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Research Article

Relationship In Between Level of Blood Pressure and Occupational Stress among Police Officers of 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. The present study was carried out to assess the relationship in between occupational stress and blood pressure among police officers in Kandy regional area. ***Methodology:*** This is a descriptive cross-sectional study; sample size of 228 conducted using pre validated self-administered stress assessment questionnaire and measurements of blood pressure in police officers of Kandy, Peradeniya and Katugastota police stations. ***Results:*** Police officers of Kandy district 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.

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

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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.

Significant of the research

The aim of this research was identified the occupational stress level of police officers in Kandy regional area and identify the relationship in between blood pressure and occupational stress of each police officers. As the previous studies were presenting with the findings of positive relationship among occupational stress and high blood pressure it was worth to assessed among Sri Lankan context also (Stueck *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.

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.

Hypothesis

To assess the effect of working shift on blood pressure among police officers in Kandy regional area

H_0 (Null hypothesis): Significant relationship cannot be identified in between pre and post shift Blood pressure values among police officers in Kandy regional area.

H_1 (Alternative hypothesis): Significant relationship can be identified in between pre and post shift Blood pressure values among police officers in Kandy regional area.

To assess the relationship in between level of blood pressure change and occupational stress

H_0 (Null hypothesis): Significant relationship cannot be identified in between occupational stress and Blood pressure among police officers in Kandy regional area.

H_1 (Alternative hypothesis): Significant relationship can be identified in between occupational stress and Blood pressure among police officers in Kandy regional area.

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 among active duty police officers 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. The target groups are 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 Size

Sample size calculated using following formula "Sample size determination in health studies" (Manual, 1991). 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 material

Level of occupational stress among police officers in Kandy regional area 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	Level of stress
Rank	Value of Systolic and
Working experience	Diastolic blood pressure

E). ETHICAL CONSIDERATION/ CLEARANCE

Ethical approval was taken from the ethical and research committee of Faculty of Allied Health sciences. Permission was taken from the senior superintendent of police, Kandy division, Officers incharge Peradeniya and Katugastota Police stations to administer the questionnaire to the police officers.

After obtained the ethical approval from ethical committee (AHS/ERC/2018/070) of the Faculty of Allied Health Sciences, approval was taken from the senior superintendent of police, Kandy division, officers incharge Peradeniya and Katugastota police stations to conduct the survey.

F). METHOD OF COLLECTION

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

Questionnaire was administered after the shift and a venue was preferred by the participants and instructions were given to fill in the questionnaire. Informed written consent were obtained from participants prior to the data collection. Confidentiality and anonymity of the participants were highly secured. All the collected data was tabulated into Microsoft office excel spread sheet, and data analysis was performed using SPSS data analysis and statistical software. Descriptive statistics were identified and percentages based on each response in Likert type of questionnaire calculated. Chi-square statistics was conducted to identified the association in between variables.

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

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

*3). **to assess the relationship in between level of Blood pressure change and occupational stress:*** Pearson relationship will be adopted to identify the relationship in between blood pressure change and level of occupational stress.

RESULTS

Out of 228 police officers only 204 police officers (89.47%) were responded for the study.

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

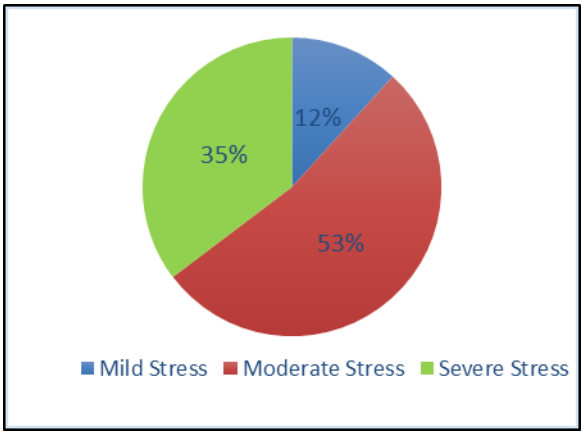

Figure 1: Stress level in total sample

According to percentage analysis 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 on male and female

		Occupational Stress Level			
		Mild Stress	Moderate Stress	Severe Stress	Total
Gender	Male	19	74	51	144
	Female	5	34	21	60
Total		24	108	72	204

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.

Gender and Occupational stress not significant in police officers in Kandy regional area. (P=0.584)

2). Occupational stress level according to the Rank:

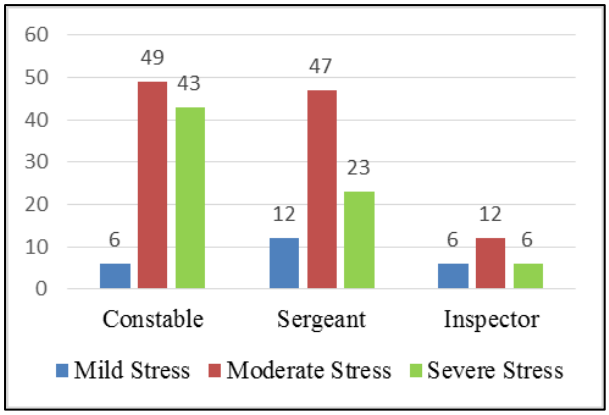

Figure 2: Occupational stress according to the Ranks

Out of 98 police constables 6 (6.12%) officers had mild occupational stress, 49 (50%) officers had moderate occupational stress and 43 (43.8%) officers had severe occupational stress. Out of 82 police sergeants 12 (14.63%) officers had mild occupational stress, 47 (57.3%) officers had moderate occupational stress and 23 (28.04%) officers had severe occupational stress. Out of 24 police inspectors 6 (25%) officers had mild occupational stress, 12 (50%) officers had moderate occupational stress and 5 (25%) officers had severe occupational stress.
Occupational stress level and Rank was significant. (p=0.024)

3). Occupational stress level according to the Working Experience: According to analysis among 33 of working experience with less than 10 years 1(3.03%) officers had mild occupational stress, 8(24.28%) officers had moderate occupational stress and 24(72.72%) officers had severe occupational stress.

Among 57 of working experience with 10 to 19 years 7(12.28%) officers had mild occupational stress, 32(56.14%) officers had moderate occupational stress and 18(31.57% officers had severe occupational stress.

Among 77 of working experience with 20 to 29 years 12(15.58%) officers had mild occupational stress, 47(61.03%) officers had moderate occupational stress and 18(23.37% officers had severe occupational stress.

Among 37 of working experience with more than 30 years 4(10.81%) officers had mild occupational stress, 21(56.75%) officers had moderate occupational stress and 12(32.43% officers had severe occupational stress.

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

*4). **Occupational stress in 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		
		Male	**Female**	**Total**
Occupational Stress Level	Moderate Stress	4	0	4
	Severe Stress	15	5	20
Total		19	5	24

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). Blood Pressure difference before and after the shift

a). Blood Pressure difference before and after the shift according to the gender applied paired t test.

Table 5: Blood pressure difference among police officers according to the gender

		p value
Male police officers	Morning SBP and evening SBP	0.0001
	Morning DBP and evening DBP	0.0001
Female police officers	Morning SBP and evening SBP	0.0001
	Morning DBP and evening DBP	0.0001

Differences in the pre and post duty systolic and diastolic blood pressure among all male and female police officers are significant (0.0001).

b). Blood Pressure difference before and after the shift according to the rank

Table 6: Blood pressure difference among police officers according to the rank

		p
Constable	Morning SBP and evening SBP	0.0001
	Morning DBP and evening DBP	0.0001
Sergeant	Morning SBP and evening SBP	0.0001
	Morning DBP and evening DBP	0.0001
Inspector	Morning SBP and evening SBP	0.0001
	Morning DBP and evening DBP	0.0001

Difference in the pre and post duty systolic and diastolic blood pressure among police officers in every ranks are significant. (p=0.0001).

C). 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 total police officers in Kandy regional area:

Table 7: 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.

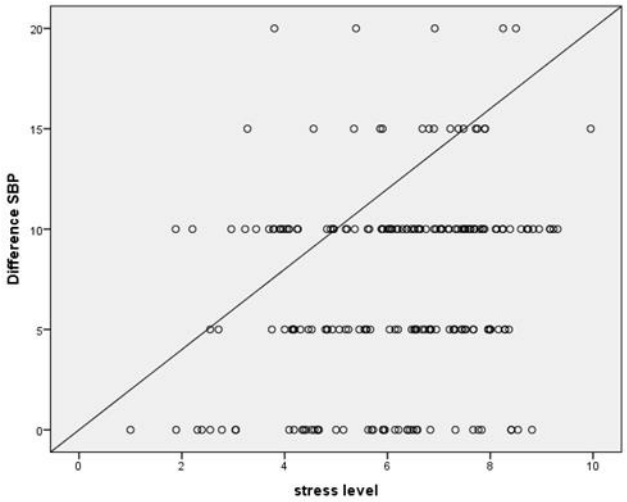

Figure 2: Effect of Occupational stress on changing systolic blood pressure

Table 8: 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.

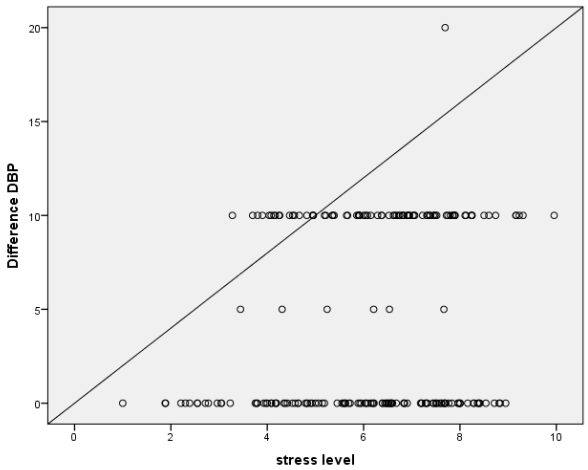

Figure 2: Effect of Occupational stress on changing diastolic blood pressure

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

Table 9: 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. There is a mild positive correlation in between diastolic blood pressure and occupational stress among male police officers in the sample.

There is a medium positive correlation in between systolic blood pressure and occupational stress among female police officers in the sample. Significant correlation cannot identify 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 10: 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

Significant correlation cannot identify in between systolic, diastolic blood pressure and occupational stress among police constables and sergeants in the sample.

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 11: 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

Significant correlation cannot identify in between systolic, diastolic blood pressure and occupational stress among police officers with less than 10years experience and also police officers with more than 30years experience in the sample.

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

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

DISCUSSION AND CONCLUSION

The aim of this research was to identify relationship in between occupational stress and Blood pressure among police officers in Kandy regional area. Given that three specific objective of this study, a cross sectional study deemed as an appropriate study design (Nelson, 2017). Having an adequate sample size, using of a probability sampling technique and having a high response rate resulted in strengthening the internal and external validity of the study findings (Manual, 1991).

The occupational stress is generally accepted that prolonged or intense stress can have a negative impact on an individual's mental and physical health (Cooper *et al.*, 2003). 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. 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).

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 more prone to having high level of stress. In contrast to that (6.12%) of police constables (lowest rank officers in selected sample) are not at all stressful

(mild stress level) but 93% of others 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 working with moderate and high occupational stress. In male traffic police officers (21.05%) officers had moderate occupational stress and (78.94%) officers had severe occupational stress. In female traffic police officers (100%) police officers had severe occupational stress. Major reason for these high level of stress is occurring due to numerous factors like inadequate rest, lack of communication with the family members, long duty hours, inadequate leave, political pressure, excessive number of vehicles on the road, hot weather, noncooperation from public, lack of coordination among colleagues, seeing too many accidents on the road so on. 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). Effect of duty shift on changing of blood pressure

Significant differences could be identified based on sex and occupational rank. According to the results significant relationship can identify pre and post shift Systolic and diastolic blood pressure among male police officers. Significant value is p= 0.001. Significant relationship can be identified in between pre and post shift Systolic Blood pressure values among Male police officers in Kandy regional area and Significant relationship can be identified in between pre and post shift Diastolic Blood pressure values among Male police officers in Kandy regional area. As well as Significant relationship can be identified in between pre and post shift Systolic Blood pressure values among female police officers also. Significant value is 0.001. Therefore, Accept alternative hypothesis. Significant relationship can be identified in between pre and post shift Systolic Blood pressure values among female police officers in Kandy regional area and Significant relationship can be identified in between pre and post shift Diastolic Blood pressure values among female police officers in Kandy regional area. Despite this, these observations are similar to another study reporting that, both male and female subjects should have been affected, while only the female police officers were found to experience a significant increase in SBP after their shift. However, the practical clinical significance of this finding may be considered negligible as determined by the effect size (Elliott and Lal, 2016).

With respect to BP measures taken before and after shift, a number of differences were identified between the police officers based on occupational rank. According to the result significant relationship have identified in all three ranks in sample (Constables, Sergeants and Inspectors) Significant value was 0.001.These observations are similar to another study reporting that, Although the pre-shift SBP ($p< 0.01$), pre-shift DBP ($p < 0.001$) and post-shift DBP ($p < 0.001$) were found to be significant, there were no elucidated differences between the ranks after Post-Hoc analysis (Elliott and Lal, 2016).

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

According to the result identified significant relationship in 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 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 identified in 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 correlation cannot identify in between systolic (p=0.059) and diastolic (p=0.108) blood pressure and occupational stress among police constables in the sample. significant correlation cannot identify in between systolic (p=0.256) and diastolic (p=0.113) blood pressure and occupational stress among police sergeants in the sample. Strong significant correlation (p=0.005, r=0.558) can identify in between systolic blood pressure and occupational stress among police inspectors in the sample. As well as medium significant correlation (p=0.03, r=0.444) can identify in between diastolic blood pressure and occupational stress among police inspectors in the sample.

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 30years 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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