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**ASSESSMENT OF IMPORTANCE OF FOOD AND NUTRITION DURING COVID-19
OUTBREAK- A CROSS-SECTIONAL STUDY**

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ABSTRACT

Background: COVID-19 (also commonly called coronavirus) pandemic is causing a lot of changes in the daily lives of people around the world. However, good nutrition is very important before, during and after an infection. Optimal nutrition and dietary nutrient intake impact the immune system, therefore the only sustainable way to survive is to maintain a healthy diet to strengthen the immune system. Main aim of study was to assess the importance of food, nutrition and social distancing among the subjects.

Methods: A cross-sectional, online based survey was conducted on voluntary participants. Distribution of self structured questionnaire was done through snowball sampling technique. Chi square test was used to analyze the data.

Results: The survey results showed that out of 402 subjects, 79.6% ($p < 0.001$) subjects were eating citrus food for strengthening the immune system. About 94% ($p < 0.001$) subjects were taking fresh foods and 95.5% ($p < 0.001$) subjects were washing hands before every meal. About 75.6% ($p < 0.001$) subjects were following social distancing protocol.

Conclusion: The present study showed that subjects were aware about importance of food and nutrition during COVID-19 outbreak and they also agreed that good nutrition and social distancing while eating food were the best protection for them and others against COVID-19.

Keywords: COVID-19, Food, Nutrition

INTRODUCTION

More than 2,500 years ago, Hippocrates said: “*Let food be thy medicine and medicine be thy food*” [1]. Currently the world is facing an unprecedented threat from the COVID-19 pandemic caused by the SARS-CoV-2 virus (referred to as the COVID-19 virus) [2]. It was declared a pandemic in March 2020 [3]. The COVID-19 (also commonly called coronavirus) pandemic is causing a lot of changes in the daily lives of people around the world. However, there are things that can be done to maintain a healthy lifestyle in these difficult times. First and foremost, everyone is encouraged to follow World Health Organization (WHO) and governmental advice to protect against COVID-19 infection and transmission. Physical distancing and good nutrition are the best protection for everyone against COVID-19. Good nutrition is very important before, during and after an infection. Infections take a toll on the body especially when these cause fever, the body needs extra energy and nutrients. Therefore, maintaining a healthy diet is very important during the COVID-19 pandemic. While no foods or dietary supplements can prevent COVID-19 infection, maintaining a healthy diet is an important part of supporting a strong immune

system. To maintain healthy diet, it is recommended to:

- Eat a variety of foods within each food group and across all the food groups.
- Eat plenty of fruits and vegetables
- Consume a diet rich in whole grains, nuts, and healthy fats such as olive, sesame, peanut or other oils rich in unsaturated fatty acids.
- Limit intake of sugar and salt.
- Drink water regularly.
- Continue to practice good food hygiene.
- Limit consumption of alcohol.
- Increase consumption of vitamin C since it is one of the major constituents of water soluble vitamins which tends to make a strong immune system [4].

The virus can spread directly from person-to-person when a COVID-19 case coughs or sneezes, producing droplets that reach the nose, mouth, or eyes of another person. So, it is advised to eat at home and maintain hygiene practices for preparing food to avoid contact with other people and try to reduce the chance of being exposed to COVID-19 [2].

It is necessary to realize the importance of type and quality of food we consume during COVID-19 pandemic. Therefore, this study was conducted to assess the importance of food and nutrition during COVID-19 outbreak.

MATERIAL AND METHOD

Present study was a cross-sectional, observational, web based survey conducted during the peak of COVID 19 pandemic to assess the importance of food and nutrition during COVID-19 outbreak. This survey was conducted in May 2020. Due to the national lockdown, social media was used to conduct the survey across various states of India. The Institutional Ethical Committee approval was obtained verbally for the survey. The snowball sampling technique was used to pool the initial eligible respondents who could potentially recruit more respondents from their acquaintances. By using Google forms, an online structured questionnaire with annexed informed consent form was developed. The survey link was generated and was sent through online platforms like WhatsApp, e-mails and Facebook to the contacts of the investigators. The respondents were motivated to refer links to their contacts for participation. The participants were auto-directed to the survey on clicking the link.

As it was an online survey in english, individuals with age ≥ 18 years, internet access and able to read and understand english were recruited. This online questionnaire contained a total of 22 questions consisting of 2 sections with several questions appearing sequentially in order of (1) Demographic variables and (2) Importance of food and nutrition during COVID-19 outbreak, among which 5 assessed demographic variables, 17 assessed importance of food and nutrition during COVID-19 outbreak.

Data analysis

The information collected from the responders was automatically arranged in a spreadsheet. Data was recorded, tabulated, and statistically analyzed using SPSS version. Descriptive analysis was applied to calculate frequencies, percentages, and proportions; Chi square test was used to find the level of association among the variables. A p value of ≤ 0.05 was considered statistically significant.

RESULTS

Four hundred two participants completed the survey questionnaire. Out of 402 (100%) study subjects, 14(3%) subjects were from 18-20 years age group, majority i.e. 286(71%) of the subjects were from 21-30 years age group, 87(22%) subjects were from

31-40 years age group, 11(3%) subjects were from 41-50 years age group and only 4(1%) subjects were from 51-60 years age group. In this survey, more than half i.e. 228(57%) subjects were females and 174 (43%) subjects were males (**Table 1**).

Among the study subjects, 204(50.7%) believed that COVID 19 spreads through food. 320 (79.6%) ate citrus fruits. 378(94%) ate fresh food. 274(68.1%) were drinking enough amount of water; 267(66.4%) were consuming moderate amount of fat and oil; 216(53.7%) were limiting their salt intake to 1 teaspoon (less than 5mg) per day; 269(66.9%) were limiting their intake of soft

drinks and other drinks that were high in sugar; 304(75.6%) were maintaining a distance of 1 meter between themselves and others while eating food; 202(50.2%) were afraid to eat non veg; 313(77.9%) were avoiding outside food; 196(48.8%) were drinking hot water; 293(72.9%) were consuming enough fibrous fruits and vegetables; 388(96.5%) were washing fruits and vegetables before eating; 77(19.2%) were consuming alcohol and 325(80.8%) were not consuming alcohol. 60(77.9%) reduced consumption of alcohol; 6(7.8%) did not reduce consumption of alcohol. 159(39.6%) liked to share food (**Table 2**).

Table 1: Demographic details of participants

Demographic variable		Percentage (100%)
Age(in years)	18-20	3
	21-30	71
	31-40	22
	41-50	3
	51-60	1
Gender	Female	57
	Male	43
Occupation	Professional	72.4
	Semiprofessional	4.0
	Clerical/shop/farmer	4.5
	Skilled worker	2.2
	Semi-skilled worker	0.2
	Unskilled worker	0.2
	Unemployment	16.4

Table 2: Importance of food and nutrition during COVID-19

S. No.	Question	Yes (%)	No (%)	Don't Know (%)	Total (%)	Chisquare value	p value
1.	Do you believe that Covid19 can spread through food?	204(50.7)	142(35.4)	56(13.9)	402(100)	82.488	<0.001
2.	Do you eat citrus fruits?	320(79.6)	26(6.5)	56(13.9)	402(100)	390.62	<0.001
3.	Do you eat fresh foods?	378(94)	2(.5)	22(5.5)	402(100)	667.94	<0.001
4.	Do you drink enough (8-10 glass) water?	274(68.1)	49(12.2)	79(19.7)	402(100)	222.04	<0.001

5.	Do you eat or consume moderate amount of fat and oil?	267(66.4)	48(11.9)	87(21.7)	402(100)	202.69	<0.001
6.	Are you limiting your salt intake to 1 teaspoon (less than 5mg) per day?	216(53.7)	117(29.1)	69(17.2)	402(100)	83.87	<0.001
7.	Are you limiting your intake of soft drinks and other drinks that are high in sugar?	269(66.9)	77(19.2)	56(13.9)	402(100)	205.67	<0.001
8.	Are you maintaining a distance of 1 meter between yourself and others while eating food?	304(75.6)	59(14.7)	39(9.7)	402(100)	325	<0.001
9.	Are you afraid to eat non veg ?	202(50.2)	191(47.5)	9(2.3)	402(100)	175.36	<0.001
10.	Are you avoiding outside food?	313(77.9)	47(11.7)	42(10.4)	402(100)	358.76	<0.001
11.	Do you wash your hands before meal?	388(96.5)	2(.5)	12(3.0)	402(100)	722.56	<0.001
12.	Are you drinking hot water?	196(48.8)	107(26.6)	99(24.6)	402(100)	43.27	<0.001
13.	Do you consume enough fibrous fruits and vegetables?	293(72.9)	31(7.7)	78(19.4)	402(100)	291.23	<0.001
14.	Do you wash vegetables and fruits before eating?	388(96.5)	5(1.3)	9(2.2)	402(100)	722.54	<0.001
15.	Do you consume alcohol?	77(19.2)	325(80.8)		402(100)	152.9	<0.001
16.	If yes then, are you avoiding alcohol or at least reduced consumption of alcohol?	60(77.9)	6(7.8)	11(14.3)	77(100)	69.37	<0.001
17.	Do you like to share food?	159(39.6)	157(39.1)	86(21.4)	402(100)	25.806	<0.001

Test used – chi square, highly statistically significant $p < 0.001$

DISCUSSION

COVID-19 is a new public health crisis threatening the world with its emergence and spread [5]. In the wake of the COVID-19 pandemic, improving the immunity assumes a significant job in keeping up optimum health. While there is no medicine yet discovered for COVID-19, vitamin C is a crucial member in the army of immunity. It

helps to prevent the regular virus. Vitamin C is a powerful antioxidant and secures against harm induced by oxidative pressure. It is also advised regarding maintaining a healthy lifestyle and to boost immunity to drink warm water every day. Healthy diet can ensure a robust immune system that can resist any onslaught by the virus. Individuals

consuming well-balanced diets appear to be safer with better quality of life [6].

Apart from maintaining a healthy lifestyle and taking supplements, the Indian health ministry was also suggesting few organic and natural ways to practice as preventive measures to fight COVID-19. The Ministry of AYUSH had recommended the following self-care guidelines as preventive measures-

- Meditation, Yogasana, and Pranayama.
- The intake of Turmeric, Cumin, Coriander and garlic.
- Herbal tea or decoction of holy basil, Cinnamon, Black pepper, Dry Ginger and Raisin.
- Ghee (clarified butter), Sesame oil, or Coconut oil in both the nostrils to keep the nostrils clean.
- Milk-half tea spoon haldi (turmeric) powder in 150 ml hot milk-once or twice a day [7].

A cross sectional web based survey was conducted on 402 subjects to assess the importance of food and nutrition during COVID-19 pandemic.

In this present study, out of 402 (100%) study subjects, 14(3.5%) subjects were from 18-20 years age group, majority i.e. 286 (71.1%) of the subjects were from 21-30 years age group, 87(21.6%) subjects were

from 31-40 years age group, 11(2.7%) subjects were from 41-50 years age group and only 4(1%) subjects were from 51-60 years age group. Similar results were seen in study conducted by Varun V Verma *et al* [5] in which majority i.e. 69% of subjects were from 21-30 years age group and only 4% of subjects were from 51-60 years age group. However, results were in contrast to study conducted by Ritu Gen Gowsawmi [7] in which majority i.e. 159(58%) of subjects were from 31-40 years age group. In this present study, more than half i.e. 228(56.7%) subjects were females and 174 (43.3%) subjects were males. Similar results were seen in study conducted by Varun V Verma *et al* [5] and Mahendra kumar *et al* [8] in which more than half (56%) and 151(68%) subjects were females and (44%) and 72(32%) subjects were males respectively. Hand washing before the meal and avoiding outside food showed statistically highly significant difference among the subjects. The results of the study were in agreement with study conducted by Varun V Verma *et al* [5] which showed a statistically significant difference among the subjects. Avoiding alcohol or reduced consumption of alcohol showed statistically highly significant difference among the subjects. The results of the study were in agreement with study

conducted by Achraf Ammar *et al* [10] which showed a statistically significant difference among the subjects. Maintaining distance while eating food showed statistically highly significant difference among the subjects. The results of the study were in agreement with study conducted by Rajesh Singh *et al* [11] which showed a statistically significant difference among the subjects. Limiting the intake of soft drinks and moderate consumption of fat and oil also showed statistically highly significant difference among the subjects. The results of the study were in agreement with study conducted by Laura Di Reno *et al* [9] which also showed a statistically significant difference among the subjects.

LIMITATION AND RECOMMENDATION

- This is a self-reported questionnaire, which may lead to the actual misreporting of data.
- Due to lockdown, snow ball sampling strategy was adopted which was not based on random sample selection of the sample and finding did not represent entire population and therefore results cannot be generalized.
- During lockdown the only feasible option for data collection was web based survey. For this reason,

response rate was relatively low and the chances of response bias cannot be completely ruled out.

- Small sample size of the study might have influenced the study results and results cannot be generalized to whole population. For which further studies are recommended taking larger sample size.

CONCLUSION

Present study proved that subjects were aware about importance of food and nutrition during COVID-19 outbreak and they also agreed that good nutrition and social distancing while eating food were the best protection options for them and others against COVID-19. But highlighting importance of food, nutrition and spreading more awareness regarding the same is yet required.

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