

ORIGINAL ARTICLE

Fatigue Among Traffic Police Officers in Metropolitan City: Exploring Factors of Noise Exposure and Work Stressors

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ABSTRACT

Introduction: Police work has been recognised worldwide as a very stressful job. Those especially in road traffic control department encounter an additional possible cause of fatigue which is noise exposure that rarely being explored. **Methods:** A cross-sectional study was conducted among traffic police officers in Kuala Lumpur to assess their level of fatigue and its risk factors including noise exposure, work stressors and individual factors. A total of 171 traffic police officers in Kuala Lumpur participated in this study. A set of questionnaires on socio-demographics, work characteristics, perception regarding noise pollution, PSQ and CIS were distributed to 200 traffic police officers in Kuala Lumpur. Five locations with heavy traffic volume in Kuala Lumpur were selected for ambient noise measurement, three times a day during peak hour by SLM. **Results:** The mean age, job tenure and BMI of respondents was 30.49±7.12yo, 4.73±4.62 years and 24.83 respectively. Most of them were Malay (81.9%), married (60.8%), and secondary school graduated (84.8%). The traffic noise exposure levels ranged between 69.50 dB(A) to 82.80 dB(A) (mean = 76.77±4.39 dB(A)). Almost 20% of respondents reported to have fatigue level that puts them at risk for subsequent work disability. After considering several potential factors, lower educational levels ($\beta=-3.67$, $p<0.01$) and doing part time job ($\beta=0.16$, $p=0.03$) was found significant in predicting more fatigue. **Conclusion:** In sum, findings provide baseline data on the main factors of fatigue among this young and normal weight police group which will help in prioritizing the intervention strategies.

Keywords: Fatigue, Traffic police officers, Work stressors, Police stress questionnaire, Noise

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INTRODUCTION

Fatigue is a common problem among working populations particularly those working under a lot of pressure and excessive workload without sufficient recovery time. Based on the Health Safety Executive (HSE) (1) and the National Institute of Occupational Safety and Health (2), it can be concluded that fatigue is defined as general deficiency of alertness and reduction in mental and physical functions because of prolonged mental/physical exertion. The common symptoms of fatigue include feeling tired or lack of energy, slow response, lack of concentration, decreased awareness and irritability. This condition will disturb the normal function of life, both personal/family and work. Prolonged fatigue disturbs the body physiological function (3) that leads to the development of various related chronic diseases (4). Hence, limit the capacity

of workers to sufficiently meeting mental and physical work demands which will result into lower individual work performance and later reduce overall performance of an organization (5,6). Due to lack of focus, less ability to process received information and decreased awareness, fatigue also expose workers to workplace injuries as proven among police officers in prior studies (7,8,9).

Fatigue among front liners (e.g. police officers and emergency response workers) are consistently being signified in previous studies. For instances, previous finding showed that nearly 40% of police officers were fatigue (7). Based on the Fatigue Management Model (10), in the context of police work, the proposed general causal factors of fatigue; shift work, extended work shifts, work time control, repetitive tasks, and night-time are all common routine of police work. Among those, shift work has been repeatedly shown to be a significant factor of fatigue among police officers (7,11). On top of that, police officers face more specific possible causal factors of fatigue including dealing with traumatic events and life-threatening situations, handling criminals, and

always be the target of public critiques (12).

Moreover, environmental physical factors also play a role in contributing to fatigue among police officers particularly those who are working mostly outdoor like traffic police officers. Traffic police officers particularly those who regulate traffic flow in a busy city like Kuala Lumpur are exposed to many environmental hazards which potentially acts as causal factors of fatigue. As a traffic police officers, they are not just controlling the congested traffic junction, but they also must mobilize around the city for patrolling and giving penalty to people who did not follow the road safety rules and regulations. Based on a previous study (13), traffic noise comes from combination of several sources which are the transit systems, road traffic, construction, industries, commercial activities, and high population density. The reported noise exposure level exposed by traffic police officers in Kuala Lumpur was between 75 dB (A) to 85 dB (A) and sometimes reached to 90dB (A) to 100 dB (A) (14). The relationship between traffic-related noise and fatigue among traffic police officers were demonstrated in prior studies (15,16).

Furthermore, based on the Fatigue Management Model (10), individual factors including age, living condition, pre-existing illnesses and prior work experiences are also recognized as the risk factors of fatigue. A study was done to explore the gender differences among police officers and results indicated that male police officers felt more tired than female officers on the afternoon shifts (17). Though it is proposed in the Fatigue Management Model (10) that age is a causal factor of fatigue, some studies in police work showed that there were no age differences in fatigue levels among police officers (18, 19). Limited number of studies on fatigue in police may contribute to the discrepancies of findings on the relationship between individual factors and fatigue among them. More studies are therefore needed to understand more about this relationship particularly in police.

Apart from the above mentioned causal factors of fatigue, there were several safety issues regarding police officers that were unsolved such as work stress. As police officers, work stress was highly reported among them. In Malaysia, the prevalence of work stress among police officers was reported to be 47% (20). Work stress can lead to fatigue or vice versa among them which will increase the likelihood of accidents and putting themselves and the publics at risks. Seok (18) in his study among police officers found that higher level of work stress significantly associated with higher level of fatigue.

The issues of fatigue need to be emphasized in occupational health study among police officers. Fatigue like other occupational hazards needs to be managed properly. The present study aims to determine

the level of fatigue among police officers and exploring its potential factors including work characteristics, socio-demographical background, work stressor, and vehicular noise exposure. This study will allow the collection of baseline data that can be used for further study in the future and act as evidence-based support for implementing actions to minimize fatigue among them. It is hypothesised that the level of fatigue increased with the increase exposure to noise, higher work stressors and influenced by individual factors including work and socio-demographical differences.

MATERIALS AND METHODS

Study design and study samples

A cross sectional study design was conducted among traffic police branch located at urban area, in Kuala Lumpur. The specific work task was traffic point-duty personnel that control the Kuala Lumpur traffic area have been included. For recruitment of respondent, the purposive sampling was implemented. No additional inclusive and exclusive criteria emphasized in this study. Nevertheless, individual factors and work factors were controlled in statistical analysis. The total population of sample was about 215 personnel. For the sample size calculations of respondents, the formula by Lemeshow (21) was used. The estimated precision, 0.9 was based on the previous study which 90% of law enforcement or police officer reported being routinely fatigue as they were performing overtime duty and shift work (22). The total of sample size estimated in this study was 167 traffic point duty personnel. In total, 200 questionnaires distributed among sample group that 171 have returned completely.

Traffic noise exposure monitoring

For the study locations to monitor the noise exposure level, five most congested traffic junctions as suggested by the Kuala Lumpur Traffic Branch were chosen. Traffic police officers were routinely assigned to these five junctions to control traffic; 1) Bulatan Sungai Besi; 2) Dataran Merdeka; 3) Bulatan Tun Hishammuddin; 4) Bulatan Dato' Onn; 5) Jalan Imbi-Bukit Bintang. The ambient noise level was measured by using Solo Sound Level Meter (SLM), in 01dB's range, Class 2, A frequency weighting, slow time weighted response, 10 dB – 140 dB threshold range, and 3 exchange rates. SLM was calibrated before and after each day of sampling. The measurement of ambient noise level was monitored during peak hours three times a day for two hours each at 7.00 – 9.00; 12.00–14.00; 16.00 – 18.00. The microphone of the sound level meter was pointing toward the source of noise at height 1.5 meter from the ground. The measurements were repeated at two consecutive days and mean noise level of the two days' readings was calculated. The measurement only took place on normal working days. Measurements were made at the selected locations, which the personnel

have been positioned to control the traffic condition.

Questionnaire

This study used a self-administrated survey. The survey was divided into seven sections (Section A to Section G). Section A consisted of questions about socio demographics data of respondents. Section B was about the work characteristics. Section C was about the perception regarding noise pollution. For Section D, Police Stress Questionnaire (PSQ) was used for measurement of the police specific stressor and finally yet importantly, Checklist Individual Strength Questionnaire (CIS) was inserted in Section E for measurement of fatigue.

The Police Stress Questionnaire (PSQ) was used for analyzing the participants' work stressor with focus on two factors, which are organizational and operational stressor; PSQ-Org and PSQ-Op. A validated Malay version of PSQ was used (Rasdi et al.,2014). PSQ consisted of two factors, which have been mentioned above. All subscales were scored on the Likert-scale ranging from "never" (1) to "always" (5). The PSQ has been tested for validity and reliability, and Cronbach alpha (α) for each factor was 0.93 for PSQ-Op and 0.94 for PSQ-Org (12).

The Checklist Individual Strength Questionnaire (CIS) is the frequently used fatigue questionnaire worldwide for measuring the prolonged fatigue among working populations (24). This questionnaire consisted of 20 items of fatigued experienced during the past two weeks and participants need to choose from a seven-point Likert scale. CIS is divided into 4 separate dimensions or subscales which are subscale 1: severity of fatigue (8-items), subscale 2: concentration of problems (5-items), subscale 3: decreased motivation (4-items) and subscale 4: decreased physical activity (3-items). Rating scales for each item varied between 1 ("true") and 7 ("not true at all"). A mean score was calculated for each subscale based on the items within the subscale. Higher scores indicate a higher degree of fatigue, high concentration problems, reduction in motivation and less physical activity (23). Internal consistency with Cronbach α was found to be good for these four subscales which are 0.91 (23) and Cronbach $\alpha >0.76$ [24]. A cutoff points of $>76\%$ was used to segregate those who are at risk for subsequent sick leave of work disability (25)

The explanation of this study and method for conducting it was given to the traffic point duty officer representatives by the researcher at the traffic police station. Questionnaire, letter of informed consent and information sheet were distributed to 200 traffic point duty officers at the station who voluntarily agreed to participate in this study. Respondents were given 1 month to complete the questionnaire. They can freely

contact the researcher for any clarification needed to answer the questionnaire. The confidentiality was assured and they were free to withdraw from the project at any time. Researcher visited the traffic police station to collect the completed surveys and letter of informed consent from them.

Pilot Study

Before the data collection begin, a pilot study was implemented among 10% of the respondents to ask the subjects for feedback to identify the difficult questions and decide whether it is reasonable to discard all unnecessary difficult questions. Then, any questions that were not answered as expected were re-worded or re-scaled.

Data analysis

The data collected was performed on the statistical analysis with SPSS Version 21.0 (Statistical Package for Social Science). For descriptive statistics, mean, standard deviation, frequency, and percentage were used to analyze data. For hypothesis testings, Pearson and Spearman correlation co-efficient, independent t-test, Mann-Whitney U, one-way ANOVA, post hoc Tukey test and Kruskal-Wallis were used to determine the significant level among study variables. Significant level was set to be $p < 0.05$.

RESULTS

Distribution of socio-demographic data of respondents

The table I shows the distribution of socio-demographic of respondent, the data shows that the minimum age was 20 years old and the maximum age was 56 years old (mean 30.49 ± 7.12 years) among respondents. The highest age group was between 21-30 years old (60.8%). Malay was the majority among others (n=140, 81.9 %). There were 145 respondents (84.8%) from high school graduates. The average salary was within the range of RM2000 to RM3000. Majority of the participants were married (n=104, 60.8%). It shows that majority of traffic point duty personnel consisted of the young personnel, which their physical conditions support the heavy work duty compared to old personnel. The mean of BMI was 24.38 with standard deviation of 3.74. The shortest work tenure among participants was 1 year and the maximum was about 32 years of works (mean 4.73 ± 4.62). All of them performed shift work. 164 or 95.9% of them works 6 days per week and only 5.8% (n=10) of the respondents were doing part time job.

Average noise exposure levels

Based on the noise monitoring, which recorded for three time per day (morning, afternoon and evening), the range of noise levels was from 69.50 dB (A) to 82.80 dB (A) averaged 76.76 ± 4.39 dB(A) at all selected locations. The average of noise exposure levels in dB (A) was recorded in Table II.

Table I : Distribution of socio-demographic and work characteristics of respondents (N=171)

Variables	f (%)	Variables	f (%)
Age (years)		Education level	
21-30	104(60.8%)	High school graduate	145(84.8%)
31-40	52(30.4%)	University graduate	26(15.2%)
41-50	8(4.7%)	Total	171 (100 %)
>50	7(4.1%)		
Race		Salary	
Malay	140 (81.9 %)	<1000	5 (2.9 %)
Chinese	4 (2.3 %)	1000 - 2000	69 (40.4 %)
Indian	5 (2.9 %)	2000 – 3000	78 (45.6 %)
Others	22 (12.9 %)	>3000	19 (11.0 %)
Total	171 (100 %)	Total	171 (100 %)
Marital status		Work shift	
Single	67(39.2%)	Normal	-
Married	104(60.8%)	Shift	171 (100%)
Divorced	-		
Total	171 (100 %)		
Total working days/ week		Making other job rather than traffic	
5 days	4 (2.3 %)	Yes	10 (5.8 %)
6 days	164 (95.9 %)	No	161 (94.2 %)
7 days	3 (1.8 %)		
Variables	Mean±(SD)	Range	
		Min	Max
Age (years)	30.49±(7.12)	20	56
BMI	24.382±(3.74)	18.13	34.31
Employment year duration (year)	4.73±(4.62)	1	32

Perceptions regarding the occupational noise pollution

Table II shows that the distribution of respondents regarding their perception on occupational noise pollution. There were 76% of participants know that noise can affects human health while the remaining of 24% did not know at all about the effect. Besides, 119 participants or 69.6% considered noise as an occupational hazard and 52 participants or 30.4% answered vice versa. A total of 88 participants (51.5%) claimed that their work environment is noisy, followed by 67 (39.2%) said that the noise can be tolerable and only 16 or 9.4% of them said that their work environment was extremely noisy. None of them considered that their

Table II : Average noise measurement dB (A) and perception of noise

Locations	Leq (dBA)	
	Morning	Evening
Location 1 (Bulatan Sungai Besi)	78.6	82.8
Location 2 (Dataran Merdeka)	82.7	80.3
Location 3 (Bulatan Tun Hishammuddin)	78.9	73.2
Location 4 (Bulatan Da-to'Onn)	80.9	80.9
Location 5 (Jalan Imbi Bukit Bintang)	69.5	78.9
Variables	Mean±(SD)	Range
		Min Max
Leq (dB)	76.76±(4.39)	69.50 82.80
Variables	Frequency (f)	Percentage (%)
Do you know that noise affects human health?		
Yes		
No	130	76
	41	24
Do you consider noise as an occupational hazard?		
Yes	119	69.6
No	52	30.4
How would you describe your present work environment?		
Quiet		
Tolerable	-	-
Noisy	67	39.2
Extremely noisy	88	51.5
	16	9.4

work environment was quite as they were exposed to high level of road traffic noise while performing the duty.

Work stressor [Police Stress Questionnaire (PSQ)]

The results reported is a mean score of Police specific work stressor (Police Stress Questionnaire [PSQ]) from the combinations of the two factors which are operational and organizational stressor. Overall total mean score for operational police stressors (PSQ-Op) was 36.82±11.12 while the organizational police stressors (PSQ-Org) was 32.37±10.71. It can be concluded that respondents feeling more stressful by operational stressors than organisational stressors. See Table IV.

Fatigue score [Checklist Individual Strength (CIS)]

The results of fatigue items were divided into four dimensions/ subscales of CIS, which are consisted of Subscale 1: Severity of fatigue, Subscale 2: Concentration problems, Subscale 3: Decreased motivation and Subscale 4: Decreased physical activity. Overall, the mean score for Subscale 1 Subscale 2 Subscale3 Subscale 4 were 25.56±4.26, 19.36±3.63, 12.36±3.96, and 10.09±3.76 respectively. Results showed that 19.3% of respondents were at risk for subsequent sick leave of work disability. See table III.

Table III: Distribution scores on fatigue (n=172)

Scales	n (%)							Mean (SD)
	1	2	3	4	5	6	7	
Subscale 1: Severity of fatigue								
Physically I feel exhausted	12(7)	5(2.9)	13(7.6)	37(21.6)	43(25.1)	21(12.3)	40(23.4)	4.85±(1.72)
I'm tired easily	31(18.1)	12(7)	12(7)	39(22.8)	33(19.3)	23(13.5)	21(12.3)	4.07±(1.95)
I feel powerless	24(14)	20(11.7)	14(8.2)	41(24)	38(22.2)	22(12.9)	12(7)	3.95±(1.78)
I am rested.	17(9.9)	21(12.3)	33(19.3)	46(26.9)	15(8.8)	17(9.9)	22(12.9)	3.94±(1.79)
Physically I feel I am in bad form	42(24.6)	28(16.4)	10(5.8)	29(17)	29(17)	17(9.9)	16(9.4)	3.52±(2.03)
I feel tired	43(25.1)	12(7)	48(28.1)	33(19.3)	14(8.2)	9(5.3)	12(7)	3.22±(1.77)
Physically I feel I am in an excellent condition.	47(27.5)	28(16.4)	28(16.4)	29(17)	11(6.4)	10(5.8)	18(10.5)	3.18±(1.97)
I feel fit.	33(19.3)	38(22.2)	39(22.8)	50(29.2)	3(1.8)	3(1.8)	5(2.9)	2.89±(1.40)
Subscale 2 : Concentration problems								
Thinking requires effort	8(4.7)	3(1.8)	8(4.7)	40(23.4)	35(20.5)	39(22.8)	38(22.2)	5.11±(1.56)
It takes a lot of effort to concentrate on things	8(4.7)	2(1.2)	9(5.3)	40(23.4)	48(28.1)	28(16.4)	36(21.1)	5.02±(1.52)
My thoughts easily wander.	47(27.5)	34(19.9)	15(8.8)	27(15.8)	23(13.5)	17(9.9)	8(4.7%)	3.16±(1.90)
I find it easy to focus	33(19.3)	28(16.4)	40(23.4)	47(27.5)	12(7)	4(2.3)	7(4.1)	3.10±(1.53)
When I am doing something, I can keep my thoughts on it.	42(24.6)	25(14.6)	43(25.1)	40(23.4)	9(5.3)	3(1.8)	9(5.3)	2.96±(1.60)
Subscale 3 : Decreased motivation								
I have a lot of plans.	38(22.2)	28(16.4)	29(17)	37(21.6)	12(7)	12(7)	15(8.8)	3.31±(1.87)
I don't feel like doing anything.	50(29.2)	24(14)	16(9.4)	32(18.7)	21(12.3)	21(12.3)	7(4.1)	3.24±(1.92)
I feel very active	35(20.5)	41(24.0)	26(15.2)	42(24.6)	9(5.3)	7(4.1)	11(6.4)	3.08±(1.71)
I feel like doing many nice things.	51(29.8)	35(20.5)	27(15.8)	37(21.6)	14(8.2)	2(1.2)	5(2.9)	2.73±(1.56)
Subscale 4: Decreased physical activities								
I am physically not very active.	32(18.7)	21(12.3)	21(12.3)	39(22.8)	26(15.2)	23(13.5)	9(5.3)	3.64±(1.83)
My level of physical activity is low	39(22.8)	23(13.5)	14(8.2)	36(21.1)	34(19.9)	13(7.6)	12(7)	3.52±(1.89)
I am physically very active	41(24)	25(14.6)	46(26.9)	41(24)	9(5.3)	2(1.2)	7(4.1)	2.92±(1.52)

Relationship between socio-demographic data and work characteristics with fatigue scores

Table V shows the result summary of the relationship between socio-demographic information with fatigue (Subscale 1 to Subscale 4). The result shows that there were significant differences of mean ($p < 0.05$) of fatigue levels by different level of education; Subscale 1 ($p = 0.001$), Subscale 2 ($p = 0.026$), Subscale 3 ($p = 0.009$) and Subscale 4 of fatigue ($p = 0.004$). Findings indicated that lower educational levels were correlated with more fatigue severity and concentration problems and lower motivation and physical activities. There were also significant differences of means for decreased motivation (Fatigue Subscale 3) ($p = 0.043$) by different group of salaries. Also, the level of concentration problems (Fatigue Subscale 2) ($p = 0.007$) was found to be significantly different by marital status. The respondents who were married (mean = 94.17) had more concentration problems related to fatigue than those who were single (mean = 73.31). All variables for work characteristics (employment duration and total working days) was not significantly associated with fatigue. But, doing part time job were found to be significantly correlated with fatigue levels ($r_s = 0.16$, $p = 0.03$)

Relationship between perception of noise and work stressors with fatigue scores

The association test cannot be done between noise exposure level with level of fatigue because respondents were assigned randomly to different road junction every day. Therefore, their individual exposure to noise levels were changing every day and making it impossible to relate them with their level of fatigue. Thus, to see the relationship between noise exposure with level of fatigue, the measured noise levels were replaced with their perception of noise exposure levels. However, all study variables of perception of noise were found to be not significantly related with fatigue ($p > 0.05$).

The relationship between work stressors and fatigue scores

In this study, the work stressors were divided into two, organisational work stressors (PSQ-org) and operational work stressors (PSQ-op). The correlation between these two scores and fatigue scores were tested. Results indicated that the PSQ-op showed no significant relationship with any subscales of fatigue. In contrast, the PSQ-org score was found significantly correlated with severity of fatigue (subscale 1) ($p = 0.049$) and

Table IV: Distribution scores on police stressors (PSQ) (n=172)

Variables	n(%)					Mean±(SD)
	0	1	2	3	4	
PSQ - Op						
Shift work	16(9.4%)	30(17.5%)	35(20.5%)	30(17.5%)	60(35.1%)	3.51±(1.36)
High risk of being injured.	25(14.6%)	23(13.5%)	35(20.5%)	27(15.8%)	61(35.7%)	3.44±(1.45)
Upholding a higher image in public	31(18.1%)	32(18.7%)	48(28.1%)	32(18.7%)	28(16.4%)	2.96±(1.32)
Negatives comments from the publics	35(20.5%)	30(17.5%)	54(31.6%)	27(15.8%)	25(14.6%)	2.87±(1.31)
work-related activities on days off (e.g. court and community events)	42(24.6%)	32(18.7%)	51(29.8%)	30(17.5%)	16(9.4%)	2.68±(1.27)
I feel like always on the job.	32(18.7%)	45(26.3%)	56(32.7%)	24(14%)	14(8.2%)	2.67±(1.17)
Overtime demands	34(19.9%)	39(22.8%)	60(35.1%)	29(17%)	9(5.3%)	2.65±(1.13)
Lack of understanding from family and friends about work.	50(29.2%)	38(22.2%)	49(28.7%)	16(9.4%)	17(9.9%)	2.50±(1.29)
Fatigue	46(26.9%)	47(27.5%)	46(26.9%)	26(15.2%)	6 (3.5%)	2.41±(1.14)
Not had the time to relax or enjoy myself with social life.	40(23.4%)	53(31%)	54(31.6%)	20(11.7%)	4 (2.3%)	2.39±(1.04)
Experienced occupational related health issues (back pain, neck pain and joint pain)	42(24.6%)	51(29.8%)	54(31.6%)	20(11.7%)	4 (2.3%)	2.37±(1.05)
Traumatic events (domestic, death, injury and witness tragic accidents) during my duty	65(38.0%)	37(21.6%)	45(26.3%)	15(8.8%)	9 (5.3%)	2.22±(1.19)
Paperwork	81(47.4%)	42(24.6%)	30(17.5%)	8(4.7%)	10 (5.8%)	1.97±(1.17)
Working alone at night.	75(43.9%)	55(32.2%)	31(18.1%)	5(2.9%)	5 (2.9%)	1.89±(0.99)
PSQ - Org						
The leaders over-emphasized the negatives (e.g. supervisors evaluations, public complaints)	39(22.8%)	30(17.5%)	38(22.2%)	30(17.5%)	34(19.9%)	2.94±(1.43)
Have you feeling like you always have to prove yourself to the organization	38(22.2%)	36(21.1%)	47(27.5%)	22(12.9%)	28(16.4%)	2.80±(1.36)
There are lack of resources in the work organization.	49(28.7%)	33(19.3%)	46(26.9%)	30(17.5%)	13(7.6%)	2.56±(1.27)
There are always inadequate equipment in my organizations.	44(25.7%)	41(24.0%)	54(31.6%)	22(12.9%)	10(5.8%)	2.49±(1.17)
Constant change in policy/legislation in my organization	56(32.7%)	31(18.1%)	51(29.8%)	28(16.4%)	5(2.9%)	2.39±(1.18)
Inconsistent leadership style of the superior	55(32.2%)	41(24.0%)	43(25.1%)	20(11.7%)	12(7.0%)	2.37±(1.24)
Unequal sharing of work responsibilities.	51(29.8%)	32(18.7%)	64(37.4%)	21(12.3%)	3(1.8%)	2.37±(1.09)
I always have a feeling like different rules apply to different people (e.g. favoritism)	55(32.2%)	44(25.7%)	45(26.3%)	19(11.1%)	8(4.7%)	2.30±(1.16)
Perceived pressure to volunteer free time	57(33.3%)	44(25.7%)	39(22.8%)	23(13.5%)	8(4.7%)	2.30±(1.19)
Lack of training on new equipment.	58(33.9%)	57(33.3%)	44(25.7%)	8(4.7%)	4(2.3%)	2.08±(1.997)
I always dealing with the court system	71(41.5%)	37(21.6%)	49(28.7%)	8(4.7%)	6(3.5%)	2.07±(1.09)
There are excessive of administration duties.	69(40.4%)	53(31.0%)	34(19.9%)	10(5.8%)	5(2.9%)	2.00±(1.05)
If you are sick or injured, your coworkers seem to look down on you.	91(53.2%)	31(18.1%)	36(21.1%)	8(4.7%)	5(2.9%)	1.86±(1.08)
There is too much computer work.	88(51.5%)	46(26.9%)	25(14.6%)	4(2.3%)	8(4.7%)	1.82±(1.07)

Table V : Relationship between Socio-demographic information with Fatigue (Subscale 1, Subscale 2, Subscale 3, Subscale 4) N=171

Variables	Subscale 1		Subscale 2		Subscale 3		Subscale 4	
	F/r/t/Z	p-value	F/r/t/Z	p-value	F/r/t/Z	p-value	F/r/t/Z	p-value
Age	-0.083 ^a	0.282	0.02 ^a	0.79	-0.139 ^b	0.07	0.068 ^b	0.38
Race	4.752 ^d	0.191	7.180 ^d	0.066	0.728 ^c	0.537	0.630 ^c	0.596
Education level	-3.369 ^e	0.001*	-2.220 ^e	0.026*	2.652 ^f	0.009*	2.917 ^f	0.004*
Salary	3.398 ^d	0.334	2.377 ^d	0.498	2.781 ^c	0.043*	0.509 ^c	0.676
Marital status	-0.770 ^e	0.441	-2.710 ^e	0.007*	0.819 ^f	0.414	1.69 ^f	0.925
BMI	0.084 ^b	0.276	0.019 ^b	0.804	0.007 ^b	0.923	0.059 ^b	0.445

*significant at alpha values (p<0.05) a= Spearman correlation b= Pearson correlation c= ANOVA d= Kruskal-Walis e= Mann-Whitney U f= Independent t-test

Table VI : Relationship between PSQ Score with Fatigue (Subscale 1, Subscale 2, Subscale 3, Subscale 4) N=171

Variables	Subscale 1		Subscale 2		Subscale 3		Subscale 4	
	r-value	p-value	r-value	p-value	r-value	p-value	r-value	p-value
PSQ – Op	0.07 ^a	0.932	-0.10 ^a	0.193	-0.105 ^b	0.173	0.064 ^b	0.407
PSQ – Org	0.151 ^b	0.049*	0.032 ^b	0.679	0.086 ^b	0.264	0.165 ^b	0.032*

*significant alpha values (p<0.05) a= Spearman correlation b= Pearson correlation

Table VII : Multiple regression predicting fatigue scores (n=172)

	B	SE	β	t	p
(Constant)	83.41	7.20		11.59	<0.01
Salary	-0.20	1.24	-0.01	-0.16	0.87
Marital status	0.18	1.86	0.01	0.10	0.92
Education levels	-8.79	2.40	-0.27	-3.67	<0.01*
Doing part time job	7.91	3.66	0.16	2.16	0.03*
Police stressors (Org)	0.08	0.08	0.08	1.00	0.32

*significant at $p < 0.05$; $R^2 = 0.12$; Adj $R^2 = 0.09$.

decreased physical activities (subscale 4) ($p=0.032$) of fatigue. See table VI.

Multiple linear regression for predicting fatigue scores

Variables that were found significantly associated/ correlated with fatigue levels in bivariate analyses were included in the multiple regression analyses. They are salary, marital status, education levels, doing part time job and organisational police stressors. The model produced was significant ($F(5) = 4.34$, $p = 0.001$) with $R^2=0.12$. Only educational levels ($\beta=-3.67$, $p<0.01$) and doing part time job ($\beta=0.16$, $p=0.03$) was found significant in predicting fatigue. See Table VII.

DISCUSSION

About 20% of respondents were having fatigue level that put them at risk for subsequent sick leave and work disability. This figure appears to be much lower than that found among American police officers (7). Nearly 40% of them reported to feel drained. This difference might be caused by the difference type of tool used to measure fatigue that lead to different method of classification and scoring. However, when considering different occupational group in Malaysia, this prevalence was similar with that found among healthcare shift workers in critical care setting (21.5%). That study also used the same measurement tool for fatigue with that of the present study. Both police and the healthcare workers in these two studies have many similar work characteristics which include shift work, working long hours, and encounters traumatic experiences (26).

Result indicated that high school graduates are more fatigue compared to university graduates. According to Tiesinga et. al, (27) the relationship between educational level and the level of fatigue depends on the group of study population. Different study populations such as patients with cancer, postpartum woman and non-pregnant woman have different findings on how education levels affect the level of fatigue. The findings of the present study are supported by those of a previous study from Junghaenel et.al, (28) which showed that there were significant differences of fatigue level with regard to educational levels. Education levels influence on how people manage their difficulties or illnesses including fatigue. Education levels determine people's health seeking behaviour whether to seek treatment or

find any effective solution.

This study also shows that the level of decreased motivation related to fatigue was significantly different with different group of salaries. Salary is a form of reward. Based on the Effort Reward Imbalance Theory (ERI) (29), the higher the reward is the higher the motivational level will be. Furthermore, better salary is always associate with better work position. Better work position usually gives better confident level and better quality of life.

Moreover, in this study results showed that those who married had more concentration problems compared to those who were single. Although this finding contradicts with that of a previous study (22,28) among police patrol officer, it is reported that, married workers complained of sleep disruption associated with family errands especially related to young children. Married workers have problems in concentration as they have additional responsibilities regarding to their married life including managing household chores that might increase their physical and mental fatigue. This finding can be explained by the fact that when they are fatigue, their cognitive function is impaired which reduce their concentration ability (30).

Furthermore, findings of the present study showed that organizational stressors were significant in predicting fatigue. These findings were in consistent with a previous study among point-duty personals (31). The reason of this might be regarding to their nature of works or workplace variables that have high chances on stress-cause factors and exposed too many hazards that might elevate the severity of fatigue and also their social wellbeing. Organisational stressors including workplace policy, control over job, leadership style, and workplace social supports constantly put workers under pressure (20).

After all the above-mentioned significant variables predicting fatigue were included in multiple regression, only education levels and doing part-time job remains to be significant. Education levels was found to be the most significant factors predicting fatigue. This model explains 12% of the variance in fatigue which indicated that there are many other potential risk factors of fatigue that has yet to be studied in future particularly among police officers.

However, the present study has limitations, which may be helpful in guiding future research. This study was conducted only in a metropolitan city, which is Kuala Lumpur due to the financial, and time constrain, but Kuala Lumpur has the highest number of traffic point-duty personnel. This study only can be generalized on this study sample but not to all traffic police populations, in future this study should be generalized to the traffic police populations. Besides, the detailed information about sleep characteristics among respondents was not collected in which this factor may affect the fatigue level.

CONCLUSION

This study showed that the prevalence of fatigue that put them at risk for subsequent sick leave and work disability was 20%. This percentage should be an eye opener knowing that their job involves the life and safety of public. determined the association between the independent variables (socio-demographic data of the respondents, work characteristics of traffic point-duty personnel, occupational noise perceptions and work stressor) and dependent variables (fatigue). The results from this study giving an idea about which factors contributed to work-related fatigue among traffic police officers. It can be concluded that the level of education is an important factor in managing fatigue among traffic police officers. Lower educational levels were associated with more fatigue severity and concentration problems and lower motivation and physical activities. Doing part time job was also found to be dominant factors of fatigue among them. In summary, findings provide baseline data on the main factors of fatigue among this young and normal weight police group which will help in prioritizing the intervention strategies.

Based on the finding of the study, a number of recommendations have been suggested to address the factors in order to minimize the impacts of fatigue in traffic police. The traffic organization should provide mental and health education among personnel regarding on managing the impacts of fatigue through healthy lifestyle. Organization should emphasize the chronic fatigue as an important issue towards safety, health, and work performance. Besides that, the safety training on occupational noise hazard needs to be prepared. As the organizational stressor significant in predicting fatigue, it is good for the existing mental health support in the Royal Malaysian Police such as Bahagian Agama dan Kaunseling (BAKA) (the Section of Counselling and Religion) (32) to include fatigue management in their program.

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