



Research Article

# Knowledge and Perceptions towards New SARS-CoV-2 Variants among General Population of India

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DOI: <https://doi.org/10.24321/0019.5138.202222>

## I N F O

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### How to cite this article:

Panda M, Priyanka, Kishore J. Knowledge and Perceptions towards New SARS-CoV-2 Variants among General Population of India. Special Issue - COVID-19 & Other Communicable Disease. 2022;134-142.

Date of Submission: 2022-01-17

Date of Acceptance: 2022-02-26

## A B S T R A C T

**Introduction:** In late 2020, the advent of COVID-19 variants which presented an increased level of risk to global or worldwide public health were categorised as Variants of Concern (VOCs) and Variants of Interest (VOIs). People have a varied understanding of these emerging variants resulting in the adoption of preventive and control measures.

**Objective:** To find out the knowledge and perceptions towards Omicron in the general population.

**Method:** A cross-sectional study was conducted via an online survey on 702 subjects above 15 years of age.

**Results:** 94.3% of the respondents had heard about the different variants of coronavirus affecting people during the pandemic. Out of those, majority had heard about the Omicron variant (95.9%) followed by the delta variant (84.3%). The level of knowledge was found to be significantly associated with education, occupation, history of COVID-19 infection of self or in the family, history of deaths in the family due to COVID-19 etc. 79.4% of the study respondents considered the new variants to be severe.

**Conclusion:** Perception of severity was associated with education, history of COVID-19 infection in the family or hospitalisation of family member(s) due to COVID-19.

**Keywords:** COVID-19, Coronavirus Variants, Omicron, General Population, India

## Introduction

At the end of December 2019, an unknown novel strain of coronavirus emerged as the primary cause of countless pneumonia cases, in Wuhan city, the Hubei province of the People's Republic of China.<sup>1,2</sup> Characterised by widespread and rapid transmission, the virus was titled SARS-CoV-2

or severe acute respiratory syndrome coronavirus-2.<sup>3</sup> It has rapidly progressed since then as COVID-19 and was declared as pandemic on 11th, March 2020 by the World Health Organization (WHO).<sup>4</sup> India reported its first case of COVID-19 on 30th January 2020 in Trissur, Kerala.<sup>5</sup> At the minimum 260 million SARS-CoV-2 infections and 5.2 million



deaths globally have been detected over 23 months since the reporting of the first COVID-19 case.<sup>6</sup>

When a virus replicates every time, there is a likelihood for it to modify its structure. Each of such modifications or changes is called 'mutation'. A virus having one or more mutations is known as a 'variant' of the native virus. Since January 2020, the World Health Organisation in collaboration with researchers from a variety of authorities (national and international) and institutions have been monitoring and closely assessing the evolution of the SARS-CoV-2. In late 2020, the advent of variants that presented an increased level of risk to global or worldwide public health was categorised as Variants of Concern (VOCs) and Variants of Interest (VOIs). A variant is regarded as a variant of interest on the condition that it has mutations that are doubted or known to create notable changes and is widely circulating. A variant of interest turns into a variant of concern when it is cognised to spread quite easily, results in severe disease, escape the immune response of the body and modify the clinical presentation.<sup>7</sup>

In late 2020 and early 2021, SARS-CoV-2 variants were identified that appear to be more transmissible than existing strains. As far as the Delta variant is concerned, it was classified as a variant of concern on 11th May 2021 by the World Health Organisation (WHO) and became the most dominant variant circulating globally in a few months' time. This variant transmits more easily as compared to the previous strains and is accountable for more number of cases and deaths in the world.<sup>7</sup> The recently reported Omicron variant (variant B.1.1.529) was categorised as a variant of concern on 26th November 2021 by the WHO.<sup>7,8</sup> This variant is a highly contrasting variant with an exorbitant number of mutations. The overall risk with respect to the Omicron variant remains significantly high as per the currently available evidence. The variant has a marked growth advantage over the Delta variant causing a fast spread in the community with soaring incidence levels than seen in this pandemic previously.

In spite of a lesser risk of extreme disease and death post the infection as compared to the previous SARS-CoV-2 variants, high transmissibility nonetheless has led to increases in hospitalisation, pose massive demands on the health care systems in majority of the countries and may usher in notable morbidity, especially in vulnerable populations.<sup>7,8</sup>

In this regard, the current study aims to assess the knowledge and perception of the general public about the new variants of coronavirus. The results and evidence generated from such studies could help the public health planners and other health sector authorities in identifying the determinants to design intervention strategies for an effective prevention program.

## Methodology

The present study was a community-based cross-sectional method carried out online by using internet-based social media applications. In view of the ongoing COVID-19 wave in India and resultant restrictions and precautions, data collection was done by online survey, which was conducted for a period of 10 days from 6th January to 15th January 2022. No similar study assessing the knowledge and perceptions pertaining to new variants of coronavirus among the Indian population is available. Therefore, for calculating sample size, an estimated level of knowledge was taken as 50%. Using 0.05 as precision and 95% confidence interval, the sample size came out to be 385. Adding 50% due to probable non-response usually observed in telephone or postcard based surveys, we chose to collect a sample of 578. Considering a low response rate in web-based surveys, we circulated the study instrument to 1000 people, out of which complete responses were obtained from 702, thereby amounting to a response rate of 70%.

## Inclusion Criteria

Participants of age group > 15 years who have access to the internet using social media applications or any other messaging platform and who were literate and could understand English were included in the study.

## Sampling Technique

Study participants were enrolled by using convenience sampling. They were contacted through phone contacts other than those associated with the investigators, messaging apps and other social media platforms and groups. It was used as a platform to send the Google form link consisting of a Participant Information sheet and a mandatory consent check box. It mentioned the purpose of the study and only those who gave their consent were included in the study. Data collection was done anonymously and every effort was made to maintain confidentiality of the study participants.

## Study Tool

An online pre-designed, pre-tested, self-administered questionnaire was designed in Google forms which contained information about the demographic profile of participants like age, sex, level of education and occupation etc. They were asked about the history of COVID-19 infection among themselves or in the family. Any history of hospitalisation or death in the family because of COVID-19 was also asked. Questions were asked related to knowledge about the new variants of coronavirus and also their perceptions regarding the same.

## Data Analysis

Data was transferred to MS-Excel and analysed using SPSS

version 22. Qualitative data were expressed in proportions or percentages and quantitative data was were in mean and standard deviation. Chi-square test was used to check the association of various clinico-sociodemographic variables with the knowledge and perception of the study participants. The level of significance was taken as less than 0.05.

### Ethical Permission

Ethical permission for the current study was not applied for since data collection was carried out through online survey after taking informed consent and participant anonymity and confidentiality was maintained, within ethical boundaries of the Declaration of Helsinki.

### Results

In the present study, a total of 702 subjects participated,

after giving consent, and completed the study questionnaire. The mean age of the participants was 39.9 (SD ± 14.9) years. The largest proportion of respondents (40.9%) belonged to the age group of 31-45 years. Almost 50% of participants were males and around 90% had completed education up to a minimum level of graduation. Around one-fourth (25.5%) were medical or paramedical professionals, (25.5%) were working in private sector, (12.7%) were working in government sector and (13.7%) were students. 26.1% had history of co-morbidities like DM, HTN etc (Table 1).

About 52.3% reported having a history of COVID-19 infection in the family, whereas 30.5% reported having been infected with COVID-19. Furthermore, 21.7% reported hospitalisations of family member(s) and 11.0% suffered the loss of a family member due to COVID-19 infection. Almost 95% of subjects had been vaccinated against COVID-19 and 95.2% of those were fully vaccinated (Table 1).

**Table I. Sociodemographic and Clinical Profile of Study Participants**

(N = 702)

S. No.	Characteristic Feature	Number	Percentage (%)
1.	Age group (in years)	15-30	27.1
		31-45	40.9
		46-60	18.5
		> 60	13.5
2.	Gender	Male	49.6
		Female	50.4
3.	Educational status	Post-graduation and above	38.0
		Graduation	28.1
		Up to secondary school	10.5
4.	Occupation of the study participants	Medical and paramedical professionals	25.5
		Public sector/ government job/ private sector job	38.2
		Student	13.7
		Housewife	6.7
		Retired	5.0
		Others	10.9
5.	History of comorbidities*	No existing disease	75.1
		Hypertension	15
		Diabetes mellitus	9.8
		Cardio-vascular disease	3.6
		Others	6.9
6.	History of COVID-19 infection in family	367	52.3
7.	History of hospitalisation of family member(s) due to COVID-19 infection in the past	152	21.7

8.	History of deaths in the family due to COVID-19	77	11.0	
9.	History of COVID-19 infection (self)	214	30.5	
10.	Treatment of COVID-19 infection (self) (n = 214)	Home isolation	176	82.2
		Hospitalisation	38	17.8
11.	Have been administered COVID-19 vaccination (n = 702)	666	94.9	
12.	No. of doses of COVID-19 vaccine administered (n = 666)	1 dose	32	4.8
		2 doses	634	95.2

**Table 2. Distribution of Study Participants according to Knowledge regarding New Variants**

S. No.	Characteristic Feature	Number	Percentage (%)	
1.	Heard about different variants of coronavirus affecting people during pandemic (N = 702)	662	94.3	
2.	Heard about which of the variants of coronavirus (n = 662)*	Alpha	256	38.7
		Beta	205	30.9
		Gamma	149	22.5
		Delta	558	84.3
		Omicron	635	95.9
		IHU	16	2.4
		Others	32	4.8
3.	As per your knowledge, which of the following variants have originated in India? (n = 662)*	Alpha	17	2.6
		Beta	18	2.7
		Delta	335	50.6
		Omicron	99	15.0
		Gamma	4	0.6
		Don't know	245	37.0
		None	7	1.1
4.	New variant OMICRON originated in which of the following countries (n = 662)*	South Africa	463	69.9
		Brazil	11	1.7
		India	23	3.5
		UK	30	4.5
		Multiple countries	67	10.1
		Don't know	62	9.4
		Others	6	0.9
5.	Source of information related to coronavirus and its new variant*	Newspaper	370	55.9
		Television	440	66.5
		Radio	43	6.5
		WhatsApp	277	41.8
		Other social media sites	259	39.1
		Internet	293	44.3
		Friends and relatives	200	30.2
		Others	40	6.0

\*Multiple options possible.

Upon being enquired about the knowledge related to coronavirus variants, 662 (94.3%) of the respondents had heard about the different variants of coronavirus affecting people during the pandemic, hence further questions related to knowledge were asked from only those respondents. Out of those, majority had heard about the Omicron variant (95.9%) followed by the delta variant (84.3%). Only 69.9% and 50.6% of the respondents correctly knew regarding the origin of Omicron and delta variant respectively. The

common source of this information was reported to be television (66.5%), followed by newspapers (55.9%), internet (44.3%), WhatsApp (41.8%) and other social media sites like Facebook, Twitter etc. (39.1%) (Table 2).

When asked about their risk perception regarding the new variant omicron, 526 (79.4%) of the study respondents considered it to be severe while the rest 136 (20.6%) considered it to be mild.

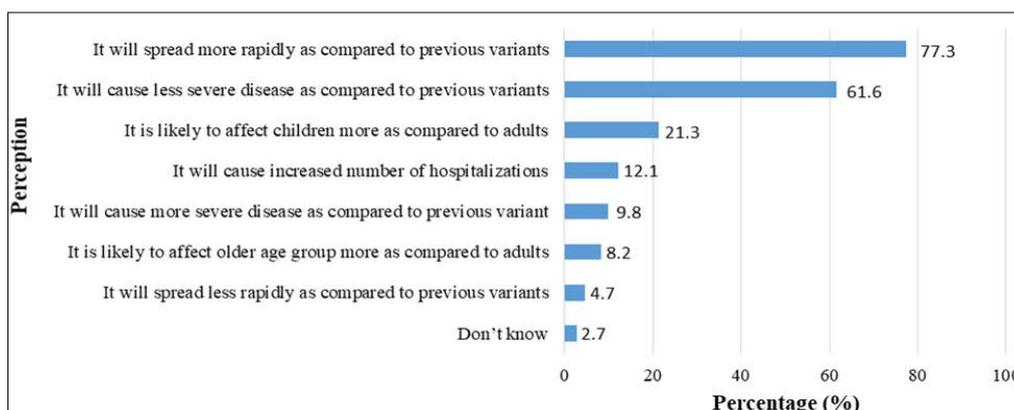


Figure 1. Perception of study participants regarding the new variant OMICRON (n=662)  
 \*Multiple options possible

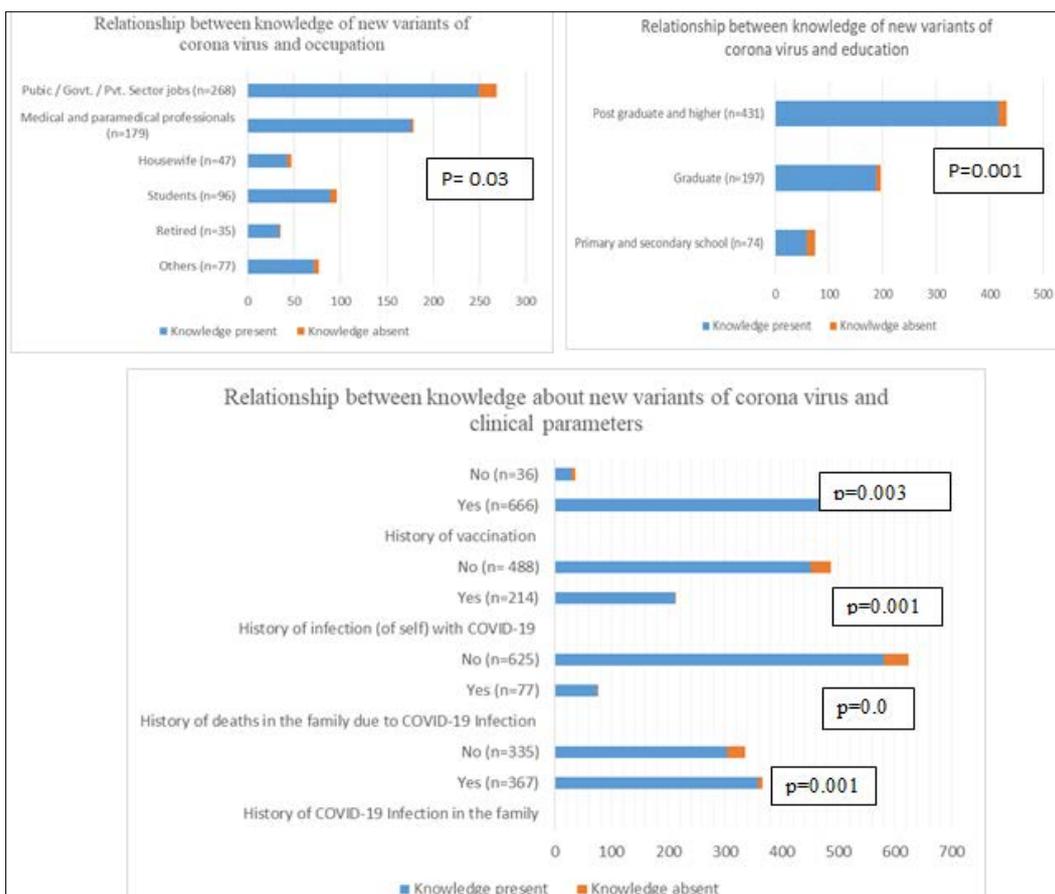


Figure 2. Association between the Knowledge about New Variants of Coronavirus with socio-demographic variables and COVID-19 Infection

Majority of the study participants perceived that the new variant will spread more rapidly as compared to the previous variants (77.3%) and it will cause less severe disease as compared to the previous variants (61.6%). However, about one-fifth (21.3%) believed the new variants would affect the children more whereas, a few (12.1%) believed it will cause an increased number of hospitalisations (Figure 1).

Further analysis was carried out to find the association of various factors with knowledge about new variants of coronavirus. It was seen that education ( $p < 0.05$ )

and occupation ( $p < 0.05$ ) were significantly found to be associated with knowledge. However, a significantly larger proportion of subjects with a history of COVID-19 infection of self or in the family, history of deaths in the family due to COVID-19 infection and those vaccinated against COVID-19 were found to have better knowledge regarding emerging variants of coronavirus ( $p < 0.05$ ). (Figure 2). No association was found between age, gender and presence of co-morbid conditions with knowledge about new variants of coronavirus.

**Table 3. Association between the Risk Perception regarding New Variant of Coronavirus with Sociodemographic Variables and COVID-19 Infection**

Characteristics	Risk Perception regarding New Variant of Coronavirus		Statistical Significance
	Less severe N (%)	Very severe N (%)	P value
<b>Age (in years)</b>			
15-30 (n = 190)	40 (21.1)	150 (78.9)	$\chi^2 = 3.98$ $p = 0.263$
31-45 (n = 287)	46 (16)	241 (84)	
46-60 (n = 130)	27 (20.8)	103 (79.2)	
> 60 (n = 95)	23 (24.2)	72 (75.8)	
<b>Gender</b>			
Males (n = 348)	76 (21.8)	272 (78.2)	$\chi^2 = 2.68$ $p = 0.101$
Females (n = 354)	60 (16.9)	294 (83.1)	
<b>Education (maximum level attained)</b>			
Post graduate and higher (n = 431)	83 (19.3)	348 (80.7)	$\chi^2 = 6.753$ $p = 0.03$
Graduate (n = 197)	31 (15.7)	166 (84.3)	
Primary and secondary school (n = 74)	22 (29.7)	52 (70.3)	
<b>Occupation</b>			
Medical and paramedical professionals (n = 179)	39 (21.8)	140 (78.2)	$\chi^2 = 6.589$ $p = 0.253$
Pubic/ govt/ pvt. sector jobs (n = 268)	40 (14.9)	228 (85.1)	
Students (n = 6)	24 (25)	72 (75)	
Housewife (n = 47)	10 (21.3)	37 (78.7)	
Retired (n = 35)	06 (17.1)	29 (82.9)	
Others (n = 77)	17 (22.1)	60 (77.9)	
<b>Presence of co-morbidity</b>			
No existing disease (n = 527)	103 (19.5)	424 (80.5)	$\chi^2 = 0.04$ $p = 0.842$
Presence of disease/ comorbidity (n = 175)	33 (18.9)	142 (81.1)	
<b>History of COVID-19 infection in the family</b>			
Yes (n = 367)	50 (13.6)	317 (86.4)	$\chi^2 = 16.27$ $p < 0.001$
No (n = 335)	86 (25.7)	249 (74.3)	

History of hospitalisation of family member(s) due to COVID-19 Infection			
Yes (n = 152)	17 (11.2)	135 (88.8)	$\chi^2 = 8.32$ $p = 0.004$
No (n = 550)	119 (21.6)	431 (78.4)	
History of deaths in the family due to COVID-19 Infection			
Yes (n = 77)	12 (15.6)	65 (84.4)	$\chi^2 = 0.795$ $p = 0.373$
No (n = 625)	124 (19.8)	501 (80.2)	
History of infection (of self) with COVID-19			
Yes (n = 214)	35 (16.4)	179 (83.6)	$\chi^2 = 1.795$ $p = 0.180$
No (n = 488)	101 (20.7)	387 (79.3)	
History of vaccination			
Yes (n = 666)	122 (18.3)	544 (81.7)	$\chi^2 = 9.252$ $p = 0.002$
No (n = 36)	14 (38.9)	22 (61.1)	

On analysing the association of various factors with the perception of severity about a new variant of coronavirus, it was seen that neither age nor gender was significantly found to be associated with the perception that new coronavirus variant may be more severe than the previous ones. However, a significantly larger proportion of subjects with the level of education graduation or higher thought the new variant could be more severe ( $p < 0.05$ ). No association was found between present occupation and presence of co-morbid conditions with perception of severity. Respondents having a history of COVID-19 infection in the family or hospitalisation of family member(s) due to COVID-19 perceived the new variant to be more severe than the previous ones ( $p < 0.05$ ). Similarly, those who were vaccinated against COVID-19 perceived that newer variants are severe and are a cause of concern ( $p < 0.05$ ) (Table 3).

## Discussion

The present study shows that a majority of respondents (94.3%) had heard about new variants of SARS CoV-2. But the level of knowledge regarding other aspects of new variants was not found to be satisfactory. Low level of knowledge among the general population can affect their attitude and perceptions towards the new variants, which in turn, can lead to inappropriate adoption of preventive measures. Smith LE et al. have shown that people having good knowledge about omicron coronavirus variant were more likely to follow COVID appropriate behaviour when they step out of their homes.<sup>9</sup> When asked about the names of newer variants, majority of respondents knew about delta (84.3%) and omicron (95.9%). As this study was conducted when the cases of omicron had just begun to rise in India, a very good level of knowledge regarding the variant is a positive aspect. People also widely knew about the delta variant probably because it was the reason for major devastation in the last wave of COVID-19 in India. However, almost half the subjects were not aware that

the delta variant originated in India. Similarly, almost one third (30.1%) did not correctly know that South Africa is the country of origin for the omicron variant. This shows that people are not quite knowledgeable about the country where newer variants are originating. We could not find any study regarding public knowledge about newer coronavirus variants. Hence the present study may be the first one to explore this aspect.

Regarding the sources of information about new coronavirus variants, other than TV and newspaper, internet sources and social media, especially WhatsApp were also cited by study subjects. This shows that with widespread access, internet and social media have emerged as an important source of information about coronavirus variants for the general population. However, the authenticity of information on these platforms is questionable and can lead to the spread of false rumours among the public which is termed as infodemic. Erfani A et al. in their population-based study from Iran, have reported that 83% of subjects relied on social media and internet as the source of information for COVID-19 and 73% of those considered it a reliable source.<sup>10</sup> Similar results are also shown by other authors.<sup>11</sup>

A large proportion of subjects had the perception that the omicron variant will spread more rapidly and will cause less severe disease as compared to the previous variants. This perception is considered as true as per evidence generated by research.<sup>12-14</sup> A segment of the study population was concerned that omicron would affect more children as compared to previous variants. Initial research showed that omicron was responsible for increased pediatric hospitalisations in South Africa.<sup>15,16</sup> This may have resulted in worry about severe disease in children.

This study did not find any association of knowledge regarding new variants with age, gender or presence of co-morbid conditions in the study subjects. However, the level of knowledge was found to be significantly associated

with education and occupation. Other authors have also shown that knowledge regarding COVID-19 was found to be positively associated with the level of education.<sup>11,17-19</sup> This association also stands true for knowledge about newer variants. The present study shows a higher level of knowledge among medical and para-medical professionals, which is understandable as they are from a medical background. Knowledge was also more in those with a history of COVID-19 infection in self or family and COVID related death of family member. The reason for this may be that they are more concerned about getting the infection as they have already gone through its consequences.

Almost one-fifth (20.5%) of the respondents were less concerned about getting infected with a new variant. Hence, it can be expected that they wouldn't take new variants seriously and it would reflect in their behaviour. Previous research has shown that the perceived risk of omicron infection is associated with the adoption of protective behaviours.<sup>9</sup> The present study shows a positive association of risk perception with the education of study subjects. These results are in accordance with other studies.<sup>9</sup> The perceived risk of infection with a new variant was also found to be higher in those with a history of prior COVID-19 infection or resultant hospitalisation in family members. The reason might be that, as they have already undergone the trauma associated with infection, they are now more concerned about the newer variant. It was also found that those who are not vaccinated against COVID-19 perceive less risk from a new variant as compared to the vaccinated group. This shows that people who perceive COVID-19 as a severe disease are more likely to get vaccinated against it. There is sufficient evidence to show the efficacy of vaccines against new variants.<sup>20,21</sup> Thus, public health managers should focus on generating awareness about the possible serious effects of new coronavirus variants and also emphasise the protection offered by vaccines in order to increase vaccine uptake.

The study has a few limitations. As the study design was cross-sectional, it is not possible to infer causal association. Another limitation was the use of convenience sampling and online data collection, which may have affected the generalisability. However, because of the widespread increase in the number of COVID-19 cases at the time of conducting this study, an online survey was the most appropriate and feasible method of data collection.

As this study was conducted when omicron cases steeply increased in India, its findings can be useful in knowing the baseline knowledge and perception of the general population about the new variant.

## Conclusion

Majority of respondents had heard about the different

variants of coronavirus affecting people during the pandemic particularly the omicron variant and delta variant. More than half of the respondents correctly knew regarding the origin of Omicron and delta variant respectively. The common source of this information was reported to be television and newspaper. The level of knowledge was found to be significantly associated with education, occupation, history of COVID-19 infection of self or in the family, history of deaths in the family due to COVID-19 etc. Fore fifth of respondents perceived the new variants as severe. Perception of severity was associated with education, history of COVID-19 infection or hospitalisation of family member(s). The results advocate for reframing the awareness programme on COVID-19 and the future course of the pandemic.

**Source of Funding:** None

**Conflict of Interest:** None

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