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Research Article

Awareness and Practices of Traffic Police on Prevention of Respiratory Problems in Kathmandu

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Abstract

Introduction: Respiratory problems are major cause of morbidity and mortality worldwide. Outdoor air pollution has become a major environmental risk to public health. Traffic police expose more to polluted air that increases the risk of respiratory problems and affect to their health.

Aim: This study aims to find out the awareness and practice regarding prevention of respiratory problems among traffic police in Kathmandu.

Methods: This study used a descriptive cross-sectional design. Data were collected through structured self- administered questionnaire from 102 traffic police working in five traffic police stations of Kathmandu using the non-probability purposive sampling technique. Data were analyzed by using descriptive statistics. Chi-square and correlation were used to measure the association between level of awareness regarding prevention of respiratory problems and different variables.

Results: The study found that the mean age of the traffic police was 28.8 ± 5.29 years, 77.5% were police constable, and mean work experience was 6.28 ± 4.30 years with mean duty hours per day was 13.62 ± 2.40 hours. Only 65.3% and 39.6% had knowledge about bronchial asthma and chronic bronchitis respectively as effects of outdoor air pollution on the respiratory system. Likewise, 85.3% had said implementation of strict traffic rules regarding reducing of air pollution for prevention of respiratory problems. Similarly, almost all (91.2%) of them had said anti-pollution face mask as most suitable for protecting from inhalation of polluted air. Similarly, 100.0% traffic police had used mask during duty hour whereas only 54.9% face masks the whole time during duty hours. Only 22.5% had implemented strict traffic laws to vehicles regarding air pollution, 10.8% had rotation of duty area to prevent respiratory problems due to air pollution and 9.8% had done routine health check-ups. More than half of the traffic police (51.0%) had an inadequate level of awareness and (56.7%) had an inadequate level of practice on the prevention of respiratory problems. There was a positive correlation between level of awareness and level of practice ($r = 0.334$, $p = 0.001$).

Conclusion and Recommendation: This study concluded that traffic police have inadequate awareness and practice regarding the prevention of respiratory problems. It is recommended to conduct regular health awareness programs and training regarding prevention of air pollution-related respiratory problems among traffic police by concerned authorities.

Keywords: Awareness; Practices; Respiratory Problems; Traffic Police

Introduction

Respiratory diseases are one of the major causes of morbidity and mortality globally. About 65 million people suffer from chronic obstructive pulmonary disease (COPD) and 3 million dies from it each year. About 334 million people suffer from asthma [1]. Outdoor air pollution is estimated to cause about 25% of

lung cancer deaths, 8% of COPD deaths, about 15% of ischemic heart disease and stroke, and about 17% of respiratory infection deaths [2]. Nepal is the fastest urbanizing country in South Asia and Kathmandu valley is the fastest-growing metropolitan area in the region [3]. The valley is especially vulnerable to air pollution due to unplanned urbanization, rapid growth of vehicles, and increasing industrialization. Air pollution has become a serious environmental concern and a public health risk in Kathmandu valley. Studies show that the concentration of PM_{10} in the valley's outdoor air is already several times higher than the WHO safer limit which makes it very unhealthy to live in. Kathmandu is the fifth most polluted city in the world and one of the most polluted cities in Asia with regards to level PM_{10} and $PM_{2.5}$ [4]. Exposure of high levels of $PM_{2.5}$ was associated with reduced lung function [5]. The Environmental Performance Index (EPI) report states that nearly 75% of population in Nepal are exposed to unsafe levels of fine particulate matters [6]. There are more than 4000 traffic polices all over Nepal and more than 1400 traffic police are working in total 35 traffic stations in different areas of Kathmandu valley [7] who are spending long hours in an environment polluted by exhaust fumes of vehicles and dust and poses serious health hazards. According to the Metropolitan Traffic Police office of Kathmandu, more than 50 traffic police personnel fall ill daily due to hazardous dust [8]. A study from 106 traffic police personnel of Kathmandu valley reported that the greater the officers are engaged in traffic duty for years greater was the decrement in their lung functions test [9]. Traffic police are continuously exposed to vehicular emissions and air polluted environment and they have higher risk of developing different types of respiratory problems. The adverse health impacts of automobile pollution can be significant [5]. Among the motor vehicle-generated air pollutants, diesel exhaust particles account for a highly significant percentage of the particles emitted in many towns and cities. Acute effects of diesel exhaust exposure include irritation of eyes and nose, lung function changes, headache, fatigue, and nausea. Chronic exposure is associated with cough, sputum production, and lung function decrements [10]. Thus, the traffic police should have adequate awareness and good practices on preventive measures of potential respiratory problems related to vehicular emissions and air polluted environment. Therefore, this study aims to find out the awareness and existing practices of traffic police to prevent respiratory problems in Kathmandu.

Material and Methods

A descriptive cross-sectional study was conducted at five traffic police stations of selected polluted areas of the ring road of Kathmandu i.e. Maharajgunj, Gaushala, Koteshwor, Kalanki, and Satdobato which are under the Metropolitan Traffic Police Division, Kathmandu. Metropolitan Traffic Police Division is responsible for controlling the overall traffics of Kathmandu valley. It has a total of 35 traffic police stations in different areas of Kathmandu valley covering almost all areas of the valley. Among those 35 stations, 5 stations were selected conveniently which situated on the ring road of Kathmandu. The sample size was calculated using Cochrane formula [11] i.e., Sample Size (n) = Z^2pq/e^2 with P = 40.0% [12]; 10.0% allowable error (e), 95.0% level of confidence and adding 10.0% nonresponse rate, calculated sample size as 102. Nonprobability purposive sampling technique was used. A total of 20 traffic police from each station and 22 from Koteshwor who meet the inclusion criteria of both sexes, more than 3 months of working experience in selected areas, and available during data collection were included**.** The traffic police who worked inside the office were excluded.

A structured self-administered questionnaire was developed based on the reviewed literature and validated with consultation with experts such as pulmonologists. The questionnaire was divided into three parts: Part one was related to socio-demographic information, job-related information, and health habits of the traffic police. Part two and three of the questionnaire related to awareness and practice on prevention of respiratory problems respectively. Validity of the instrument was maintained by an extensive literature review and consulting with Pulmonologists of Tribhuvan University Teaching Hospital. The questionnaire was translated into the Nepali language and back translated to English to preserve the meaning of the original questionnaire by consulting the bilanguage expert. Pretesting of the instrument was done in 10.0% of the total sample size in Singha Durbar traffic police station who were excluded from the final study sample. The instrument was modified as findings of pretesting and feedback.

Part two contained 14 awareness-related questions and part three contained 8 practices-related questions. Every right answer was given 1 mark and the wrong answer was given 0. Similarly, each correct answer of multiple-choice questions was given 1, and the wrong answer given 0. In this way, the total score for awareness-

related questions was 53 and for practice-related questions was 18. The mean score of awareness and mean score of the practice of each traffic police was calculated and a score above mean is regarded as an adequate level of awareness or practice and a score below the mean as an inadequate level of awareness or practice.

Ethical approval was obtained from the research committee of Maharajgunjg Nursing Campus, Institute of Medicine. Written permission was taken from Metropolitan Traffic Police Division to collect the data. The purpose of the study was explained to the traffic police and informed written consent was obtained before data collection. Anonymity and confidentiality were maintained by keeping code numbers in the questionnaire, asking not to write their names, not disclosing the findings, and using the information only for study purposes. Traffic police were explained that their participation is voluntarily. Questionnaires were distributed to the traffic police asked them to fill and were returned to the researcher. The data collection period was from 25 June to 8 July 2017. Collected data were checked for completeness and accuracy daily. Data were rechecked, edited, classified, coded, and enteredand analyzed by using SPSS version 23.0. The data were analyzed by using mean, standard deviation, range, frequency, and percentage. Chi-square, Fisher- exact test were used to measure the association between awareness level and selected variables.

Results

Personal profile of the traffic police

Regarding the sociodemographic characteristics of the traffic police, a higher proportion (57.8%) had belonged to the age group 20-29 years and the mean age was 28.8 (SD ± 5.3) years. Almost all (96.1%) of the traffic police were male and a higher proportion (47.1%) had completed an intermediate level education. Concerning Job-related information of the traffic police, the majority (77.5%) were Police constables and 54.9% had 1-5 years (mean ± SD = 6.28 ± 4.3) of work experience in Nepal Traffic Police. Likewise, 64.7% had 11-15 hours (mean ± SD = 13.62 ± 2.4) duty per day and all the traffic police (100%) had to work 7 days of the week. The majority (80.4%) of them were not participated in any seminar/conference about air pollution and its safety measures. Similarly, the majority (77.5%) of them work areas hadn't been rotated while working in polluted areas (Table 1).

Table 1: Socio-demographic and Job-related Information of the Traffic Police_____ (n = 102).

Variables	Number	Percent
Socio-demographic characteristics		
Age (in completed years)		
20-29	59	57.8
30-39	39	38.2
40-49	4	3.9
Gender		
Male	98	96.1
Female	4	3.9
Educational level		
Secondary education exam (SEE) pass	36	35.3
Intermediate level	48	47.1
Bachelor level	16	15.7
Master level	2	2.0
Designation		
Police constable	79	77.5
Above constable	23	22.5
Work experience (in years)		
1-5	56	54.9
6-10	26	25.5
11-15	19	18.6
16-20	1	1.0
Duty hours per day		
6-10	9	8.8
11-15	66	64.7
16-20	27	26.5
Duty days per week		
7 days	102	100.0
Participate in seminar / training on air pollution		
Yes	20	19.6

Awareness and practices on prevention of respiratory problems

Regarding the awareness on respiratory problems associated with outdoor air pollution, majority (78.2%) of them had answered flu and common cold and also lung cancer whereas least (19.8%) had answered pneumonia. Similarly, majority (77.2%) had

answered difficulty in breathing followed by 76.2% had answered coughing and 76.2% had answered irritated, dry and sore throat as signs and symptoms seen on respiratory system due to inhalation of polluted air. Likewise, for prevention of respiratory problems due to outdoor air pollution, higher proportion (81.4%) of response was for avoiding or less working on polluted areas followed by 68.2% response for wearing mask while working in polluted areas. Similarly, most of them (85.3%) had said implementation of strict traffic rules regarding prevention of air pollution for prevention of respiratory problems. Almost all (91.2%) of them had said anti-pollution face mask as most suitable for protecting from inhalation of polluted air whereas least (2.9%) had answered surgical mask (Table 2).

Table 2: Awareness on Outdoor Air Pollution related Respiratory Problems and Their Prevention_____(n = 102).

Variables	Number	Percent
Effects on respiratory system (n = 101)		
Lung cancer	79	78.2
Flu and common cold	79	78.2
Allergies	70	69.3
Bronchial asthma	66	65.3
Chronic bronchitis	40	39.6
Pneumonia	20	19.8
Signs and symptoms of respiratory problems *(n = 101)		
Difficulty in breathing	78	77.2
Coughing	77	76.2
Irritated, dry and sore throat	77	76.2
Sneezing and running nose	72	71.3
Chest tightness and pain	69	68.3
Headache, nausea and fatigue	62	61.4
Wheezing sound	48	47.5
Fever	39	38.6
Prevention of respiratory problems*		
Avoiding or less working on polluted areas	83	81.4
Wearing mask while working in polluted areas	70	68.2
Avoiding smoking and passive smoking	59	57.8
Regular health check-up	59	57.8
Implement strict traffic rules regarding prevention of air pollution by Government	87	85.3
Most suitable face mask		
Anti- pollution face mask	93	91.2
Cloth face mask	6	5.9
Surgical mask	3	2.9

*Multiple responses.

Regarding the practices of traffic police to prevent respiratory problems**,** 100% had used face mask during their duty hours and more than half (54.9%) of them had used protective antipollution mask during the duty hours working in traffic zone. Majority (56.90%) had used face mask while only 8.80% had used protective anti-pollution face mask. Very least (0.98%) had attended occupational hazards prevention skill training/seminar organized in the office. Similarly, 22.5% had implemented strict traffic laws to vehicles regarding air pollution and 10.8% had rotation of duty area to prevent respiratory problems due to air pollution (Table 3).

Table 3: Practices of Traffic Police on Prevention of Respiratory Problems_____ (n = 102).

Variables	Number	Percent
Preventive Practices*		
Wash hand and face regularly with soap and water after duty	83	81.4
Use of face mask during duty hour	102	100.
Wear face masks during whole duty hours working in traffic zone	56	54.9
Wash clothes and bath every day after duty hours	43	42.2
Have healthy diet and do regular exercise	39	38.2
Learn about prevention of respiratory problems from different medias	31	30.4
Avoid smoking and alcoholism	29	28.4
Have routine health check-ups	10	9.8
Attend occupational hazards prevention skill training/seminar organized in the office	1	0.9
Strict traffic laws to vehicles regarding air pollution	11	10.8

Rotation in duty area	23	22.5
Type of face mask used		
Cloth face mask	58	56.9
Medical mask	25	24.5
Double face mask	9	8.8
Protective anti-pollution face mask	9	8.8
Handkerchief	1	1.0

*Multiple responses.

Regarding the awareness on prevention of respiratory problems, more than half (51.0%) of the traffic police had inadequate awareness on prevention of respiratory problems whereas 49.0% had adequate knowledge. The category of awareness level was made based on the mean score of a total of 14 awareness-related questions (total score = 53) which was 31.49 ± 10.92. The range for the score of awareness questions was 42 being a minimum score of 10 and a maximum score of 52. Concerning traffic police's level of practice on prevention of respiratory problems, 56.9% of the traffic police had an inadequate level of practice whereas less than half (43.1%) of the traffic police had an adequate level of practice regarding the prevention of respiratory problems. The category of practice level was made based on the mean score of total 8 practice-related questions (total score = 18) which was 6.27 ± 2.35. The range for the score of practice questions was 12 being a minimum score 1 and a maximum score 13 (Table 4).

Table 4: Traffic Police's Level of Awareness and Practices on Prevention of Respiratory Problems_____(n = 102).

Variables	Number	Percent	Mean score	Standard Deviation
Level of awareness				
Adequate (above mean score)	50	49.0	31.49	10.92
Inadequate (below mean score)	52	51.0		
Level of practices				
Adequate (above mean score)	44	43.1	6.27	2.35
Inadequate (below mean score)	58	56.9		

Relationship between level of awareness and practice on prevention of respiratory problems and selected variables

Association between the variables was calculated using the Chi-square test and Fisher's Exact Test and found no significant association between the selected independent variables (age, gender, education level, designation, work experience, and participation in seminar and conference on air pollution and level of awareness since all of those p-value is >0.05 (Table 5).

Table 5: Association between Level of Awareness and Selected Personal Characteristics.

Variables	Level of awareness				Chi – Square	P- value
	Adequate		Inadequate			
	n	%	n	%		
Age						
≤ 30 years	34	68.0	35	67.30		
>30 years	16	32.0	17	32.70	0.006	0.940
Gender						
Male	50	100.0	48	92.30	2.221	0.136*
Female	00	0.0	4	7.70		
Education level	42	84.0	42	80.80	0.183	0.669
Below Bachelor	8	16.0	10	19.20		
Above Bachelor						
Designation						
Above Police Constable	11	22.0	12	23.10	0.017	0.896
Police Constable	39	78.0	40	76.90		

Work experience in Nepal traffic police >10 years ≤10 years	11 39	22.0 78.0	9 43	17.30 82.70	0.356	0.551
Participate in conference/ seminar Yes No	6 44	12.0 88.0	14 38	26.90 73.1	3.601	0.058

*Yate's Correction for Continuity.

Association between the variables was calculated using Chi-square test and Fisher's Exact Test and found no significant association between the selected independent variables (age, gender, education level, designation, work experience, duty hours per day, and participation in seminar and conference on air pollution) and level of practice since all of those p-values is >0.05 (Table 6).

Table 6: Association between Level of Practice and Selected Personal Characteristics.

Variables	Level of Practice Chi- square P-value					
	Adequate		Inadequate			
	n	%	n	%		
Age ≤ 30 years > 30 years	 31 13	 70.5 29.5	 38 20	 65.5 34.5	0.279	0.598
Gender Male Female	 43 1	 97.7 2.3	 55 3	 94.8 5.2	0.053	0.816*
Education level Below Bachelor Above Bachelor	 36 8	 81.8 18.2	 48 10	 82.8 17.2	0.015	0.902
Designation Above Police constable Police constable	 9 35	 20.4 79.5	 14 44	 24.1 75.9	0.194	0.659
Work experience in Nepal traffic police >10 years ≤ 10 years	 10 34	 22.70 77.3	 10 48	 17.20 82.8	0.478	0.489
Duty hours per day >15 hour ≤15 hour	 9 35	 20.50 79.5	 18 40	 31.0 69.0	1.439	0.230
Exposure to conference/ seminar Yes No	 8 36	 18.20 81.8	 12 46	 20.7 79.3	0.100	0.752

*Yate's Correction for continuity.

The relationship between level of awareness and level of practice are positively correlated (r = 0.334, P = 0.001) which is statistically strongly significant. It clearly shows that traffic police who had adequate level of awareness also had adequate level of practice (Table 7).

Table 7: Relationships between Level of Awareness and Level of Practice.

Level of awareness	Level of practice				Pearson Correlation (r- value)	P- value
	Adequate		Inadequate			
	Number.	%	Number	%		
Adequate	30	60.0	20	40.0	0.334	0.001**
Inadequate	14	26.9	38	73.1		
Total	44		58	102		

Correlation Level of Significance is 0.01.

Discussion

The result of this study shows that majority of traffic police had above SEE level of education, 77.5% were police constable and 80.4% did not have any training, seminar or workshop on prevention of respiratory problems related to air pollution. This study showed that the traffic police had knowledge regarding adverse effects on respiratory system due to air pollution. They had answered flu and common cold (78.2%), lung cancer (78.2%), allergies (69.3%), bronchial asthma (65.3%), chronic bronchitis (39.6%) and pneumonia (19.8%) as effects of outdoor air pollution to respiratory system. Indifferent with these findings, another study conducted in Kathmandu reported that pneumonia (90.4%) bronchial asthma (76.5%) and lung cancer (60.8%) as effects of air pollution on respiratory system while about 6.0% did not know about respiratory problems [13]. Similarly, studies carried out in India have also reported that there is increased risk of getting different respiratory problems when traffic police are exposed to polluted air for a longer time [14,15].

In this study, traffic police were aware about signs and symptoms of respiratory problems, similar findings also reported by other studies conducted in Kathmandu [16]. In present study, majority of the traffic police had knowledge that they need to use antipollution mask (91.2%) which is higher that the finding of another study conducted in Kathmandu where 74.7% had knowledge about need to use antipollution mask for prevention of respiratory problems [16]. This difference might be due to difference in study period, population and sample size. In present study, 57.8% traffic police had knowledge about need to do regular health checkups to prevent respiratory problems caused by outdoor air pollution which is similar as findings of the another study done in Kathmandu [13].

In current study, 100% of the traffic police had used face mask during their duty hours and more than half (54.9%) of them had used protective antipollution mask during the duty hours working in traffic zone. These findings are higher than the studies of Kathmandu where 86.1% to 94.0% traffic police had used mask during their duty hour [13,16]. These differences might be due to difference in study period, population and sample size. Only few (9.8%) traffic police had practice of regular health checkups in this study. This finding is almost similar with finding of another study conducted in Kathmandu where 9.6% had done regular health checkups where as 35.5% had done regular health checkups in the study done by Karki, K.C. and Neupane [13].

The mean score for total awareness questions was 31.49 ± 10.92 and a half (51.0%) of the traffic police had inadequate and 49.0% had an adequate level of knowledge. Inconsistent to these findings, a study done in Kathmandu reported 41.0%, 34.9% and 24.1% had average, above average and the below-average level of knowledge respectively. These differences might be due to differences in categorization for the level of knowledge [16].

Similarly, in this study, more than half (56.9%) of the traffic police had an inadequate level of practice and less than half (43.1%) had an adequate level of practice. In contrast to these findings, the study done in Kathmandu reported 88.0% had below-average level of practice, 7.2% had an average (50-69%) and 4.8% had above average (>70%) level of practice [16] whereas similar findings were reported by another study where 54.6% had poor 42.9% fair and 2.5% had a good level of practice [12]. Similarly, the study conducted in the Udaipur district of Rajasthan also reported the contrast findings where most of the traffic policemen (75%) had average knowledge, and all traffic policemen had poor practices

regarding health hazards management against air pollution. These differences might be due to differences in population, sample size, and study settings [17].

In this study level of awareness was reported comparatively higher (49.0%) than the level of practices (43.1%) among the traffic police. Similar findings were reported in a study of Kathmandu where the level of knowledge was found to be average in 41.0%, while the level of practice was below average in 88.0% [16]. Similarly, a study conducted to find out knowledge and practice of occupational hazard among traffic police of Kathmandu reported that good knowledge (28.4%) was higher than good practice (2.5%) [12]. Similar findings were also reported in a study by Karki, K.C. and Neupane where (54.2%) had average, 26.5% had below average and 19.3% above average level of knowledge on the respiratory problem. Likewise, 77.1% had below average, 18.1% had average and 4.8% had above average practice level in the prevention of respiratory problems [13].

Present study did not find any significant association between level of awareness and age, gender, education level, designation, work experience, and participation in seminars/conference. This finding is contradicted to the study of Kathmandu reported a significant association between level of education and level of awareness [16]. But similar findings from another study of Kathmandu had reported no significant association with gender, level of education, and work experience whereas the association with age group and level of knowledge as to be reported [12]. This may be due to different sample sizes, settings, populations, time, and different levels of awareness categorization.

Likewise, the findings of this study reported that there was no significant association between level of practice with age, gender, education level, designation, work experience in the traffic police, duty hours per day, and participation in conference/seminar. In contrast to these findings, level of practice was found to have a significant association with age, sex, and work experience of the study conducted in Kathmandu [12]. Similarly, another study also reported that a significant association was found between work experience and level of practice [16]. This might be due to different sample sizes, study setting, population, time, and different levels of practice categorization.

In this study, The relationship between the level of awareness and level of practice are positively correlated ($r = 0.334$, $P = 0.001$) which is statistically strongly significant. It clearly shows that traffic police who had an adequate level of awareness also had an adequate level of practice. Similar findings are reported by different studies [18,19].

Conclusion and Recommendations

Traffic police working in Kathmandu metropolitan city had not adequate level of knowledge and practices regarding prevention of respiratory problems. However more the level of awareness of the traffic police better will be in the practice regarding the prevention of respiratory problems. Awareness of educational programs regarding the prevention of respiratory problems should be provided to enhance better practices and to prevent potential health threats among Nepal traffic police.

Limitations

As the study was a descriptive cross-sectional design with a non-probability purposive sampling technique and limited only to five traffic stations of Kathmandu valley, it cannot be generalized in other populations and settings. Practice on prevention of respiratory problems among traffic police was assessed by using self-administered questionnaire instead of observation with a checklist.

Implications

The findings of this study might be helpful to provide baseline information regarding the existing level of awareness and practice regarding the prevention of respiratory problems among traffic police of Kathmandu valley which is useful to future researchers. Similarly, the findings might be useful to concerned authorities to plan awareness programs on the prevention of respiratory problems. Also, helps to develop training packages to minimize occupational health hazards and to promote the health of traffic police personnel.

Conflict of Interest

Authors declare that there is no conflict of interest.

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Bibliography

1. Forum of International Respiratory Societies. "The Global Impact of Respiratory Disease". 2nd ed, *Sheffield, European Respiratory Society*, (2017).

2. World Health Organization. "Ambient (Outdoor) air pollution". *World Health Organization*, Geneva (2016).

3. The World Bank. "Managing Nepal's Urban Transition". The World Bank, News, 1 April, USA (2013).

4. World Health Organization. "Ambient and Household Air Pollution and Health". *World Health Organization,* Geneva (2014).

5. Shakya K M., *et al*. "Respiratory effects of high levels of particulate exposure in a cohort of traffic police in Kathmandu, Nepal". *Journal of Occupation and Environmental Medicine* 58.6 (2016): 218-225.

6. Tamang RS. "Air pollution causing more deaths than road accidents". *My Republica,* Wednesday, 12 July (2017).

7. Metropolitan Traffic Police Division. Kathmandu (2017).

8. World Health Organization. "7 million premature deaths annually linked to air pollution". *World Health Organization*, News release, 25 March (2014).

9. Shrestha H S., *et al*. "A Cross-Sectional Study of Lung Functions in Traffic Police Personnel at Work in Kathmandu Valley, Nepal". *Annals of Clinical Chemistry and Laboratory Medicine* 1.1 (2015): 42-48.

10. Sydbom A., *et al*. "Health effects of diesel exhaust emissions". *European Respiratory Journal* 12.4 (2001): 733-746.

11. Cochran W G. "Sampling techniques". 2nd Ed., New York: John Wiley and Sons, Inc., (1963).

12. Panta S and Neupane M. "Awareness and Practice Regarding Prevention of Occupational Hazards among Traffic Policemen in Kathmandu". *Journal of Chitwan Medical College* 6.17 (2016): 39-45.

13. Karki K., *et al*. "Prevention of Respiratory Problems among traffic police: A cross sectional study in Kathmandu valley exploring knowledge and practice". *Al Ameen Journal of Medical Sciences AJMS* 11.3 (2018): 142-146.

14. S Gupta., *et al*. "Respiratory effects of air pollutants among nonsmoking traffic policemen of Patiala, India". *Lung India* 28.4 (2011): 253-257.

15. R Sayyad., *et al*. "Evaluation of pulmonary function tests on non smoking traffic police men at Tirupati, AP, India". *International Journal of Physiotherapy and Research* 1.5 (2013): 279-282.

16. Aryal Ambika., *et al*. "Awareness and Practice Regarding Prevention of Respiratory Problems in Traffic Police, Kathmandu". *International Scholarly Research Notices* 2015.716257 (2017).

17. Rawat Vijay S. "A Descriptive Study to Assess the Knowledge, Attitude and Practices Regarding Health Hazards Management Against Traffic Pollution Among Traffic Policemen Working at Udaipur District". *Journal of Drug Delivery and Therapeutics* 9.4 (2019): 1138-1140.

18. Wannalai Sasiwimol., *et al*. "Assessment of Knowledge and Perception of Adverse Health Effects Associated with Self-Prevention from Air Pollution in Traffic Policemen in Bangkok, Thailand". *Journal of Health Research* 30.2 (2016).

19. Shashidhara GS. "Descriptive Study to Assess the Knowledge, Attitude and Practice Among Traffic Policemen to Protect Against Health Hazards in Bangalore City". *International Scholarly Research Notices*, (2005).