



CLINICAL AND DEMOGRAPHIC PROFILE OF ELDERLY POPULATION WITH SARS-COV-2 FROM TWO DISTRICTS OF DOABA REGION OF PUNJAB

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ABSTRACT **Introduction:** The outbreak of SARS-CoV-2 has posed great threat throughout the globe, with highest transmissibility and mortality rate, older patients being the higher risk group. This study aimed to investigate the clinical and demographic characteristics of older patients with COVID-19 from two districts of Doaba region of Punjab, mainly Hoshiarpur and Kapurthala. **Materials and Methods:** A retrospective study was conducted on 7858 samples of older adults (≥ 65 years) of two districts (Hoshiarpur and Kapurthala) whose nasopharyngeal and/or oropharyngeal swab samples were received at VRDL, GMC, Amritsar, Punjab, for a period from April 2020 to December 2020. All samples were tested by RT-PCR for the presence of SARS-Cov-2 genes as recommended by WHO, 2020. **Results:** A total of 203007 samples were received from districts of Hoshiarpur and Kapurthala, Punjab, from the months of April 2020 to December 2020. Out of the total population, 7858 samples were of elderly people having age ≥ 65 years. In older adults, 167 (4.17%) and 112 (2.99%) samples were found to be positive in Hoshiarpur and Kapurthala, respectively. Patients having high blood pressure ($p > 0.00$) and diabetes ($p > 0.04$) were at higher risk of contracting SARS-CoV-2. In Hoshiarpur, minimum cases were 4 in the month of April and maximum cases were 956 in the month of August, whereas, in Kapurthala, least number of cases was 52 in May and highest number observed was 733 in October. Demise of only 3 (1.38%) older adults was reported in the present investigation. **Conclusion:** Overall, a significant association of diabetes and hypertension was observed in elderly patients with SARS-CoV-2. Apart from that, highest number of sample was tested in the month of August till mid October from both the districts.

KEYWORDS : Elderly, COVID-19, SARS-CoV-2, diabetes, hypertension

INTRODUCTION:

Novel coronavirus (COVID-19) outbreak, caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), initially reported from Wuhan, (Hubei province) China, spread rapidly around the world.⁽¹⁻⁴⁾ The World Health Organization (WHO) declared COVID-19 as a public health emergency of international concern on March 11, 2020. Numerous studies have focused on epidemiological and clinical findings, and outcomes of patients suffering from COVID-19.^(5,6) However, the precise information about elder patients remains unknown and appears to cause the highest morbidity and mortality in adults aged over 70 years.^(5,7) According to Ministry of Statistics and Programme Implementation of India,⁽⁸⁾ 8.6% population belonged to elderly people (Census-2011) and this was projected to be around 10% in 2019.⁽⁹⁾ Evidences around the world advocates that age itself is the paramount risk factor for grave COVID-19 disease and its adverse health outcomes.⁽¹⁰⁾ The older population with co-morbidities such as hypertension, diabetes and renal failure represents one of the major risk groups for SARS-CoV-2 imposing a heavy burden on the public and health care systems in the globe.⁽¹¹⁾ The clinical manifestations amid elderly individuals entails fever, cough, rales and they may have typical or atypical exhibitions of infection as that defined by the Infectious Diseases Society of America (IDSA).⁽¹²⁾ Apart from the environmental factors, host immune system plays a significant role in disease progression in senior citizens infected with SARS-CoV-2.⁽¹³⁾ It has been proposed that age related impairment of immune defence or immunosenescence against SARS-CoV-2 infection leads to vulnerability to mature adults.⁽¹⁰⁾ Thus, the present study aimed to investigate the clinical and demographic features along with monthly trends of novel coronavirus outbreak in elderly population of two districts of Doaba of Punjab, mainly Hoshiarpur and Kapurthala.

MATERIALS AND METHODS:

A retrospective study was conducted on 7858 samples of older adults (≥ 65 years) of two districts (Hoshiarpur and Kapurthala) whose

nasopharyngeal and/or oropharyngeal swab samples were received at VRDL, Government Medical College, Amritsar, Punjab, from the period of April 2020 to December 2020. All samples included in this study were tested by RT-PCR for the presence of SARS-Cov-2 genes as recommended by WHO (Available from: <https://apps.who.int/iris/handle/labtestingforcoronavirusdisease2019>). RT-PCR reports were generated based on amplification of E gene, N gene and RdRp gene. At the time of sample receiving, demographic features and clinical history of the patient was recorded on a pre designed questionnaire.

RESULTS:

A total of 203007 samples were received from districts of Hoshiarpur and Kapurthala, Punjab, from the months of April 2020 to December 2020. Out of 203007, 114736 were from the district of Hoshiarpur and 88271 were from Kapurthala. Only 2.55% and 2.39% samples were tested positive for SARS-CoV-2, respectively, from both the districts (Table 1).

Table 1: The results for SARS-CoV-2 positivity in total population in two districts of Punjab

Districts	Total number	Number of females	Number of males	Positive (%)	Negative (%)
Hoshiarpur	114736	40582	74157	2921 (2.55)	111815 (97.45)
Kapurthala	88271	33560	54709	2116 (2.39)	86155 (97.60)
Total	203007	74142	128866	5037 (2.48)	197970 (97.52)

Out of the total population, 7858 samples were of elderly people having age ≥ 65 years, 4107 were from Hoshiarpur and 3751 were from Kapurthala district. It was also witnessed that mean age of older females were 70.97 years and 70.07 years in Hoshiarpur and Kapurthala district, respectively. On the other hand, mean age of males were 70.70 years in Hoshiarpur and 70.72 years in Kapurthala (Table 2).

Table 2: Distribution of elderly males and females in two districts of Punjab

Districts	Total no.	Total no. of Females (%)	Mean age (Females)	Total no. of males (%)	Mean age (Males)
Hoshiarpur	4107	1388 (33.79)	70.97	2721 (66.25)	70.70
Kapurthala	3751	1278 (34.07)	70.07	2471 (65.87)	70.72
Total	7858	2666 (33.92)		5192 (66.07)	

In older adults, 167 (4.17%) and 112 (2.99%) samples were found to be positive in Hoshiarpur and Kapurthala, respectively (Table 3).

Table 3: The results for SARS-CoV-2 in two districts of Punjab among older population

Districts	Total no.	Positive (%)	Negative (%)
Hoshiarpur	4107	167 (4.17)	3940 (95.93)
Kapurthala	3751	112 (2.99)	3639 (97.01)
Total	7858	279 (3.55)	7579 (96.45)

Table 4 showed that males accounted for higher number of SARS-CoV-2 positive cases as compared to females in both districts; however, no significant difference was seen between two genders.

Table 4: Gender wise distribution of SARS-CoV-2 positive results in older population

Districts	Positive	Females (%)	Males (%)	p-value
Hoshiarpur	167	67 (40.1)	100 (59.9)	0.23
Kapurthala	112	37 (33.0)	75 (66.9)	
Total	279	104 (37.3)	175 (62.7)	

Multivariate regression analysis was performed on co-morbidities associated with advanced age. Table 5 demonstrated that patients having high blood pressure (p>0.00) and diabetes (p>0.04) were at higher risk of contracting viral infections, while the respiratory distress showed no association.

Table 5: Multivariate regression analysis of co-morbidities in elder patients with SARS-CoV-2

Factors	Yes	No	Odds ratio	95% CI	P value
Diabetes	208	71	1.77	1.00-3.13	0.04
Blood Pressure	155	124	3.13	1.88-5.18	0.00
Respiratory distress	68	211	0.915	0.51-1.64	0.76

Significant at p<0.05

Clinical features recorded among the older people at the time of COVID-19 testing was cough (81.72%) followed by fever (58.06%), sore throat (57.70%), joint pain (32.62%), breathlessness (32.25%) and rashes (8.96%) (Figure 1).

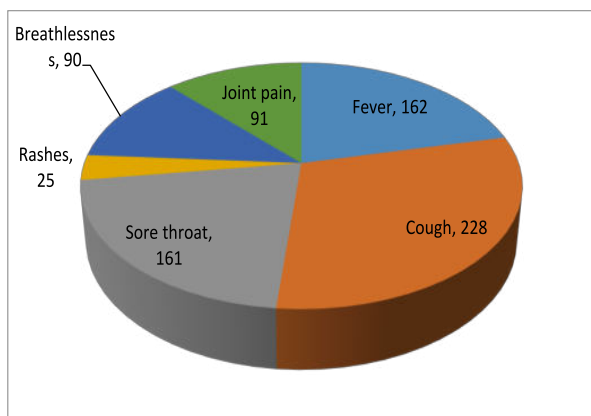


Figure 1: Clinical features of the older Patients with SARS-CoV-2 positive results

Data from April to December was analysed and noticed that it had mixed trend. In Kapurthala, the month of April showed quick decline in COVID-19 cases till May. After that, rapid rise in the trend till August and again a sudden drop in cases were observed in both the districts (Figure 2). In Hoshiarpur, minimum cases of elderly patients were 4 in the month of April and maximum cases were 956 in the month of August, whereas, in Kapurthala, least number of cases was 52 in May and highest number observed was 733 in October. Demise of

only 3 (1.38%) older adults was reported in the present investigation.

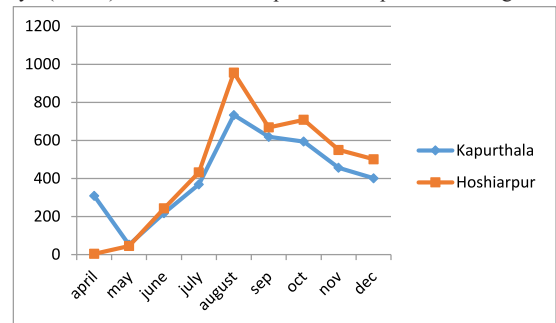


Figure 2: Showing the trend of SARS-CovV-2 in two districts from April to October

DISCUSSION:

Older people are more predisposed to a variety of diseases as compared to youngsters entailing COVID-19 infection which has dramatically increased the healthcare burden of an aging society. The entire population is vulnerable to the SARS-CoV-2 infection; however, the people in their advanced age had higher morbidity and fatality.^(14,15) Therefore, very less reports are there on COVID-19 infection in elderly patients. An epidemiological survey on 72,314 COVID-19 cases showed that the proportion of cases in older patients above the age of 60 years was 44.1% in Wuhan, 35.1% in Hubei and 31.2% across China.⁽¹⁶⁾ This study is in contrast to the present study which stated that only 2.02% people in Hoshiarpur and 1.84% in Kapurthala, Punjab fell in the category of old age. Another study confirmed that in Australia 21.4% people had age above 60 years⁽¹⁷⁾ while only 7% fell under this category in US.⁽¹⁸⁾ A model based study observed that the increasing age jeopardize the older adults for COVID-19 infections and seen an elevation from 1.04% for age group 20-20 years to 18.40% for those aged 80 years or above.⁽¹⁹⁾ We have also observed that average age of male and female was 70 years, which is in contrast to the study from US.⁽²⁰⁾ A study from China reported the average age amid older population to be 74 years⁽¹⁶⁾ and Brazilian older population had the mean age of 70 years.⁽¹¹⁾

In the present study, more number of males was infected with SARS-CoV-2 than females; however, no significant difference for gender gap was found (Table 4). This finding is in consistent with the meta-analysis done on 3,111,714 cases reported globally.⁽²¹⁾ Evidence based studies documented positive correlation between angiotensin converting enzyme 2 (ACE 2) expressions and SARS-CoV-2 infection because an organism whose expression of ACE 2 protein is high has a facilitated environment for pathogenesis of coronavirus. Numerous studies quantified the expression of ACE 2 proteins in human cells and indicated that Asian males had higher expression of ACE 2 than female.⁽²²⁾ A studies on Chinese population found that expression of ACE 2 in human lungs was expressed in Asian males than females.⁽²³⁾ The gender based difference in immune system may impact the fighting capability against SARS-2-CoV-2 infection. Additionally, females are more resistant to infections than men because of factors such as sex hormones, high expression of ACE2, smoking and drinking habits in men. Also, women are more responsible toward the Covid-19 pandemic because of undertaking of preventive measures such as frequent hand washing, wearing of face mask, and stay at home orders.⁽²⁴⁾

The present investigation noticed that presence of hypertension and diabetes may worsen the risk for COVID-19 (Table 5). This is due to the fact that people with high glycemic index are more susceptible to microbial infections because of compromised immune system.^(25,26) Similarly, hypertension being the principal contributor of development of cardiovascular and kidney disorders and presence of the same are associated with elevated risk of chronic diseases following SARS-CoV-2 infection.⁽²⁷⁾ Apart from dysregulated immune system, increased expression of ACE2 receptor play significant role, as SARS-CoV-2 binds to target cells through ACE2 receptors which are expressed in several tissues and are involved in rennin-angiotensin-aldosterone system (RAAS).⁽²⁸⁾ ACE2 is homologue to ACE that converts angiotensin II to angiotensin 1-7 and reduces the vasoconstriction regulated by RAAS and pro-inflammatory role of angiotensin II. As SARS-CoV-2 binds to ACE2, it alters the signalling pathway, resulting in vasoconstriction, pro-inflammatory response and endothelial dysfunctioning that lead to myocardial injury and

prothrombotic processes.⁽²⁹⁾

The current study observed that in both districts the number of cases showed steep increase from the month of April to August and then started declining till 20th December 2020. The initial cases of COVID-19 in India were due to migrants, overseas visitors, and some others who were in contact with these infected persons, thus the Indian Government called the countrywide lockdown to overcome this transmission. After this the situation seemed to be under control as the confirmed cases were only 511 in the month of March. However, the cases rose drastically from April due to the religious gathering in New Delhi and it rife throughout the country, which ultimately results in human-to-human transmission of COVID-19 in India. In the districts of Hoshiarpur and Kapurthala, cases of elderly age group were SARS-CoV-2 positive due to contact with infected people who travelled internationally. Moreover, the higher number of cases in August was owing to lack of awareness of viral symptoms in their bodies and unable to interact and express their health status to the workers/authorities for initial screening.

Conclusion: The alarming effects of the pandemic of SARS-CoV-2 infection can be observed all over the world, and multiple efforts are in progression to deter the transmission of the COVID-19 virus. It is obligatory to study the impact of current pandemic in different age-groups in numerous countries with adequate or limited health resources as the virus eruption has affected all countries in the world regardless of growth and development in the medical sector. There is a need for timely care and medical assistance for the livelihood of elderly people because they are at higher risk of COVID-19 infection as world has recorded more demise among older population.^(30,31) It is vital to encompass research data on older people so that strategies for prevention, treatment and rehabilitation should be optimise in this vulnerable age group.

Limitations: Firstly, the retrospective study may decrease the integrity and future perspective, thus, cohort study should be considered. Secondly, the comprehensive analysis of older adults with COVID-19 is urgently needed, which will bestow reliable data. Finally, the data pertaining the outcomes of elderly patients with COVID-19 need to be further investigated.

Conflict of Interest: None

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