

Assessment of Knowledge of College Students about COVID-19 and Related Nutritional Aspects Using Online Quiz

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Abstract

COVID-19 has changed the lives of people throughout the world. Education of school and college students underwent a complete transformation from going to classrooms to sitting at home and attending online classes. Knowledge about any illness is essential to protect oneself from the disease. Hence this cross sectional study was conducted to evaluate the knowledge of college students about COVID-19 using Google form. The results showed that majority of participants were Chennai. More than half of the students were doing undergraduate programs. Nearly 75 percent were students studying an under graduate or a postgraduate degree in food, nutrition and related subjects. More than 95 percent of the students were very good in basic knowledge about COVID-19 except the symptoms, without any difference between any groups. PG students performed better than the UG students in questions about nutritional facts related to COVID-19 with a significant difference between UGF and UGO students. The knowledge of PG students especially PGF students was more about immunoprotective foods. UGF and UGO did not show any difference in this. Only less than 50 percent of the participants could identify all the healthy practices required to protect from COVID-19. It is recommended to conduct such surveys for rural students alone and based on the results awareness can be created to protect everyone from the pandemic.

Keywords: COVID-19, College Students, Food Sources, Nutritional Knowledge, Healthy Practices

1. Introduction

COVID-19 had brought drastic changes and stressful conditions in many countries. There were imposing of lockdown, school closures, quarantine, travel restrictions and social distancing¹. There was a drastic change in the regular food pattern such as decreased or increased meal frequency and increased snacking with foods which bring emotional comfort. These alterations may lead to further complications and health risks². Jay *et al.*, (2021)³ observed that the pandemic had an impact on the diet quality of females, young adults, unemployed individuals, obese and overweight individuals and certain other groups of

people in America. Stephani *et al.*, (2021)⁴ had quoted that impaired sleep quality, eating behavior and physical activity during COVID-19 had increased depression and anxiety in the people. People who were less worried about COVID-19 were having low level of health literacy. They did not accept that they would get infection and also not ready to be prepared for the outbreak⁵. On the other hand, it was also noted by several studies that promotion of one's own health by effective prevention and management of illness depended on their KAP level⁶. Considering these aspects the present study was conducted to assess the knowledge of college students about COVID-19 and nutritional aspects related to it. Because staying at home,

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eating junk foods and being physically inactive during pandemic by college students decreased their immunity and made them vulnerable to infection⁷. Hence assessing their knowledge related to COVID-19 will throw some light on the area to be focused to execute some intervention program in future.

2. Methodology

For this cross sectional study on the knowledge of the college students about COVID-19, a self-structured questionnaire was developed by the investigator which included 20 'Yes' or 'NO' type questions apart from the questions asked about the details of the respondent. Details of the respondents included their name, program and subject studying, name of the institution and its location. To assess their knowledge questions were asked about their basic knowledge about COVID-19, knowledge about nutritional facts related to COVID-19, knowledge about immunoprotective foods and knowledge about healthy practices to be followed to combat COVID-19. Questions about symptoms, affected people, importance of immune system and preventive measures to be followed were included under basic knowledge. Knowledge about nutrition facts included questions on importance of good nutritional status and healthy body weight and also about immunoprotective vitamins and minerals. Questions about junk foods and sources of copper, zinc and selenium were included under knowledge about immunoprotective foods. Questions on knowledge about healthy practices such as being physically active, enough sleeping, meditation and eating balanced diet were also included.

For this study, data collection was done during the lockdown period of first COVID wave during which time one to one contact could not be done personally. So the investigator used online mode of data collection⁸. A Google form was created especially for this purpose and circulated through various WhatsApp groups to reach student populations in Tamil Nadu, India. Students' response was voluntary without any compensation. Totally 261 responses were received by the investigator which were used for further analysis. The respondents were classified into undergraduate (UG) and postgraduate (PG) students. UG students were further classified into those studying food related subjects (UGF) and other

subjects (UGO). PG students were also classified into those who were studying food related subjects (PGF) and other subjects (PGO). This classification was done to see whether there was any difference between the groups due to their level of graduation and the subject they studied. Data analysis was done using MS. Excel and chi square test was used to find the difference between groups ($P < 0.05$).

3. Results and Discussion

Totally 20 questions were used to assess the knowledge of the students where one point was awarded to each correct answer. The average score obtained by the participants was 15.67 ± 3.11 . The median score was 16 and the scores obtained by the participants were within the range of 6 to 20.

3.1 Distribution of Respondents

District wise distribution of the participants is presented in Figure 1.

College students studying in 6 districts in Tamil Nadu state participated in this online quiz. Majority of the participants (41.76%) were students from Chennai district. Next highest number of participants was from Namakkal district (22.22%) which is followed by Krishnagiri district (19.56%). There were participants from Salem (7.66%), Karur (5.74%) and Coimbatore districts (3.06%) also.

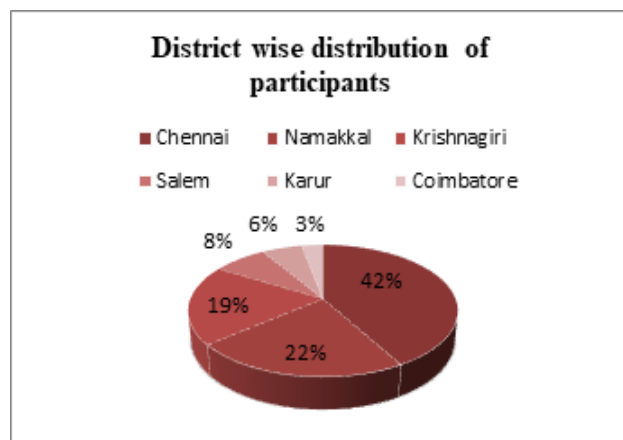


Figure 1. District wise distribution of students.

Table 1. Faculty wise distribution of participants (N = 261)

S. No	Faculty	Under graduation (n=151)		Post-graduation (n=110)	
		Number	Percent	Number	Percent
1	Food and nutrition	112	74.17	85	77.27
2	Other science	30	19.87	19	17.28
3	Arts	2	1.32	6	5.45
4	Commerce	7	4.64	0	0.00

Among the 261 participants, 57.85 percent were doing undergraduate programs (n = 151) and 42.15 percent were doing post graduate programs (n = 110). Faculty wise distribution of the students showed that three fourth of the participants (75.48%) (n = 197) were studying a degree in science in food and nutrition related subjects. Among the rest of the student, 18.77 percent were studying other science subjects. There were participants who were studying degree in arts (3.07%) and in commerce (2.68%) also.

Among the undergraduate (UG) students, 74.17 percent were studying food and nutrition related subjects (UGF). Among the post graduate (PG) students, 77.27 percent were students studying food and nutrition

related subjects (PGF). Among the participants who were doing food and nutrition related subjects (n = 197), 56.85 percent were in under graduate programs and the remaining (43.15%) were doing post graduate programs. Faculty wise distribution of participants is depicted in Table 1 and in Figure 2.

When the gender of the participants was taken into consideration, more than 95 percent of the participants were female students. Very few male students (3.06%) only had participated in this study.

3.2 Basic Knowledge of the Participants about COVID-19

The college students' basic knowledge about COVID-19 was assessed using 5 questions and presented in Table 2 and Figure 3.

The results showed that more than 65 percent of the students, irrespective of the subjects studied by them or their graduation level, were familiar with the early symptoms of COVID-19 namely fever, cough, difficulty in breathing etc. But frequent symptoms of COVID-19, such as hypoxemia, vomiting and diarrhea were known to only 46.35 percent of UG students and 45.5 percent of PG students. Singh *et al.*, (2021)⁹ also revealed that 64 percent of the respondents in rural area had moderate knowledge and 26 percent had good knowledge about the characteristics of COVID-19. In their study nearly half of the respondents had good knowledge about clinical symptoms and 41 percent had moderate knowledge about the same.

More than 95 percent of students studying UG and PG, irrespective of the subject studied, knew about the

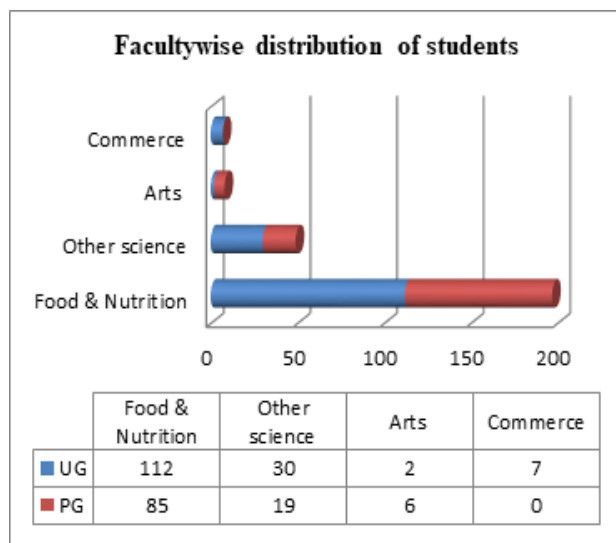
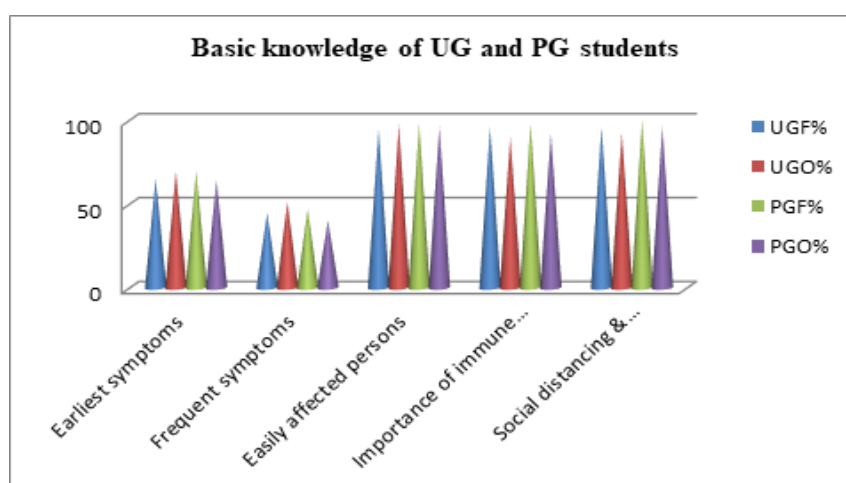

Figure 2. Faculty wise distribution of students.

Table 2. Basic knowledge of the participants about COVID-19

S.No	Information	UG (n=151)	PG (n=110)	Total (N=261)
1	Earliest symptoms	100 (66.22%)	75 (68.2%)	175 (67.09%)
2	Frequent symptoms	70 (46.35%)	50 (45.5%)	120 (45.97%)
3	Easily affected persons	144 (95.36%)	107 (97.3%)	251 (96.17%)
4	Importance of immune system	142 (94.04%)	106 (96.4%)	248 (95.1%)
5	Social distancing and hygienic practices	143 (94.7%)	109 (99.1%)	255 (97.7%)

**Figure 3.** Basic knowledge of UG and PG students about COVID-19 (Faculty wise).

persons easily affected by this disease. The importance of maintaining good immune system to fight against COVID-19 was known to 94.04 percent of the UG students and 96.4 percent of the PG students. The percentage of UGF and PGF students knowing about the importance of immune system was comparatively higher than the students who were studying other subjects. The important preventive measures such as social distancing and hygienic practices were known to all the PG students studying food related subjects (PGF) and 96 percent of PG students who studied other subjects (PGO); 95.53 percent of UG students studying food related subjects (UGF) and 92.3 percent of UG students who were studying other subjects (UGO). Of the total students, 97.7 percent knew about these preventive measures. But Singh *et al.* (2021)⁹ showed a lower level of knowledge about this in rural area

where only 49 percent were having good knowledge and 45 percent were having moderate knowledge.

Washing hands with soap and water after and before every meal was present in only 46 percent of the adolescents in Vijayapura of Karnataka state¹⁰. Martín-Rodríguez *et al.*, (2021)¹¹ emphasized that though wearing mask and social distancing were mandatory, these measures would be followed only by those people who had contact with COVID positive subjects.

3.3 Knowledge about Nutritional Facts related to COVID-19

Table 3 gives details of the knowledge of the students about nutritional facts related to COVID-19 and Figure 4 represents faculty wise knowledge of the same.

Table 3. Knowledge about nutritional facts related to COVID-19

S.No	Nutrition facts	UG (n=151)	PG (n=110)	Total (N=261)
1	Importance of good nutritional status	100 (66.22%)	81 (73.6%)	181 (69.34%)
2	Importance of healthy body weight	114 (75.49%)	93 (84.5%)	207 (79.31%)
3	Immunoprotective minerals	108 (71.52%)	92 (83.6%)	200 (76.63%)
4	Immunoprotective vitamins	138 (91.39%)	105 (95.5%)	243 (93.1%)

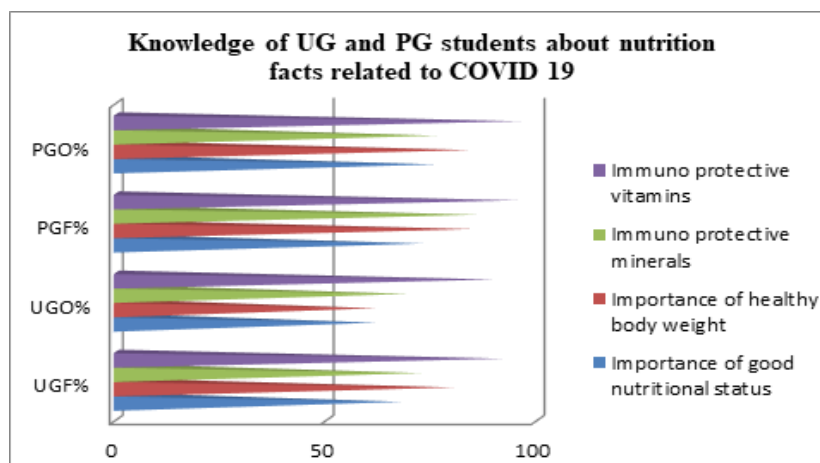


Figure 4. Comparison of knowledge of UG and PG students about nutrition facts related to COVID-19 (Faculty wise).

Compared to UG students, PG students had better knowledge about the nutritional facts related to COVID-19. Among the UG students, 67.85 percent of UGF students agreed the importance of good nutritional status and 80.35 percent of them accepted that maintaining healthy body weight was important to fight against COVID-19. But only 61.54 percent of UGO students knew that good nutritional status and maintaining healthy body weight were important. Psychological stress caused by COVID-19 pandemic along with poor diet and low physical activity increased the weight gain along with decreased immunity⁷. Knowledge about immunoprotective minerals such as copper, iron, selenium and zinc and

immunoprotective vitamins such as vitamins A, B₆, B₁₂, C, D and folic acid was present in 72.32 percent and 91.96 percent of UGF students respectively. But only 69.23 percent and 89.74 percent of UGO students knew about them. A statistically significant difference was observed in the percentage of students having knowledge about the nutritional facts related to COVID 19 between UGF students and UGO students. Shahbaz *et al.*, (2022)¹² had reported a declined intake of immunoprotective nutrients such as protein, zinc, iron and iodine in Pakistan.

Sriram (2021)¹³ suggested that strengthening the immune system by optimal nutrition and dietary intake was the only sustainable way to survive the current

pandemic. Among the PG students, 73.6 percent and 84.5 percent knew the importance of good nutritional status and maintaining healthy body weight respectively. The knowledge about immunoprotective minerals was seen in 83.6 percent and immunoprotective vitamins was present in 95.5 percent of the PG students. There was no difference in the knowledge level between PGF students and PGO students.

When the knowledge level of UGF and PGF students was compared, it was observed that PG students had more knowledge about nutritional facts than the UG students. But the difference was not statistically significant. When the knowledge of PGO and UGO students was compared, PGO students had significantly more knowledge than the UGO students.

A comparison of knowledge of all PG students with all UG students showed that PG students had more knowledge about nutritional facts related to COVID-19 than the UG students.

3.4 Students' Knowledge about Immunoprotective Foods

Knowledge of the participants about immunoprotective foods is presented in Table 4 and Figure 5.

Immanuel *et al.*, (2021)⁸ had pointed out the importance of maintaining a healthy diet during pandemic because no food or any supplement could prevent

COVID-19 infection. When compared with UG students, PG students had answered all the questions regarding immunoprotective foods very well. Among the UG students, more percentage of students who were studying other subjects had answered questions like no specific food can prevent COVID-19 (74.36%) and limiting fast foods, red meat, sugar and alcohol improves immune function (74.36%) correctly than the students who were studying food related subjects. Singh *et al.*, (2021)⁷ also stated that junk foods along with other conditions reduced immunity and increased the chance of infection. But questions about food sources of immunoprotective nutrients like good sources of copper (66.07%), good sources of zinc (61.61%) and good sources of selenium (82.12%) were answered well by UGF students. But no significant difference was found between UGF students and UGO students. Savadatti S. (2021)¹⁰ found that only 22 percent of the adolescent girls in Vijayapura, Karnataka knew about the rich sources of vitamin-A.

Among the PG students, all the questions were answered better by PGF students except the question 'No specific food can prevent COVID-19'. Around 72 percent of PGO students had answered this question correctly. But for other questions, such as limiting fast foods, red meat, sugar and alcohol improves immune function, good sources of copper, zinc and selenium, 77.65 percent, 74.11 percent, 77.65 percent and 88.23 percent of the students

Table 4. Students knowledge about immunoprotective foods

S.No	Nutrition facts	UG (n=151)	PG (n=110)	Total (N=261)
1	No specific food can prevent COVID-19	100 (66.22%)	74 (67.3%)	174 (66.67%)
2	Limiting fast foods, red meat, sugar and alcohol improves immune function	109 (72.18%)	83 (75.5%)	192 (73.56%)
3	Good sources of copper	100 (66.22%)	81 (73.6%)	181 (69.35%)
4	Good sources of zinc	90 (59.6%)	83 (75.5%)	173 (66.28%)
5	Good sources of selenium	122 (80.74%)	95 (86.4%)	217 (83.17%)

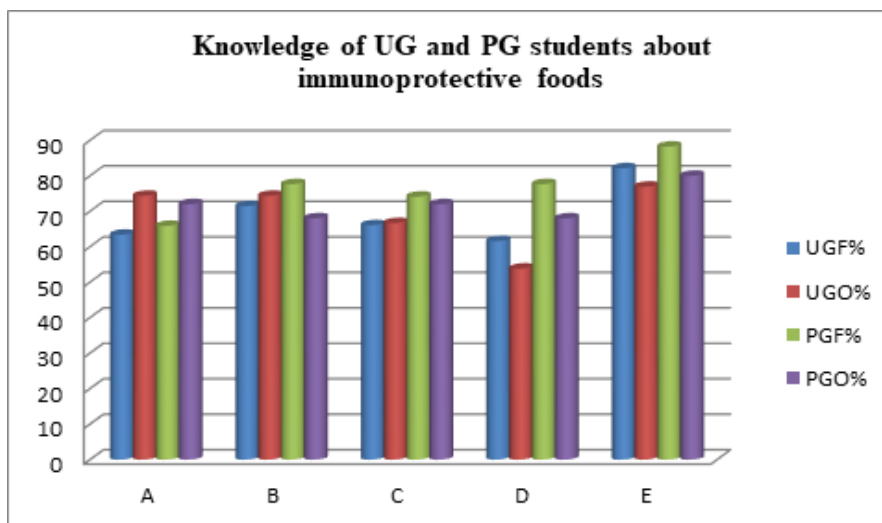


Figure 5. Comparison of knowledge of UG and PG students about immunoprotective foods (Facultywise).

- A – No specific food can prevent COVID-19
- B – Limiting fast foods, red meat, sugar and alcohol improves immune function
- C – Good sources of copper
- D – Good sources of zinc
- E – Good sources of selenium

had answered correctly. But here also no significant difference was found between students studying food related subjects and other students.

When the UGF and PGF students were compared, PGF students had more knowledge about all the questions than the UGF students. Of the total students, PG students had performed well in all the questions than the UG students especially, food sources of zinc was answered correctly by 75.5 percent of PG students whereas only 59.6 percent of UG students only answered this question correctly.

3.5 Knowledge of College Students about Healthy Practices to Combat COVID-19

Participants’ knowledge about the healthy practices to be followed during COVID-19 to combat the disease is depicted in Figure 6.



Figure 6. Knowledge of college students about healthy practices.

When the students were asked about the healthy practices to be followed to combat COVID-19, 17.3 percent of the students had chosen 'being physically active' as the answer. Savadatti S. (2021)¹⁰ also stated that 32 percent of the adolescent girls did not know that regular exercise was not a healthy practice. Another 15.6 percent of them said 'getting enough sleep' as the answer. About 13.3 percent said 'meditation' and 8 percent said 'eating balanced diet' as healthy practice. But the correct option 'all of the above' was chosen by only 45.8 percent of the total students. This shows that more than half of the students were not aware of the fact that health is not a single component and integration of physical activity, enough sleep, meditation and balanced diet are essential to combat COVID-19. Clemente-Suárez *et al.* (2021)¹⁴ recommended physical activity, sleeping for an adequate number of hours and proper nutrition and hydration throughout the day for positive outcomes for physical and mental wellness of youth.

4. Conclusion and Recommendation

In this cross sectional study conducted in online mode, majority of the participants were from institutions located in Chennai. As most of the participants were from urban area, their exposure to information might be good. PG students, especially those who were studying about food and related subjects, were very much aware of the facts related to COVID-19 due to their higher education level. It is recommended to conduct such studies exclusively for rural students studying subjects other than food, nutrition and related subjects and assist them to get more health and nutrition related information. This is essential for protecting people in urban and rural areas equally from the pandemic.

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