Journal of Public Health in Africa
Received 6 Feb 2022 | Accepted 21 Apr 2022 | Published Online 11 Jan 2023

DOI: https://doi.org/10.4081/jphia.2022.2147
JPHIA 13 (4), 2147 (2022)

ISSN (O) 2038-9930 IF:0.0

ORIGINAL ARTICLE

Respiratory symptoms among urban traffic policemen in Bangladesh: a cross-sectional study

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Abstract

Background: There is accumulating evidence that roadside pollution is detrimental to health. Traffic police personnel are exposed to roadside pollution due to the nature of their job and are at risk of adverse health outcomes.

Objective: This study aims to compare the risk of adverse respiratory symptoms in different categories of traffic police including traffic constables, sergeants, and inspectors.

Methods: The study population consisted of 369 randomly selected traffic police personnel from the city of Chittagong in Bangladesh. Information on their occupation and respiratory health symptoms were collected. The health outcomes were coughing, coughing sputum, coughing up blood, shortness of breathing, wheezing, and chest pain

Result: The risk of coughing [adjusted Odds Ratio (AOR) = 4.469, 95% CI=1.265-15.793], coughing sputum [AOR= 3.687, 95% CI= 1.004 -13.540], coughing up blood [AOR=1.040, 95% CI=0.227-6.162], shortness of breathing [AOR=3.937, 95% CI=1.069-14.500], wheezing [AOR= 2.464, 95% CI= 0.613-9.906] and chest pain with deep breathing [AOR=2.163,95% CI= 0.560-8.349] was higher in traffic constables compared to inspectors. In sergeants odds increased for coughing up blood [AOR=1.102, 95% CI= 0.283-4.286] and wheezing [AOR=1.260, 95% CI= 0.304-5.229].

Conclusion: There was a substantial difference in the risk of studied respiratory symptoms between different categories of traffic police jobs. Targeted occupational health interventions are recommended.

INTRODUCTION

Environmental exposures during work activities can affect health. Traffic police carry out assigned duties connected with or intended to facilitate the management of traffic on the relevant road network. Due to the nature of the job, traffic police personnel spend a long duration of time by the roadside and are exposed to vehicular emissions in cities that can cause both long- and short-term health problems. Previously conducted epidemiological studies reported the association of occupational health hazards such as environmental pollution due to vehicular emission and adverse respiratory health outcomes in traffic police personnel. [1,2]

Road traffic pollution is a major source of Particulate Matter (PM), Nitrous Oxide (NO), Carbon Dioxide (CO2), Ozone, Carbon Monoxide (CO) and is responsible for injury to the terminal bronchioles and decreases in pulmonary compliance, vital capacity and lung function.[3,4] According to World Health Organization,[3] million deaths are linked with ambient air pollution every year and the main source of this ambient air pollution are vehicle exhausts and vehicular fumes. Outdoor air pollution increases the morbidity rate of CVD, stroke, respiratory infection, chronic obstructive pulmonary disease (COPD).[5]

Bangladesh, one of the most densely populated countries in the world, is going through economic transition and rapid urbanization in recent years. The numbers of motor vehicles are also rapidly increasing in Bangladesh with urbanization. Major cities of Bangladesh, particularly Chittagong and capital city Dhaka is congested with a large number of motor vehicles, including local transport buses, long route buses, diesel-run local passenger vans, passenger cars, commercial vans, private cars, compressed natural gas (CNG)-run auto-rickshaws, and heavy-duty diesel-powered lorry trucks for the shipment of garment products to the Chittagong port. Most of these vehicles use high-sulfur diesel. Other fuels used are gasoline and natural gas.[6] Air quality of Dhaka, the capital city of Bangladesh, is considered to be one of the most polluted in the world, at 82 $\mu g/m^3$ annual average PM2.5 concentration from a variety of pollution sources and ranked as the third most polluted city among the megacities with at least 14 million people.[7] According to the Bangladesh Road and Transport Authority (BRTA), there were 504,130.000 registered motor vehicles in 2019 in Bangladesh, most of which were decades old and unfit for the road, polluting the environment severely.[8] Exhaust and fumes of these vehicles are a major source of NO_2 emissions and CO emissions in Chittagong and Dhaka, accounting for some 58.6% of the total annual NO_2 emissions and 40.5% of the total CO emissions.[9] The concentration of PM particles, SO_2, Ozone, Carbon monoxide in some cities of Bangladesh including Chittagong city has been found well above the recommended level of the World Health Organization (WHO). [10,11]

Despite high pollution and vulnerability, very limited studies have been done so far in Bangladesh regarding the respiratory health of urban traffic policemen. This study aims to assess the risk of adverse respiratory health outcomes in different categories of traffic police including constables, sergeants, and inspectors in Bangladesh.

MATERIALS AND METHODS

Study setting

A cross-sectional study was conducted in Chittagong city of Bangladesh. The data collection process was carried out from June 1st, 2018 to August 31st, 2018.

Study population and work environment

Study participants were traffic police personnel working in different areas in the city of Chittagong of Bangladesh. In Bangladesh, traffic police constables, by job definition are assigned in traffic control and management at traffic junctions, traffic inspectors coordinate scheduled service within assigned

Supplementary information The online version of this article (Tables/Figures) contains supplementary material, which is available to authorized users.

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territory of streetcar, bus, or railway transportation system with the periodical investigation in schedule delays for accidents, equipment failures, complaints and files written report, and sergeants perform patrol duties in roads to address traffic infringement or violation and is responsible for the initial scene management of incidents. The road traffic is very dense at most of the traffic junctions in Chittagong city either because of nonfunctional traffic lights or due to traffic snarl-ups. Traffic police personnel aged 20 years or over were invited for the study.

Determination of sample size

The sample size for the prevalence of the respiratory disease among traffic police was determined using single proportion formula with the following assumptions: level of significance (α) =5%, (at a confidence level of 95%), p= 68% (According to a study done in India, 68% traffic police personnel had frequent coughing and other complications with various percentages due to occupational exposure. India was considered for expectation prevalence for this study since India and Bangladesh are located in the same geographical region and both countries share similar types of exposures).[12]

Value=1 96, marginal error d=7% of p,

$n = z^2 * p * (1-p)/d^2 = 369$

Simple random sampling technique was used to collect police personnel following STROBE guideline (https://www.strobe-statement.org/index.php?id=available-checklists).

Variables

The survey about respiratory symptoms was based on a questionnaire adapted from the Standard Respirator Medical Evaluation Questionnaire.[13] The questionnaire covered the following respiratory symptoms: coughing, coughing sputum, wheezing, coughing up blood, shortness of breathing, and chest pain with deep breath. Respiratory symptoms were recorded as being present if a participant answered, "Yes", to a relevant question. The participants were provided with explanations about each respiratory symptom.

The questionnaire also included socio-demographic information of the participants including age, height, weight, marital status, job information including job title (inspector, sergeant, or constable), preventive measures such as using a face mask, information about behavioral factors including smoking and workout habits (exercise), and history of a previous respiratory disease diagnosed by a doctor including Asthma, Tuberculosis, Chronic Bronchitis, Emphysema, Pneumonia, Pneumothorax, Cancer, Tuberculosis, chest injury or surgery, broken ribs, allergic reaction interfering with breathing.

Three trained data collectors went to area sites with questionnaires after obtaining approval from the police authority and conducted face-to-face interview after obtaining the consent of the participants. Validation of respiratory symptoms (complains) was done daily by a registered medical doctor (first author).

Research approach

The research approach of the present study was the identification of the type of industries where there is an excess risk of adverse respiratory health outcomes. Focus on workers in these occupations can lead to recognition of one or several factors, which may have independent or synergic effects.[14]

Data management and analysis

All data were recorded and analyzed in Statistical Package for the Social Sciences (SPSS) version 22.

In the present study, traffic inspectors were used as the reference category to compare the risk of respiratory health outcomes among traffic police as traffic inspectors are considered least exposed to roadside exposure due to their nature of job responsibilities and duties.

To determine the risk of respiratory outcomes among traffic police, a two-step statistical model approach was undertaken. First, the prevalence of adverse respiratory health outcomes in different traffic police by job title (duty type) was measured. Second, the risk of adverse respiratory outcomes was compared to different categories of traffic police by job title (duty). Odds Ratio with 95% confidence interval (CI) was the measure of association. Logistic regression analysis was conducted to estimate adjusted Odds Ratio where covariates such as age, BMI, education, smoking status, use of face mask, workout (exercise), and previous respiratory diseases were adjusted for

each of the other.

Ethical consideration

The study was approved by the Research and Ethics Committee of the Asian University for Women, Bangladesh. Informed verbal consents of the participants were obtained before data collection. The study followed the Helsinki declaration and the confidentiality of participants was maintained.

RESULTS

Table 1 describes the sample characteristics according to the job title. 25 inspectors, 145 sergeants, and 199 constables participated in the study. There was no missing information. A substantial difference was observed in the distribution of socio-demographic determinants, which could be partly explained by relatively small numbers in some groups. For example, the prevalence of masks used at the workplace was 16.0% in traffic inspectors which was 34.5% in sergeants and 13.6% in constables. However, workout habit was found to be almost the same in all the occupational groups.

Table 2 shows the prevalence of present respiratory symptoms and previous respiratory illness diagnosed by a doctor according to the job title. There were substantial differences in the prevalence of all present respiratory symptoms according to the job title. For example, the prevalence of coughing was 24 % in the inspectors, 7.6% in the sergeants, and 21.6% in constables while corresponding estimates for coughing sputum were 24.0%, 7.6%, and 19.1% respectively. The participating traffic inspectors, sergeants, and constables were found to have almost no history of previous respiratory diseases, which could be partly explained by the recruitment of healthy personnel in the police service including the traffic police service of Bangladesh.

Table 2 shows logistic regression analysis of respiratory symptoms according to job title (duty type). Constables were found at risk for all the studied respiratory symptoms in comparison to the inspectors for coughing (adjusted Odds Ration=4.469, 95% CI = 1.265-15.793), coughing sputum (adjusted odds ratio=3.687, 95% CI= 1.004 -13.540), shortness of breathing (Adjusted Odds Ratio = 3.937, 95% CI= 1.069-14.500). Risk also increased for wheezing (adjusted odds ratio=2.464, 95% CI=0.613-9.906), chest pain with deep breathing (adjusted Odds Ratio=2.163, 95% CI=0.560-8.349), and coughing up blood (adjusted odds ration=1.040, 95% CI=0.227-6.162), however, the risk was not significant statistically. Risk moderately increased in sergeants for coughing up blood [AOR=1.102, 95% CI= 0.283-4.286] and wheezing [AOR=1.260, 95% CI= 0.304-5.229], in comparison to traffic constables, however, the risk was not significant.

DISCUSSION

Roadside pollution has become a major public health concern in developing countries. The result of this cross-sectional study shows a large variation in the prevalence of respiratory symptoms among the categories of traffic police in Bangladesh. The random sampling technique minimized selection bias in the study. Misclassification was unlikely to occur as the source population was recruited from designated traffic boxes (mini traffic stations by the roadside). The study explored a high prevalence of respiratory symptoms in different branches of traffic police. A similar high prevalence of respiratory among traffic policemen was reported in studies conducted in India and Thailand.[15,16]

The use of a questionnaire was useful to take into account a large number of potential confounders. After adjustment of potential covariates, constables were found at risk of coughing, cough sputum, coughing up blood, shortness of breath, wheezing, and chest pain with deep breathing in comparison to the inspectors. Similar to the present study, an epidemiological study conducted before in Italy also reported that traffic police personnel assigned for traffic control management by the roadside are at high risk of adverse respiratory symptoms including coughing, wheezing, shortness of breathing, and asthma in comparison to traffic police personnel assigned for administrative duties at the office.[17]

The elevated risk of studied respiratory symptoms in constables could be explained by direct and continuous roadside exposure to traffic pollution which has

been shown to be a direct correlate.[18,19] Roadside exposure among the traffic constables is continuous and direct in comparison to inspectors and which makes them vulnerable to adverse respiratory health outcomes. A recently conducted comparative study in Malaysia explored that traffic police personnel who were working by the roadside are at high risk of adverse respiratory outcomes in comparison to unexposed occupational groups due to continuous and direct exposure.[20] Continuous and direct exposure to toxic chemicals and gases of vehicular emission cause irritation and allergy in the lungs and airways, airway obstruction, and increased mucus production leading to obstructive lung diseases.[21,22] Although the human bronchopulmonary tract has multiple protective mechanisms, such as the air-blood barrier and mucosal cilia, air pollutants are able to accumulate in or pass through lung tissues depending on the size and chemical nature of pollutants.[23] The vapor of air pollutants is prone to be absorbed by human tissues or dissolved in body fluids, relying mostly on hydrophilicity and hydrophobicity. The ultrafine particles are capable of translocation through blood circulation to distal organs and tissues, such as liver tissue for detoxification.[24] Particles deposited in the respiratory tract in sufficient amounts can induce pulmonary inflammation. Controlled human and animal exposure studies have demonstrated increased markers for pulmonary inflammation following exposure to a variety of different particles.[25] Airway inflammation increases airway responsiveness to irritants such as particle pollution, allergens, and gaseous pollutants, reducing lung function by causing bronchoconstriction. At the cellular level, inflammation may damage or kill cells and compromise the integrity of the alveolar-capillary barrier. Repeated exposure to particle pollution aggravates the initial injury and promotes chronic inflammation with cellular proliferation and extracellular matrix reorganization.[26]

As regards to subjective symptoms of the current study, investigated by means of the questionnaire, positive results were more prevalent among the constables than inspectors, this difference being statistically significant which seems to be in agreement with what was observed by a study conducted in China which showed an increase of respiratory symptoms in road traffic workers.[27] Regarding the research approach of the study, the identification of the type of industries and occupations where there is an excess risk of adverse respiratory health outcomes is in agreement with a study done before in Italy.[28]

LIMITATION

This study, to the best knowledge of the authors, is the first of its kind that measures the association of adverse respiratory health with traffic police occupation in Bangladesh. However, there are some limitations in the present study. Given the cross-sectional design of the study, it has limited capability to infer causality. The relatively small number in the reference group can affect the validity of the outcome of the study. Also, the personal exposure levels of subjects were not evaluated. Further epidemiological studies, on larger samples and environmental air quality data provided, are required to better understand and define the role of urban pollution-related respiratory diseases in traffic police personnel.

CONCLUSIONS

The study explored that there was a substantial difference in the risk of studied respiratory symptoms between different categories of traffic police jobs. The findings suggest a valuable need for targeted occupational health interventions such as the use of protective masks at the workplace and periodic medical surveillance to prevent respiratory morbidity and mortality in traffic police personnel working in a polluted environment.

INFORMATION

Acknowledgments: Asian University for Women, Bangladesh.

Contributions : PA conceptualized the study, NA and ME coordinated data collection, PA and ME coded all transcripts, PA analyzed all study findings, PA drafted the manuscript and all authors critically

reviewed and contributed towards the manuscript. All authors read and approved the final manuscript.

Conflict of interest: None.

Funding: None.

REFERENCES

1. Han X, Naeher LA. Review of traffic-related air pollution exposure assessment studies in the developing world. Environ Int 2006; 32:106–20. doi: 10.1016/j.envint.2005.05.020. Epub 2005 Jul 6. PMID: 16005066.

2. Gowda G, Thenambigai R. A Study on Respiratory Morbidities and Pulmonary Functions among Traffic Policemen in Bengaluru City. Indian J Community Med 2020; 45(1):23-26. doi: 10.4103/ijcm.IJCM_102_19. PMID: 32029979; PMCID: PMC6985951.

3. Ingle ST, Pachpande B, Wagh N, Patel VS, Attarde SB. Exposure to vehicular pollution and respiratory impairment of traffic policemen in Jalgaon City, India. Ind Health 2005; 43(4):656-62, DOI: 10.2486/indhealth.43.656 PMID: 16294920

4. Sasikumar, S, Maheshkumar, K, Dilara, K, Padmavathi R. Assessment of pulmonary functions among traffic police personnel in Chennai city - A comparative cross-sectional study. J Family Med Prim Care 2020; 9(7): 3356–3360. doi: 10.4103/jfmpc.jfmpc_1126_19. PMCID: PMC7567253 PMID: 33102296

5. World Health Organization. 7 million premature deaths annually linked to air pollution. World Health Organization; 2014. Available at

6. Rahman M, Mahamud S, Thurston G. Recent spatial gradients and time trends in Dhaka, Bangladesh, air pollution and their human health implications. J Air Waste Manag Assoc. 2019; 69(4):478-501. doi: 10.1080/10962247.2018

7. Health Effects Institute. State of Global Air 2020. Special Report. Boston, MA: Health Effects Institute. Available at https://www.stateofglobalair.org/

8. Ahmed S, Mahmood I. Air pollution kills 15,000 Bangladeshis each year: The role of public administration and governments integrity. J Pub Admin Policy Res. 2011; 3(4):129–40. Available at https://academicjournals.org/jpapr

9. Randall S, Sivertsen B, Ahammad, S, Cruz ND, Dam TV. Emissions Inventory for Dhaka and Chittagong of Pollutants PM10, PM2.5, NOx, SOx, and CO. January 2015. Available at https ://bit.ly/3UIKARt

10. Rouf MA, Nasiruddin M, Hossain AMS, Islam MS. Trend of ambient air quality in Chittagong City. Bangladesh J Sci Ind Res2012; 47(3):287-296.

11. Hasan MR, Hossain MA, Sarjana U, Hasan MR. Status of Air Quality and Survey of particulate Matter Pollution in Pabna City, Bangladesh. Am J Eng Res 2016; 5(11):18-22

12. Gupta S, Mittal S, Kumar A, Singh DK. Respiratory effects of air among nonsmoking traffic policemen of Patiala, India. Lung India 2011; 28(4):253-7. doi: 10.4103/0970-2113.85685.

13. Occupational Safety and Health Administration (OSHA). Respiratory Medical Evaluation questionnaire. USA: US Department of Labour; 1988.

14. Ahmed P, Jaakkola JJ. Maternal occupation and adverse pregnancy outcomes: a Finnish population-based study. Occup Med (Lond) 2007; 57(6):417-23. DOI: 10.1093/occmed/kqm038 PMID: 17566072

15. Satapathy D, Behera T, Tripathy R. Health status of traffic police personnel in brahmapur city. Ind J Com Med 2009; 34(1):71-2. doi: 10.4103/0970-0218.45380

16. Karita K, Yano E, Tamura K, Jinsart W. Effects of working and residential location areas on air pollution related respiratory symptoms in policemen and their wives in Bangkok, Thailand. Eur J Public Health 2004; 14(1):24-6. doi: 10.1093/eurpub/14.1.24.

17. DeToni A, Fillon LF, Finotto L. Respiratory diseases in a group of traffic police officers: results of a 5-year follow-up. G Ital Med Lav Ergon 2005; 27(3):380-82.

18. Kumar M, Shaker I, Kann N. The study of frequency domine analysis of HRV in traffic police. Int J Bioassays 2012; 1: 64–7. DOI: 10.21746/ijbio.2012.10.004

19. Jung TH. Respiratory Diseases in Firefighters and Fire Exposers. J Korean Med Assoc 2008; 51(12):1087-1096.DOI:

20. Chean KY, Abdulrahman S, Chan MW, Tan KC. A Comparative Study of Respiratory Quality of Life among Firefighters, Traffic Police and Other Occupations in Malaysia. Int J Occup Environ Med 2019; 10(4): 203–215. DOI: 10.15171/ijoem.2019.1657.

21. D'Amato G, Liccardi G, D'Amato M, Cazzola M. The role of outdoor air pollution and climatic changes on the rising trends in respiratory allergy. Respir Med 2001; 95(7):606-11.

22. Beverland IJ, Cohen GR, Heal MR, Carder M, Yap c, Robertson C. A comparison of short-term and long-term air pollution exposure associations with mortality in two cohorts in Scotland. Environ Health Perspect 2012; 120(9):1280-5. doi: 10.1289/ehp.1104509. Epub 2012 Jun 6.

23. D'Amato G, Cecchi L, D'Amato M. Urban air pollution and climate change as environmental risk factors of respiratory allergy: an update. J Investig Allergol Clin Immunol 2010; 20:95–102.

24. Falcon-Rodriguez C, Osornio-Vargas A, Sada-Ovalle I, Suegura- Medina P. Aeroparticles, composition, and lung diseases. Front Immunol 2016; 20; 7:3. doi: 10.3389/fimmu.2016.00003.

25. He F, Liao B, Pu J, Li C, Zheng M, Huang L, et al. Exposure to Ambient Particulate Matter Induced COPD in a Rat Model and a Description of the Underlying Mechanism. Sci Rep 2017 Mar 31; 7: 45666. doi: 10.1038/srep45666.

26. Berend, N. Contribution of air pollution to COPD and small airway dysfunction. Respirology 2016; 21(2):237-44. doi: 10.1111/resp.12644. Epub 2015 Sep 27.

27. Gao ZY, Li PK, Zhao JZ, Jiang RF, Yang BJ, Zhang MH, et al. Effects of airborne fine particulate matter on human respiratory symptoms and pulmonary function. Chin J Industr Hyg Occup Dis 2010; 28: 748–751.

28. Proietti L, Mastruzzo C, Palermo F, Vancheri C, Lisitano N, Crimi N. Prevalence of respiratory symptoms, reduction in lung function and allergic sensitization in a group of traffic police officers exposed to urban pollution. Med Lav 2005; 96(1):24-32.

How to cite this article: Ahmed P., Eaty M., Alam N., Anthony L., Yasmin N. **Respiratory symptoms among urban traffic policemen in Bangladesh: a cross-sectional study**. Journal of Public Health in Africa . 2022;1−10. https://doi.org/10.4081/jphia.2022.2147

TABLE 1: Characteristic of participants according to job title (N=369).

Variable		Job title			
		Inspector (n/%)	Sargent (n/%)	Constable (n/%)	Total (n/%)
Age (years)	<30	0 (0.0%)	4 (2.9%)	21 (23.6%)	25(6.8%)
	30-40	48 (33.8%)	86 (62.3%)	11 (12.4%)	145(39.3%)
	>40	94 (66.2%)	48 (34.8%)	57 (64.0%)	199(53.9%)
	X^2 =101.019,df=4,p=0.000				
Education	School	9 (36.0%)	0 (0.0%)	25 (12.6%)	34(9.2%)
	High school	9 (36.0%)	0 (0.0%)	141 (70.9%)	150(40.7%)
	Undergraduate and higher	7 (28.0%)	145 (100.0%)	33 (16.6%)	185(50.1%)
BMI	Underweight	0 (0.0%)	2 (1.4%)	3 (1.5%)	5(1.4%)
	Normal	4 (16.0%)	81 (55.9%)	113 (56.8%)	198(53.7%)
	Overweight	16 (64.0%)	62 (42.8%)	79 (39.7%)	157(42.5%)
	Obese	5 (20.0%)	0 (0.0%)	4 (2.0%)	9(2.4%)
	X^2 =101.019,df=6,p=0.000				
Marital status	Single	4 (16.0%)	12 (8.3%)	63 (31.7%)	79(21.4%)
	Married	21 (84.0%)	133 (91.7%)	136 (68.3%)	290(78.6%)
	X^2= 27.723,df=2,p=0.000				
Physical Exercise (workout)	Yes (always)	3 (12.0%)	11 (7.6%)	14 (7.0%)	28(7.6%)
	No	4 (16.0%)	83 (57.2%)	72 (36.2%)	159(43.1%)
	Sometimes	18 (72.0%)	51 (35.2%)	113 (56.8%)	182(49.3%)
Use of mask at workplace	Yes	4 (16.0%)	50 (34.5%)	27 (13.6%)	81(21.9%)
	Yes	4 (16.0%)	50 (34.5%)	27 (13.6%)	81(21.9%)
	Sometimes	14 (56.0%)	60 (41.4%)	124 (62.3%)	198(53.7%)
	No	7 (28.0%)	35 (24.1%)	48 (24.1%)	90(24.4%)
	X^2 =24.168,df=4,p=0.000				
Smoking status	No	25 (100.0%)	125 (86.2%	189 (95.0%)	339(91.9%)
	Yes	0 (0.0%)	20 (13.8%)	10 (5.0%)	30(8.1%)
	X^2 = 11.007,df=2,p=0.004				

TABLE 2: Prevalence of respiratory symptoms and history of respiratory disease according to job title of traffic police (n=369).

Symptoms	Job title			
	Inspectors (n/%)	Sergeants (n/%)	Constables (n/%)	Total (n/%)
Coughing	6 (24.0%	11 (7.6%)	43 (21.6%)	60(16.3%)
Coughing sputum	6 (24.0%)	11 (7.6%)	38 (19.1%)	55(14.9%)
Coughing up blood	5 (20.0%)	11 (7.6%)	41 (20.6%)	57(15.4%)
Shortness of breathing	6 (24.0%)	11 (7.6%)	39 (19.6%)	56(15.2%)
Wheezing	4 (16.0%)	11 (7.6%)	39 (19.6%)	54(14.6%)
Chest pain with deep breathing	12 (48.0%)	12 (8.3%)	41 (20.6%)	65(17.6%)
History of pneumonia	0	1 (0.7%)	1 (0.5%)	1(0.3%)
History of tuberculosis	0	0	0	0
History of chronic bronchitis	0	0	1 (0.5%)	1(0.3%)
History of asthma	0	0	0	0
History of pneumothorax	0	0	0	0
History of lung cancer	0	0	0	0
History of chest injury or surgery	0	0	0	0
History of broken ribs	0	0	0	0
Allergic reaction interfering with breathing	0	1 (0.7%)	1 (0.5%)	2(0.5%)

TABLE 3: Logistic regression analysis of respiratory symptoms according to job title

Outcomes	**Job title**	**Crude Odds Ratio**		**Adjusted Odds Ratio***	
		PE	95% CI	PE	95% CI
Coughing	Inspector			-	
	Sergeants	1.429	0.299-6.817	0.841	0.230-3.075
	Constables	3.358	1.665-6.771	4.469	1.265-15.793
Coughing sputum	Inspector			-	
	Sergeants	1.727	0.467-29.761	0.573	0.151-2.169
	Constables	2.875	1.415-5.843	3.687	1.004-13.540
Coughing up blood	Inspector			-	
	Sergeants	1.038	0.367-2.932	1.102	0.283-4.286
	Constables	3.161	1.563-6.392	1.040	0.227-6.162
Shortness of breathing	Inspector				
	Sergeants	.772	0.289-2.061	0.612	0.163-2.291
	Constables	2.969	1.464- 6.024	3.937	1.069-14.500
Wheezing	Inspector			-	
	Sergeants	1.280	0.415-3.942	1.260	0.304-5.229
	Constables	2.969	1.464- 6.024	2.464	0.613-9.906
Chest pain with deep breathing	Inspector			-	
	Sergeants	0.281	0..119-0.662	0.741	0.302-1.821
	Constables	2.876	1.452- 5.696	2.163	0.560-8.349

**Logistic regression analysis adjusting for age, BMI (body mass index), education, marital status, smoking, use of mask and work out (exercise), history of respiratory disease.*