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Assessment of Occupational Stress Index and Lipid Profile among Professional Drivers in Ismailia City, Egypt

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Abstract: Background: Driving is a stressful job. Professional drivers are high risk group for occupational stress. Occupational stress has been associated with abnormal levels of lipids. However, many studies could not find any association. **Aim and Objectives:** The study aimed at contributing to improving the professional drivers' health through assessing occupational stress, lipid profile and their association. **Subjects and Methods:** It was a cross-sectional study conducted at Suez Canal Authority in Ismailia City, Egypt, including 131 professional drivers. A structured interview questionnaire was performed to assess occupational stress index (OSI) and cardiovascular risk factors. Lipid profile in form of cholesterol, triglyceride, low density lipoprotein cholesterol (LDL-C) and high density lipoprotein cholesterol (HDL-C) were assessed. **Results:** The total OSI score was 79.98 ± 6.14. The prevalence of dyslipidemia was 79.4%, 51.9% of drivers had hypercholesterolemia, 37.4% had hypertriglyceridemia, 50.4% had high level of LDL-C, and 45% had low level of HDL-C. The total OSI score and OSI aspects did not have statistically significant relationship with dyslipidemia. The high demand aspect score of OSI had statistically significant relationship with hypercholesterolemia. The conflict aspect had statistically significant relationship with high LDL-C. The noxious exposure and conflict aspects of OSI had weak positive significant correlations with cholesterol level (r=0.163, 0.162 respectively). A weak positive significant correlation (r=0.149) was found between noxious exposure aspect score and LDL-C level. Binary logistic regression analysis was conducted to assess independent risk factors of dyslipidemia. The model included aspects of OSI, total OSI score, driving hours a day, smoking status, passive smoking, body mass index (BMI) and dietary habits. It identified conflict aspect of OSI, driving hours a day, and BMI as predictors of dyslipidemia. **Conclusion:** Professional drivers are exposed to occupational stress. Dyslipidemia is prevalent among professional drivers. Total OSI score doesn't have statistically significant relationship with dyslipidemia. However, certain aspects of OSI have significant relationship with abnormal lipid profile.

Keywords: professional drivers; occupational stress index; lipid profile

1. Introduction

Despite the fact that occupational stress is not a new phenomenon, it becomes progressively globalized and has effects on workers, families and the overall society. It is in constant growth and presents a growing medical and economical problem **[**1**]**. This stress may occur due to the responsibilities related to the work itself, or the conditions that are based on the personality conflicts or corporate culture. It can affect individuals' wellbeing if not managed appropriately **[**2**]**.

Driving is a stressful job which needs high levels of attention and caution to cope appropriately with job demands. Drivers stress can also occur due to timetables and working hours, traffic and weather conditions, passengers and goods safety, and the responsibility if an error and/or an accident occur [3]. The Cardiovascular diseases (CVD) of professional drivers remain a key concern in clinical practice and occupational health research [4]. The risk of cardiovascular events has already been well documented among professional drivers [5]. Occupation is a major socioeconomic factor that together with a prolonged exposure to stress at workplace may have a direct effect on the autonomic nervous system and neuroendocrine activity, which may lead to increased incidence of diabetes mellitus, development of hypertension, and lipid disorders [6]. Professional drivers are exposed to several occupational risk factors as long working hours, shift work, noise, carbon monoxide, and chemical materials. These factors increase the probability of emerging CVD. Moreover, these drivers are more prone to develop obesity as they burn less calories due to the nature of the work activities, eating poor and irregular diet and driving in a sitting position for long duration every day [5]. Dyslipidemia is a well-established modifiable cardiovascular risk factor [7]. Dyslipidemia is a heterogeneous disorder which may happen due to multiple etiologies. Most of dyslipidemia is secondary to dietary habits and lifestyle [8]. The risk factors of dyslipidemia include age, smoking, genetics, diet, physical activity, and stress [9]. Although cross-sectional studies have linked occupational stress with lipid disorders, this association is still not consistent [10].

2. Methods

This cross-sectional study was performed during 2016 - 2017 in Suez Canal Authority, Ismailia City, on 131 professional drivers who were divided into 44 car drivers, 43 bus drivers, and 44 truck drivers selected randomly. The drivers included in the study sample have spent at least one year as professional drivers. A structured interview questionnaire was prepared by the researcher. It included socio-demographic data, occupational history, medical history, occupational Stress Index (OSI) and cardiovascular risk factors.

2.1. The occupational Stress Index

Permission of the first author Karen Belkić was taken before using this questionnaire. The OSI is arranged as a two-dimensional matrix, the vertical axis being composed of level of information transmission and the stressor aspects placed along the horizontal axis. The elements are equally weighted, scored from 0 to 2 (maximum), from absent to strongly present, with higher scores meaning higher level of burden. The elements are summed to yield aspects of seven groups high demands, strictness, underload, extrinsic time pressure, noxious exposure, avoidance and conflict. The total score of each aspect is calculated by adding input, output, central and general scores of this aspect. The total OSI score is obtained by adding the total of seven aspects together **(Table 1)** [11].

2.2. Cardiovascular Risk Factors Assessment

Cardiovascular risk factors were assessed to investigate the other risk factors that may affect lipid profile rather than occupational stress as lifestyle (including smoking, passive smoking, sports practice, and environment), sleep, life stress, medical history, family history of CVD, blood sugar, and dietary habits. These factors were evaluated and scored according to cardiovascular-risk-assessment-questionnaire of Sydney [12].

Table 1. Occupational Stress Index Matrix [11].

Aspects Information Transmission Level	Under-load	High Demand	Strictness	Extrinsic Time Pressure	Aversiveness/ Noxious Exposures	Avoidance/ Symbolic Aversiveness	Conflict/ Uncertainty
=*Input*	• Homogeneous signals • Low frequency of incoming signals • Works alone--without need for communication	• Several info. sources • Heterogeneous information • Heavy burden on visual system • High frequency of incoming signals • 3 sensory modalities • Communication essential	• Strict requirements for signal detection	• No control over speed of incoming signals	• Glare • Noise	• High level of attention (Serious consequences of momentary lapse) • Visually-disturbing scenes • Listens to emotionally-disturbing occurrences	• Signal/noise conflict • Signal/signal conflict
Central Decision-Making	• Decisions automatic from input	• Complex decisions • Complicated decisions • Decisions affect work of others • Rapid decision-making	• Strict problem-solving strategy • Strictly defined correct decision	• Decisions cannot be postponed		• Serious consequences of a wrong decision	• Missing information needed for decision • Contradictory information • Unexpected events change work plan
Output/ Task performance	• Homogenous tasks • Simple Tasks • Nothing to do	• Heterogeneous tasks • Simultaneous task performance • Complex tasks • Rapid task performance	• Work must meet a strictly defined standard	• No control over rate of task performance	• Isometric lifting • Vibration	• Hazardous task performance	• Conflicting demands *Task performance hampered by*: • Extrinsic problems • Interruptions from people
General	• Fixed pay • Inadequate pay • No chances for upgrade • Lack of recognition of work	• Piece rate work • Long work hours • Holds 2+ jobs • Lack of rest breaks • Night shift/irregular work hours • Lack of paid vacations	• Fixed body position • Confined, window-less, workspace • Lack of autonomous workspace • Limited in taking time off from work *Low influence over*: • Schedule • Tasks • Policy • With whom one works	• Deadline pressure • Speed-up	• Heat • Cold • Noxious gases, fumes, dusts	• Work Accident • Witnessed work accident • Suicide occurrence • Work-related litigation/Testifying in court • Lack of functioning emergency system	• Emotionally-charged work atmosphere • Lack of help with work-related difficulties • Opposition to career advancement • Violations of behavior norms/abuses of power • No grievance redress • Threat of job loss • Job lacks coherence

2.3. Examination

Blood pressure was measured for all participants. The participant was considered as of normal blood pressure if the systolic blood pressure was less than 120 mmHg and diastolic blood pressure was less than 80 mmHg. Being at risk (prehypertension) if the systolic blood pressure is 120–139 mmHg and diastolic blood pressure is 80–89 mmHg. High blood pressure is considered when the systolic blood pressure is 140 mmHg or higher and diastolic blood pressure is 90 mmHg or higher [13].

Body Mass Index (BMI) was calculated after measuring the height and weight. Below 18.5 was considered underweight. Between 18.5 –< 25 was considered normal or healthy weight. Between 25.0 – < 30 was considered overweight. Thirty or above is considered obese [14].

2.4. Determination of Lipid Profile

After twelve hours fasting venous blood sample (5 ml) was taken. Quantitative determination of the lipid profile of participants including total cholesterol (TC), triglycerides (TG), high-density lipoprotein (HDL) cholesterol and low density lipoprotein (LDL) cholesterol; After centrifugation of the blood separation of serum was done. A total amount of TC, TG, HDL cholesterol and LDL cholesterol were determined [15]. Operational definition of dyslipidemia: Dyslipidemia was defined by one or more of the following abnormalities: total cholesterol > 200 mg/dl, triglycerides > 150 mg/dl, LDL-C > 130 mg /dl, HDL-C < 40 mg /dl in men. Hypercholesterolemia: Total cholesterol > 200 mg/dl. Hypertriglyceridemia: Triglycerides >150 mg/dl. HypoHDLaemia: HDL-C < 40 mg/dl. HyperLDLaemia: LDL-C >130 mg/dl **[**16**]**.

2.5. Statistical Analysis

All statistical analyses were performed using the Statistical Package for Social Science (SPSS) version 20.0. Data were coded and entered into the computer statistical program and presented as means, standard deviations, and medians for quantitative data. Percentages were computed for categorical data. Tabulation or graphical presentations were done as required. Chi squared test was computed for categorical variables. Student t-test was computed for quantitative variables of two groups and ANOVA test was for more than 2 groups corresponding non-parametric tests was used for non-parametric data as suitable. Logistic regression analysis for risk factors of dyslipidemia was done. Statistical significance was set at $p<0.05$.

3. Results and Discussion

Regarding sociodemographic characteristics of participants, Table 2 shows that the mean age of the studied drivers was 39.8 ± 8.3 years, ranging from 27 to 59 years. The age of about half of drivers (55.7%) was between 30 to < 40 years. The highest percentage (69.5%) had completed their secondary or vocational school. Most of them (93.1%) were married. The number of offspring ranged from 0 to 6 offspring with mean (2.5 ± 1.4 offspring).

Table 2. Sociodemographic characteristics of the studied drivers (n = 131).

Sociodemgraphic Characteristics	No.	%
Age (years)		
20–	5	3.8
30–	73	55.7
40–	31	23.7
50–60	22	16.8
Range	27-59	
Mean ± SD	39.7 ± 8.3	
Educational level		
No formal education	12	9.2

Primary or preparatory	15	11.4
Secondary or vocational school	91	69.5
University	13	9.9
Marital status		
Single	5	3.8
Married	122	93.1
Divorced or widow	4	3.1
Number of offspring		
Range	0-6	
Mean ± SD	2.5 ± 1.4	

Nearly half of the studied drivers (47.3%) drive both inside city and between cities. The average duration of driving hours per day was 7.2 ± 2.6 hours a day with median 8 hours (Table 3).

Table 3. Occupational history of the studied drivers (n = 131).

Occupational history	No.	%
City		
Inside the city	36	27.5
Between cities	33	25.2
Both	62	47.3
Average duration of driving hours per day		
Range	1-14	
Mean ± SD	7.2 ± 2.6	
Median	8.0	
Years as professional driver		
Range	1-40	
Mean ± SD	14.1 ± 9.4	
Median	11.0	

Table 4 describes the different aspects of OSI and the total OSI score among the studied drivers. The mean scores of underload, high demand, strictness, extrinsic time pressure, noxious exposure, symbolic aversiveness and conflict aspects of stress were (9.56 ± 2.58, 16.92 ± 2.58, 17.22 ± 1.61, 7.56 ± 1.38, 6.75 ± 1.29, 9.22 ± 1.58, 12.76 ± 2.04) respectively. The total OSI score mean was 79.98 ± 6.14 among the studied drivers.

Table 4. Occupational stress index aspects and total score among studied drivers.

Occupational Stress Index (OSI) Aspects (Maximum Score) (n = 131)	Mean ± SD	Median(IQR)
Total underload (20)	9.56 ± 2.58	10.00(3.00)
Total high demand (30)	16.92 ± 2.58	17.00(4.00)
Total strictness (21)	17.22 ± 1.61	18.00(1.00)
Total extrinsic time pressure (9)	7.56 ± 1.38	7.00(2.00)
Total noxious exposure (12)	6.75 ± 1.29	7.00(2.00)
Total symbolic aversiveness (avoidance)(20)	9.22 ± 1.58	9.00(2.00)
Total conflict (29)	12.76 ± 2.04	12.00(3.00)
Total OSI score (141)	79.98 ± 6.14	81.00(9.00)

IQR Interquartile Range.

Table 5 demonstrates statistically significant differences among drivers groups regarding underload, high demand, extrinsic time pressure, noxious exposure, strictness, and conflict aspects scores of OSI. Also, the total OSI score shows statistically significant difference among car, bus drivers, and truck drivers (p = 0.003).

Table 5. Occupational index stress among car, bus and truck drivers (Kruskal-Wallis test) (n = 131).

OSI Aspects	Car Drivers n=44	Bus Drivers n=43	Truck Drivers n=44	*p*-Value
Total underload	8.50 ± 2.11^	9.12 ± 2.12#	11.07 ± 2.76	**0.000 ***
Total high demand	16.82 ± 2.31^	17.56 ± 2.00#	16.39 ± 1.33	**0.020 ***
Total strictness	16.36 ± 2.27^	17.58 ± 1.07#	17.58 ± 0.62	**0.000 ***
Total extrinsic time pressure	8.00 ± 1.12@	7.44 ± 1.42	7.23 ± 1.49	**0.046 ***
Total noxious exposure	6.82 ± 1.28^ @	5.72 ± 0.96#	7.68 ± 0.74	**0.000 ***
Total symbolic aversiveness	8.84 ± 1.74	9.44 ± 1.80	9.39 ± 1.04	0.189
Total conflict	12.20 ± 2.38^	13.40 ± 1.87	12.68 ± 1.67	**0.035 ***
Total OSI	77.55 ± 6.79^ @	80.26 ± 6.02	82.16 ± 4.62	**0.003 ***

OSI Occupational Stress Index, * Statistically significant at p<0.05**,** ^ Mann-Whitney test between car drivers are statistically significant at p<0.05 compared with bus drivers, @ Mann-Whitney test between car drivers are statistically significant at p<0.05 compared with truck drivers, # Mann-Whitney test between bus drivers are statistically significant at p<0.05 compared with truck drivers.

Figure 1 shows that 79.4% of the studied drivers have dyslipidemia (104 drivers).

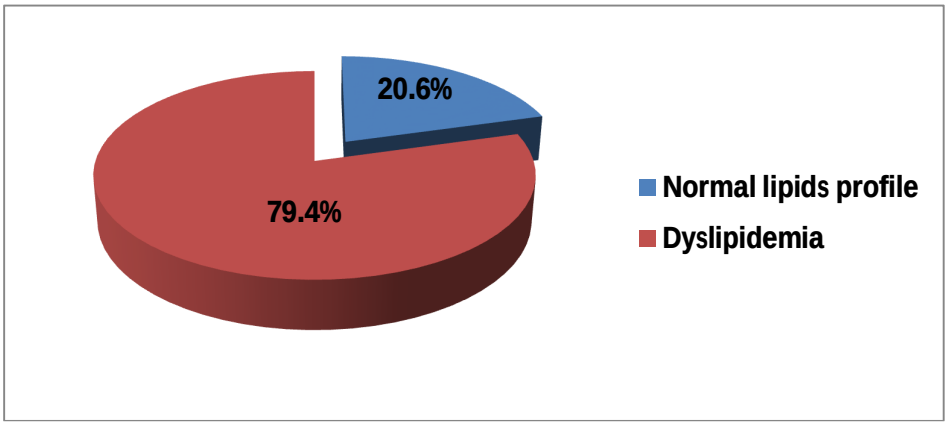

Figure 1. Frequency distribution of dyslipidemia among drivers (n = 131).

Table 6 shows that 51.9% of the studied drivers suffered from hypercholesterolemia. The mean of the cholesterol level was 204.37 ± 37.01mg/dl. In addition, 37.4% had hypertriglyceridemia. The mean of the triglycerides was 146.79 ± 90.86 mg/dl. The LDL-C was high among 50.4% of the studied drivers. The mean of the LDL-C was 133.56 ± 38.74 mg/dl, and the HDL-C level was low among 45% of studied drivers. The mean of the HDL-C was 42.40 ± 11.32 mg/dl.

Table 6. Lipid profile of studied drivers (n = 131).

Lipid profile(mg/dl)	Normal		Abnormal	
	No.	%	No.	%
Cholesterol	63	48.1	68	51.9
Range	113–281			
Mean ± SD	204.37 ±37.01			
Median(IQR)	205.00(49.00)			
Triglycerides	82	62.6	49	37.4
Range	44–610			
Mean ± SD	146.79 ± 90.86			
Median(IQR)	126.00(94.00)			
LDL-C	65	49.6	66	50.4

Range	54–229			
Mean ± SD	133.56 ±38.74			
Median(IQR)	133.00(56.00)			
HDL-C	72	55.0	59	45.0
Range	22–88			
Mean ± SD	42.40 ±11.32			
Median(IQR)	41.00(11.00)			

LDL-C Low density lipoprotein cholesterol, HDL-C High density lipoprotein cholesterol, IQR Interquartile Range.

To assess the lipid profile among the three drivers groups, Figure 2 reveals that 70.5% of car drivers, 86% of bus drivers and 81.6% of truck drivers have dyslipidemia but this difference is statistically insignificant.

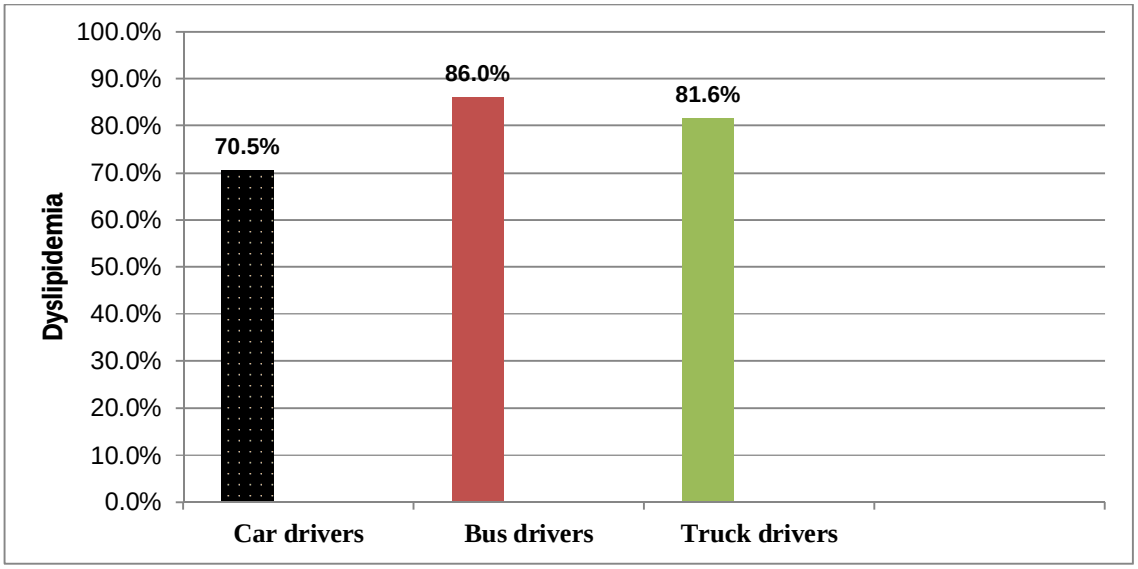

Figure 2. Comparison of prevalence of dyslipidemia among drivers groups by Kruskal-Wallis test (n = 131).

Regarding the cardiovascular risk factors scores, Table 7 shows that the family history of CVD score ranged from 0 to 45. In addition, the life style score; which included exercise practice, smoking status, passive smoking and environmental factors ranged from 0 to 138. Besides, the range of sleep score was from 0 to 22. Moreover, the life stress ranged from -10 to 89 and the blood sugar score ranged from 0 to 110. Furthermore, the diet score range was from -8 to 26.

Table 7. Cardiovascular risk factors scores among studied drivers (n = 131).

Cardiovascular risk factors scores (Maximum score)	Range	Mean ± SD	Median
Family history of CVD (45)	0-45	12.25 ± 12.45	15.00
Life style (138)	0-138	68.95 ± 39.57	58.00
Exercise practice (20)	-25-20	16.73 ± 9.22	20.00
Smoking status (80)	0-80	33.51 ± 36.12	10.00
Exposure to passive smoking (25)	0-25	14.50 ± 12.39	25.00
Environment (13)	0-9	4.21 ± 2.47	3.00
Sleep (24)	0-22	4.34 ± 4.30	3.00
Life stress (331)	-10-89	5.12 ± 14.68	0.00
Blood sugar (110)	0-110	11.60 ± 29.06	0.00
Diet (48)	-8-26	6.33 ± 7.63	5.00

CVD, Cardiovascular disease.

Regarding occupational risk factors of dyslipidemia, Table 8 reveals that average duration of driving hours per day is the only statistically significant risk factor associated with dyslipidemia with mean of 6.00 ± 2.69 hour per day among drivers with normal lipids profile compared with 7.20 ± 2.31 hours per day among drivers with dyslipidemia. By contrast, the OSI aspects, total OSI score, driving inside city or between cities do not have statistically significant relationship with dyslipidemia among the studied drivers.

Table 8. Occupational risk factors of dyslipidemia among drivers with normal lipid profile and drivers with dyslipidemia (Mann Whitney U Test) (n = 131).

Occupational Risk Factors	No Dyslipidemia (n = 27)	Dyslipidemia (n = 104)	*p*-Value
Underload aspect	9.00 ± 2.45	9.71 ±2.60	0.170
High demand aspect	17.11 ± 1.91	16.87 ± 1.99	0.508
Strictness aspect	17.41 ±2.02	17.17 ±1.49	0.931
Extrinsic time pressure aspect	7.41 ±1.42	7.60 ± 1.37	0.500
Noxious exposure aspect	6.44 ±1.45	6.83 ±1.24	0.246
Symbolic aversiveness aspect	9.22 ± 1.60	9.22 ± 1.58	0.942
Conflict aspect	12.14 ±1.49	12.91 ±2.14	0.114
Total OSI	78.74 ± 6.09	80.31 ± 6.14	0.239
Average driving hours a day	6.0 ± 2.7	7.2 ± 2.3	**0.017***
Years as professional driver	12.3 ± 8.3	12.5 ± 7.9	0.308
City			
Inside the city	10 (37.0%)	26 (25.0%)	0.139[c]
Between cities	3 (11.1%)	30 (28.8%)	
Both	14 (51.9%)	48 (46.2%)	

SCA: Suez Canal Authority, [c] Chi square test, * Statistically significant at p<0.05.

Table 9 shows that noxious exposure and conflict aspects of the OSI have weak positive significant correlations with cholesterol level (r=0.163, 0.162 respectively). The correlations between OSI and triglycerides level are insignificant except a weak negative significant correlation between high demand aspect and triglyceride level (r=-0.148). Weak positive significant correlations are shown between conflict aspect score and LDL-C (r=0.234) and between noxious exposure aspect score and LDL-C level (r=0.149).

Table 9. Correlations between occupational stress index and lipid profile (n = 131).

Occupational Stress Index (OSI) Aspects	Spearman Rank Correlation Coefficient (r)			
	Cholesterol	Triglycerides	LDL-C	HDL-C
Underload	0.086	0.033	0.079	-.0048
High demand	-0.072	**-0.148***	-0.034	-0.002
Strictness	0.020	0.010	-0.039	0.099
Extrinsic time pressure	-0.061	-0.019	-0.020	0.024
Noxious exposure	**0.163***	0.112	**0.149***	0.057
Symbolic aversiveness	-0.127	-0.065	-0.081	0.034
Conflict	**0.162***	-0.137	**0.234***	0.297
Total OSI	0.093 [a]	-0.086	0.104	0.044

[a] Pearson correlation , * Statistically significant at $p < 0.05$.

With regards to non-occupational risk factors of dyslipidemia, Table 10 shows that 72.4% of drivers exposed to passive smoking had dyslipidemia compared with 27.6 % who did not have dyslipidemia and this difference is statistically significant. Moreover, the BMI mean is higher among dyslipidemic drivers (29.79 ± 4.06) compared with drivers having normal lipid profile (27.73

± 4.44) and this difference is also statistically significant. Other non-occupational factors do not have statistically significant relationship with dyslipidemia.

Table 10. Non-occupational risk factors of dyslipidemia (n = 131). .

Non-Occupational Risk Factors	No Dyslipidemia (n = 27)	Dyslipidemia (n = 104)	*p*-Value
Age	41.4 ± 9.0	39.3 ± 8.1	0.325[a]
Family history score	12.78 ±12.27	12.12 ±12.55	0.753[a]
Life style score	66.00 ± 39.04	69.72 ± 39.86	0.709[a]
Exercise practice score	15.81 ± 11.05	16.97 ± 8.73	0.638[a]
Smoking status			
Never	14(51.9%)	43(41.3%)	
Ex-smoker	3(11.1%)	12(11.5%)	
Current smoker less than 20 cigarettes/ day	4(14.8%)	12(11.5%)	0.592[b]
Current smoker equal or more than 20 cigarettes/day	6(22.2%)	37(35.6%)	
Number of cigarettes per day	24.0 ± 12.0	27.5 ±10.7	0.372[a]
Years of smoking if current	15.9 ± 7.1	15.71 ± 7.0	0.896[a]
Passive smoker	21(27.6%)	55(72.4%)	**0.020[c]***
Environment score	4.00 ± 2.45	4.59 ± 2.38	0.637 [a]
Sleep score	4.33 ± 3.04	4.86 ± 4.29	0.505 [a]
Life stress score	10.78 ± 20.81	5.47 ±16.31	0.896 [a]
Blood sugar score	6.67 ± 21.30	12.89 ± 30.71	0.430 [a]
Diet score	7.00 ± 6.00	9.00 ± 6.91	0.179[d]
BMI	27.73 ± 4.44	29.79 ± 4.06	**0.023[d]***
Systole	121.1 ± 14.5	122.2 ± 12.2	0.839 [a]
Diastole	78.5 ± 9.9	79.3 ± 9.4	0. 995 [a]

BMI: Body mass index, [a] Mann-whitney U test,[b] Fisher exact test, [c] Chi square test, [d] Student t test, * Statistically significant at $p < 0.05$.

Regarding independent significant risk factors of dyslipidemia, binary logistic regression analysis identified conflict aspect of the OSI, average duration of driving hours per day, and BMI as positive statistically significant independent risk factors for dyslipidemia (Table 11).

Table 11. Logistic regression of independent risk factors of dyslipidemia (n = 131).

Covariates of Dyslipidemia	ß	*p* Value	OR	(95% CI)
Strictness score	-.0296	0.087	0.744	(0.530-1.044)
Conflict score	0.281	**0.042***	1.324	(1.010-1.736)
Average of driving hours a day	0.346	**0.002***	1.414	(1.137-1.759)
Body mass index	0.176	**0.006***	1.192	(1.052-1.351)
Constant	- 4.428	0.199	0.012	
Model χ^2 = 21.690		**0.000***		

Variables entered and excluded: underload aspect, high demand aspect, extrinsic time pressure aspect, noxious exposure aspect, symbolic averseness aspect, total occupational stress index score, smoking status, passive smoking status, and diet.* Statistically significant at p<0.05. Cox and Snell R Square = 0.153. Nagelkerke R Square = 0.239.

In the present study the total OSI score mean was 79.98 ± 6.14 among the studied drivers. This agrees with the results of a Serbian study conducted on 417 male professional drivers, where total OSI was 63.9 ± 8.8 [1]. The professional drivers are exposed to occupational stress because driving is a stressful task. Occupational stress of drivers can also occur due to timetables and working hours, traffic and weather conditions, passengers and goods safety [3].

The current study reveals that 79.4% of the studied drivers have dyslipidemia. In the current study, 51.9% of the studied drivers suffer from hypercholesterolemia, 37.4% have hypertriglyceridemia. 50.4% have high LDL-C and 45% have low HDL-C level. This is in agreement with that of an Iranian study conducted on 429 bus and truck male drivers where 53.4% have elevated triglyceride and 48.7% have low HDL-C levels [17]. Also, these findings partly support a Korean study results, conducted on 443 male bus drivers, where 64.2% of them had high triglyceride, 38.6% had high cholesterol, 36.3% had low HDL-C, and 25.4% had high LDL-C [5].

By contrast, Biglari et al. (2016) results showed that 28.3% of the studied drivers had hypercholesterolemia with cholesterol level > 200 mg/dl and 15.2% had hypertriglyceridemia with triglycerides level > 240 mg/dl [18]. The difference in prevalence of dyslipidemia among studies may arise from the multifactorial etiology of dyslipidemia, which is a heterogeneous disorder which may occur due to multiple etiologies. Most of dyslipidemia is secondary to dietary habits and lifestyle. So, modern diet and lifestyle such as tobacco use, high fat intake, obesity, and sedentary activity play roles in the current epidemic of atherosclerosis [19].

Regarding the association of occupational stress and lipid profile, according to the results obtained in the present study, the total OSI score do not have statistically significant relationship with dyslipidemia among studied drivers. Moreover, insignificant correlations are found between total OSI score and cholesterol level, triglycerides, LDL-C, or HDL-C. These results corroborate with findings from a meta-analysis conducted to investigate occupational stress and cardiovascular disease risk factors. No association was found between occupational stress and lipid profile [6]. The present study results also concur with Biglari et al. (2016) who did not reveal a significant relationship between job stress and dyslipidemia. In addition, the correlation tests do not demonstrate significant correlations between stress and blood cholesterol or triglycerides levels [18]. Moreover, Tsutsumi et al. (2003) concluded that job control or job strain (the ratio of demands to control) did not have significant association with any of the lipid levels in males or females and suggest that psychologically demanding jobs may be related to an unfavorable lipid profile, but the effect of job strain on atherogenic lipids is negligible [20].

In contrast to Jovanović et al. (2008) results, which reveal statistically significant relations between OSI and total cholesterol, LDL-C and triacylglycerol [1]. Also, Djindjic et al. (2012) results illustrate a significant association between total OSI score and any lipid profile abnormality. The group as a whole showed significant associations between total OSI and hypercholesterolemia, hypertriglyceridemia, and low (HDL) cholesterol [21]. Furthermore, Djindjić et al. (2013) results suggest a significant difference in prevalence of dyslipidemia associated with total OSI and some OSI aspects among professional drivers. Logistic regression analysis showed that total OSI score is significant risk factor for high triglycerides, high LDL-C, and low HDL-C [22].

4. Conclusions

The professional drivers in the study setting are exposed to occupational stress. A high proportion of the studied professional drivers have dyslipidemia. Total occupational stress index score does not have statistically significant relationship with dyslipidemia while certain aspects of occupational stress index have significant relations with lipid profile.

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