, we observed the odds of LBP to be higher among drivers with two-stroke engines compared to drivers with four-stroke engines. Two-stroke engines are older and known to produce more exhaust gas and noise pollution, which is why Sri Lanka banned the import of two-stroke engine three-wheelers in 2008. We hypothesized that the older engine models may also expose drivers to increased vibration, although we were unable to find any literature on the difference in vibration between two-stroke and four-stroke engines. Moreover, as vehicles with four-stroke engines are newer, they were more likely to have more comfortable seating and suspension. These are possible explanations for the observed difference in the prevalence of LBP between drivers of two and four-stroke engine models and deserve further research. It is also plausible that engine type is related to socio-economic factors.

Table 2 Characteristics of low back pain (LBP) reported by drivers of three-wheelers

LBP characteristics		%
Duration (N=31)*	<3 months	75.8
	3–7 months	18.2
	7 months–3 years	3.0
	>3 years	3.0
Frequency of Symptoms (N=29)	Some days	78.8
	Most days	18.2
	Everyday	3.0
Causes (N=29)	Working as a driver of three-wheelers	51.7
	Lifting heavy weight	17.2
	Injury/accident to back at work	3.5
	Injury/accident to back outside of work	3.5
	Others	31.1
Pain worsened by driving three-wheeler (N=29)	Yes	44.8
	No	55.2
Pain score (N=31)	Mean ± SD=5.71 ± 1.87	N/A
RMDQ score (N=31)	Mean ± S.D=7.13 ± 4.67	N/A

Note: LBP, low back pain; RMDQ, Roland–Morris Disability Questionnaire.

*The number of respondents for each question is indicated in brackets. Mean and standard deviation instead of % are recorded for pain score and RMDQ.

[†]Pain score lies between values 0 and 10, and higher score indicates greater severity of pain.

[‡]Higher RMDQ score indicates more disability due to low back pain.

Table 3 Association between selected variables and low back pain (LBP) (multivariate logistic regression)

Variables [†]	OR [‡] (95% CI) [§]
Work hours/week (hours/week)	<i>P</i> =0.052
<71	1.5 (0.33–6.9)
71–81	<i>Ref</i>
82–91	2.4 (0.57–10)
>91	5.3 (1.3–22)*
Engine type	<i>P</i> =0.020*
Two-stroke	2.9 (1.2–6.9) *
Four-stroke	<i>Ref</i>
Feeling pressure to compete	<i>P</i> =0.056
Yes	2.6 (0.98–6.9)
No	<i>Ref</i>
Perceived Stress Scale	<i>P</i> =0.16
Average or below (≤ 15)	<i>Ref</i>
Slightly higher than average (16–20)	0.92 (0.33–2.5)
Much higher than average (≥ 21)	2.6 (0.89–7.6)

Note: OR, odds ratio; CI, confidence interval.

**P*<0.05.

[†]Variables included were those from Table 1 column 3 with a *P*-value <0.10.

[‡]OR reported were obtained with reference to categories labeled *ref*.

[§]*P*-values reported in this column are for the category variable overall.

Pressure to compete with other drivers and PSS score were also correlated with LBP in the univariate analysis, but not in the adjusted analysis. Recently, an excess of three-wheelers has been reported in Sri Lanka, creating increased competition for clients among drivers.^{9,37} Drivers of these vehicles are also competing with drivers of buses and private vehicles and have previously expressed concern that their loss of the transportation market share is growing.¹⁷ The financial and psychological stress from such competition may be reflected in the responses of drivers to the questions about the pressure to compete with other drivers and to the PSS. Competition and stress may lead to longer work hours for drivers, explaining why the significant univariate association between these variables and LBP becomes weaker and non-significant when adjusted for work hours per week. Additionally, pressure to compete was a stronger correlate of LBP than PSS. This could be because pressure to compete reflects an occupation specific measure of stress, whereas PSS assesses the degree to which respondents find their lives unpredictable, uncontrollable, and overloaded from stress, a measure that could be influenced by events outside of work.³⁶

Strengths and limitations

In addition to describing the prevalence of LBP among drivers of three-wheelers in Sri Lanka and identifying modifiable occupational risk factors, this study draws attention to the informal work sector, where the health of workers and research are often neglected, and there is a strong need for formal organized occupational health services. There was a high response rate among drivers approached to participate in this study, likely

influenced by administering the questionnaire in Sinhala and compensating participants for their time. Another strength of this study is the use of a “standard” definition of LBP, derived by consensus among experts of LBP using a Delphi method, in identifying significant occupational risk factors of LBP. Limitations include the moderate sample size, the cross-sectional design, and the use of convenience sample. Although the sample size was moderate, the results supported our primary hypothesis that the number of hours worked were associated with the 4-week prevalence of LBP among drivers of three-wheelers.²⁴ Random sampling was not possible for this study due to the lack of a list of park sites and data on the number of drivers and park sites in each region, emphasizing the need for a regulatory body for drivers of three-wheelers and park sites. It also highlights a key challenge of carrying out research with workers in the informal sector.

To ensure the health and safety of drivers of three-wheelers in the context of LBP, interventions should be instituted through policy changes and health education. While it may be difficult to reduce drivers’ work hours due to the pressure to earn income, practices to increase fairness and decrease pressure can be implemented. For example, in some park sites, drivers line up and take turns to serve clients in an effort to reduce competition. Another potential intervention is for operators of park sites to stagger the work time of drivers to help increase efficiency and reduce driver wait time and competition.

Another important finding was the association of LBP with driving a vehicle with a two-stroke engine. Despite the ban on the import of three-wheelers with two-stroke engines in 2008, about half of the drivers we interviewed were still driving the two-stroke engine three-wheelers.³⁰ However, it is likely that the remaining two-stroke engine three-wheelers will be phased out in the near future, resulting in the increase in the proportion of drivers driving the four-stroke engine three-wheelers, which were associated with lower prevalence of LBP.

Our finding that LBP is common among drivers of three-wheelers can be used to develop behavioral health interventions. These interventions should use social marketing to educate drivers on healthier sitting postures and strengthening, mobility and stretching exercises to help prevent and treat LBP.^{38,39} It is necessary to communicate our findings and these recommendations to both policy makers and to the drivers themselves for early prevention and intervention for LBP.

Disclosure Statement

Contributors I hereby declare that all above-mentioned authors have fulfilled the following criteria:

(1) have made a substantial contribution to the concept and design, acquisition of data or analysis and interpretation of data; (2) drafted the article or revised it critically for important intellectual content; and (3) approved the version to be published.

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Conflicts of interest None declared.

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