Effect of occupational stress on changing blood pressure among police officers in Kandy regional area

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***Abstract*—**

Introduction: Police department has been identified as having higher level of occupational stress. Relationships between psychological features and physiological parameters, are highly correlated. The rate of increasing psychological disorders among the police officers in Kandy police division was found to be high in Sri Lankan context* (Wickramasinghe *et al.*, 2016) *The present study was carried out to assess the relationship between occupational stress and blood pressure among police officers in Kandy regional area.

Methodology: This descriptive cross-sectional study; was conducted using pre-validated self-administered stress assessment questionnaire and measurements of blood pressure in police officers of Kandy, Peradeniya and Katugastota police stations. The sample size was 228

Results: Police officers of Kandy regional area are in moderate stress level (53%). Female police officers (56.66%), lower ranked police officers (93%) and police officers with less experience (97%) are suffering from high level of stress. There was a mild significant relationship in between occupational stress and systolic (p= 0.001, r= 0.222), diastolic (p=0.010, r=0.18) blood pressure difference among police officers in Kandy regional area.

Conclusion: Police officers in Kandy regional area are suffering from moderate occupational stress level. There was a mild significant relationship in between occupational stress and blood pressure in this sample. As recommendation, necessary action should be implemented to reduce stress level and to introduce positive coping styles to improve mental health and physical health of highly stressful police officers. Assessing the mental and physical health condition of police officers should be done periodically to maintain the quality of health of the employees.

Keywords*— Occupational stress, Systolic Blood Pressure, Diastolic Blood pressure, Police officers

I. INTRODUCTION

It is generally accepted that "workers who are stressed are more likely to be unhealthy, poorly motivated, less productive and less safe at work"(Nelson, 2017). High levels of stress-related illnesses raise concerns in the industry. As police officers they have to critical role in working with and supporting people. Police officers may be the first to respond to urgent situations and have to make quick decisions to assess the cases as well as the needs of the individuals involved, ensuring their safety and that of the general public. Police officers are usually the first at scenes of murder, suicides or accidents and the last to leave the area. At such scenes death or injury is a possible. In general, exposure to danger, violence and having to exercise discretion under critical circumstances by police officers, are factors that could lead to occupational stress (Bucker and Wiecko, 2007). Enforcement of law is inherited with some of the unique features that can lead to labor stress, and police service very tense to be stressed (Peñalba, Mcguire and Jr, 2010). Policing is among the top four occupations which are reported to be most stressful by both occupational physicians and psychiatrists, which attributed to high rates of crime and violence in the country (Jorgensen and Rothmann, 2008).

Relationships between psychological features and physiological parameters, such as blood pressure, have a high relevance in research on coping with stress. Psychosocial interventions are a common treatment for stress related symptoms and psychological disorders in police officers. High numbers of sickness absence rates are recorded among police officers compared to other occupations and one of the major cause of long term absence is depression and other stress related disorders. Among the police officers, 26% of medical pensions are due to mental or mental disorders (Aremu, 2006). The rate of increasing psychological disorder among police officers in the Kandy police division was found to be high in comparison to the noticed rates in other studies in Sri Lankan context and this signifies that the moment and the associations of psychological disorders in policing should be further explored with a holistic approach to uplift the overall well-being of the target population (Wickramasinghe *et al.*, 2016).

Level of stress among the police officers and the relationship in between physiological factors can be identified and by the study and results can be used in purposes of policy making. With the identification of the stress factors, can be addressed to provide optimum police facility for Sri Lankans. If the officers are found to be stressed due to occupation, necessary actions can be workout.

General Objective

To assess the relationship in between level of Occupational stress and blood pressure among police officers in Kandy regional area.

Specific Objectives

1) To identify the level of occupational stress among police officers in Kandy, Peradeniya and Katugastota police stations.
2) To assess the effect of working shift on blood pressure among police officers in Kandy, Peradeniya and Katugastota police stations.
3) To assess the relationship in between level of blood pressure change and occupational stress.

II.Methodology

This study conducted as a descriptive cross-sectional study by using a self-administered questionnaire and measurements of blood pressure among police inspectors, police sergeants and police constables in Kandy, Peradeniya and Katugastota police stations.

A). Inclusion and Exclusion criteria

Inclusion criteria: The participants consisted of active duty policemen and women at the time of data collection who are working in Kandy regional area. Land marking of Kandy regional area is Gelioya, Peradeniya, Kandy, Katugastota, Gurudeniya, Haragama. I have been selected all three police stations in Kandy regional area (Kandy, Peradeniya and Katugastota police stations) for study. The target population was officers between constable to inspector police ranks.

Exclusion criteria: All the police officers who are getting treatments for stress related diseases and blood pressure alterations (hypertension and hypotension) was excluded as they do not fit with the selected sample.

B). Sampling Method and sample Size

Sample size calculated using following formula.

$$n = \frac{Z^2 P(1-P)}{d^2}$$

n = Sample size.

Z = Standard normal deviation this will be taken as 1.96 corresponding to 95% confidence level.

d = Absolute precision will be specified as 0.05

P = Anticipated population proportion of police officers having an occupational stress will be taken as 83%(Agolla, 2009).

Number of police officers from each police stations were chosen according to probability proportion. Stratified random sampling method was obtained data collection.

Table 1: Selected Sample

Police station	Police officers in the police station	Selected police officers
Kandy	987	178
Peradeniya	143	26
Katugastota	133	24
Total	**1263**	**228**

C). Study instruments and materials

Level of occupational stress among police officers in Kandy regional area was assessed using previously developed and validated self-administered questionnaire(Nelson, 2017). Forward translation, backward translation, edition of the final draft, conducting expert opinion and pilot test were carried out. The Likert type (1-10 scale) of questionnaire was prepared in all three mediums English, Sinhala, and Tamil for, better understanding. Ratings from 1-3 will considered “not very stressful”, 4-6 was “moderately stressful”, and 7-10 will “very stressful”. All information was assured for privacy and confidentiality.

To assess the blood pressure a standard sphygmomanometer was used. All measurements were taken by principal investigator by using one standard sphygmomanometer.

D). Variables

Table 2: Variables

Independent variables	Dependent variables
Gender Rank Working experience	Level of stress Value of Systolic and Diastolic blood pressure

E). Ethical Consideration

Ethical approval was taken from the ethical and research committee of Faculty of Allied Health Sciences, University of Peradeniya Permission was taken from the senior superintendent of police, Kandy division, Officers in-charge Peradeniya and Katugastota Police stations to conduct the study for police officers. written consent was obtained from participants prior to the data collection. Confidentiality and anonymity of the participants were highly secured.

F). Method of data collection

1). To assess the level of stress among police officers of Kandy regional area:

Self-administered questionnaire was administered after the shift in a venue which was preferred by the participants and instructions were given to fill in the questionnaire

2). To measure Blood pressure among police officers in Kandy, Regional area:

Blood pressure of the each and every participant was measured before and after their shift. Three measurements of blood pressure values were obtained giving 5 minutes of resting periods in both before and after the shift. Mean values were calculated for data analysis.

G. Data analysis

All the collected data was tabulated into Microsoft office excel spread sheet, and data analysis was perform using SPSS data analysis and statistical software. Descriptive statistics were identified and percentage based on each response in Likert type of questionnaire calculated. Chi-square statistics was conducted to identified the association in between variables. To assess the relationship in between level of Blood pressure change and occupational stress Pearson relationship was adopted.

III.RESULTS

Out of 228 police officers, 204 police officers took part in the study. Hence, the rate of response was 89.47%.

A. *Occupational stress level of police officers in Kandy regional area*

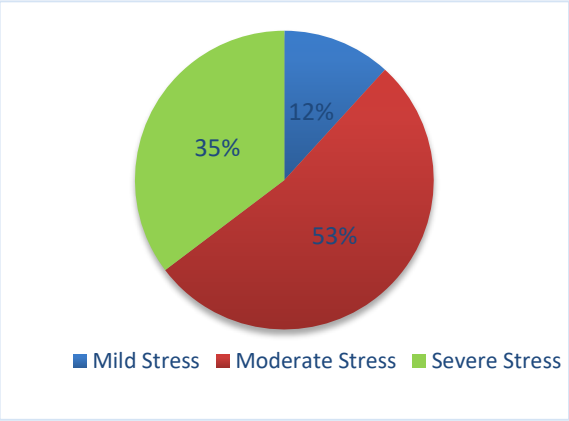

Figure 1: Stress level among police officers in Kandy regional area

According to the results out of 204 police officers, 24 (12%) police officers had mild occupational stress, 108 (53%) police officers had moderate occupational stress and 72 (35%) police officers had severe occupational stress.

1). Occupational stress level according to the gender:

Table 3: Occupational stress level based on the Gender

		Occupational Stress Level			
		Mild Stress	Moderate Stress	Severe Stress	Total (%)
Gender	Male	19	74	51	70.5
	Female	5	34	21	29.5
Total		24	108	72	100

Out of 144 male police officers, 19(13.19%) officers had mild occupational stress, 74(51.38%) officers had moderate occupational stress and 51(35.41%) officers had severe occupational stress.

Out of 60 female participants, 5(8.33%) officers had mild occupational stress, 34(56.66%) officers had moderate occupational stress and 21(35%) officers had severe occupational stress.

2). Occupational stress level according to the Rank:

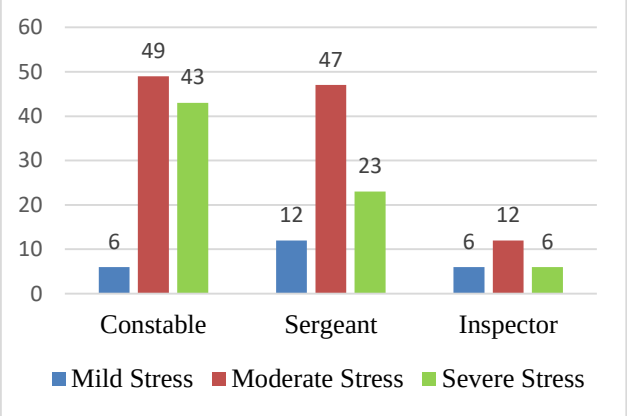

Figure 2: Occupational stress level in percentages according to the Ranks

Occupational stress level and Rank was significant. (p=0.024)

3). Occupational stress level according to the Working Experience

According to the analysis police officers with less working experience, had severe occupational stress (72.72%). Among police officers with more working experience, only 32.43% percentage of officers had severe occupational stress.

Occupational stress level and working experience was significant (0.001).

4). Occupational stress among traffic police officers:

According to the analysis in three police stations among 204 police officers 24 officers were traffic police officers. Out of 24 police officers 19(79.16%) were male officers and 5(20.83%) were female officers.

Table 4: Occupational stress among traffic police officers

		Gender		Total
		Male	Female	%
Occupational Stress Level	Moderate Stress	4	0	16.66
	Severe Stress	15	5	83.33
Total		19	5	100

Out of 19 of male traffic police officers 4(21.05%) officers had moderate occupational stress and 15(78.94%) officers had severe occupational stress. Out of 5 female traffic police officers 5(100%) police officers had severe occupational stress.

B). Effect of occupational stress on changing blood pressure among police officers in Kandy regional area

1). Effect of occupational stress on changing blood pressure among police officers in Kandy regional area:

Table 5: Effect of occupational stress on changing systolic blood pressure

		Difference SBP	stress level
Difference SBP	Pearson Correlation	1	.222**
	Sig. (2-tailed)		.001
	N	204	204
Stress level	Pearson Correlation	.222**	1
	Sig. (2-tailed)	.001	
	N	204	204

r=0.222. Therefore, there is a mild positive correlation in between systolic blood pressure and occupational stress among police officers in Kandy regional area.

Table 6: Effect of occupational stress on changing diastolic blood pressure

		stress level	Difference DBP
stress level	Pearson Correlation	1	.180*
	Sig. (2-tailed)		.010
	N	204	204
Difference DBP	Pearson Correlation	.180*	1
	Sig. (2-tailed)	.010	
	N	204	204

r=0.18. Therefore, there is a mild positive correlation in between diastolic blood pressure and occupational stress among police officers in Kandy regional area.

2). Effect on occupational stress on blood pressure change among male and female police officers separately:

Table 7: Effect of occupational stress on changing diastolic blood pressure according to gender

		P value	r value
male	SBP difference and occupational stress	0.017	0.200
	DBP difference and occupational stress	0.011	0.211
female	SBP difference and occupational stress	0.018	0.305
	DBP difference and occupational stress	0.449	0.099

There is a mild positive correlation in between systolic blood pressure and occupational stress among male police officers in the sample and there is a medium positive correlation in between systolic blood pressure and occupational stress among female police officers in the sample.

3). Effect of occupational stress on blood pressure change among constable, sergeant and inspector police officers separately:

Table 8: Effect of occupational stress on changing diastolic blood pressure according to rank

		p value	r value
Constable	SBP difference and occupational stress	0.562	0.059
	DBP difference and occupational stress	0.290	0.108
Sergeant	SBP difference and occupational stress	0.256	0.127
	DBP difference and occupational stress	0.113	0.176
Inspector	SBP difference and occupational stress	0.005	0.558
	DBP difference and occupational stress	0.030	0.444

Strong significant correlation can identify in between systolic blood pressure and occupational stress among police inspectors in the sample. Medium significant correlation can identify in between diastolic blood pressure and occupational stress among police inspectors in the sample.

4). Effect of occupational stress on systolic blood pressure change among police officers based on working experience:

Table 9: Effect of occupational stress on changing diastolic blood pressure according to work experience

		p value	r value
<10 Years	SBP difference and occupational stress	0.449	0.133
	DBP difference and occupational stress	0.802	0.045
10-19 Years	SBP difference and occupational stress	0.012	0.333
	DBP difference and occupational stress	0.024	0.301
20-29 Years	SBP difference and occupational stress	0.002	0.349
	DBP difference and occupational stress	0.027	0.252
>30 Years	SBP difference and occupational stress	0.263	0.189
	DBP difference and occupational stress	0.100	0.274

Medium significant correlation can identify in between systolic and diastolic blood pressure and occupational stress among police officers with 10-19years experience and 20-29years experience in the sample.

IV. DISCUSSION AND CONCLUSION

A). Assess the level of occupational stress among police officers in Kandy regional area.

Considering gender, descriptive statistics can be summarized as follows. In the study sample there were males (13.19%) than females (8.33%) suffering mild stress level and females (91.66%) than males (86.79%) had moderate and severe level of occupational stress. It was also identified that occupational stress is more in female police officers compared to males which may be due to the multiple roles that are expected by the society and performed by females without adequate support in Indian context (Ragesh *et al.*, 2017).

Considering police ranks, lower ranked police officers were more prone to having high level of stress. In contrast, (6.12%)of police constables (lowest rank officers in selected sample) are not stressful at all (mild stress level) but 93% of police sergeants and police inspectors have experienced in moderate or severe stress level. As well as it could be identified relatively increase mild stress level (25%) in inspectors and relatively (75%) moderate and severe stress level in inspectors. It can be justifiable as constables are directly dealing with the public, and involved in crime investigation and law and order maintenance other than officers with higher ranks. It also identified as operational and organizational stress were higher among lower level rank officials (Ragesh *et al.*, 2017). Considering working experience officers with less working experience (less than 10 years) have reported having moderate (24.28%) and severe (72.72%) stress level. Only 3.03% officers not at all stressful. It also proved as the younger age police officers and lower ranked police officers is having high level of occupational stress than others (Bano, 2011).

When considering traffic police officers all traffic police officers were working with moderate and high occupational stress. Male traffic police officers (21.05%) had moderate occupational stress and (78.94%) had severe occupational stress. In female traffic police officers (100%) police officers had severe occupational stress. Similar to the study a survey done in Kolkata, police officers were randomly selected from 11 traffic guards. Data were collected by using a standardized psychological scale entitled, Occupational Stress Index (OSI) and a semi-structure questionnaire. The study disclosed that 79.4 % of the traffic police officers were stressed (Deb, Chakraborty and Chatterjee, 2008).

B). Relationship in between occupational stress and blood pressure.

According to the results significant relationship was identified between occupational stress and systolic (p=0.010, r=0.222) and diastolic (p=0.010, r=0.180) blood pressure among police officers in Kandy regional area. The observations are similar to another studies. The value of systolic and diastolic blood pressure monotonically increasing with level of occupational stress (Su *et al.*, 2001). Exposure long term to occupational stress can cause increase blood pressure by ≥3.5 mmHg (Gasperin *et al.*, 2009).

According to the results significant relationship have been identified between occupational stress and systolic (p=0.017, r= 0.200) and diastolic blood pressure (p=011, r=0.211) among Male police officers in Kandy regional area. These cross-sectional analyses of the data from a sample representative for the male working population in Taiwan support the existence of observed significant and positive associations between occupational stress index and blood pressure (Su *et al.*, 2001). Among men, there was a 3 mmHg increase of systolic blood pressure (p=0.001) moving from low to high strain job categories(Psychosocial and Ambulatoriali, 2003). According to the results obtained medium correlation (p=0.018, r=0.305) in between systolic blood pressure and significant correlation (p= 0.449) cannot identify in between diastolic blood pressure and occupational stress among female

police officers in the sample. Similar differences were not observed in women and for the demand dimension in both sexes. Job strain categories did not show any significant relationship with diastolic blood pressure (Psychosocial and Ambulatoriali, 2003).

Significant relationship cannot be identified in between systolic (p=0.459) and diastolic (p=0.802) blood pressure and occupational stress among police officers with less than 10 years experience in the sample. Medium significant correlation (p=0.012, r= 0.333) can identify in between systolic blood pressure and occupational stress among police officers with 10-19years experience in the sample. Medium significant correlation (p=0.024),r= 0.301) can identify in between diastolic blood pressure and occupational stress among police officers with 10-19 years experience in the sample. Medium significant correlation (p =0.002, r= 0.349) can identify in between systolic blood pressure and occupational stress among police officers with 20-29years experience in the sample. As well as Small significant correlation (p=0.027, r= 0.252) can identify in between diastolic Blood pressure and Occupational stress among police officers with 20-29 years experience in the sample. Working experience with 10-29years group of officers are middle aged group. It also identified as correlation identified in between job stress and blood pressure among middle age workers in India(Article, 2013).

According to the Results significant correlation cannot identify in between Systolic (p=0.263) and diastolic (p=0.100) blood pressure and occupational stress among police officers with more than 30years experience in the sample. More than 30 years experience group is around 50years old. Aging is major effective factor for blood pressure alternations (Aboriginal and Strait, 2016).

As recommendation, necessary action should be implementing to reduce stress level and to introduce positive coping styles to improve mental health and physical health of highly stressful police officers. Asses of mental and physical health condition of police officers should done periodically to maintain the quality of health of employees.

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