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Understanding the prevalence of COVID-19 in Bhopal

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Abstract

The present study revealed that mostly the working hand (age group 21- 50 yrs) contributed majorly for the increased number of COVID-19 cases. It was also found that urban areas being more prone to rural areas which is due to the condensed population in urban areas. Our results also proved that males being more infected than females due to being a working group. Certain factors like migrant workers, high density of population, poor health hygiene etc. might also contribute to an increasing number of cases besides metrological parameters.

Keywords: COVID -19, Urban, migrant workers, age group

Introduction

Corona virus disease 2019 popularly known as (COVID-19) is an infectious disease caused by severe acute respiratory syndrome corona virus 2 (SARS-CoV-2). It was first identified in December 2019 in Wuhan, China, and has resulted in an ongoing pandemic. The first case may be traced back to 17 November 2019. The first case of the COVID-19 pandemic in India was reported on January 30, 2020. In Madhya Pradesh the first four cases of the COVID-19 pandemic were confirmed in Jabalpur, on 20th March, 2020. The first case of COVID-19 in Bhopal was confirmed on 22nd March 2020. The Indian Prime Minister announced a nation-wide lockdown from the midnight of 24th March 2020. Only essential services were functioning and government services apart from health, law and order, banking, power and a few others have been suspended altogether. The virus is primarily spread between people during close contact, most often via small droplets produced by coughing, sneezing, and talking. The droplets usually fall to the ground and surfaces rather than travelling through air over long distances. Less commonly, people become infected by touching contaminated surfaces. It is most contagious during the first three days after the onset of symptoms, although spread is possible before the appearance of symptoms.

Need & objectives of Study

The statistical study related to the effect of gender, lifestyle and age on the susceptibility of COVID-19 in Bhopal is needed to be studied so that the vulnerable groups/locations can be identified and appropriate measures can be taken, to prevent the spread of similar viral pandemic in future. Moreover, no such study has been conducted in Bhopal or nearby to assess the effect of location (urban/rural), sex and age of tested individuals on incidences of COVID-19 and to identify the vulnerable class of citizens towards COVID-19.

Data collection and methodology

The data was obtained from office of the District Epidemiologist, Chief Medical Health Officer Jai Prakash District Hospital Bhopal Madhya Pradesh for first wave of COVID-19 pandemic which ranged from March 2020 to March 2021. The city of Bhopal lies within the geological coordinates of 23.25° N and 77.42°E respectively. Bhopal is the capital of the state of Madhya Pradesh and has been selected under National Smart Cities program's first round for integrated urban development. It is also known as the city of lakes after several natural and artificial lakes that dot the city. It has an estimated urban population of 2.0 million. The old city of Bhopal is home for small and medium industries covering electrical goods, medicinal products, cotton, chemicals, jeweler, flour milling, cloth weaving, painting, matches and wax manufacturing, and sporting equipment. It also houses the Baharat Heavy Electricals Limited (BHEL), which is one of the largest engineering companies in India that manufactures coal-fired power plant boilers (among many other heavy machinery). Therefore, the present study was carried out with the following objectives

The data relates to the numbers of patients who were suffering from COVID 19 virus in the studied location. For the present study the city was divided into rural and urban areas.

COVID-19 Cases

Total positive cases between March 2020 to March 2021, Gender, Age group, Urban & Rural area. The data was Statistically analyzed using SPSS Version 24 & R Statistical software, the data was categorized into Sex (Male, Female), Age (1 to 10, 11 to 20, 21 to 30, 31 to 40, 41 to 50, 51 to 60, 61 to 70 and above 70), those residing in Urban & Rural area of Bhopal.

Result

During the present study a total of 51941 individuals were found infected with COVID-19. Further it is evident from the data that males were more infected than females. A total of 33804 males were found infected during the present investigation. However, the number of females as COVID positive recorded were 18137. The percent contribution of infected males to total infected was found to be 65% while 35% were females (Fig.1).

During the present study all the infected cases were distributed as per the age group. It was found that the age group between (21-30 years) were most infected as the total number of this group was 11491 which accounts for nearly 22% to the total infected cases and the least infected age group was 1-10 years accounting almost 3% of the total infected cases (Table-1 and Fig.2). The age group 11-20years contributed 8% to the total infected cases (51941), on the other hand the age group 31-40 years contribution was 20%. Further, the age group 41-50 years contributed 17% to the total infected cases (51941), while the age group 51-60 years contribution was 16%. As evident from the data the age group 61-70years contributed 8% to the total infected cases (51941), and the age above71years contribution was 5% (Table-1 and Fig.2).

Our study focussed on the location of the infected cases as urban and rural and it was found that only a small portion of cases were reported from the rural areas and majority of the cases were from the urban areas. During the investigation a total of 509 infected cases inhabit rural areas. Among them 365 were males and 144 were females (Table-2). The contribution of males to the rural cases reported was 72% and those of females were estimated to be 28% (Fig.3). Further during the present study, a total of 51437 infected cases inhabitants of urban areas. Out of these 33438 were males and 17994 were females (Table-2). The contribution of males to the urban cases reported was 65% and those of females was estimated to be 35% (Fig.4.4).

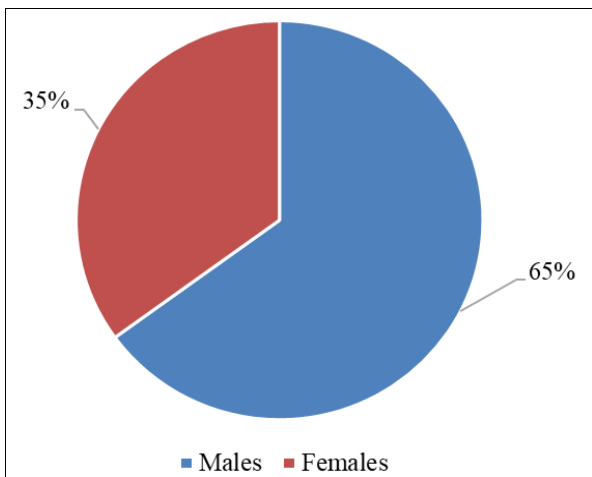


Fig 1: Shows percent contribution of infected males and females during study period.

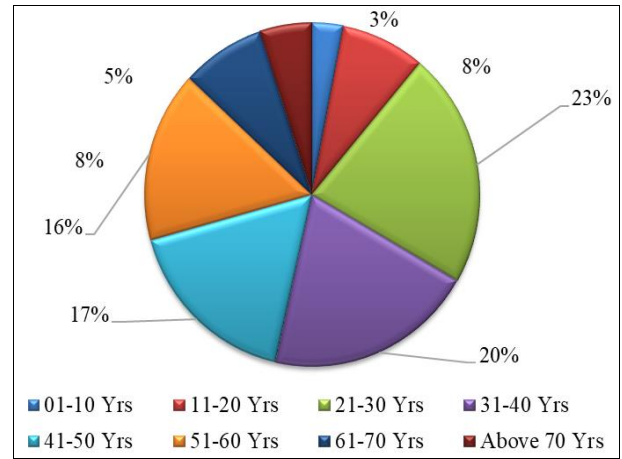


Fig 2: Shows percent contribution of infected different age groups during study period.

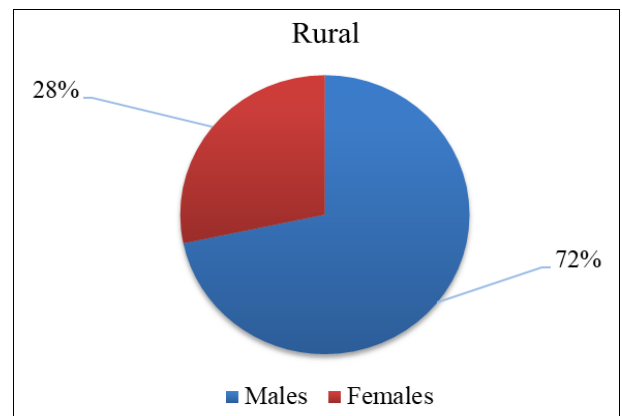


Fig 3: Shows percent contribution of males and females of rural area during study period.

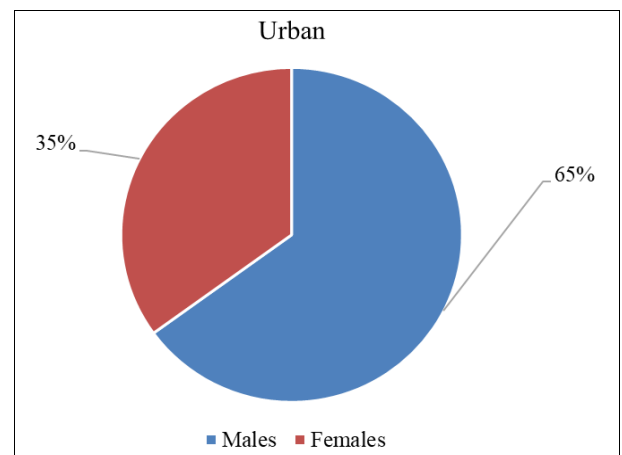


Fig 4: Shows percent contribution of males and females of urban area during study period.

Table 1: Shows the age group of infected persons during study period.

| Age Group | Cases |
|---------------|-------|
| 01-10 yrs. | 1540 |
| 11-20 yrs. | 4146 |
| 21-30 yrs. | 11491 |
| 31-40 yrs. | 10629 |
| 41-50 yrs. | 8785 |
| 51-60 yrs. | 8522 |
| 61-70 yrs. | 4408 |
| Above 70 yrs. | 2420 |

Table 2: Shows infected cases of Rural and Urban during the study period

| Location | Males | Females |
|----------|-------|---------|
| Rural | 365 | 144 |
| Urban | 33438 | 17994 |

Discussion

Huang *et al.*, 2021^[7] have also reported higher number of cases from the urban areas. Further as per the Huang *et al.*, 2021^[7] the higher number of cases from urban areas is due to the condensed population in urban areas. Further, it has been found that there exists a significant relationship between density and the spread of the virus (Qiu *et al.*, 2020 & Ren *et al.*, 2020)^[4, 5]. However, some studies like (SCHDEC 2020)^[6] are of the view that the possibility to screen the COVID tests on its own costs may be one possible way that most cases are registered from urban areas. As we are aware that COVID 19 occurs both through the fecal and oral routes (Naddeo and Liu, 2020)^[2] so the quality of water in the cities may be a major cause for the increased number of cases in Urban areas. As per Hallema *et al.*, 2020^[8] due to reduced anthropogenic activities, headwaters that are often located far from cities are less affected by non-point pollution sources such as NO₂, SO₂, and NH₃ while as downstream water resources are also less contaminated by point sources such as industrial units and non-point sources such as vehicular traffic. This results in most polluted nature of aquatic sources in urban areas than rural areas. Further, Sufficient disinfection of water and wastewater treatment plants and measures such as the prevention of sewage leakage into freshwater resources are essential to reduce human exposure to the virus. However, these are challenging tasks in many densely populated areas such as India, where there is a lack of sewage treatment facilities (Naddeo and Liu, 2020)^[2]. Moreover, there are certain factors like migrant workers, high density of population, poor health hygiene etc. that might also contribute to an increasing number of cases besides metrological parameters. Further it has been observed that every 1 °C increase in temperature is associated with 3.08% reduction in daily new cases (Wu *et al.*, 2020)^[1]. Similarly, a 1% increase in relative humidity has been found to be associated with 0.85% reduction in the daily new cases (Wu *et al.*, 2020)^[1].

Conclusion

Our study revealed that mostly the working hand (age group 21- 50) contributed majorly for the increased number of COVID-19 cases. Our results also proved that males being more infected than females due to being a working group outside. One of the possible causes for this may be that most of the tests were done firstly on this age group. Certain factors like migrant workers, high density of population, poor health hygiene etc. might also contribute to an increasing number of cases besides metrological parameters. The important findings in our study were a statistically significant association of COVID-19 cases with an increase in the total number of tests. This is also being reflected in the country as cases have rampantly increased after increase COVID-19 testing capacity.

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