

## ***Nutritional Knowledge, Attitude, and Practices Related to COVID-19 in People of Yazd, 2021***

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### ABSTRACT

**Background:** The importance of healthy nutrition in increasing immunity and reducing disease has been identified for many years. Nutrient deficiencies lead to decreased immune function and thus increase the incidence or exacerbation of infections. This study aimed to investigate the knowledge, attitude, and nutritional function associated with COVID-19 disease in people of Yazd. **Methods:** This descriptive and analytical study was conducted in 2021. The sample size was 420 adults in Yazd referring to health centers. Research tools included demographic checklist and questionnaire of nutritional knowledge, attitude, and practices related to COVID-19. **Results:** The mean scores of nutritional knowledge, attitude, and practices related to COVID-19 in people of Yazd were  $21.35 \pm 4.54$ ,  $20.74 \pm 3.58$ , and  $38.99 \pm 7.39$ , respectively. There was a statistically significant difference between knowledge and level of education and history of COVID-19 and practice with gender and history of COVID-19. The most important source of information for people was cyberspace. **Conclusion:** Knowledge of the nutritional factors affecting a disease can affect people's attitudes and practices. So that lack of sufficient knowledge and misunderstanding among people can increase the prevalence of the disease and delay the recovery of COVID-19. Due to the importance of this matter, the need to implement educational programs to inform people about proper practices should be considered.

**Keywords:** *Knowledge; Attitude; Practice; Nutrition; COVID-19*

### Introduction

Coronaviruses are a large family of viruses and a subset of Coronaviridae. These viruses are widely distributed in humans and other mammals (Ramezani and Amirpour, 2020). COVID-19

disease is a highly contagious infectious disease caused by a new coronavirus that can be transmitted from person to person through close contact (Cohen and Normile, 2020). The

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coronavirus was first detected in December 2019 in Wuhan, China, a large city of 11 million people. The first four reported cases were related to the seafood market in southern China (Xiang *et al.*, 2013).

Due to the COVID-19 epidemic, most active sectors of the economy experienced a sharp decline in demand, leading to a recession projected in 2020. The health sector, in spite of other economic sectors, has faced a sharp increase in demand for health care in all parts of the world due to its strong presence in the fight against the virus (Molloy *et al.*, 2020). This increase in demand for health care has put pressure on healthcare systems, as well as the high rate of COVID-19 losses. The health sector in all health systems has always faced unlimited potential demands and limited actual resources (Ferguson *et al.*, 2020).

Symptoms observed in patients vary according to the type of virus. Symptoms can range from the common cold to fever, dry cough, shortness of breath, and difficulty breathing. Unlike SARS, coronavirus can affect other vital organs in addition to the respiratory system, and in acute cases, gastrointestinal problems, such as diarrhea, acute respiratory failure, coagulation disorders, and kidney failure have been reported, which may require dialysis (Velavan and Meyer, 2020).

According to studies performed on patients with the disease, most hospitalized patients have severe inflammation and anorexia, leading to a severe reduction in food intake. A significant percentage of patients with respiratory failure require non-invasive or invasive ventilation and nutritional support (Marzban *et al.*, 2021, Riccardo *et al.*, 2020).

There is currently no treatment or vaccine for this disease that is definitively and universally available to everyone. In the absence of specific treatment for this new virus, finding alternative methods to prevent and control the spread of the virus seems necessary. Eating a balanced and healthy diet that contains all the essential nutrients is very important for maintaining good health (Marzban and Soleymani-Rad, 2021, Misra, 2020). Balance in micronutrients is a key factor in

maintaining a healthy immune system. The importance of healthy eating in increasing immunity and reducing disease has been recognized for many years. Many studies have shown that a lack of certain nutrients reduces the function of the immune system and thus increases the likelihood of infections or their exacerbation (Alsan *et al.*, 2020, Luo *et al.*, 2020).

In the study of Mansourian conducted in Gonabad in 1999, a positive and significant relationship was observed between the nutritional awareness and attitude of individuals with the improvement of nutritional practice of the people (Mansoorian *et al.*, 2021).

Previous studies have shown that the two main factors that play an important role in the development of healthy eating behaviors are awareness and nutritional attitudes of individuals. Therefore, increasing the level of awareness of individuals and improving nutritional attitudes and its role in controlling and preventing coronary heart disease can be useful in reducing the burden of effective health and economic costs resulting from this crisis. Accordingly, the present study aimed to investigate the nutritional knowledge, attitude, and practices associated with COVID-19 disease in people of Yazd.

## Materials and Method

*Study design and participants:* This descriptive and analytical study was conducted in 2021. The study population was all adults (over 18 years) in Yazd who referred to health centers in Yazd.

At first, out of 24 urban-rural health centers in Yazd, 5 centers were selected using cluster-random sampling according to the method of similar studies. The sample size was determined using a similar study and through the following formula, taking into account the 95% confidence level and  $Z = 1.96$ , 420 people.

$$n = \frac{z^2 p(1-p)}{d^2}$$

These 420 people were divided according to the number of population covered by each center. By referring to the health centers of Yazd, the samples were selected randomly from patients' health records, after contacting the people to obtain their

consent to participate in the study virtually and provide the necessary explanations. Then the link of the online questionnaire in cyberspace (whatsapp, facebook, telegram, etc.) was sent to the subjects and completed.

**Measurements:** Demographic information of the participants included age, gender, education, economic status, occupation, marital status, and number of family members. The questionnaire included three questions about the history of chronic diseases, such as diabetes, hypertension, etc., as well as the history of coronary heart disease and the source of information in the field of COVID-19.

The research tool was a questionnaire of nutritional knowledge, attitude, and practices related to COVID-19 disease which was evaluated in the study of Mansoorian on people of Gonabad and its validity and reliability were confirmed (Mansoorian *et al.*, 2021). The Cronbach's alpha in three sections of nutritional knowledge, attitude, and practices about Corona was 0.82, 0.79, and 0.83, respectively. In Mansoorian study, Cronbach's alpha in three sections of nutritional knowledge, attitude, and practices about Corona was obtained 0.87, 0.81, and 0.78, respectively. According to the review of new texts published in the period after the study of Mansoorian, with the opinion of a nutritionist and health education expert, changes were made in the knowledge questions. Some questions were added, then a new questionnaire was sent to 5 professors of nutrition and health education and obtained their approval and Cronbach's alpha of the questionnaire was re-examined and the Cronbach's alpha value of the total questionnaire was reported to be 0.79.

The questionnaire consisted of 20 questions related to nutritional knowledge of people about COVID-19, which were based on a 3-point Likert scale, including 'correct', 'incorrect', and 'I do not know'. The answer 'correct' scored 2 points, the answer 'I do not know' scored 1 point, and the answer 'incorrect' scored zero. The scores obtained in the knowledge section were in the range of 0-40.

The questionnaire consisted of 13 questions related to the nutritional attitudes of individuals about COVID-19 disease. The answers were based on a 3-point Likert scale scored from 1 to 3. The acquired score of each person in the nutritional attitude section was in the range of 13-39.

The questionnaire included 20 questions related to nutritional practices of people with COVID-19 disease. The answers were in the form of a 3-point Likert scale, including 'always', 'sometimes', and 'never'. The answers were scored from 1 to 3. The acquired score of each person in this section was in the range of 20-60.

**Ethical considerations:** It is worth mentioning that this article is the result of a research project (code: 9925) of the Student Research Committee of Shahid Sadoughi University of Medical Sciences, Yazd, with the ethics code approved by the University Ethics Committee IR.SSU.REC.1400.054.

**Data analysis:** The data were analyzed by SPSS24 software using descriptive statistics, independent t-test, analysis of variance, and correlation coefficient.

## Results

The mean age of the participants was  $36.57 \pm 5.24$ . Among 420 participants, the majority (56.90%) was male and 23.57% of them were in the age range of 30-40 years. Also, 33.80% of the subjects were self-employed, 27.38% had high school education, 41.90% earned enough to support themselves, and 51.90% were married. Moreover, 61.62% of the subjects were not diagnosed with COVID-19 and 50.95% had a history of chronic diseases. General information about the demographic characteristics of the subjects is given in **Table 1**.

According to **Table 2**, the mean scores of nutritional knowledge, attitude and practices of males in Yazd about COVID-19 were  $21.35 \pm 4.54$ ,  $20.74 \pm 3.58$ , and  $38.99 \pm 7.39$ , respectively.

According to **Table 3**, there was a statistically significant relationship between knowledge score with education level and history of COVID-19 and

nutritional practice score with gender and history of COVID-19.

Reveals that there was a positive and significant correlation between the variables of knowledge, attitude, and practice, and the correlation coefficient between knowledge and attitude was stronger.

**Table 4** shows that the most important source of information for people with COVID-19 was cyberspace (27.85%). Also, people obtained the least information through books and magazines

(8.09%).

### Discussion

Studies have shown that the three main components that play an important role in the prevention of COVID-19 and the recovery of patients are nutritional knowledge, attitude, and practices of individuals. Therefore, this study was conducted to investigate the level of nutritional knowledge, attitude, and practices associated with COVID-19 disease in people of Yazd in 2021.

**Table 1.** Frequency distribution of demographic variables of participants.

Variables	Description	Number	Percent
Gender	Male	239	56.90
	Female	181	43.10
Age (year)	18-30	79	18.80
	30-40	99	23.57
	40-50	83	19.76
	50-60	94	22.39
	>60	65	15.47
Occupation	Student	51	12.14
	Employed	66	15.71
	Housewife	59	14.04
	Retired	45	10.71
	Unemployed	57	13.57
	Self-employed	142	33.80
Level of Education	Illiterate	41	9.76
	Elementary school	100	23.80
	Junior high school	103	24.52
	High school and diploma	115	27.38
	Academic degree	61	14.52
Sufficient income	Yes	107	25.47
	Somewhat	176	41.90
	No	137	32.61
Marital status	Single	105	25
	Married	218	51.90
	Divorced	64	15.23
	Widowed	33	7.85
A person's history of COVID-19	Yes	157	37.38
	No	263	61.62
A person's history of chronic diseases	Yes	214	50.95
	No	206	49.04

**Table 2.** Mean and standard deviation of knowledge, attitude, and practice scores of the subjects.

Variables	Number	Range	Mean	SD
Knowledge	420	0-40	21.35	4.54
Attitude	420	13-39	20.74	3.58
Practice	420	20-60	38.99	7.39

**Table 3.** Mean score of knowledge, attitude, and practice of the subjects according to demographic characteristics.

Variables	State	Knowledge		Attitude		Practice	
		Mean	SD	Mean	SD	Mean	SD
Gender	Female	19.68	4.09	20.75	3.74	42.12	7.14
	Male	20.10	4.12	20.58	3.98	38.65	7.27
P-value <sup>a</sup>		0.11		0.21		0.01	
Age (year)	18-30	21.67	4.99	20.95	3.84	38.14	7.56
	30-40	21.08	4.87	20.74	3.14	38.65	7.54
	40-50	21.25	4.65	20.42	3.57	38.95	7.95
	50-60	20.98	4.39	20.65	3.65	38.24	7.78
	>60	21.58	4.81	20.75	3.75	38.57	7.85
P-value <sup>b</sup>		0.17		0.21		0.21	
Occupation	Student	21.05	4.66	20.67	3.87	38.24	7.22
	Employed	21.56	4.57	20.47	3.68	38.67	7.35
	Housewife	21.51	4.69	20.55	3.64	38.95	7.69
	Retired	21.35	4.11	20.95	3.58	38.15	7.45
	Unemployed	21.08	4.27	20.65	3.98	38.01	7.55
	Self-employed	21.84	4.55	20.54	3.47	38.51	7.86
P-value <sup>b</sup>		0.32		0.23		0.11	
Level of Education	Illiterate	12.35	4.68	20.64	3.75	38.75	7.99
	Elementary school	13.68	4.44	20.38	3.11	38.06	7.56
	Junior high school	14.27	4.58	20.21	3.98	38.24	7.27
	High school and diploma	20.39	4.17	20.11	3.57	38.03	7.66
	Academic degree	27.81	4.34	20.41	3.47	38.22	7.38
P-value <sup>b</sup>		0.01		0.22		0.15	
Sufficient income	Yes	21.24	4.98	20.75	3.61	38.21	7.08
	Somewhat	21.59	4.88	20.51	3.57	38.05	7.35
	No	21.85	4.39	20.08	3.75	38.22	7.07
P-value <sup>b</sup>		0.10		0.19		0.31	
Marital status	Single	21.69	4.42	20.98	3.64	38.21	7.67
	Married	21.58	4.41	20.74	3.09	38.07	7.24
	Divorced	21.48	4.37	20.08	3.07	38.02	7.23
	Widowed	21.37	4.56	20.61	3.54	38.65	7.54
P-value <sup>b</sup>		0.24		0.27		0.16	
A person's history of COVID-19	Yes	31.54	4.46	20.61	3.78	45.15	7.61
	No	20.65	4.38	20.68	3.95	32.38	7.77
P-value <sup>a</sup>		0.00		0.20		< 0.001	
A person's history of chronic diseases	Yes	21.39	4.61	20.99	3.67	38.54	7.61
	No	21.87	4.75	20.75	3.47	38.51	7.33
P-value <sup>a</sup>		0.15		0.26		0.24	

<sup>a</sup>: Independent t-test; <sup>b</sup>: ANOVA test.**Table 4.** Distribution of sources of information about COVID-19.

Sources	Number	Percent
Cyberspace	117	27.85
TV and radio	82	19.52
Doctor and health center staff	75	17.85
Internet	69	16.42
Friends and family	43	10.23
book and magazine	34	8.09
Total	420	100

The mean score of nutritional knowledge of individuals in the field of COVID-19 indicated that the level of knowledge of the subjects was moderate but far from ideal. In Mansourian's study, the nutritional knowledge of people of Gonabad was at a moderate level (Mansoorian *et al.*, 2021). Numerous studies by Shabadi (Shabadi *et al.*, 2020), Jothi (Jothi and Shridevi), Biradar (Biradar *et al.*), and Kaur (Kaur *et al.*, 2020) were conducted on knowledge, attitude, and practices of people with COVID-19. However, there are limited studies examining individuals' nutritional knowledge, attitudes, and practices in relation to COVID-19.

The mean score of nutritional attitude of individuals in the field of COVID-19 indicated that the level of attitude of individuals was moderate. This finding is in line with the results of the study by Rahmanian (Rahmanian M *et al.*, 2020) and Mansoorian (Mansoorian *et al.*, 2021). The good attitude of the people depended on having information and knowledge about the principles and benefits of nutrition in the process of COVID-19 disease and forming their beliefs in this field properly.

The mean score of nutritional practices of the individuals in the field of COVID-19 indicated that the rate of practice was moderate. This finding is consistent with the study of Mansoorian in Gonabad (Mansoorian *et al.*, 2021), but is not in line with the results of the studies of Błaszczyk (Błaszczyk-Bębenek *et al.*, 2020), Al-Domi (Al-Domi *et al.*, 2021), and Ozden (Özden and Parlar Kiliç, 2021). Nutritional care is essential to reduce the risk of coronavirus infection or its complications during infection and recovery.

There was a statistically significant difference between the mean and standard deviation of nutritional practice with gender, and females performed significantly better than males. This finding was consistent with the results of Mansourian's study (Mansoorian *et al.*, 2021). Females care more about their health than men and have better eating behaviors.

There was a statistically significant difference between the mean and standard deviation of nutritional knowledge in people of Yazd with the level of education. People with higher education were more aware. It is consistent with the results of Al-Hazmi's study (Al-Hazmi *et al.*, 2018), but it is not in line with the results of Mansoorian's study (Mansoorian *et al.*, 2021). Increasing education level usually increases people's knowledge of various health issues.

There was a statistically significant difference between the mean and standard deviation of nutritional knowledge and practice score of individuals with a history of COVID-19. It indicates that individuals became susceptible to the disease after getting COVID-19 and learn about nutritional issues related to COVID-19. Increasing knowledge improved people's practice.

There was a positive and significant correlation between the variables of knowledge, attitude, and practice; the correlation coefficient between knowledge and attitude was stronger. Therefore, due to the existence of this correlation, the education level also affected attitude and practice.

The most important source of information for people in the field of COVID-19 was cyberspace. In Rahmanian's study (Rahmanian M *et al.*, 2020), the most important source of information was physicians and nurses. Unfortunately, there is a lot of incorrect information in most developing countries, due to the lack of reliable and accessible information. False information in the event of a health crisis makes people vulnerable to the coronavirus, the spread of fear and the stigma of disease.

## Conclusion

Knowledge of the nutritional factors affecting a disease can affect people's attitudes and practices. So that lack of sufficient knowledge and misunderstanding among people can increase the prevalence of the disease and delay the recovery of COVID-19. Due to the importance of this matter, the need to implement educational programs to inform people about proper practices should be considered.

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### Authors' contributions

Marzban A and Zamani M were involved in designing and supervising the survey. Mozaffari-Khosravi H and Khaleghi-Moori M were involved in designing the study, data collecting, and data analyzing. Yoshany N and Maayeshi N participated in data analysis. Marzban A, Mozaffari-Khosravi H and Yoshany N participated in writing the manuscript. All authors critically reviewed the manuscript and approved the final version submitted for publication.

### Conflict of interest

The authors declared no conflict of interest.

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