

Evolving Impact of Vaccination, Blood Group, Social Habits and Sensory Perception Impairment Burden in Covid 19: A Multiregional Survey Based Study

Annmaria Tom^{1*}, Aruna T², Afra Balan³, Kiron S S⁴, Rajagopal P L⁵

¹Pharm D Intern, College of Pharmaceutical Sciences, Government Medical College Kannur, Kerala, India

²Pharm D Intern, College of Pharmaceutical Sciences, Government Medical College Kannur, Kerala, India

³Pharm D Intern, College of Pharmaceutical Sciences, Government Medical College Kannur, Kerala, India

⁴Professor, College of Pharmaceutical Sciences, Government Medical College Kannur, Kerala, India

⁵Professor, College of Pharmaceutical Sciences, Government Medical College Kannur, Kerala, India

***Corresponding Author:** Annmaria Tom, Pharm D Intern, College of Pharmaceutical Sciences, Government Medical College Kannur, Kerala, India

Received: 06 December 2022; **Accepted:** 21 December 2022; **Published:** 06 February 2023.

Citation: Annmaria Tom, Aruna T, Afra Balan, Kiron S S, Rajagopal P L. (2022). Evolving Impact of Vaccination, Blood Group, Social Habits and Sensory Perception Impairment Burden in Covid 19: A Multiregional Survey Based Study. Journal of Pharmacy and Drug Development (JPDD).1(3). DOI:10.58489/2836-2322/015

Copyright: © 2023 Annmaria Tom, this is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Abstract

COVID 19 which wreaked havoc in the lives of thousands of people was yet another chapter in the long history of global pandemics. Though the waves of the pandemic have ceased for the time being, it remains a mystery how it has affected the quality of life of people. The aim of the study was to assess the burden of impairment in perception through five sense organs, as well as the in-disease progression to determine quality of life of patients post COVID 19. Study was conducted as an online survey in multiple regions of South India. Along with it the face-to-face interview provided insight into the real experience of people.

Altogether 346 (59%) individuals were tested positive for covid19 in the population. Post vaccination discomfort was found in 42.7% of the vaccinated population. It was found that 41.3% of the individuals contracted with the disease suffered from some sort of sensory perception impairment Symptomatic burden was not found to have significantly affected by the social habits or the blood group. Sensory Perception impairment made carrying out daily activities strenuous and found to have negatively impacted the nutrition of the population.

Keywords: neurons; cerebral ischemia; L-arginine; Omega-3 PUFAs

Introduction

Corona virus disease 2019 (COVID 19), caused by SARS-CoV-2 (severe acute respiratory syndrome Corona virus 2) is a highly contagious, pathogenic and novel viral disease that triggered a substantial loss of human life worldwide [1]. Clinical implications associated with SARS-Cov-2 differ significantly and it often brought devastating effects, though sometimes these effects were minimal and controllable. It ranges from fever, dry cough, dyspnea to severe cases of pneumonia, acute respiratory distress syndrome and sometimes even death [2]. Unprecedented occurrence of COVID 19 has changed the course of life of many and have burdened them with chronic disabilities and discomforts.

The global pandemic instigated a novel perspective to every aspect of life and brought about transformative discoveries in the scientific world. Currently, several vaccines and medications are at their various stages of development with some of them being clinically approved and administered worldwide. To this day, the whole world has encountered severe setbacks in terms of physical, social and mental wellbeing as well as in the economic and cultural aspects of human life. Even now when the severity of the disease is abating, emergence of a highly virulent variant in near future remains a constant fear. Since the devastations caused by the pandemic, the assessment of quality of life of the commoner with respect to parameters that were already a part of their life like social habits

Pharmacy and Drug Development

and certain novel aspects like vaccination and the burden of infection were to be monitored essentially. Growing evidence redolent of an association between ABO blood group and SARS-CoV-2 infection, where individuals of A group have high likelihood of infection and proclivity to develop severe disease while O group were less susceptible, recommends further evaluation of the scenario [3].

It is through the five senses that a human beings perceive the world. The impairment in or loss of any one of these senses is an abject misery. The constant complaints of the colleagues on the strain of having perception impairment after the infection motivated us to learn the extent of the damage this disease caused on perception of the immediate environment through the five sense organs. Thus, this study aims at evolving the impact of selected external and certain intrinsic factors on the diseased population.

Materials And Methods

The study was conducted as an 'online cross-sectional survey' over a period of three months from first of April, 2022 to the last of June, 2022 in the multiple regions of South India. Individuals aged eighteen and above were made a part of the survey. All the individuals who were illiterate and unable to communicate were excluded from the survey. The questionnaire contained 31 questions and was validated with a pilot study in about 20 individuals. Google form created was further updated according to the relevant points made by these individuals.

The Google form was created in four sections:

The first section consisted of online consent from the study subjects. The accompanying section was for collection of patient demographics, social habits and contact information. The next section formed the heart of the survey which was intended to collect information about COVID infection. This section also enquired about the vaccination details. The final section covered the questions related to the sensory perception impairment and its burden. The survey was conducted by sending questionnaire through online platforms like Email and Whatsapp to the people. Data processing, tabulation of descriptive statistics, calculation and graphical representation were done using statistical software SPSS version 21 (Statistical Package for the Social Sciences) and Microsoft Excel.

Along with the online distribution of the questionnaire, 60 individuals who were COVID positive and were part of the survey were included in a face-to-face interview. The selection criteria were largely convenient. 60 individuals who were easily

accessible for the interview were contacted and as per their time of convenience were asked to meet in a place of choice in groups of 5. Thus 12 groups each containing five individuals were interviewed. This qualitative approach was to gain an in-depth knowledge about the difficulties faced by the individuals who contracted the disease and to know general trends of the disease progression.

Results

Of the total 2376 individuals contacted for the purpose of study, 1008 of them responded. A total of 586 responses were included in the study and 422 of the responses were excluded due to lack of consent. Characteristics of the individuals who participated in the online survey is given in Table.1. Mean age of the respondents were 30.125 ± 8.7 . Out of the total 432 females, 252 of them were tested positive at least once. There were 94 males who contracted the disease. Altogether 346 (59%) individuals were tested positive for covid19. Among them 48 of them were tested positive for more than once. 34 individuals had tested positive for two times and 9 of them for three times. All the 5 subjects who tested positive for COVID for more than three times were below 30 years of age. Among the individuals who were tested positive twice, majority of them were young, in their twenties. There was just one person who contracted the disease twice in the age group of 51 to 70. Fever and headache were the most common symptoms experienced by the study sample. A total of 313(90.4%) out of 346 individuals with the disease experienced fever and 64.4% of them experienced headache (Table.2). Vaccination details of the infected individuals were collected and it was found that only one individual has not received any doses of vaccine (Table.3). Post vaccination discomforts was experienced by 147 individuals which makes 42.7% of vaccinated population (Figure.2). 48 individuals who were vaccinated contracted the disease more than once. As the Astrazeneca made vaccine Covisheid was the first and widely available vaccine in India, it was the mostly administered one and was associated with fever in 56 of the received individuals and myalgia in 12. Of the 8 individuals who took Moderna vaccine, 2 of them had post vaccination discomforts. Fever, body ache and fatigue were associated with this vaccine. Individuals who took Sputnik V and Pfizer reported only fever as post vaccination discomfort.

143 (41.3 %) of the total subjects who were infected with the disease had some sort of sensory perception impairment. Loss of or reduced perception of smell and taste was most widely reported complaints

(Figure.3). For 67.1% of the people with anosmia, the symptoms started within first 5 days of the infection and for 3 of them sense of smell was lost after 10 to 20 days into the initiation of disease. Most of them recovered the sense of smell in twenty days' time (78.1%). But for 11 of them it took a month for recovery. 17 of them experienced a case of microsmia even after one month of infection. Of the total parosmic individuals, almost 80% of them had food triggered parosmia where 11 individual each developed a strong aversion to meat and onion. Garlic induced parosmia in 7 people whereas egg and rice induced parosmia in 8 and 9 individuals respectively. 11 respondents had non-food induced parosmia. 52.8% of the respondents who experienced reduction in taste perception or dysgeusia, experienced reduced appetite as a result of it. Most of them as in case of anosmia, lost the sense of taste in the first few days of infection. But 3 individuals reported to have lost the sense of taste after twenty days of infection. Most of them recovered the taste in ten days (72.8%) but there were 11 individuals who suffered with taste loss for one month and 13 of them who struggled with it for more than one month. Of the total 26 individuals who reported some sort of variation in tactile perception, 9 of them reported it to be on the palms and 5 of them on their soles. There were 12 individuals who reported the tingling and numbing sensation all over the body. For 12 respondents' eye related disturbances started after 1 month of infection. But there were 18 individuals who suffered disturbances like eye irritation, redness and light sensitivity in the first twenty days. The hearing impairment that usually considered to be a late onset complication of this disease was developed in one month for 10 individuals. 2 of them experienced it after 3 months and 1 person after 6 months of infection. One individual reported hearing loss with a magnitude as high as 7 in a ten-point scale were zero represented no hearing loss and 10 represented total loss of hearing. The assessment of social habits like drinking and smoking showed that there were 70 individuals who consumed alcohol and 32 of them never contracted the disease. Smoking was practiced by 24 of the study population and only 10 of them contracted the disease. Most of them recovered the taste in ten days (72.8%) but there were 11 individuals who suffered with taste loss for one month and 13 of them who struggled with it for more than one month. Of the total 26 individuals who reported some sort of variation in tactile perception, 9 of them reported it to be on the palms and 5 of them on their soles. There were 12 individuals who reported the

tingling and numbing sensation all over the body. For 12 respondents' eye related disturbances started after 1 month of infection. But there were 18 individuals who suffered disturbances like eye irritation, redness and light sensitivity in the first twenty days. The hearing impairment that usually considered to be a late onset complication of this disease was developed in one month for 10 individuals. 2 of them experienced it after 3 months and 1 person after 6 months of infection. One individual reported hearing loss with a magnitude as high as 7 in a ten-point scale were zero represented no hearing loss and 10 represented total loss of hearing. The assessment of social habits like drinking and smoking showed that there were 70 individuals who consumed alcohol and 32 of them never contracted the disease. Smoking was practiced by 24 of the study population and only 10 of them contracted the disease.

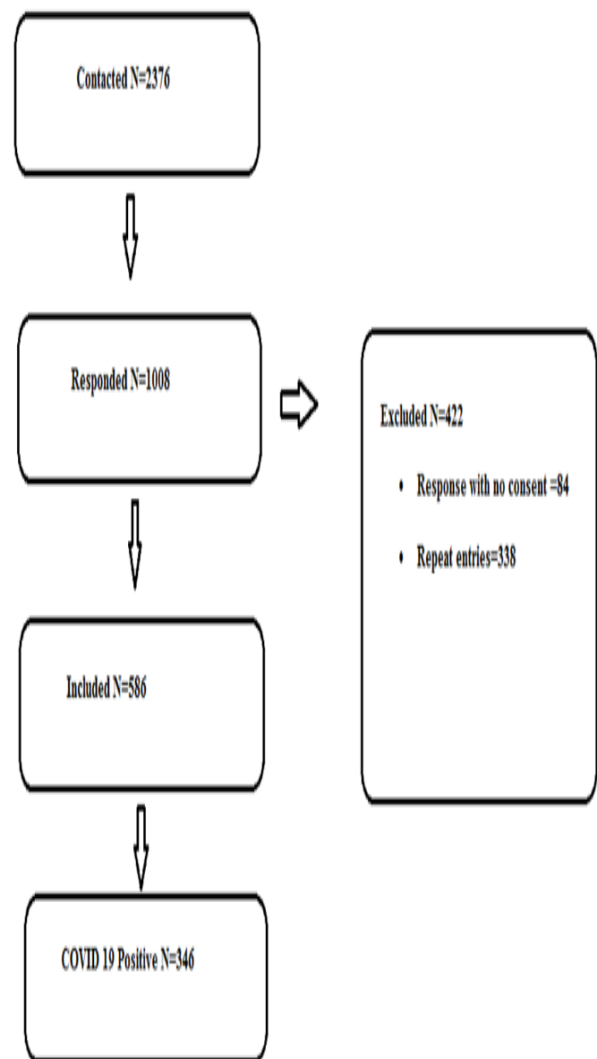


Fig1: Study Inclusion.

Pharmacy and Drug Development

Table 1: Population Characteristics

Population characteristics	Total frequency(N=586)	Covid positive(N=346)	P value
Gender			
Male	154	94	0.614
Female	432	252	
Age			
18-30	463	264	0.063*
31-50	86	59	
51-70	33	20	
>70	4	3	
Blood Group			
A+ve	137	88	0.287
A-ve	10	7	
B+ve	135	72	
B-ve	16	9	
O +ve	227	137	
O-ve	12	8	
AB+ve	47	25	
AB-ve	2	0	

*Significant

Table .2: Symptoms of infection

Symptoms	Frequency
A	8
B	5
C	3
D	4
E	1
G	1
I	1
J	2
N	3
S	1
T	12
A, G	12
A, B	5
A, B, C, D, E, N	43
A, B, C, D, E, G, J	38
A, F, H, I, J, O	46
A, E, G, N, S	6
A, C, D, G, J, N, P	23
A, B, G, J, N	17
A, B, C, G, S	8
A, B, K, N	10
A, B, H, I, N, O, P	39
A, B, E, G, M, N	17
A, B, C, D, O, L	41

Table.3: Vaccination detail

Vaccinated	Frequency(N=346)
Yes	344
No	1
Not responded	1
Number of vaccines taken	
First dose	18
Second dose	246
Booster dose	80
Not responded	2
Type of vaccine (only positive)	
Covishield	311
Covaxin	18
Johnson and Johnson	1
Moderna	8
Sputnik V	2
Pfizer	4
Not responded	2

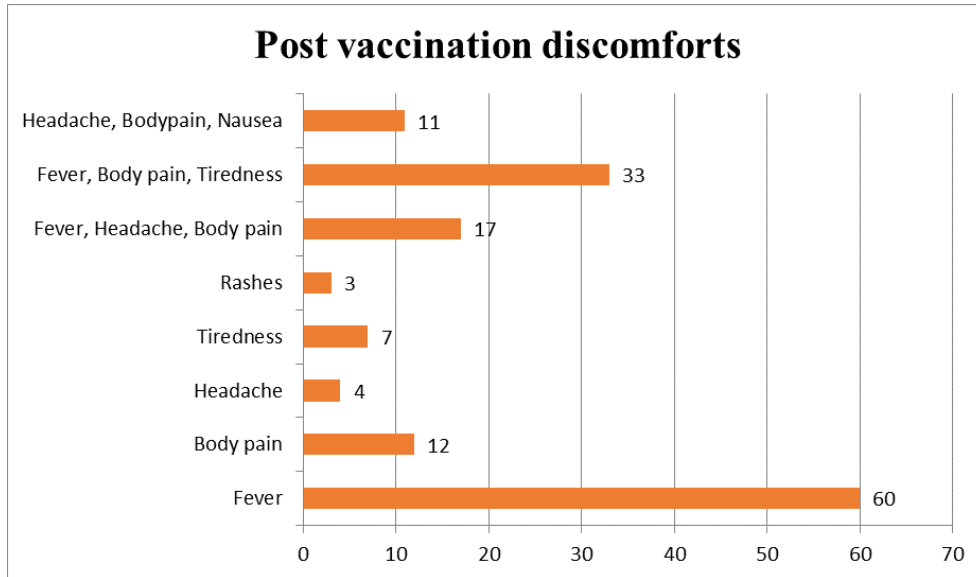


Fig.2: Post vaccination discomforts

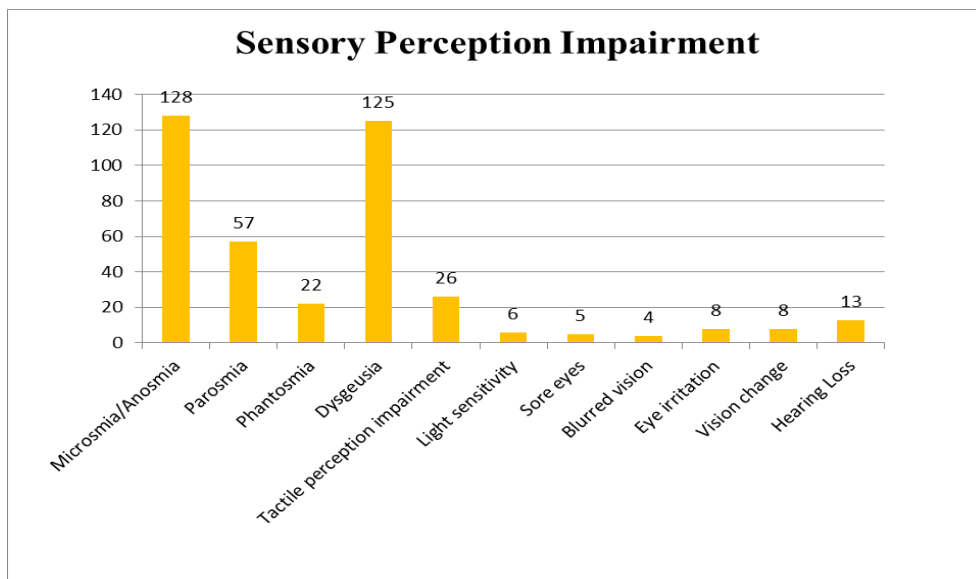


Fig.3: Sensory Perception impairment

Discussion

The respondents of survey were from different areas of India, following diverse life styles and having different perspectives. A large number of respondents were young and working. The fact that only a bare minimum of the elderly has stepped themselves into the electronic era or preferred social media was well reflected in our study as only 4 of the respondents were aged above 70[1]. Blood group was often put forth as a factor on which the susceptibility and severity of this disease was predicted upon. According to the study conducted in 2020 in China, it was found that largest percent of patients who contracted the disease were having type A blood group [3]. Another multicentre study conducted in China also indicated to similar outcome

where the proportion of individuals with type A blood group was compared in COVID 19 patients and normal people [4]. The systemic review and meta-analysis conducted in China also concluded that type A and B individuals have more susceptibility to developing the disease [5]. In our study we plotted the individuals with type A blood group to having contracted the disease or not. It was found that 64.6% of study population were infected with the disease. The presence of large number of respondents with type O blood group in the study made the type O individuals to be the highest among COVID positive individuals. Of the 346 individuals who were COVID positive, 48 of them were positive more than once, with 5 individuals tested positive more than thrice. Upon detailed enquiry it was found that all these

Pharmacy and Drug Development

individuals were health workers and 3 of them had a recurrence within 45 days. Whereas for the other two, each recurrence was spaced in months. The concern of symptomatic re-infection in health care workers was also reported by a Brazilian study, where mean time to re-infection was found to be 50.5 days [6].

The survey was able to infer that fever was the most prevalent symptom among the population. Out of the 346 individuals with the disease 313 of them complained about having fever. And 53.4% individuals complained about having headache. There was one Covid positive individual who did not reveal his vaccination status. There was significant correlation when the vaccination status and the symptoms were compared (P Value=0.000). Of the total 18 individuals who took only the first dose of vaccination, 22.2% of them had sleeping disturbance, vomiting and diarrhea in addition to the common symptoms of fever, headache, sore throat and breathing difficulty. There were 246 individuals who took the second dose of vaccination at the time of survey and 13.4% of them developed these symptoms. 29 of the individuals who took the second dose vaccination also developed hair loss along with the other symptoms.

The qualitative study conducted among 60 individuals who were separated into a group of 5 were able to provide a broad perspective to the symptomatic burden of the disease. There were 12 groups of which at least one person of each group had breathing difficulty. On enquiring about the experience during an episode suggested that breathlessness occurred mostly during night and it made walking and talking even for a short time difficult. This lasted for almost one month of infection and made carrying out day today activities strenuous. The systemic review on frequency and variety of symptoms conducted by Tahmina Nesserie indicated dyspnea to be the most prevalent symptom where it was reported in 26 studies [7]. The complaints of breathlessness was found to be mostly in individuals who contracted the disease in first and second waves. Only 9 out of 27 interviewed individuals who contracted the disease in third wave had breathing difficulty. But the study conducted in Poland where dynamics of third wave was investigated, dyspnea was reported in 40.9% of the individuals [8]. Sleeping difficulty, cough and hair loss were some of the persistent symptoms that lasted into weeks and months of infection. The persistent coughing bouts which could not be subsided by over the counter cough syrups impacted the life of teaching faculties and doctors negatively. Insomnia drastically reduced the productive

functioning in about 40 of the individuals. The Long Haulers symptoms survey report marked these three among the 50 most common persistent symptoms [9]. Out of the 17 of the total females in the study population who reported irregular menstruation, 10 had one month delay in adjacent menstrual cycle and 3 complained of dysmenorrhea, developed after covid infection. The analysis of post vaccination symptoms showed that fever was the most common symptom. 2 of the individuals reported to have needed physician's assistance for fever management. Similarly 1 health care worker reported to have severe body ache that effected the daily routine for a week. The survey on post vaccination symptoms in India reported tiredness and myalgia to be the most prevalent symptoms [10]. Another interesting aspect found in these discussions was the fact that almost 19 of the individuals who were personally interviewed, who contracted the disease in the third wave, did so immediately after the booster dose vaccination. They tested positive between 5 to 20 days of receiving booster shots with symptoms of fever, headache, running nose, cough, body ache and in rare 2 cases vomiting.

The online survey showed a prevalence of 21.8% of microsmic or anosmic individuals. Microsmia was experienced by 37 of the 60 individuals interviewed during the period of infection. Anosmia was experienced by another 13 individuals. The survey on most common neurological symptoms of corona virus infection by E.Moro reported anosmia to be one of the most prevalent symptoms [11]. The study conducted by Paolo Rizzo reported the prevalence of anosmia to be 6.9% and that of severe microsmia as 4.8% [12]. The recovery from gustatory dysfunction was evaluated in detail by Niklassen where it was found that though anosmia was drastically reduced in patients post infection and it was hyposmia that persists [13]. Though hyposmia lasted for a slightly longer term for 17 individuals in our survey, it was parosmia and phantosmia that really raised a concern. The loss of or impaired ability to experience the touch, taste, sight, sound and smell was made a focus of the interview. The respondents were encouraged to describe the smells they experienced. Four of them experienced altered smell for toothpaste, detergent and perfumes. The smell of toothpaste was reported to be like ammonia that it was impossible for them to continue to use it. The smell of detergent was described to be that of fireworks and that of perfume as similar to the chemical fuels. 19.2% of the parosmic individuals in the survey had non food induced parosmia. People

who experienced food induced parosmia along with dysgeusia disclosed that it was an onerous task to find the dishes they could eat without being disgusted. Strong aversion to meat, egg, onion and garlic made it impossible to eat any food that contained these ingredients in it. The study by Kathrin Ohla et al found the prevalence of parosmia to be 10.1% in COVID patients [14]. The smell of burning that could be smelt only by the phantasmic individual as was reported in their study was complained along with the smell of rotten egg by one of our respondents. The detailed information on phantasmia was limited as only one individual in the personally interviewed group complained of phantasmia.

The impact of the social habits on COVID infection and progression was also evaluated and it was difficult to infer that the social habits could in anyway influence the disease progression. In order to address the controversies regarding the false claims of cure of COVID by alcohol, WHO released an official note to counter the myths circulated about alcohol use where it was clarified that alcohol cannot cure the disease [15]. A total of 70 individuals who participated in the survey consumed alcohol where 32 of them never contracted the disease. The presence of a larger female population within the age of 30 might have significantly affected the lower number of alcohol consumers. Alcohol consumption was reported by only 38 of the total 346 COVID positive respondents and the symptomatic burden was seen significantly reduced in them. This can be explained such that when only 5.2% (N=346) of the alcohol consumers experienced a combination of symptoms like fever, headache, cough, running nose, sneezing, body pain, sore throat and breathing difficulty, the same was experienced by 11.6% of the non alcohol users. Similarly the symptoms of alopecia, fever, headache, running nose, cough and sleep disturbances were reported only in 2.6% of alcohol consumers, it was reported in 12.9% of non alcohol consumers. There were a total of 24 smokers in the study population and the presence of only 10 smokers in COVID positive group made it impossible for any sort of generalization regarding the habit.

Conclusion

Our study objective was developing the impact of vaccination, blood group, and social habits, which were considered to have made significant value in the understanding of disease progression. The necessity of further evolution of these factors for a better disease pattern perception and management strategy development has made this an essential and worthy purpose. The sensory perception

impairment assessment showed that there was a significant reduction in sensory perception in patients who contracted the disease. Mostly these symptoms were reversible but often enough some of them retained for a long period which obviously affected the quality of life of people. This study was deemed a necessity of the day since the quality of life of the people was significantly affected by the impairment inflicted by the disease.

Conflict Of Interest

Authors declare no conflict of interest

Acknowledgement

The authors are truly grateful to their peers who held an indispensable role in data collection and the College management for their immense support.

References

1. Venkatraman, S. (2017). Social media in south India (p. 256). UCL press.
2. Zahra, S. A., Iddawela, S., Pillai, K., Choudhury, R. Y., & Harky, A. (2020). Can symptoms of anosmia and dysgeusia be diagnostic for COVID-19?. *Brain and behavior*, 10(11), e01839.
3. Wu, Y., Feng, Z., Li, P., & Yu, Q. (2020). Relationship between ABO blood group distribution and clinical characteristics in patients with COVID-19. *Clinica chimica acta*, 509, 220-223.
4. Zhao, J., Yang, Y., Huang, H., Li, D., Gu, D., Lu, X., Zhang, Z., Liu, L., Liu, T., Liu, Y., He, Y., Sun, B., Wei, M., Yang, G., Wang, X., Zhang, L., Zhou, X., Xing, M., & Wang, P. G. (2021). Relationship Between the ABO Blood Group and the Coronavirus Disease 2019 (COVID-19) Susceptibility. *Clinical Infectious Diseases*, 73(2), 328-331.
5. Liu, N., Zhang, T., Ma, L., Zhang, H., Wang, H., Wei, W., ... & Li, H. (2021). The impact of ABO blood group on COVID-19 infection risk and mortality: A systematic review and meta-analysis. *Blood reviews*, 48, 100785.
6. Dos Santos, L. A., de Góis Filho, P. G., Silva, A. M. F., Santos, J. V. G., Santos, D. S., Aquino, M. M., ... & de Almeida, R. P. (2021). Recurrent COVID-19 including evidence of reinfection and enhanced severity in thirty Brazilian healthcare workers. *Journal of Infection*, 82(3), 399-406.
7. Nasserie, T., Hittle, M., & Goodman, S. N. (2021). Assessment of the Frequency and Variety of Persistent Symptoms Among Patients With COVID-19: A Systematic Review. *JAMA network open*, 4(5), e2111417.
8. Kłosiewicz, T., Szkudlarek, W., Węglewska, M., Konieczka, P., Zalewski, R., Podlewski, R., Sowińska, A., & Puślecki, M. (2022). Dynamics of the Third Wave of COVID-19 from the

Pharmacy and Drug Development

- Perspective of the Emergency Department in a Large Regional Hospital—Single Center Observational Study. *Healthcare*, 10(1), 18.
9. Natalie J Lambert, survivor corps. COVID-19 “Long Hauler” Symptoms Survey Report Indiana University School of Medicine.
 10. Jayadevan, R., Shenoy, R., & TS, A. (2021). Survey of symptoms following COVID-19 vaccination in India. *Medrxiv*, 2021-02.
 11. Moro, E., Priori, A., Beghi, E., Helbok, R., Campiglio, L., Bassetti, C. L., ... & EAN core COVID-19 Task Force. (2020). The international European Academy of Neurology survey on neurological symptoms in patients with COVID-19 infection. *European journal of neurology*, 27(9), 1727-1737.
 12. Boscolo-Rizzo, P., Menegaldo, A., Fabbris, C., Spinato, G., Borsetto, D., Vaira, L. A., ... & Hopkins, C. (2021). Six-month psychophysical evaluation of olfactory dysfunction in patients with COVID-19. *Chemical senses*, 46, bjab006.
 13. Niklassen, A. S., Draf, J., Huart, C., Hintschich, C., Bocksberger, S., Trecca, E. M. C., ... & Hummel, T. (2021). COVID-19: recovery from chemosensory dysfunction. A multicentre study on smell and taste. *The Laryngoscope*, 131(5), 1095-1100.
 14. Ohla, K., Veldhuizen, M. G., Green, T., Hannum, M. E., Bakke, A. J., Moein, S. T., ... & Niv, M. Y. (2021). Increasing incidence of parosmia and phantosmia in patients recovering from COVID-19 smell loss. *MedRxiv*, 2021-08.
 15. World Health Organization. 2020.