

## Original Article

### **PATTERN OF RESPIRATORY SYMPTOMS IN MOTORCYCLISTS IN LAHORE**

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#### **ABSTRACT**

**Background:** Road-traffic emissions induce adverse health effects, mainly respiratory health problems. Due to long-term exposure to these air pollutants, motorcyclists are at high risk of developing respiratory illnesses or worsening pre-existent diseases. This study aimed to determine the pattern of respiratory symptoms in motorcyclists in Lahore.

**Material and Methods:** This descriptive cross-sectional study was conducted from Jan 2019-July 2019 among motorcyclists in Lahore. Using convenience sampling technique, a sample of 209 motorcyclists was selected. A self-constructed pre-tested questionnaire was used. Data were analyzed using SPSS version 23.

**Results:** The mean age of participants was 34.8±11.4 years. The mean duration of using a motorcycle was 14.9±8.8 years. The majority of motorcyclists traveled 1-3 hours per day. About 38.3% participants reported of having frequent respiratory illnesses. The cough was the main symptom reported by 63.6% of participants. Other reported symptoms were wheezing (20.1%), shortness of breath (37.8%), chest tightness (33.5%), nasal congestion (17.7%), sneezing (39.7%) irritation of the throat (47.4%), and asthma (22.5%). Only 29% of motorcyclists used masks while riding the bikes. Twenty-two percent of respondents gave a history of hospitalization due to respiratory illnesses.

**Conclusion:** The prevalence of respiratory symptoms among motorcyclists was high in Lahore. The cough was the main symptom, reported by 63.6% of participants. Other symptoms included productive cough, wheezing, shortness of breath, symptoms of rhinitis, irritation of throat and asthma. A very low percentage of motorcyclists used face masks.

**Key Words:** Air pollutants, Cough, Asthma,

#### **INTRODUCTION**

Motorcycles provide an accessible and fuel-efficient means of transport in the developing world. They now compete with other available transport modes as people require greater mobility to access jobs and services.<sup>1</sup> Studies show that people who commute by motorcycle are generally more exposed to air pollutants as compared to people using other modes of transport.<sup>2</sup> Motorcyclists inhale harmful chemicals like dust, smoke, and volatile organic compounds especially when passing through highly air-polluted areas and

situations such as traffic jams, highly populated localities, and industrialized areas of the city.<sup>3</sup>

Emissions from vehicles have been the major source of air pollution. High index of air pollution in the city is a complex mixture of pollutants generated from many sources mainly from automobiles. Emissions from motorcycles induce adverse health effects, mainly respiratory health problems, due to the deposition of pollutants in the respiratory tract.<sup>4</sup>

Motorcyclists face the problem of chronic exposure to pollutants. The issue is a major public health concern, especially in metropolitan cities. Researches have shown the presence of nitrogen oxide, carbon monoxide, sulfur dioxide, volatile organic compounds, and particulate matter in ambient air, which may affect lung function.<sup>5</sup>

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The spectrum and severity of respiratory illnesses due to inhalation of harmful pollutants may range from subclinical disease to premature death. The resulting respiratory health issues include diseases of the upper and lower airways. Empirical evidence has shown that these inhaled substances produce a strong pulmonary and systemic inflammatory response and can cause inflammation and allergy in the respiratory tract especially after long exposure.<sup>6</sup>

The most recent WHO assessment shows that nine out of ten people breathe unsafe polluted air; resulting in approximately 7 million deaths annually.<sup>7</sup> Increased concentrations of particulate matter with an aerodynamic diameter of less than  $10\mu\text{g}/\text{m}^3$  (PM10) is associated with an increase hospital admissions, respiratory symptoms and high mortality rate.<sup>8</sup> Long-term exposure to air pollution results in several harmful effects and worsening of pre-existent respiratory problems among motorcyclists.<sup>9</sup>

In a study conducted in Tanzania, respiratory symptoms were more commonly observed in motorcycle drivers as compared to office attendants. The symptom included morning cough, a cough lasting for three months, phlegm lasting for three months, wheezing, and shortness of breath.<sup>10</sup>

South Asia has the worst air quality index in the world. According to the air quality index, Lahore ranked 12<sup>th</sup> in the list of most polluted cities.<sup>11</sup> Air pollution in Lahore especially on roads is caused by vehicle emissions. There are as many as 4.2 million motorcycles in Lahore.<sup>12</sup> Motorcyclists are exposed to adverse effects of the inhaled pollutants more as compared to the general population. There is a paucity of available data on this topic in our country. At present, little is known about the respiratory health issues of motorcyclists of metropolitan cities of Pakistan. This study was conducted to determine the prevalence and pattern of respiratory symptoms among motorcyclists in Lahore.

## MATERIAL AND METHODS

This descriptive cross-sectional study involving 209 current motorcycle drivers of

Lahore was conducted from Jan 2019-July 2019. Approval from ethical review board of Akhtar Saeed Medical & Dental College was taken (IRB certificate no M-18/028/-CM). Keeping margin of error at 5%, confidence level at 95%, and prevalence at 15.4%, sample size of 199 was calculated.<sup>4</sup> Sample size was increased by 5% to cover missing data. After adding a 5% increase, a total sample size of 209 was calculated finally. The convenience sampling technique was used for data collection.

A self-constructed pre-tested questionnaire was used which included the socio-demographic variables. Based upon the objectives of the study, research questionnaire was designed after extensive literature review. All participants completed the questionnaire regarding respiratory symptoms (cough, dyspnea, expectorations, chest wheezing) smoking history, socio-demographic characteristics (age, income per month, education level, marital status, smoking history), years of using motorcycle for transportation, duration of traveling per day and co-morbidities (asthma, allergies, TB). Motorcyclists who used motorcycles in their daily routine were included in the study. Those who denied giving consent were excluded.

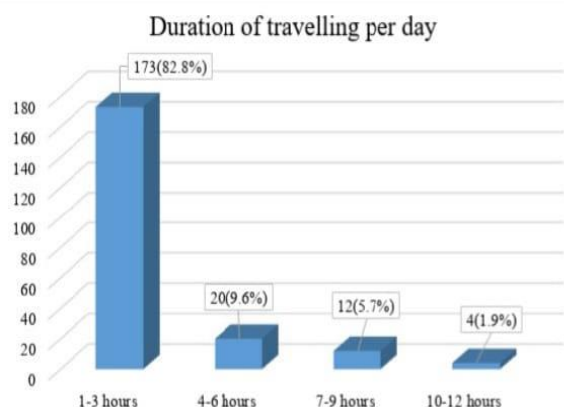
Data were analyzed using SPSS Version 23. Qualitative data was presented by frequencies and percentages. Mean and standard deviation was calculated for quantitative data.

## RESULTS

The mean age of participants was  $34.8\pm 11.37$  years. All participants were male. The mean duration of using motorcycle was  $14.91\pm 8.81$  years. Fifty-four (25.8%) participants were unmarried while other were married. Most participants had monthly income ranging from 10000 to 20000/- per month. The mean duration of traveling hours per day  $2.65\pm 2.03$ . (Figure-1)

The majority of participants were between 18-35 years of age, however a small percentage (2.9%) of below 18 years also participated in the study. Among total

participants 118(56.5%) were smokers. Details are mentioned in table 1.



**Figure-1:** Duration of traveling per day

**Table-1:** Socio-economic details

Socio-economic details of participants		Frequency	Percentage
Age	Below 18 years	6	2.9
	18-35 years	102	48.8
	36-55 years	91	43.5
	More than 55 years	10	4.8
Monthly income per month	10000-20000	97	46.4
	20000-40000	56	26.8
	More than 40000	27	12.9
	No income	29	13.9
Educational status	Illiterate	55	26.3
	Matric	54	25.8
	Intermediate and bachelor	79	37.8
	Masters and above	21	10
Marital status	Married	155	74.2
	Unmarried	54	25.8
Smoking history	Smokers	118	56.5
	Non smokers	91	43.5
Years of using bikes	Less than 5 years	35	16.7
	5-10 years	43	20.6
	11-20 years	88	42.1
	More than 20 years	43	20.6

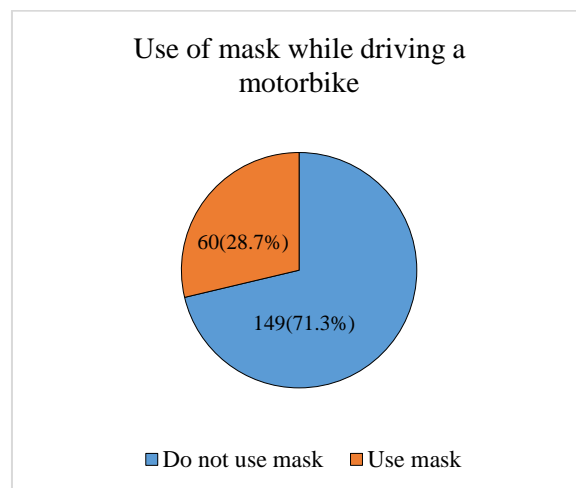
Eighty participants (38.3%) reported having frequent respiratory illnesses. The cough was the main symptom reported by 133 (63.6%)

participants. Among total of 133, most of the participants (34.9%) had dry cough. Other reported symptoms were wheezing, shortness of breath, chest tightness, sneezing, nasal congestion, running nose, irritation of throat and asthma. Among 209 participants, 46(22%) gave history of hospitalization due to respiratory illnesses. Details of respiratory symptoms are mentioned in table no 2.

**Table-2:** Self-reported respiratory symptoms experienced by motorcyclists

Respiratory Health issues	Yes (%)	No (%)
Frequent Respiratory illness	80(38.3)	129(61.7)
Cough	133 (63.6)	76 (36.3)
Productive cough	60 (28.7)	149 (71.3)
Dry Cough	73 (34.9)	136 (65.1)
Wheeze	42 (20.1)	167 (79.9)
Shortness of breath	79 (37.8)	130 (62.2)
Chest tightness	70 (33.5)	139 (66.5)
Sneezing	83 (39.7)	126 (60.3)
Nasal congestion	37 (17.7)	172 (82.3)
Running nose	29 (13.9)	180 (86.1)
Irritation of throat	99 (47.4)	110 (52.6)
Asthma	47 (22.5)	162 (77.5)
Hospitalization due to respiratory illness	46 (22)	163 (78)

Use of face masks while riding the motorcycle was reported by only 60(28.7%) of participants.



**Figure-2:** Use of face mask

## DISCUSSION

The findings of this study revealed high prevalence of respiratory symptoms among

motorcyclists in Lahore. This study was following the findings of previous studies where urban city motorcyclists were found to have health issues related to respiratory system.

Traffic related air pollution affects respiratory systems of motorcyclists. About 38% respondents reported of having frequent respiratory illnesses. The cough was the main symptom reported by 64% of participants. The findings of this study were also comparable to study in Tanzania, which showed that the prevalence of respiratory symptoms was higher among motorcycle taxi drivers compared to office attendants for all symptoms cough 55.5%, phlegm 53.2%, wheezing 29% and shortness of breath 47.7%. All these associations were statistically significant.<sup>10</sup> Both studies show high prevalence of respiratory symptoms.

Another study conducted in Nigeria, showed cough was present in 71% of commercial motorcyclists.<sup>13</sup> The higher percentage may be attributed to more exposure to air pollutants on roads.

Study conducted by Ekpenyong et al. in Nigeria described that higher adjusted odd's ratio was found regarding symptoms like cough with phlegm, wheezing, breathlessness, chest pain, rhinorrhea and irritation of throat in motorcyclists.<sup>14</sup>

In this study shortness of breath was reported by 37.8% of participants. Another research carried out in Benin using self-reported data collection tool distributed to commercial motorcycle drivers, showed 23% of the drivers had difficulty in breathing.<sup>15</sup>

Exposure to air pollution from road traffic is often associated with nasal symptoms like rhinitis and sneezing. In this study, nasal symptoms running nose, sneezing and nasal congestion were main symptoms reported by motorcyclists. This was following the study conducted by Brant T et al.<sup>16</sup> Similar findings were described by researchers in Nigeria. In their study, most commonly reported symptoms were cough (46.0%), dust allergies (40.7%) sneezing (34.0%) and catarrh among tricyclists in Nigeria.<sup>17</sup>

Use of masks while riding the motorcycle was reported by only 29% of participants. Different results were found in a study in Vietnam. Most of the motorcycle commuters in Vietnam, use face masks, especially during rush hours.<sup>18</sup> The difference may be due to different levels of awareness and literacy in both countries.

## CONCLUSION

The prevalence of respiratory symptoms among motorcyclists was high in Lahore. Commonly reported symptoms were cough, wheezing, shortness of breath, sneezing, irritation of throat and asthma. More than one third of respondents reported having frequent respiratory illnesses.

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## AUTHORS CONTRIBUTION

- AMJ: Conceived the topic, designed methodology and prepared final manuscript  
 IM: Verified analytical methods, supervised the project and gave final approval of manuscript  
 SM: Carried out literature search and analyzed data  
 TW: Carried out literature search and collected data  
 UA: Carried out literature search and collected data  
 MM: Carried out literature search and collected data

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