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Olfactory Dysfunction Amongst Covid-19 Positive Patients

Hina Majid[1], Salman Shahid[2], Ghazala Rubi[3], Farwa Sijjeel[4]

1 ***Assistant Professor, Department of Anatomy, PGMI/AMC/LGH, Lahore Pakistan***
Conception & design of work, Acquisition, Analysis, Interpretation of data for the work

2 ***Medical Officer, Department of Special Education, Lahore Pakistan***
Drafting the work, Revising it critically for important intellectual content

3 ***Director Research, PGMI/AMC/LGH, Lahore Pakistan***
Read and approved final version of the manuscript submitted for publication

4 ***Assistant Professor, Department of Hematology, Pakistan Institute of Medical Sciences, Rawalpindi Pakistan***
Statistical analysis, Literature review

CORRESPONDING AUTHOR
Dr. Hina Majid
Assistant Professor, Department of Anatomy, PGMI/AMC/LGH, Lahore Pakistan
Email: hinamajidmir@gmail.com

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ABSTRACT

Background: Rapid spread of COVID-19 has overburdened the health systems globally forcing the triage of limited health facilities. Early identification of disease can help to allocate the health facilities in an efficient way. Olfactory dysfunction among COVID positive cases can serve as an important predictor of the disease. **Objective:** Recent surge of olfactory impairment has been observed among patients with COVID-19 in Pakistan. The objective of the study was an assessment of the frequency of olfactory disorder in COVID-19 patients. **Study Design:** Cross-sectional study. **Settings:** Participants were from different cities of province of Punjab, Pakistan. **Duration:** From 1st May to 1st June 2020 (1 month). **Methodology:** A questionnaire was created on google forms and circulated through WhatsApp and email to the voluntary COVID-19 positive cases. **Results:** Out of 200 COVID confirmed participants, 70% were females who suffered olfactory dysfunction. 55% of the respondents reported anosmia while 45% experienced hyposmia. 70% participants reported sudden anosmia, while 30% reported that loss of smell was gradual. 42% also reported decrease in their sense of taste along with loss of smell. 45% reported that loss of olfaction had a negative effect on their quality of life. The mean duration of hyposmia/anosmia was 7±5.3 days. **Conclusion:** Olfactory dysfunction has been reported by a number of COVID positive patients in Pakistan. The scientific basis of loss of smell amongst COVID positive patients must be further investigated.

Keywords: *COVID-19, Epidemic, Olfactory dysfunction, Anosmia, Hyposmia.*

INTRODUCTION

Having origin from Wuhan, China the coronavirus disease 2019 (COVID-19) has rapidly spread all over the globe.[1,2] Globally, the health systems are over stressed by the COVID-19 pandemic.[3,4] The coronaviruses belong to the family of viruses that has in the past resulted in Middle East Respiratory Syndrome (MERS-CoV) and Severe Acute Respiratory Syndrome (SARS-CoV). COVID-19 is a new strain from this family which made its first appearance in the world in December 2019.[5,6] The World Health Organization has reported 8 525 042 confirmed cases of COVID-19 with 456, 973 deaths by 20th June 2020, globally.[7] Common clinical presentations reported are cough, fever, malaise and difficulty in breathing.[8,9,10,11] As it is a novel virus, new aspects of the disease are reported with each passing day. All this information put together into the jigsaw puzzle can help make the real picture become clear. Olfactory dysfunction, is described as the diminished or altered ability to smell. In adults, viral infections are the main cause of olfactory dysfunction.[12] Viruses that cause the common cold are the leading cause of anosmia.[13] Researches have documented that the human strains of corona virus gain entry into the central nervous system. The virus can also propagate through the olfactory bulb.[14] Emerging evidences suggests increasing incidence of anosmia among COVID-19 infected cases.[15,16] The objective of the current study was an assessment of the frequency of olfactory dysfunction amongst COVID positive patients of our country.

METHODOLOGY

Study Design: It was a cross-sectional study.
Settings: Participants were from different cities of province of Punjab, Pakistan.
Duration: The study was conducted 1st May to 1st June 2020 (1 month).
Sample Size: 200 COVID positive participants.
Inclusion Criteria: COVID positive individuals from all over Punjab who completely filled the questionnaire and sent their COVID-19 positive reports.
Exclusion Criteria: Individuals who were not COVID-19 positive and those who did not attach their COVID-positive reports.
Data Collection Procedure: The online questionnaire in google document format was formulated. 5 questions

were related to the basic characteristics of participants (age, date of birth, gender, city of residence, any co-morbidity) and 10 questions were about any changes in smell and taste. Other clinical manifestations along with loss of smell such as flu or cold symptoms, fever, cough, dyspnea, nasal irritation, sneezing, purulent nasal discharge was also asked. 200 COVID positive cases with either hyposmia or anosmia voluntarily responded to the online questionnaire. The participants were asked to email their COVID positive laboratory reports. Categorical variables were represented as frequency and percentage, while quantitative variables were shown as mean ±SD.

RESULTS

200 COVID positive participants had fully completed the questionnaire. Based on demographic data, mean age of respondents was 36±5.3 years, range of respondents being 13-75 years. 70% participants were females and 30% were males who were COVID positive and experienced olfactory dysfunction Most respondents were from Lahore (60%), Islamabad (20%), Faisalabad (12%), and Gujranwala (8%) (Table 1).

Table 1: Gender and city wise distribution of respondents

Demographic Variables		Frequency N	Percentage %
Gender	Female	140	70%
	Male	60	30%
City	Lahore	120	60%
	Islamabad	40	20%
	Faisalabad	24	12%
	Gujranwala	16	8%

Table 2: Clinical symptoms experienced along with loss of smell

Clinical Symptoms	Frequency N	Percentage %
Flu or cold symptoms	60	30
Headache	80	40
Nasal congestion	130	65
Fever	94	47
Sore throat	72	36
cough	140	70
Dyspnea	40	20

55% of the respondents reported anosmia while 45% experienced hyposmia. 70% participants experienced sudden loss of smell, while 30% reported that loss of smell was gradual. 42% also reported decrease in their sense of taste along with loss of smell. 45% reported that loss of olfaction had a negative effect on their quality of life. 25% participants had a travel history out of their home station. 15% reported that they were hospitalized due to respiratory symptoms. 15% had a history of severe respiratory disease. At the time of the response to the questions, the mean duration of hyposmia/anosmia was 7±5.3 days, ranging from 1 to 30 days. 30% respondents had flu like symptoms, 70% reported cough, 65% experienced nasal congestion and 40% experienced headache. Other clinical manifestations experienced along with loss of olfaction were also noted and tabulated in Table 2.

DISCUSSION

Olfactory dysfunction is being commonly reported by the COVID confirmed patients in Pakistan. According to the present study, 70% COVID positive patients with olfactory dysfunction were females. Studies report that olfactory dysfunction following viral infections are more common among females and middle-aged.[17] In our study, the number of females with olfactory dysfunction was more. Tian et al. reported that the intensity of olfactory loss is same in both genders and males do not have any significant protection against the damage rendered by SARS-CoV-2 on the olfactory epithelium.[18] 55% of the respondents reported anosmia while 45% experienced hyposmia. The onset of anosmia was sudden in 70%, while 30% reported that loss of smell was gradual. The study conducted in US by Kaye et al. reported that out of the 237 COVID positive patients 73% reported anosmia, and amongst these 26.6% patients experienced anosmia as their initial symptom.[19]

42% participants also reported decrease in their sense of taste along with loss of smell. The gustatory sensations sweet, sour, bitter, salty, and umami are well appreciated following the stimulation of olfactory receptors by smell of the food. Thus, the olfactory stimuli has a strong association with the sensory perception of taste. Therefore, loss of taste can also be an early symptom of COVID-19 disease.[20] The latest inclusion of olfactory and gustatory dysfunction among other symptoms of COVID-19 is based on the complains of loss of smell reported by COVID confirmed patients. Lechien et al. reported that out of 417 COVID confirmed patients; 85.6% suffered olfactory and 88.0% faced gustatory dysfunction and the sense of smell was lost before the appearance of other symptoms in 11.8% patients.[21] Other symptoms of COVID-19 such as fever, flu and dyspnea were reported by 47%, 30%, 20% participants respectively. About 15% patients mentioned that they were hospitalized due to respiratory problems. The research team at King's College London, formulated a prototype for identification of the symptoms that can help predict COVID-19 cases. The model included olfactory and gustatory loss, fever, cough, fatigue, diarrhea, abdominal pain and anorexia. [22] The key predictor is loss of olfaction and gustation. Yan et al. in their study on COVID positive patients described that 68 % patients had anosmia and 71% reported loss of taste.[23]

Researches on animal models have shown that various viruses damage the olfactory neuroepithelium and the

associated brain areas.[24] The exact mechanism for the loss of olfaction amongst COVID positive cases still not clear and needs investigations. It is documented that SARS-CoV-2 enters the epithelial cells by attaching to the angiotensin converting enzyme 2 (ACE2) receptor present on the surface of the cells. The cribriform plate near the olfactory bulb could be a route for the COVID-19 virus to enter and influence the brain. Future research is required to completely understand how the SARS-CoV-2 infects the taste afferents and taste related brain regions.[25,26]

CONCLUSION

There is a surge in the outbreak of olfactory impairment in the COVID-19 positive patients in Pakistan. 200 COVID-19 positive patients reported olfactory dysfunction in our study.

LIMITATIONS

The data was gathered through an online self-reported questionnaire. The participants were part of the population who were literate and had an access to the internet.

SUGGESTIONS / RECOMMENDATIONS

Olfactory dysfunction greatly affects the quality of life of COVID-19 positive patients. Clinical trials should be conducted to investigate the correlation between COVID-19 and olfactory dysfunction.

CONFLICT OF INTEREST / DISCLOSURE

None.

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