

Self-Reported Mental and Physical Health Problems among Traffic Police due to Air Pollution in Kathmandu Valley

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ABSTRACT

Introduction: Kathmandu valley has its unique bowl shaped topographic features due to which it is highly vulnerable to air pollution. Traffic police personnel (TPP) are at the highest risk of pollution related disease, because they are constantly exposed to the air pollution (vehicular emissions) as the nature of their occupation. The main objective of this study was to assess the mental and physical health problems among traffic police due to air pollution in the selected area of Kathmandu valley.

Methods: A cross-sectional descriptive study was carried out in Kathmandu Valley among traffic police. Samples were collected from each police station of ring road area. Total sample calculated and collected was 222. Standard questionnaire for symptoms of physical problem, anxiety and stress i.e. ST-George respiratory questionnaire (SGRQ), Hamilton Anxiety rating scale and Perceived stress scale respectively were used to collect the data. Data was entered and analyzed using SPSS v16, with descriptive statistics.

Results: About 73% of traffic police were reported with anxiety while stress related problems were identified among 40.6%. Skin, respiratory and eye problems were the most common physical problems seen among traffic police.

Conclusions: Traffic police in Nepal have both physical and mental health problems associated with air pollution. Hence, future interventions for the effort of reducing such problems should be prioritized, planned and implemented with generation of action plan to minimize the problem.

Keywords: air pollution; traffic police; health problems; Nepal.

INTRODUCTION

The Kathmandu valley is surrounded by hills that forms a bowl-shaped topography. Due to which the wind movement are restricted and the pollutants in the atmosphere are retained. Hence, the valley is highly vulnerable to air pollution.¹ In addition, other factors like rapid urbanization, industrialization, maintenance and widening of roads, increasing number and poor maintenance

of vehicles etc in the valley are responsible for poor quality of the air.²

Traffic police personnel's (TPP) are at the highest risk of pollution related diseases, because they are constantly exposed to the air pollution (vehicular emissions) as the nature of their occupation.³ Mainly, air pollution has adverse effects on the crucial system such as cardiovascular system and central nervous system.⁴ Most of the TPP in Kathmandu valley complained of health problems such as fatigue, back/neck problems, arthritis, dryness of nostrils, poor memory, headache, irritation, indigestion and pressure/stress.⁵ The main objective of this study was to assess the health problems among

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traffic police due to air pollution in the selected area of Kathmandu valley.

METHODS

A cross-sectional descriptive study design was conducted among calculated sample size of 222 TPP of the ring road area of Kathmandu valley.

Sample size calculation: $n = \frac{z^2 p(100 - p)}{e^2}$

$$Z = 1.96$$

$$p = 50$$

$$e = 10$$

Convenient sampling technique was done so the calculated sample was doubled with 10% non-respondent rate.

Calculated sample size was 211, total sample collected was 222.

From ring road, the selected area included 10 Traffic police stations: Satdobato, Koteshor, Airport, Gaushala, Sokedhara, Swoyambhu, New Buspark, Kalanki, Sanepa and Balkhu. Data was collected through schedule interview with TPP's consent.

Study Population: Traffic Police of Kathmandu

Sampling frame: Traffic Police of Ring Road

Both male and female traffic police who were available at the time of data collection was included. Traffic police those who were involve in administrative works during study was excluded.

Ethical approval for the research was taken from Nepal Health Research Council Reg no 142.

According to Metropolitan Traffic Police Division, there were currently altogether 1274 traffic personnel stationed at 40 units in Kathmandu valley. Out of which traffic police stationed at 10 units in ring road area

were taken.

Consent was taken from the participant.

A semi-structure questionnaire and standard questionnaire for symptoms of physical problem, anxiety and stress i.e. ST-George respiratory questionnaire (SGRQ), Hamilton Anxiety rating scale and Perceived stress scale respectively were used. Questionnaire was developed based on the objectives and variables used for this study.

The SGRQ is a set of questionnaires which was developed to measure quality of life in patients with diseases of airways obstruction. Similarly, Hamilton Anxiety rating scale was used to assess anxiety among traffic police. Scoring was done accordingly:

Anxiety Scoring:

≤ 6 : Not present

7-14 : Mild

15-24 : Moderate

> 24 : Severe

Perceived stress scale was used to assess the stress. Scoring was done respectively:

Stress Scoring:

≤ 8 : Never

9-16 : Almost never

17-21 : Sometimes

> 21 : Fairly often

After the collection of data, Statistical Package for Social Sciences (SPSS) version 16.0 was used for data analysis. Data was interpreted by descriptive statistic for general objective and univariate and bivariate analysis was done for specific objective. Chi-square test and Fisher's exact test were conducted to see the association between health services utilization which was a part of specific objective.

Meticulous literature review was done by listing of keywords, with recognition of

synonyms from MESH database to provide the theoretical background to the concept of mental and physical health problem of traffic police and factors related to it. Search was done in order to identify identical and significant studies which were published between 2010 and 2018, in peer reviewed and indexed publication available in local and international journals published in English. The following databases were searched: PUBMED, EMBASE, and MEDLINE.

Boolean operators (i.e. AND, OR, NOT or AND NOT) were used as conjunctions to combine or exclude keywords in a search, thereby resulting in more focused and relevant results in PUBMED. Boolean operator, wildcard and truncation were adapted accordingly for the other databases.

RESULTS

Table 1 shows physical health problem among the respondents. Out of total respondents, more than half of them had eye problems i.e. 52.3%, upper respiratory tract problem i.e. 52.3%, lower respiratory tract problem i.e. 55.4% and skin problem 55.9% due to air pollution. These were found to be the most common physical health problems among TPP due to air pollution.

Table 1. Physical Health Problems(n=222)

Physical health problems	Frequency (%)
Eye problem	116 (52.3)
Upper respiratory tract Problem	116 (52.3)
Lower respiratory tract Problem	123 (55.4)
Skin problem	124 (55.9)

Table 2 shows symptoms associated with physical problems due to air pollutions. Out of total respondents, three fourth of the respondent i.e. 75.7% had felt dryness on eyes, 78.8% of respondent had felt itching on eyes, 72.1% had felt redness on eyes, 75.2% had

felt nasal dryness, 68% felt nasal irritation, 81.1% had felt nasal congestion, 76.1% had felt throat pain, 60.4% had felt shortness of breathing, 71.6% of had felt chest pain, 56.8% of respondent had felt episode of wheezing, 74.8% of respondent had felt dry cough, 61.3% of respondent had felt difficulty in breathing, 66.7% of respondent had felt skin allergy, 56.8% of respondent had felt skin redness.

Table 2. Symptoms Associated with Physical Problems (n=222)

S. N.	Components	Yes	No
		Frequency (%)	Frequency (%)
1	Dryness on eyes	168(75.7)	54(24.3)
2	Itching on eyes	175(78.8)	47(21.2)
3	Redness on eyes	160(72.1)	62(27.9)
4	Nasal dryness	167(75.2)	55(24.8)
5	Nasal irritation	151(68)	71(32)
6	Nasal congestion	180(81.1)	42(18.9)
7	Throat pain	169(76.1)	53(23.9)
8	Shortness on breathing	134(60.4)	88(39.6)
9	Chest pain	159(71.6)	63(28.4)
10	Episode of wheezing	126(56.8)	96(43.2)
11	Dry cough	166(74.8)	56(25.2)
12	Difficulty on breathing	136(61.3)	86(38.7)
13	Skin allergy	148(66.7)	74(33.3)
14	Skin redness	126(56.8)	96(43.2)

Table 3 shows anxiety scoring as reported by respondents. Out of total respondents, 27% of respondents did not show any symptoms of anxiety, 25.7% who showed moderate symptoms, 24.3% had mild symptoms while remaining 23% showed symptom of severe anxiety. It was identified that almost 3/4th of the respondents (73%) had symptoms of mild, moderate and severe anxiety.

Table 3. Anxiety Scoring using Hamilton Anxiety Scale (n=222)

	Frequency(%)
Normal	60(27)
Mild	54(24.3)
Moderate	57(25.7)
Severe	51(23)
Anxiety Scoring:	
<= 6	: Not present
7-14	: Mild
15-24	: Moderate
>24	: Severe

Table 4 shows anxiety scoring as per reported by respondent. Out of total respondent, 26.1% of respondents never felt any symptoms of stress, followed by 33.3% of said they had almost never felt stress, 19.9% of respondent said they had sometimes felt symptoms of stress and 20.7% said they had felt the symptoms stress very often.

Table 4. Stress Scoring using Perceived Stress Scale (n= 222)

	Frequency (%)
Never	58(26.1)
almost never	74(33.3)
Sometimes	44(19.9)
very often	46(20.7)
Stress Scoring:	
< = 8	: Never
9-16	: Almost never
17-21	: Sometimes
> 21	: Fairly often

Table 5 shows the association of eye problems among traffic police with different variables among which the p value at confidence level of 95% for sex and education was less or equal to 0.05 i.e. 0.05 (fisher exact test) and

0.038 respectively, which shows that eye problem is associated with sex and education of the respondents. There was no association of eye problem among traffic police with age of the respondent, alcohol consumption, work experience of respondents, duration of exposure, duty hour of respondent, PPE used by respondents, periodic health check-ups by respondents and free health care services as the p-value was more than 0.05 according to chi-square test and fisher's exact test.

Table 5. Association of eye problems with different variables (n=222)

Variables	Eyes Problem Score		P value
	Present(%)	Absent(%)	
Age			
<=35	107(92.2)	92(86.8)	0.183
>35	9(7.8)	14(13.2)	
Sex			
Male	114(98.3)	98(92.5)	0.05
Female	2(1.7)	8(7.5)	(Fisher's exact Test)
Education			
SLC pass	24(20.7)	35(33)	0.038
Higher secondary and above	92(79.3)	71(67)	
Alcohol			
Yes	32(27.6%)	21(19.8%)	0.175
No	84(72.4%)	85(80.2%)	
Work experience			
<=5 years	56(48.3%)	40(37.7%)	0.113
>5years	60(51.7%)	66(62.3%)	
Duration of Exposure			
<3 years	15 (12.9%)	13(12.3%)	0.881
>= 3 years	101(87.1%)	93(87.7%)	
Duty hour			
<=8 hours	2(1.7%)	3(2.8%)	0.579
>8 hours	114(98.3%)	103(97.2%)	
Personal Protective Equipment (Use of goggles)			

Variables	Eyes Problem Score		P value
	Present(%)	Absent(%)	
Yes	89(76.7%)	78(73.6%)	0.588
No	27(23.3%)	28(26.4%)	
Periodic health check ups			
Yes	59(50.9%)	53(50.0%)	0.898
No	57(49.1%)	53(50.0%)	
Free health check Services			
Yes	25(21.6%)	34(32.1%)	0.076
No	91(78.4%)	72(67.9%)	

Table no. 6 shows the association of upper respiratory problem with different variables among which only the p value at confidence level of 95% for sex is less or equal to 0.05 i.e. 0.05 (fisher exact test), which shows that upper respiratory tract problem is associated with sex of respondents. There was no association of upper respiratory problem among traffic police with age of the respondent, education of respondents, smoking, alcohol consumption, work experience of respondents, duration of exposure, duty hour of respondent, PPE used by respondents, periodic health check-ups by respondents and free health care services as the p-value was more than 0.05 according to chi-square test and fisher's exact test.

Table 6. Association of upper respiratory problems with different variables (n=222)

Variables	Upper respiratory problem score		p- value
	Present	Absent	
Age			
<=35	106(91.4%)	93(87.7%)	0.374
>35	10(8.6%)	13(12.3%)	
Sex			
Male	114(98.3%)	98(92.5%)	0.05
Female	2(1.7%)	8(7.5%)	
Education			
SLC pass	30(25.9%)	29(27.4%)	0.879

Variables	Upper respiratory problem score		p- value
	Present	Absent	
Higher secondary and above	86(74.1%)	77(72.6%)	
Smoking			
Current smoker			
Yes	16(13.8%)	23(21.7%)	0.122
No	100(86.2%)	83(78.3%)	
Past smoker			
Yes	17(14.7%)	21(19.8%)	0.308
No	99(85.3%)	85(80.2%)	
Alcohol			
Yes	29(25%)	24(22.6%)	0.681
No	87(75%)	82(77.4%)	
Work experience			
<=5 years	48(41.4%)	48(45.3%)	0.558
>5 years	68(58.6%)	58(54.7%)	
Duration of Exposure			
<3 years	12(10.3%)	16(15.1%)	0.287
>= 3 years	104(89.7%)	90(84.9%)	
Duty hour			
<=8 hours	1(0.9%)	4(3.8%)	0.195
>8 hours	115(99.1%)	102(96.2%)	(Fisher's exact Test)
Personal Protective Equipment (Use of goggles)			
Yes	115(99.1%)	104(98.1%)	0.607
No	1(0.9%)	2(1.9%)	(Fisher's exact test)
Periodic health check ups			
Yes	64(55.2%)	48(45.3%)	0.141
No	52(44.8%)	58(54.7%)	
Free health check Services			
Yes	27(23.3%)	32(30.2%)	0.244
No	89(76.7%)	74(69.8%)	

DISCUSSION

Study published in environmental claims journal showed air pollution has same effect

in all age group but age groups between 25-34 and above 45 were affected more whereas our study showed that age group of more than 35 were affected significantly higher.⁶

According to Gupta et al, both the restrictive and obstructive patterns of respiratory impairment had been observed in their study with the help of the Spiro-metric parameter which we failed to express in our study.³

In this study, it was found that 74.8% had dry cough, 56.8% had episode of wheezing, 78.8% had itching on eyes and 68% had nasal irritation. Similar health problems were noted among traffic police according to the study "Occupational exposure to air pollutants particulate matters and respiratory symptoms affecting traffic police" conducted in Bogata 2013, the percentage of nasal irritation was similar to this study i.e. 62.3% but the percentage of cough, wheezing and eye itching i.e. 18.6%,19.5% and 32.9% respectively contradicts to this study.⁷

The study conducted in Lucknow, India from April 2012 to September 2012 found that 68% of traffic policemen were suffering from breathlessness, 42% from chest pain and 45% from irritation in respiratory tract.⁸ The percentage of policemen suffering from breathlessness is similar to this study i.e. 60.4% but it contrasted with the percentage of policemen suffering from chest pain i.e. 71.6 and irritation in respiratory tract i.e. 68%.

The study conducted in Patiala India found that 68% and 22% of traffic police complained to have coughing and shortness of breath respectively.³ The percentage of traffic police suffering from coughing is similar to this study i.e. 74.8% but it is contrasted with the percentage of shortness of breath i.e. 60.4%.

This study contradicts to the finding of another study conducted in India 2010,

as it reflects 33% of traffic police were suffering from frequent coughing, 2% from shortness of breath,23% from irritation in respiratory tract, 35% from chest pain and 3% from wheezing.⁹ It might be due to rapid urbanization, industrialization, maintenance and widening of roads, increasing number and poor maintenance of vehicle in our country.

According to this study, it was found that 52.3 % of respondent had eye problems due to air pollution, 52.3% had upper respiratory tract problems, 55.4% had lower respiratory tract problems and 55.9% had skin problems. It was identified that 73% of the traffic police had anxiety and 40.6% of traffic police were identified of having stress due to air pollution.

In our study, sex and education with eye problem were found to be associated. Also, significant association was seen between sex and upper respiratory tract problem. In contrast, the study conducted in India showed that traffic police who were exposed to various air pollution were associated with incidence of respiratory symptoms.³

Our study didn't look for PM value and its health effect on traffic police in contrast a study done by Zhao et al showed that most traffic police were exposed to high concentration of PM2.5 in winter season.¹⁰

CONCLUSIONS

Anxiety among the traffic police due to air pollution was found to be higher. It was also found that more than half of the respondents had physical health problems. The effects of mental health problems might not be seen immediately and in near future they might be vulnerable to problems like bronchial asthma, lung cancer, heart disease, severe depression, other occupational disease etc. So, counseling on psychological problem should be provided to traffic police at police hospitals for

betterment of mental health and development of future action plan for the effort of reducing such problems should be prioritized, planned and implemented.

CONFLICT OF INTEREST: None

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