



ANALYSING EFFECT OF ROAD TRAFFIC AIR POLLUTION ON CARDIO- RESPIRATORY FITNESS OF TRAFFIC POLICE OFFICERS

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ABSTRACT

Background: Traffic flow contributes significantly to high levels of air pollution observed in built-up areas around the world. Human exposure to traffic-related air pollution has well established negative health impacts for urban population. Both short period and extensive exposures to air pollution have been shown to elevate the risk for cardiovascular diseases. Exposure to air pollution changes the normal process of lung evolution, which suggests that air pollution may have a lasting effect on respiratory health and may play a role in the development of respiratory diseases. Traffic police officers are at excessive risk for adverse health effects of air pollution compared to general population. **Aim:** To analyse the Cardiorespiratory Fitness in Traffic Police Officers. **Methodology:** 60 samples in the age group of 18–58 years were selected based on inclusion and exclusion criteria from traffic police department of Pune. Proper consent was taken from each participant and 6MWT was performed. **Result:** The 6MWT-distance decreased significantly with increasing age ($P < 0.0001$) and the dyspnea value was significantly seen increased in older age officers associated with other health problems ($P < 0.001$). The test was found to be extremely significant. **Conclusion:** Our study concludes that the increasing pollution did not affect the cardiorespiratory fitness of traffic police officers, but increasing age and associated health problems may affect their cardio-respiratory fitness.

Keywords: Traffic, Air Pollution, Cardiorespiratory Fitness, Traffic Police, 6Minute Walk Test

INTRODUCTION

The actual or potential capacity of an individual to perform activities of daily living as defined by the maximal oxygen uptake ($\dot{V}O_2\max$), many investigations have indicated that the evaluating functional capacity provides important diagnostic and prognostic information in a wide variety of clinical and research settings^[1].

Numerous studies indicate that urbanization in less progressed countries was associated with inauspicious health effects like asthma symptoms, allergies, and respiratory airway inflammation. In addition, in many urban areas, the major contributor of air pollution has been the transportation sector. Upper respiratory symptoms were reported by the 28% of traffic police officers assigned to traffic control and by the 11% of the administrative workers. The follow on FEV1 and FVC did not show an accelerated decline in traffic policemen assigned to traffic control as compared to administrative police workers, which suggested that the need to go looking after this study, assessing symptoms and respiratory function, for a longer period of time, in order to better understand the role of road traffic pollution in inducing respiratory diseases. Another very important advantage of studying the impact of vehicular pollution on traffic police is that it helps in quantification of environmental exposures and risk characterization of the health outcome^[2]. Outdoor occupations in general are hazardous in nature due to prolonged periods of exposure to high concentrations of vehicular pollution putting the employees at increased risk of respiratory and cardiovascular diseases^[3].

Traffic is ubiquitous in current environment, with a considerable proportion of the population, particularly persons disadvantaged by low socioeconomic status, living close enough (within 500 m) to a major road or a highway to be chronically exposed to heavy concentrations. Traffic police officers are put through to various physical and psychological stress related to their work territory. Their job requirements are such that they are mostly susceptible to develop psychological stress and musculoskeletal problems in knee, ankle, and low back^[4].

Cardiorespiratory fitness is well known as a predictor of health and cardiovascular disease in the general population^[5]. In general population, studies have shown a high correspondence between 6MWT and cardiorespiratory fitness^[6]. For assessing cardiorespiratory exercise tests are commonly used to measure maximal oxygen consumption (VO₂max) directly^[7]. But since most of the daily activities do not require maximal effort, the term of functional capacity is also used to express an individual's capacity to perform submaximal activities^[8]. The best measure used to assess the benefits of regular physical activity is the maximal oxygen consumption (VO₂max). The 6-minute walking test is considered an adequate submaximal test for individuals, it is a self-paced test, it is better tolerated and more reflective of daily activities than other maximal exercise tests. It has the advantages of feasibility and safety; there is no need of any particular equipment or advanced training and unlike maximal cardiopulmonary exercise testing, it can be performed by patients with severe impairments, therefore the six minute is a valid clinical functional exercise capacity test^{[8][9]}.

METHODOLOGY

Ethical approval was taken from institutional ethical committee of Tilak Maharashtra Vidyapeeth, Department of Physiotherapy. The aims and objectives of the research were explained to the participants and those are willing to participate were included in the study after the written consent was obtained. Sample size was selected on the basis of inclusion and exclusion criteria. 60 participants (traffic police officers) were selected. Demographic details of subjects like Age, Gender were taken. The inclusion criteria were participants who were Traffic police officers who were in the Age group between: - 18 to 58 years^[4]. The exclusion criteria included the participants who had Unstable angina, Active Myocardial infarction, A resting heart rate of more than 120 beats per min, Systolic blood pressure more than 180 mm Hg, Active endocarditis, history of Uncontrolled heart failure, Pulmonary infarctions, Thrombus of lower extremities, Acute respiratory failure, Moderate stenotic valvular heart disease and Mental impairment leading to inability to cooperate. We performed the 6MWT according to the guidelines of the American Thoracic Society and European Respiratory Society. Since the literature suggests no learning effect of the 6MWT in apparently healthy individuals, we conducted only one test in the present study. Proper consent was taken from each participant and each of them was selected according to inclusion and exclusion criteria and then the test was concluded. We instructed individuals to walk the maximum distance possible for six minutes on a 30 m long, flat, and straight corridor indoors. Two traffic cones designated the directions, and the corridor was marked every 3 m. Standardized commands and verbal cheering were provided to the participants every minute. We registered the 6MWT distance in meters and dyspnea was measured according to Modified Borg Scale Pre and Post-test.

RESULTS

Table No.1: - Gender Distribution

Gender	No of participants
Male	44
Female	16

Table No. 2: - Correlation Between Pre and Post Test Dyspnea in Relation with Age.

Age	39.4
Pre-Test Score	0.116
Post Test Score	1.05

Table No. 3: - Six Minute Walk Distance with Age

Age	39.4
6MWT Distance	465.3

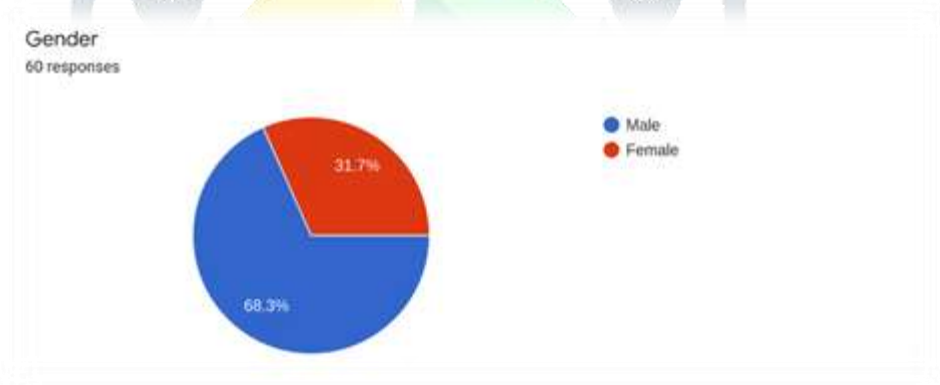


Figure 1:- Gender Distribution

The correlation co-efficient of the Six Minute Walk Distance with relation to age was found to be 0.5777 and the coefficient of determination was found to be 0.3337. The P value was found to be < 0.0001 which is considered extremely significant. But the study concluded that the increasing road traffic air pollution affects the Cardiorespiratory fitness and increases the risk of getting the cardiovascular diseases in those who are exposed to this road traffic air pollution both for longer period and shorter period of time and as traffic police officers are highly exposed to this road traffic air pollution their cardio-respiratory fitness may be affected. [12][3]

Although by conducting this research, we tried to bring attention to the increasing risk of cardiovascular diseases among the traffic police personnel due to the increasing the road traffic air pollution [3]. As most of the studies suggest that assessing cardiorespiratory fitness of traffic police officers and taking follow ups is necessary this study contributes to the those and can be useful in future for assessing the health conditions of traffic police officers [15].

CONCLUSION

The result of the study concluded that the test performed was extremely significant which indicates that traffic police officers have a good cardiorespiratory fitness, which means the road traffic air pollution has no effect on cardiorespiratory fitness of traffic police personnel.

LIMITATIONS

1. Smaller sample size was assessed.
2. Lack of active participation due to their busy schedule.

FUTURE SCOPE

1. Spreading awareness of risk of cardiovascular diseases
2. Larger sample size can be assessed
3. Interventions can be done
4. Study on different age groups and different professionals exposed to long hours work in polluted areas can be done
5. A Study should be conducted to rule out the causes responsible for the compromised cardiorespiratory fitness in officers with low fitness levels.

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