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Traffic Air Pollution and Respiratory Health: A Cross-Sectional Study among Traffic Police in Dhaka City (Bangladesh)

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Abstract
Air pollution from vehicles is the main source of pollution in capital city of Bangladesh. Road traffic has the potential to significantly increase emissions of pollutants such as carbon monoxide, oxides of nitrogen, particulate matter, and hydrocarbons. These pollutants can induce harmful effects on health. Road traffic exposes traffic police to the detrimental effects of air pollutants on respiratory health. This study determined the frequency of chronic respiratory illnesses and its related factors among traffic police in Dhaka, Bangladesh. This study had a cross-sectional design conducted in a total of 384 traffic polices in different traffic zone of Dhaka city, the capital of Bangladesh. A questionnaire was used to inquire about socio-economic characteristics, occupational factors and respiratory health problems of traffic polices. According to the present study, most the respondents (84.4%) had respiratory problems and among them cough problem are most common (31.2.1%) followed by phlegm problem (27.6%), whistling problem (15.4%) when getting cold, and breathlessness when walking (4.4%) respectively. About 3.1% were suffering from asthma and among them 2.1% had been suffering from asthma for less than 15 years. About 9.1% cases there had a history of parental lung diseases and lung cancer are the most common (1.3%). Among the Safe PM 2.5 status only 75.9% have respiratory problems and 95.2% having respiratory problems were in unhealthy PM2.5 status. And it is also shown that there was significant association between respiratory problems and PM2.5 status. Among the Safe PM 10 status 70.6% have respiratory problems and 98.9% having respiratory problems were in unsafe PM 10status. And it is also shown that there was significant association between respiratory problems and PM 10 status. The respiratory symptoms and illnesses observed among traffic police are associated with their exposure to air pollutants from road traffic.
Keywords: *Traffic Air Pollution, Respiratory Health, Traffic police.*

Introduction

Air pollution from vehicles is the main source of pollution in capital city of Bangladesh[1]. Road traffic has the potential to significantly increase emissions of pollutants such as carbon monoxide, oxides of nitrogen, particulate matter, and hydrocarbons.

These pollutants can induce harmful effects on health[2-5]. Inhalation represents the fundamental mechanism of exposure to pollutants in humans[6-8]. Consequently, the respiratory system becomes a primary target of the adverse effects of air pollution[9]. Chronic respiratory diseases can have environmental causes such as exposure to air pollution[10].

Chronic respiratory diseases are affecting more and more people in the world. The WHO has estimated 235 million people with asthma and 64 million people with COPD worldwide[10-12]. Many studies have shown that some people are more exposed than others to air pollution due to their professional activity[6]. Traffic polices are exposed to large quantities of ambient air pollutants when they are on duty in different traffic zone of Dhaka city. In Africa, unlike developed countries, little research has been done on the respiratory health of workers who are highly exposed to air pollution from cars. These studies were largely conducted among traffic police[13,14]. The purpose of this study is to obtain data on respiratory health status of traffic polices in order to advocate and adopt targeted strategies to protect them and the population from the deleterious effects of air pollution from road traffic. This study aimed to assess the respiratory health of traffic polices exposed to chronic air pollution in Dhaka city.

Materials and Methodology

This Cross sectional study was conducted from 1st January to 31st December, 2018 at the different traffic zone of Dhaka city (east/west/south/north) among 384 traffic polices who were selected purposively. The traffic police who have been working for minimum 2 year were included for this study and traffic police with known respiratory deformities were excluded.

A purposive sampling technique was used and data were collected through face to face interview using a semi structured questionnaire (close ended). It was designed on the basis of American Thoracic Society (ATS) guideline European committee of Respiratory Health survey questionnaire (ECRSH).

The interview of the traffic police was arranged according to their work schedule. Before starting the interview informed written consent was taken from each traffic police and individual information was recorded on a separate questionnaire for each.

Collected data were checked edited and entered the coded questionnaire in SPSS 23 version for analysis.

Results

In this study we have 384 participants. Mean age was 39.03($\pm$8.33) years. Out of 384 respondents 352 (91.7%) were Muslim and 31 (8.1%) were Hindu. About 195 (50.8%) participants have completed secondary level of education, 108 (28.1%) have completed higher secondary, 81 (21.1%) have completed higher education like BA, MA etc. Average monthly income of the respondents was BDT 31840.89 ($\pm$6102.79). 193 (50%) respondents have smoking habit (Table 01).

According to the present study, most the respondents (84.4%) had respiratory problems and among them cough problem are most common (31.2.1%) followed by phlegm problem (27.6%), whistling problem (15.4%) when getting cold, and breathlessness when walking (4.4%) respectively. (Table 02).

About 3.1% were suffering from asthma and among them 2.1% had been suffering from asthma for less than 15 years. About 9.1% cases there had a history of parental lung diseases and lung cancer are the most common (1.3%).

Among the Safe PM 2.5 status only 75.9% have respiratory problems and 95.2% having respiratory problems were in unhealthy PM2.5status. And it is also shown that there was significant association between respiratory problems and PM2.5 status

Among the Safe PM 10 status 70.6% have respiratory problems and 98.9% having respiratory problems were in unsafe PM 10status. And it is also shown that there was significant association between respiratory problems and PM 10 status (Table 02). .

Table 1: Presence of respiratory problems in relation to different factors

Socio-demography	Category	f (%)	Mean (±SD)
Age	20-29 years	49 (89.1%)	
	30-39 years	95 (78.5%)	0.139
	40-49 years	150 (86.7%)	
	>49 years	30 (85.7%)	
Smoking status	Yes	165 (85.5%)	0.554
	No	159 (83.2%)	
Duration of employment	<10 years	109 (79.6%)	
	>10 years	215 (87.0%)	0.053
PM 2.5 status	Safe (<100ug/m3)	164 (75.9%)	0.001
	Unsafe (>100ug/m3)	160(95.2%)	
PM 10 status	Safe (<150ug/m3)	139 (70.6%)	
	Unsafe (>150ug/m3)	185 (98.9%)	0.060

Table 2: Distribution of respondents according to different respiratory health problems

Variables	Frequency	Percent
Cough	120	31.2
Phlegm	106	27.6
Whistling	70	18.3
Breathless when walking	17	4.4

Discussions

The relationship between occupation and occupational pulmonary contaminants and respiratory health problems have been studied since earlier. But in Bangladesh there is very limited study about respiratory health problems among traffic police. This study was designed to explore the prevalence of respiratory health problems among traffic police in Dhaka city. This study showed that respiratory problems among the traffic police of 20-29 years of age (89.1%), 30-39 (78.5%), 40-49 (86.7%) and >49 (85.7%) years. Age 30-39 (78.5%) traffic police had less respiratory problems. The findings indicated that the reasons for higher respiratory problems amongst young study subjects may include lack of information, lack of training, lack of supervision, lack of experience on the job, lack of knowledge and skill. Older workers had lower chance of injury which may be because they had more work experience but on the other hand, it was also possible that because of their seniority, they were less exposed to the occupational hazards in the workplace in their actual assignments. Most of the study found that having respiratory problems higher among the older age group[15].

The respondents having respiratory problems was found higher among the smoker than the non-smoker. It's because the smoking causes respiratory problems and reduction of lung capacity. The same finding also found in several study[16].

The percentage of respiratory health problems was 79.6% among the respondent who were employed in Dhaka city for less than 10 yrs. followed by 87% of the respondent who were employed in Dhaka city for more than 10 yrs. That means the respondent are exposed to air pollution for more than 10 years had much respiratory problems. The Same type findings was also found in several study[17].

Different studies showed that where the level of PM10 was increased there was presence of different respiratory health problems and also shown that there was significant association between them. And also, in present study it was estimated that where PM2.5 and PM10 level increased there was presence of different respiratory health problems and also in unhealthy PM2.5 and PM10 level there was high prevalence of respiratory problems. And there was significant association[18-20].

Conclusions

This cross-sectional study was conducted among traffic police in different traffic zone of Dhaka city to find out the proportion of traffic police having respiratory health problems. Among total respondent 5% respondent had respiratory problems. The percentage of respiratory health problems was

higher among the respondent who were appointed as traffic police in Dhaka city for more than 10 yrs. The respiratory health problems were higher among the respondent who did not smoke. Among the ways, the use of mask and regular health checkup can prevent the effects of air pollution. The majority of the traffic police did not use masks during duty hours and had rotation in duty areas. The level of knowledge among the traffic police is adequate, but the level of practice on prevention of respiratory health problems is not satisfactory. Association of level of practice was observed with working experience but not with education of the traffic police in Dhaka. It is the responsibility of the government and concerned authorities to deal with the issues and derive effective and sustainable solutions to ensure better health of traffic police in the city.

Acknowledgments

Declarations

Conflict of Interest: No competing interests relevant to this study to disclose for all authors. Full forms submitted and on file for all authors.

Ethical Approval: The objectives and importance of the research were explained to all participants prior to recruitment. Participation in the study was voluntary. The confidentiality of the participants was maintained, and written informed consent as well as ascent was obtained from all participants. The study was approved by the Institutional Review Board (IRB) of the National Institute of Preventive and Social Medicine (NIPSOM) and obtained an ethical clearance waiver from same source.

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