

# Associations between Diet History and Symptoms in Covid-19 Recovered People

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## Research Article

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## Abstract

Most prior studies confirm that people who eat a balanced diet have stronger immunity. The current study aimed to identify the effect of the diet history of COVID-19 patients recovered from occurring symptoms and their severity. The study sample consisted of 346 people aged 20–65 years. The study includes (personal data and an electronic questionnaire for getting diet history and the kinds of symptoms). Then the study focused on four hardness symptoms (fever, body pain, cough, and dyspnea) to find a relationship between them and some immunity foods. In this study, we can conclude that:-Intake of some functional foods slightly affected the reduction of symptoms occurring in compared with those who did not eat any of these foods by using averages of their percent, which was 88.1% suffered from symptoms in the case of no intake of these foods, compared with symptoms in cases of little and intensive intake, which were 85.54% and 85.55%, respectively.

## Introduction

The Coronavirus, or COVID-19, is a serious acute respiratory syndrome (**Centers for Disease Control and Prevention. Coronavirus (COVID-19), 2020**). This disease was announced at the end of 2019 in Wuhan, China (**Cucinotta & Vanelli., 2020 and Jianget al.,2020**).In March 2020, the World Health Organization (WHO) considered COVID-19 a global pandemic (**Sohrabiet al.,2020**).. Since 14, February 2020 when the first case of corona infections in Egypt was reported, the Egyptian people have been living in a different reality (**de Morais, 2021 and The Arab Republic of Egypt the Prime Minister,2020**).The first syndrome of COVID-19 is a pain syndrome, headache, myalgia, or arthralgia; it appears as the first manifestation 1.6 days after the onset of illness. The second syndrome is fever, followed by cough and diarrhea. The next syndrome is anosmia, which occurs days after the onset of infection. All Symptoms persisted for  $10 \pm 4.9$  (range, 3–27) days, and the duration of fever was  $5.5 \pm 4.4$  (range, 1–19) days. Also, the mean duration of cough and anosmia was respectively  $7.7 \pm 4.3$  (range, 1–18) days and  $7.3 \pm 5$  (range, 1–19) days (**Zayet et al.,2020**).

Nutritional status resulting from nutritional history can have a significant impact on overall health and reduce the risk of developing infections (**WHO, 2020**). Adoption of nutritional habits healthfully will prevent the onset of non-communicable diseases, which is particularly risky for the development of COVID-19 (**Zabetakis et al., 2020**). Also, nutrition is related to infectious diseases like effects on the human body's immune system and systemic infectious diseases (**Farhadi and Ovchinnikov, 2018**). In this respect, malnutrition increases the host's susceptibility to infectious diseases. These infections, in turn, have a bad effect on the metabolism, leading to worsening of the nutritional state (**Alfonso et al., 2016**). Moreover, getting used to a healthy lifestyle is so important to reduce cholesterol levels and to get high levels of antioxidants contained in fruits and vegetables, as well as monounsaturated fatty acid (MUFA), present in fish, nuts, and olive oil (**Soldati et al., 2018**). Also, having healthy foods frequently like vegetables, fruits, and fish helps to provide our bodies with a sufficient intake of essential nutrients and antioxidants (**Wallace et al., 2020 and Hosseiniet al., 2017**). Relatively in Damietta (Egypt), noticed that most patients have poor nutritional habits and they have severe Symptoms of fatigue. Also, most COVID-19 patients are overweight or obese, and there is an increase in the severity of Symptoms of fatigue (**Sahloul & EL-Kholey, 2022**). Notably, the Mediterranean diet (MD) is one of the healthiest diet patterns in the world, where it has lower mortality and lower obesity, type 2 diabetes mellitus, low-grade inflammation, cancer, Alzheimer's disease, depression, and Corona's disease (**Cani & Van, 2020 and Soldati et al., 2018**).

In light of the above, the current study aims to recognise the effect of the nutritional history of COVID-19 recovering patients on the degree of some Symptoms.

## Subjects And Methods

### Study Design and Participants

This study was conducted in Egypt (Damietta Governorate). A random sample of 346 people, consisting of 212 women and 134 men, aged from 20 to 65 years, 131 from rural and 213 from urban areas, was recovered from Covid-19. Most of them 165 (47.7%) had a duration of injury of 14 to 21 days.

All participants confirmed that they agreed to share their data, and sending the electronic questionnaire was considered their approval. The validity of the test was verified by a number of specialised faculty members from the faculty of specific education at Damietta University. The coefficient of two tests' stability was calculated before using them. The average time spent on the survey was 10 minutes.

### The study includes:

1) Personal information (gender, location, age, and length of injury)

2) a structured questionnaire packet for diet history, then a relationship was made between the diet history of some foods and the degree of some symptoms.

An electronic questionnaire (in Arabic language) was built by using the Google Form application (Di Renzo *et al.*,2020 and Heuer *et al.*, 2015).

[https://docs.google.com/forms/d/e/1FAIpQLSfNudaJ3Hp1XonEFU-rJkq5zZnywYhDzoV9Y28rQ9NkmQ8LA/viewform?usp=sf\\_link\\_](https://docs.google.com/forms/d/e/1FAIpQLSfNudaJ3Hp1XonEFU-rJkq5zZnywYhDzoV9Y28rQ9NkmQ8LA/viewform?usp=sf_link_)

#### **COVID-19 cases :**

COVID-19 cases were defined as syndrome cases (fever, cough, nasal congestion & runny nose, sore throat, dyspnea, loss of smell or taste, body pain and diarrhea) or asymptomatic cases (defined as a positive PCR or antibody test without COVID-19 (Kim *et al.*, 2021).

#### **The severity and duration of COVID-19 cases**

Cases were asked to recognise the rate of COVID-19 symptoms. Participants had three options: Asymptomatic symptoms, moderate symptoms, and severe symptoms In addition, how many days did they spend with COVID-19 Symptoms? (Kim *et al.*, 2021).

#### **Statistical analysis**

SPSS statistical software was used to analyse all of the collected data. The calculation occurred by standard deviation and person relation (R) by SPSS ver. 11.5.1 (Artimage and Berry, 1987).

## **Results**

**The data in Table (1) indicate that COVID-19 injury symptoms are being investigated.** The symptoms of COVID-19 investigated in recovered people in the sample were: fever, body pain, cough, nasal congestion, and runny nose, sore throat, diarrhea, dyspnea, and loss of smell or taste.

According to the samples investigated, most of them were suffering from moderate symptoms such as: fever, cough, nasal congestion, and runny nose, sore throat, diarrhea, and dyspnea (52%, 63.6%, 59%, 53.8%, 49.1%, and 53.2%, respectively), while samples who suffered from severe symptoms were: body pain and loss of smell or taste (67.6% and 48.6%, respectively).

In light of the above, most of the samples were suffering from moderate symptoms, followed by those suffering from severe symptoms; the least number of people had no symptoms.

Table 1  
COVID-19 symptoms investigated

Injury Symptoms		No Symptoms	Moderate Symptoms	Severe Symptoms
Fever	N	48	180	118
	%	13.9	52	34.1
Body pain	N	4	108	234
	%	1.2	31.2	67.6
Cough	N	74	220	52
	%	21.4	63.6	15
Nasal congestion and runny nose	N	80	204	62
	%	23.1	59	17.9
Sore throat	N	62	186	98
	%	17.9	53.8	28.3
Diarrhea	N	140	170	36
	%	40.5	49.1	10.4
Shortness of breath	N	70	184	92
	%	20.2	53.2	26.6
Loss of smell or taste	N	52	126	168
	%	15	36.4	48.6

In the first, all tables from (2) to (6) studied the relationship between prior intake of some foods and feelings of different COVID-19 symptoms. Every table from 2 to 5 described only one of the COVID-19 symptoms. These symptoms were fever, body pain, cough, and dyspnea. On the other hand, the foods undergo were fruits or vegetables, yogurt, onions, and garlic. Also, every table was divided into three levels of food intake: the first level was for those who did not intake these foods; the second level was for those who had little intake (weekly or monthly); and the third was for intensive intake (daily or more than once a week).

Table (2) shows that fever syndrome can occur with or without food intake. Data in the table showed that 166 cases of recovered people did not eat any of these foods, and 20 of them (12.5%) did not feel any symptoms, whereas 146 (87.5%) of the cases suffered from either moderate or severe symptoms. In this table, where there is little intake (weekly or monthly), all cases together were 338 cases. Of those, only 38 cases (11.24%) did not feel any symptoms, whereas 300 cases (88.76) suffered either from moderate or severe symptoms. Whenever, in the third level, there was intensive intake (daily or more than once a week), all cases together numbered 877 cases. Those who did not feel any symptoms were 134 cases (15.26%), and those who suffered from moderate or severe symptoms were 744 cases (84.74%).

These data explained that similarity to some extent was between the levels of no intake and little intake of fever syndrome occurrence (88% and 88.8%) respectively, wherever an observed increase has happened in the case of intensive intake (84.7%), which did not feel any symptoms. Also, foods tested in this study showed different effects on the ratio of occurring symptoms, wherein in the first level (no intake of any foods), the fewer symptoms were (80%) for those who did not eat vegetables or fruits, and the higher the (92.9%) for those who did not eat yogurt. In the case of little intake (weekly or monthly), yoghurt and vegetables or fruits appeared to have fewer levels of fever symptoms (87% and 87.5% resp.), whereas, higher symptoms were found in the case of onion and garlic (91.9% and 89.4% resp.). Otherness, results revealed that intensive intake (daily or more than once a week) had an approximate in symptoms; they were 86.3%, 84.7%, 84.2%, and 83.3% for fruit or vegetables, yogurt, garlic, and onion, resp.

There is a significant correlation between onions and fever and having a total food and fever level of 0.01.

**Table (2): Relationship between having some foods and fever symptoms**

Level of intake	Symptoms rate	Foods	Fruits or vegetables		Yogurt		Onions		Garlic		Total symptoms	
		N	%	N	%	N	%	N	%	N	%	
No intake	Asymptomatic	4	20	2	7.1	6	10.7	8	12.9	20	12	
	Symptoms	Moderate	8	40	14	50	26	46.4	32	51.6	80	48.2
		Severe	8	40	12	42.9	24	42.9	22	35.5	66	39.8
	Total	16	80	26	92.9	50	89.3	54	87.1	146	88	
Total		20	100	28	100	56	100	62	100	166	100	
Little intake (monthly or weekly)	Asymptomatic	8	12.5	14	13	6	8.1	10	10.6	38	11.2	
	Symptoms	Moderate	34	53.1	58	53.7	38	51.4	48	51.1	178	52.3
		Severe	22	34.4	36	33.3	30	40.5	36	38.3	124	36.5
	Total	56	87.5	94	87	68	91.9	84	89.4	302	88.8	
Total		64	100	108	100	74	100	94	100	340	100	
Intensive intake (daily or more than time weekly)	Asymptomatic	36	13.7	32	15.3	36	16.7	30	15.8	134	15.3	
	Symptoms	Moderate	138	52.7	108	51.4	116	53.7	100	52.6	462	52.6
		Severe	88	33.6	70	33.3	64	29.6	60	31.6	282	32.1
	Total	226	86.3	178	84.7	180	83.3	160	84.2	744	84.7	
Total		262	100	210	100	216	100	190	100	878	100	
Total		346		346		346		346		1384		
R		0.063 ± 0.240		0.075 ± 0.163		0.141 ± 0.009**		0.068 ± 0.207		0.135 ± 0.00**		
R: Correlation using (Pearson Correlation)												
**: Correlation is significant at the 0.01 level (2-tailed).												

Data in table (3) showed 100% of cases were feeling either moderate or severe body pain symptoms in the first level of food intake (no intake) where no symptoms was zero. Whereas 98.8% suffered from symptoms at the level of little intake (weekly or monthly), at the third level of intensive intake (daily or more than once a week), a slight decrease in symptoms has happened at 98.6%. Based on these results, it may be possible that these foods and their bioactive compounds affect to some extent the body's resistance against body pain.

Also, data in the same table revealed 100% symptoms when having fruit or vegetables and onions at a level of little intake (weekly or monthly). Whereas, a slight decrease has occurred in all foods in the level of intensive dietary (99%, 98.9%, 98.5%, and 98.1%) for yogurt, garlic, fruit or vegetables, and onion, respectively.

**Table (3): Relationship between having some foods and body pain symptoms**

Level of intake	Symptoms rate	foods		Fruits or vegetables		Yogurt		Onions		Garlic		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
No intake	Asymptomatic	0	0	0	0	0	0	0	0	0	0	0	0
	Symptoms	Moderate	8	40	8	28.6	14	25	18	29	48	28.9	
		Severe	12	60	20	71.4	42	75	44	71	118	71.1	
	Total	20	100	28	100	56	100	62	100	166	100		
Total		20	100	28	100	56	100	62	100	166	100		
Little intake (monthly or weekly)	Asymptomatic	0	0	2	1.9	0	0	2	2.1	4	1.2		
	Symptoms	Moderate	16	25	46	42.6	32	43.2	32	34.1	126	37	
		Severe	48	75	60	55.5	42	56.8	60	63.8	210	61.8	
	Total	64	100	106	98.1	74	100	92	97.9	336	98.8		
Total		64	100	108	100	74	100	94	100	340	100		
Intensive intake (daily or more than time weekly)	Asymptomatic	4	1.5	2	1	4	1.9	2	1.1	12	1.4		
	Symptoms	Moderate	84	32.1	54	25.7	62	28.7	58	30.5	258	29.4	
		Severe	174	66.4	154	73.3	150	69.4	130	68.4	608	69.2	
	Total	258	98.5	208	99	212	98.1	188	98.9	866	98.6		
Total		262	100	210	100	216	100	190	100	878	100		
Total		346		346		346		346		1384			
R		0.057 ± 0.219		0.024 ± 0.655		0.069 ± 0.199		0.018 ± 0.735		0.037 ± 0.172			
R: Correlation using (Pearson Correlation)													

Cough symptoms can occur with or without food, according to the data in Table (4). According to the findings, 166 cases from recovered people who did not consume any of these foods had either moderate or severe symptoms. In this table regarding little intake (weekly or monthly), all cases together were 340 cases, whereas 258 of them (75.9%) suffered either from moderate or severe symptoms. Whereas, in the third level, in cases of intensive intake (daily or more than once a week), all cases together were 878, of which 684 (77.9%) suffered from moderate or severe symptoms.

These data explained that similarity to some extent was between the level of little intake and intensive dietary intake of ratio of cough symptoms occurred (75.9% and 77.9%), respectively, wherever an observed increase happened in the case of no intake (87.9%) who suffered from symptoms. Also, foods tested in this study showed different effects in terms of the ratio of occurring cough symptoms. Whereas in the first level (no intake of any foods), fewer symptoms were (78.6%) to those who did not eat yogurt, whereas other foods showed a similarity to symptoms (90.3%, 90%, and 89.3%) to garlic, onions, and fruit or vegetables, respectively. Whereas, in the case of little intake (weekly or monthly), fruits or vegetables appeared to have a lower level of cough symptoms (68.8%) whereas similarity symptoms (75.9% and 76.6%) in cases of intake of yoghurt and garlic, resp. Then higher symptoms happened in the case of onions (81.1%). However, intensive intake (daily or more than once a week) was found to have a lower level of symptoms (75% and 75.8%, respectively) for onion and garlic. Higher level of symptoms was found in cases of yoghurt and fruits or vegetables (80% and 80.2% resp.). There is a significant correlation between garlic and cough at level 0.05.

**Table (4): Relationship between having some foods and cough symptoms**

Level of intake	Foods	Fruits or vegetables		Yogurt		Onions		Garlic		Total		
		Symptoms rate		N	%	N	%	N	%	N	%	N
No intake	Asymptomatic		2	10	6	21.4	6	10.7	6	9.7	20	12.1
	Symptoms	Moderate	15	75	18	64.3	34	60.7	34	54.8	101	60.8
		Severe	3	15	4	14.3	16	28.6	22	35.5	45	27.1
		Total	18	90	22	78.6	50	89.3	56	90.3	146	87.9
	Total		20	100	28	100	56	100	62	100	166	100
Little intake (monthly or weekly)	Asymptomatic		20	31.2	26	24.1	14	18.9	22	23.4	82	24.1
	Symptoms	Moderate	38	59.4	62	57.4	34	45.9	52	55.3	186	54.7
		Severe	6	9.4	20	18.5	26	35.2	20	21.3	72	21.2
		Total	44	68.8	82	75.9	60	81.1	72	76.6	258	75.9
	Total		64	100	108	100	74	100	94	100	340	100
Intensive intake (daily or more than time weekly)	Asymptomatic		52	19.8	42	20	54	25	46	24.2	194	22.1
	Symptoms	Moderate	167	63.7	98	46.7	110	50.9	92	48.4	467	53.2
		Severe	43	16.4	70	33.3	52	24.1	52	27.4	217	24.7
		Total	210	80.2	168	80	162	75	144	75.8	684	77.9
	Total		262	100	210	100	216	100	190	100	878	100
Total		346		346		346		346		1384		
R		0.022 ± 0.688		-0.086 ± 0.11		0.014 ± 0.797		-0.116 ± 0.031*		-0.002 ± 0.955		
R: Correlation using (Pearson Correlation)												
*: Correlation is significant at the 0.05 level (2-tailed).												

Data in Table (5) declares a relationship between having some foods and having dyspnea syndrome with or without food intake. Data in that table revealed that 36 of 166 cases of recovered people who had not eaten any of these foods did not feel any symptoms (21.7%), whereas 130 (78.3%) of the cases suffered from either moderate or severe symptoms. In this table regarding small intake (weekly or monthly), all cases together were 340. whereas only 74 of them (21.8%) did not feel any symptoms, whereas 266 cases (78.2%) suffered from either moderate or severe symptoms. Wherever, in the third level, in cases of intensive intake (daily or more than once a week), all cases together were 878. The recovered cases who did not feel any symptoms were 170 (19.4%) and those who suffered from moderate or severe symptoms were 708 cases (80.6%). These findings explained a degree of similarity between the average of all levels of food intake (78.3%, 78.2%, and 80.6%, respectively) of cases suffering from dyspnea symptoms. Wherever, an observed decrease has happened in the case of no intake (70%) of those who ate fruits or vegetables, followed by garlic, yogurt, and onions, which were 77.4%, 78.6%, and 82.2% resp.

Whereas, in the case of little intake (weekly or monthly), yoghurt showed a lower level of dyspnea (74.1%) than similarity symptoms (78.1%, 80.9%, and 81.1%) in cases of intake of fruit or vegetables, garlic, and onions, resp. Whereas results were revealed in cases of intensive intake (daily or more than once a week) had a higher level of symptoms (82.9%) in yogurt, the similarity of symptoms were in cases of onion, garlic, and fruits or vegetables (78.7%, 80.9%, and 80.9% resp.).

There is a significant correlation between having total food and having dyspnea at level 0.05.

**Table (5): Relationship between having some foods and dyspnea symptoms**

Level of intake	Symptoms rate	Foods		Fruits or vegetables		Yogurt		Onions		Garlic		Total		
		N	%	N	%	N	%	N	%	N	%	N	%	
No intake	Asymptomatic	6	30	6	21.4	10	17.8	14	22.6	36	21.7			
	Symptoms	Moderate	8	40	18	64.3	26	46.5	34	54.8	86	51.8		
		Severe	6	30	4	14.3	20	35.7	14	22.6	44	26.5		
		Total	14	70	22	78.6	46	82.2	48	77.4	130	78.3		
	Total	20	100	28	100	56	100	62	100	166	100			
Little intake (monthly or weekly)	Asymptomatic	14	21.9	28	25.9	14	18.9	18	19.1	74	21.8			
	Symptoms	Moderate	28	43.8	52	48.2	36	48.6	48	51.1	164	48.2		
		Severe	22	34.3	28	25.9	24	32.5	28	29.8	102	30		
		Total	50	78.1	80	74.1	60	81.1	76	80.9	266	78.2		
	Total	64	100	108	100	74	100	94	100	340	100			
Intensive intake (daily or more than time weekly)	Asymptomatic	50	19.1	36	17.1	46	21.3	38	20	170	19.4			
	Symptoms	Moderate	148	56.5	114	54.3	122	56.5	102	53.7	486	55.4		
		Severe	64	24.4	60	28.6	48	22.2	50	26.3	222	25.2		
		Total	212	80.9	174	82.9	170	78.7	152	80	708	80.6		
	Total	262	100	210	100	216	100	190	100	878	100			
Total		346		346		346		346		1384				
R		0.063 ± 0.264		-0.083 ± 0.125		0.091 ± 0.092		0.018 ± 0.742		0.062 ± 0.022*				
R: Correlation using (Pearson Correlation)														
*: Correlation is significant at the 0.05 level (2-tailed).														

Table (6) refers to averages of final results concluded from tables 2, 3, 4, and 5 together for finding a relationship between food history for recovered people from COVID-19 and the rate of symptoms. A comparison was made between the averages of all levels of food intake. These results were an accumulation of all the averages of symptoms that occurred with these foods together for comparing their symptoms at different levels of intake. The obtained results from these averages were that 88.1% suffered from symptoms in the case of no intake of any of these foods. On the other hand, symptoms in cases of little intake as well as intensive intake were 85.54% and 85.55%, respectively.

We can conclude that food history for recovered people may help to some extent in increasing resistance to some symptoms, as was shown in cases of little and intensive food intake when compared with those who didn't consume any of these foods.

**Table (6): Relationship between all level of food intake and percentage average of collected symptoms.**

level of intake	Kind of symptoms	Foods	Fruits or vegetables	Yogurt	Onions	Garlic	Average
		%	%	%	%	%	
<b>No intake</b>	<b>fever</b>	<b>80</b>	<b>92.9</b>	<b>89.3</b>	<b>87.1</b>	<b>87.3</b>	
	<b>Body pain</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	
	<b>Cough</b>	<b>90</b>	<b>78.6</b>	<b>89.3</b>	<b>90.3</b>	<b>87.1</b>	
	<b>Dyspnea</b>	<b>70</b>	<b>78.6</b>	<b>82.2</b>	<b>77.4</b>	<b>77.1</b>	
	<b>Average</b>	<b>85</b>	<b>87.5</b>	<b>90.2</b>	<b>88.7</b>	<b>87.9</b>	
<b>Little intake (monthly or weekly)</b>	<b>fever</b>	<b>87.5</b>	<b>87</b>	<b>91.9</b>	<b>89.4</b>	<b>89</b>	
	<b>Body pain</b>	<b>100</b>	<b>98.1</b>	<b>100</b>	<b>97.9</b>	<b>99</b>	
	<b>Cough</b>	<b>68.8</b>	<b>75.9</b>	<b>81.1</b>	<b>76.6</b>	<b>75.6</b>	
	<b>Dyspnea</b>	<b>78.1</b>	<b>74.1</b>	<b>81.1</b>	<b>80.9</b>	<b>78.6</b>	
	<b>Average</b>	<b>83.6</b>	<b>83.8</b>	<b>88.5</b>	<b>86.2</b>	<b>85.6</b>	
<b>Intensive intake (daily or more than time weekly)</b>	<b>fever</b>	<b>86.3</b>	<b>84.7</b>	<b>83.3</b>	<b>84.2</b>	<b>84.6</b>	
	<b>Body pain</b>	<b>98.5</b>	<b>99</b>	<b>98.1</b>	<b>98.9</b>	<b>98.6</b>	
	<b>Cough</b>	<b>80.2</b>	<b>80</b>	<b>75</b>	<b>75.8</b>	<b>77.8</b>	
	<b>Dyspnea</b>	<b>80.9</b>	<b>82.9</b>	<b>78.7</b>	<b>80</b>	<b>80.6</b>	
	<b>Average</b>	<b>86.3</b>	<b>86.7</b>	<b>83.8</b>	<b>84.7</b>	<b>85.4</b>	

## Discussion

As far as we know, this study may be the first to relate between symptoms of COVID-19 to some foods consumed by recovered people at different levels of intake. In this study, food intake was divided into 3 levels: no intake, little intake (weekly or monthly), and intensive intake (daily or more than once a week). Four kinds of feathered immunising foods were chosen in this study. First were fruits or vegetables, which have high amounts of vitamins and minerals and thus are important for the immune system (Elsayh et al., 2020). Also, yogurt, which was used with the COVID-19 infection rate of some people who drink yoghurt every day, was significantly lower than that of those who do not drink yoghurt (Silverio et al., 2021). Yogurt, a fermented dairy product, exhibits interesting properties related to the presence of bioactive peptides and probiotics that may play a beneficial role in COVID-19 presentation and outcome. (Shahbazi et al., 2021).

On the other hand, (Kumar et al., 2015) indicated that onions possess immune stimulatory activities towards murine lymphocytes. In this respect also (Hirayama et al., 2019) suggested that the intake of low- or high-dose of onion green leaf extract might positively regulate immune competence. Also, garlic essential oil is a valuable natural antivirus source that contributes to preventing the invasion of coronavirus into the human body (Thuy et al., 2020). It is also known that the immune system is highly affected by malnutrition, leading to decreased immune responses and a consequent augmented risk of infection and disease severity ( Mösbauer et al., 2021)

In line with our findings, participants suffered from different symptoms such as: fever, body pain, cough, nasal congestion, runny nose, sore throat, diarrhea, dyspnea, and loss of smell or taste. However, the study found only four more cruel symptoms among them: fever, body pain, cough, and dyspnea, with a link between them and immune food history and previous intake. These findings were similar to those reported by (Carfi et al., 2020) they found that patients after the onset of the first COVID-19 symptom, only 18 (12.6%) were completely free of any COVID-19 symptom, while 32% had 1 or 2 Symptoms and 55% had 3 or more. A worsened quality of life was observed among 44.1% of patients. The data shows that a high proportion of individuals still reported myalgia (53.1%), dyspnea (43.4%), and joint pain, (27.3%). In this respect, (Çalica et al., 2020) reported that out of 297 patients, 143 had positive Symptoms and 154 had negative Symptoms. The most common Symptoms in the positive group were: cough (56.6%), weakness (56.6%), taste disorder (35.7%), myalgia (34.3%), and fever (33.6%); and in the negative group were: cough (63%), weakness (45.5%), dyspnea (29.9%), headache (27.3%), and fever (24.7%).

This study compared symptoms that occurred with all foods, whether together or alone, at all levels of intake. Results showed no differences between symptoms occurred and the kinds of food in all levels of intake, but they differed from level to another and also from syndrome to another, whether increase or decrease. Thus, none of these foods were more distinguished than others. Nonetheless, the obvious results on the cases of body pain symptoms reached 100% for those who had not eaten any of these foods, compared to a low or high intake. there were obvious results in table (6) by the accumulation of average symptoms at all levels of intake, which demonstrated an overall decrease in symptoms in cases of little and intensive intake compared with no intake. In this respect, (Kim et al., 2021) declared that no association was observed between diets and the odds of COVID-19-like illness or duration of Symptoms.

#### **The strengths and limitations of the study were:**

The strengths of the study's findings relate to the COVID-19 syndrome and some foods consumed by recovered people at different levels of food intake.

The limitations of the study were getting recovered people to participate and persuading them to participate.

## **Conclusions**

In conclusion, intake of some functional foods slightly affected the reduction of symptoms occurring in comparison with those who did not eat any of these foods by using averages of their percent. This is especially true in the case of body pain.

## **Declarations**

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**Informed Consent Statement:** "Informed consent was obtained from all subjects involved in the study."

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## **References**

- Alfonso J. Rodriguez-Morales, Adrián Bolívar-Mejía, Camila Alarcón-Olave, and Lauren Sofia Calvo-Betancourt.** Nutrition and Infection, In book: Encyclopedia of Food and Health, 2016, DOI: 10.1016/B978-0-12-384947-2.00491-8.
- Artimage, G.Y. and Berry, W.G.** Statistical Methods 7th Ed. Ames, Iowa Stata University Press, 1987, 39-63.
- Çalica Utku, A., Budak, G., Karabay, O., Güçlü, E., Okan, H. D., & Vatan, A.** Main symptoms in patients presenting in the COVID-19 period. *Scottish Medical Journal*, 2020. 65(4), 127-132.
- Cani, P. D., and Van Hul, M.** Mediterranean diet, gut microbiota and health: when age and calories do not add up!. *Gut*, 2020. 69(7), 1167-1168.
- Carfi, A., Bernabei, R., & Landi, F.** Persistent symptoms in patients after acute COVID-19. *Jama*, 2020.324(6), 603-605
- Centers for Disease Control and Prevention. Coronavirus (COVID-19).** <https://www.cdc.gov/coronavirus/2019-ncov/index.html>. Accessed 25 Jul 2020.
- Cucinotta, D., and Vanelli, M.** WHO declares COVID-19 a pandemic. *Acta Bio Medica: Atenei Parmensis*, 2020. 91(1), 157.
- de Morais, C. M.** Nutritional therapy in COVID-19 management. *Kompass Nutrition & Dietetics*, 2021.1(1), 10-12.
- Di Renzo, L., Gualtieri, P., Pivari, F., Soldati, L., Attinà, A., Cinelli, G., ... & De Lorenzo, A.** Eating habits and lifestyle changes during COVID-19 lockdown: an Italian survey. *Journal of translational medicine*, 2020. 18, 1-15.
- Elsayh, K. I., El-Badawy, O., Saad, K., & Zahran, A. M.** Wheat bran as a natural remedy for COVID-19. *Current Trends in Immunology*, 2020.1.
- Farhadi, S., & Ovchinnikov, R. S.** The relationship between nutrition and infectious diseases: A review. *Biomedical and Biotechnology Research Journal (BBRJ)*, 2018. 2(3), 168.

- Heuer, T., Krems, C., Moon, K., Brombach, C., and Hoffmann, I.** Food consumption of adults in Germany: results of the German National Nutrition Survey II based on diet history interviews. *British journal of nutrition*, **2015**. 113(10), 1603-1614.
- Hirayama, Y., Takanari, J., Goto, K., Ueda, H., Tanaka, A., & Nishihira, J.** Effect of Welsh onion (*Allium fistulosum* L.) green leaf extract on immune response in healthy subjects: a randomized, double-blind, placebo-controlled study. *Functional Foods in Health and Disease*, **2019**. 9(2), 123-133
- Hosseini, B., Berthon, B. S., Wark, P., & Wood, L. G.** Effects of fruit and vegetable consumption on risk of asthma, wheezing and immune responses: a systematic review and meta-analysis. *Nutrients*, **2019**. 9(4), 341.
- Jiang, S., Xia, S., Ying, T., and Lu, L.** A novel coronavirus (2019-nCoV) causing pneumonia-associated respiratory syndrome. *Cellular & molecular immunology*, **2020**. 17(5), 554-554.
- Kim, H., Rebholz, C. M., Hegde, S., LaFiura, C., Raghavan, M., Lloyd, J. F & Seidemann, S. B.** Plant-based diets, pescatarian diets and COVID-19 severity: a population-based case-control study in six countries. *BMJ Nutrition, Prevention & Health*, bmjnph-2021.
- Kumar, V. P., Prashanth, K. H., & Venkatesh, Y. P.** Structural analyses and immunomodulatory properties of fructo-oligosaccharides from onion (*Allium cepa*). *Carbohydrate Polymers*, **2015**.117, 115-122.
- Mösbauer, K., Fritsch, V. N., Adrian, L., Bernhardt, J., Gruhlke, M. C. H., Slusarenko, A. J., ... & Antelmann, H.** Allicin inhibits SARS-CoV-2 replication and abrogates the antiviral host response in the Calu-3 proteome. *bioRxiv* **2021**.
- Sahloul, O.T & EL-Kholey, H.M.** Impact of Nutritional Habits and Status on the Symptoms Degree with COVID-19. *Journal of research in the fields of Specific Education*, **2022**.8(38), 525-544.
- Shahbazi, S., Hajimohammadebrahim-Ketabforoush, M., Shariatpanahi, M. V., Shahbazi, E., & Shariatpanahi, Z. V.** The validity of the global leadership initiative on malnutrition criteria for diagnosing malnutrition in critically ill patients with COVID-19: A prospective cohort study. *Clinical Nutrition ESPEN*, **2021**.43, 377-382
- Silverio, R., Gonçalves, D. C., Andrade, M. F., & Seelaender, M.** Coronavirus disease 2019 (COVID-19) and nutritional status: the missing link?. *Advances in Nutrition*, **2021**. 12(3), 682-692
- Sohrabi, C., Alsafi, Z., O'Neill, N., Khan, M., Kerwan, A., Al-Jabir, A, and Agha, R.** World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19). *International journal of surgery*, **2020**. 76, 71-76.
- Soldati, L., Di Renzo, L., Jirillo, E., Ascierio, P. A., Marincola, F. M., & De Lorenzo, A.** The influence of diet on anti-cancer immune responsiveness. *Journal of translational medicine*, **2018**. 16(1), 1-18.
- The Arab Republic of Egypt the Prime Minister [homepage on the Internet]** Available from: <https://www.care.gov.eg/EgyptCare/News/Preview.aspx?id=15059>. Accessed 13 March, 2020.
- Thuy, B. T. P., My, T. T. A., Hai, N. T. T., Hieu, L. T., Hoa, T. T., Thi Phuong Loan, H., ... & Nhung, N. T. A.** Investigation into SARS-CoV-2 resistance of compounds in garlic essential oil. *ACS omega*, **2020**. 5(14), 8312-8320
- Wallace, T. C., Bailey, R. L., Blumberg, J. B., Burton-Freeman, B., Chen, C. O., Crowe-White, K. M., ... & Wang, D. D.** Fruits, vegetables, and health: A comprehensive narrative, umbrella review of the science and recommendations for enhanced public policy to improve intake. *Critical reviews in food science and nutrition*, **2020**. 60(13), 2174-2211.
- World Health Organization.** Off-label use of medicines for COVID-19.; Available online **2020**.: <https://www.who.int/news-room/commentaries/detail/off-label-use-of-medicines-for-covid-19>.
- Zabetakis, I., Lordan, R., Norton, C., and Tsoupras, A.** COVID-19: the inflammation link and the role of nutrition in potential mitigation. *Nutrients*, **2020**.12(5), 1466.
- Zayet, S., Gendrin, V., and Klopfenstein, T.** Natural history of COVID-19: back to basics. *New Microbes and New Infections*, **2020**. 38, 100815.