

Medical Supplements Consumption during COVID-19 Pandemic: A Cross-Sectional Study in Saudi Arabia

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ABSTRACT

Background: In December 2019, pneumonia caused by the novel coronavirus spread in Wuhan, Hubei Province and quickly spread across China. In light of the COVID-19 pandemic emerging from SARS-CoV-2, the search for prevention and anti-viral treatment strategies is of particular and urgent importance. Supplements have been used to prevent or help in the treatment protocol of COVID-19 as zinc, vitamin D and vitamin C are known for their antioxidant properties and protecting the body's cells and tissues from oxidative stress and dysfunction.

Aim: This study aimed to explore the supplements usage rate during the pandemic and identify their perception for preventing COVID-19 infection by using an online questionnaire.

Materials and methods: This cross-sectional study was conducted by using a self-administered online questionnaire distributed to volunteering participants after IRB approval. The survey instrument includes socio-demographic characteristics, history of chronic diseases and the pattern of medical supplements usage.

Results: Data was obtained from 212 participants, males were 64.4% and females were 35.4%; females depend mainly on social media as a source of information while males depend on medical personnel ($p=0.005$). Males prefer vitamin C and D as medical supplements while females vitamin C and folic acid. However, males had taken it for better immunity and appetite ($p=0.0001$) and males had felt improvement in their immunity ($p=0.0001$) and mood. In contrast, females had taken supplements to enhance their immunity and felt improvement in their immunity only ($p=0.002$).

Conclusion: During the COVID-19 pandemic period, males took vitamin C and D as the leading medical supplements to boost their immunity, however females took them to improve immunity and appetite and males felt an improvement in their immunity and mood, while the females felt better in their immunity only. This study should expand our understanding of supplemental usage during the pandemic crises of COVID-19.

Key words: COVID-19, Vitamin C, Vitamin D, Folic acid, SARS-COV

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INTRODUCTION

In December 2019, pneumonia caused by the new Coronavirus broke out in Wuhan, Hubei Province and quickly spread across China, with the threat of an epidemic continuing. After the virus was identified and isolated, this pneumonia's pathogen was initially called novel coronavirus 2019. It was later formally named severe acute respiratory syndrome (SARS-CoV-2) virus by the World Health Organization.

On January 30, 2020, the World Health Organization declared the spread of SARS-CoV-2 a public health emergency of great concern. Compared to SARS-CoV that caused the SARS outbreak in 2003, SARS-CoV-2 has a more substantial capacity. The rapid increase in confirmed cases is making the prevention and control of COVID-19 extremely dangerous. There is no doubt that COVID-19 has become a part of everyone's daily life with unprecedented circumstances [1].

Aim of the study

To evaluate the rate of medical supplement consumption during the COVID-19 pandemic among the Saudi population.

Objectives

- To explore the medical supplement usage rate during the pandemic and their perceived benefit and effect.
- To address participants' behaviors toward MOH COVID-19 preventive measures.
- To assess any correlation between the medical supplement usage and occupation status, employment type and smoking history [2].

MATERIALS AND METHODS

Study subject

The inclusion criteria were participants aged 18 years and above and currently living in Saudi Arabia. Participants excluded if they were: a) Under 18 years of age; and b) unable to understand the Arabic language.

Study design

This cross-sectional study was conducted by using a self-administered online questionnaire distributed to volunteering participants after ethical committee approval. The survey instrument including socio-demographic characteristics, history of chronic diseases and the use of medical supplements products.

Sampling technique

Google form distribution and collection of responses was done through emails. Questionnaire was divided into two parts.

Information sheet was provided and prior consent was obtained from participants in the first part of questionnaire. Responses were recorded in the second part of questionnaire. Responses were recorded and analysed [3].

Ethical considerations

- An informed consent was included in the first page of the questionnaire.
- No names or ID numbers was collected to maintain confidentiality.

Statistical analysis was conducted using IBM SPSS version 22, continuous variables were presented by mean \pm SD and categorical variables were presented in frequency and percentages.

RESULTS

A total of 212 individuals responded to our online self-administered questionnaire, questions were divided into 2 categories demographics and practice of multivitamins used during last pandemic (COVID-19), males represented the majority of sample as 64.4%, while 35.4% were females (Table 1) [4].

Table 1: Demographics information.

Demographics	Count	Column N%
Age group	18-24 years	8.50%
	25-39 years	68.90%
	40-59 years	21.20%
	>60 years	1.40%
Gender	Male	64.60%
	Female	35.40%
Marital	Unmarried	25.50%
	Married	74.50%
Nationality	Non-Saudi	2.80%
	Saudi	97.20%
Education	Primary	0.90%
	Secondary	20.30%
	Bachelor	58.50%
Residency	Postgraduate studies	20.30%
	Center	59.40%
	North	2.80%
	East	18.90%
	South	0.00%
	West	18.90%

Employment	Unemployed	23	10.80%
	Student	23	10.80%
	Non-medical profession	66	31.10%
	Medical profession	100	47.20%
Smoking	Nonsmoker	138	65.10%
	Ex-smoker	13	6.10%
	Smoker t	61	28.80%

Table 2: Responses of participants regarding multivitamins usage.

		Count	Column N%
Corona infected	No	175	82.50%
	Yes	37	17.50%
Chronic diseases	None	135	63.70%
	Pulmonary disease	20	9.40%
	Cardiovascular disease	17	8.00%
	Diabetes	9	4.20%
	Metabolic disease	20	9.40%
	Renal disease	3	1.40%
	Neurological disease	8	3.80%
Washing hands	No	1	0.50%
	Sometimes	28	13.20%
	Yes	183	86.30%
Face mask	No	8	3.80%
	Sometimes	28	13.20%
	Yes	176	83.00%
Social distancing	No	4	1.90%
	Sometimes	56	26.40%
	Yes	152	71.70%
Used to supplements	No	132	62.30%
	Sometimes	12	5.70%
	Yes	68	32.10%
Prophylaxis corona	No	130	61.30%
	Sometimes	2	0.90%
	Yes	80	37.70%
Why not used supplements	None	82	38.70%
	Lack of information	122	57.50%
	Costly	6	2.80%
	Lack of time	2	0.90%
Discussed supplements	No	161	75.90%
	Yes	51	24.10%
Source of Info	None	53	25.00%

	Medical personnel	76	35.80%
	Social media	57	26.90%
	Friends and family	26	12.30%
Decrease risk of infection	No	132	62.30%
	Yes	80	37.70%
Type of supplements	Folic	4	1.90%
	Multivitamins	13	6.10%
	Natural sources	4	1.90%
	None	12	5.70%
	Omega 3	26	12.30%
	Vitamin C	111	52.40%
	Vitamin D	41	19.30%
	Zinc	1	0.50%
Cause of usage	Not applicable	53	25.00%
	Better appetite	35	16.50%
	Enhance immunity	104	49.10%
	Therapeutic	20	9.40%
Improvement	Not applicable	2	0.90%
	Better appetite	7	3.30%
	Better mood	48	22.60%
	Enhanced immunity	73	34.40%
	None	82	38.70%

Table 3: Correlations of gender.

		Gender				P value
		Male count	Column N%	Female count	Column N%	
Corona infected	No	117	85.40%	58	77.30%	0.14
	Yes	20	14.60%	17	22.70%	
Chronic diseases	None	87	63.50%	48	64.00%	0.24
	Pulmonary disease	11	8.00%	9	12.00%	
	Cardiovascular disease	10	7.30%	7	9.30%	
	Diabetes	7	5.10%	2	2.70%	
	Metabolic disease	17	12.40%	3	4.00%	
	Renal disease	2	1.50%	1	1.30%	
	Neurological disease	3	2.20%	5	6.70%	
Washing hands	No	1	0.70%	0	0.00%	0.52
	Sometimes	16	11.70%	12	16.00%	
	Yes	120	87.60%	63	84.00%	
Face mask	No	6	4.40%	2	2.70%	0.56
	Sometimes	20	14.60%	8	10.70%	
	Yes	111	81.00%	65	86.70%	

Social distancing	No	4	2.90%	0	0.00%	0.21
	Sometimes	33	24.10%	23	30.70%	
	Yes	100	73.00%	52	69.30%	
Used to supplements	No	93	67.90%	39	52.00%	0.07
	Sometimes	6	4.40%	6	8.00%	
	Yes	38	27.70%	30	40.00%	
Prophylaxis corona	No	85	62.00%	45	60.00%	0.52
	Sometimes	2	1.50%	0	0.00%	
	Yes	50	36.50%	30	40.00%	
Why not used supplements	None	44	32.10%	38	50.70%	0.17
	Lack of information	85	62.00%	37	49.30%	
	Costly	6	4.40%	0	0.00%	
	Lack of time	2	1.50%	0	0.00%	
Discussed supplements	No	108	78.80%	53	70.70%	0.18
	Yes	29	21.20%	22	29.30%	
Source of info	None	42	30.70%	11	14.70%	0.005
	Medical personnel	52	38.00%	24	32.00%	
	Social media	32	23.40%	25	33.30%	
	Friends and family	11	8.00%	15	20.00%	
Decrease risk of infection	No	83	60.60%	49	65.30%	0.49
	Yes	54	39.40%	26	34.70%	
Type of supplements	Folic	0	0.00%	4	5.30%	0.01
	Multivitamins	8	5.80%	5	6.70%	
	Natural sources	3	2.20%	1	1.30%	
	None	8	5.80%	4	5.30%	
	Omega 3	20	14.60%	6	8.00%	
	Vitamin C	65	47.40%	46	61.30%	
	Vitamin D	33	24.10%	8	10.70%	
	Zinc	0	0.00%	1	1.30%	
Cause of usage	Not applicable	40	29.20%	13	17.30%	0.0001
	Better appetite	31	22.60%	4	5.30%	
	Enhance immunity	57	41.60%	47	62.70%	
	Therapeutic	9	6.60%	11	14.70%	
Improvement	Not applicable	0	0.00%	2	2.70%	0.002
	Better appetite	1	0.70%	6	8.00%	
	Better mood	36	26.30%	12	16.00%	
	Enhanced immunity	42	30.70%	31	41.30%	
	None	58	42.30%	24	32.00%	

Table 3 shows that females depended mainly on social media as a source of information while males depend on medical personnel as a source of their information with p value 0.005, males took vitamin C and D as the main supplements while females had vitamin C and folic acid with p value 0.01, females had taken

supplements to enhance their immunity, however males had taken it for better immunity and appetite with p value 0.0001 and males had felt improvement in their immunity and mood while females had felt improvement in their immunity only with p value 0.002 [5].

Table 4: Correlations of age group.

		Age group				P value
		18-24 Count	25-39 Count	40-59 Count	>60 Count	
Corona infected	No	15	117	40	3	0.47
	Yes	3	29	5	0	
Chronic diseases	None	12	97	26	0	0.0001
	Pulmonary disease	3	16	1	0	
	Cardiovascular disease	2	3	9	3	
	diabetes	0	6	3	0	
	Metabolic disease	0	15	5	0	
	Renal disease	0	3	0	0	
	Neurological disease	1	6	1	0	
	Washing hands	No	0	1	0	
Sometimes	4	22	2	0		
Yes	14	123	43	3		
Face mask	No	0	5	3	0	0.22
	Sometimes	1	25	2	0	
	Yes	17	116	40	3	
Social distancing	No	0	4	0	0	0.44
	Sometimes	6	42	8	0	
	Yes	12	100	37	3	
Used to supplements	No	8	98	26	0	0.02
	Sometimes	3	8	1	0	
	Yes	7	40	18	3	
Prophylaxis corona	No	5	94	28	3	0.053
	Sometimes	0	2	0	0	
	Yes	13	50	17	0	
Why not used supplements	None	12	47	20	3	0.01
	Lack of information	5	92	25	0	
	Costly	1	5	0	0	
	Lack of time	0	2	0	0	
Discussed supplements	No	14	115	32	0	0.18
	Yes	4	31	13	3	
Source of info	None	2	39	12	0	
	Medical personnel	6	56	11	3	
	Social media	6	36	15	0	
	Friends and family	4	15	7	0	
Decrease risk of infection	No	8	94	27	3	0.2
	Yes	10	52	18	0	
Type of supplements	Folic	1	2	1	0	0.14
	Multivitamins	0	9	4	0	
	Natural sources	0	4	0	0	

	None	0	10	2	0	
	Omega 3	5	16	5	0	
	Vitamin C	10	81	20	0	
	Vitamin D	2	23	13	3	
	Zinc	0	1	0	0	
Cause of usage	Not applicable	1	38	14	0	0.12
	Better appetite	6	25	4	0	
	Enhance immunity	10	71	20	3	
	Therapeutic	1	12	7	0	
Improvement	Not applicable	0	0	2	0	0.19
	Better appetite	0	6	1	0	
	Better mood	6	34	8	0	
	Enhanced immunity	6	49	15	3	
	None	6	57	19	0	

Table 4 presented older respondent had higher frequency of chronic diseases with p value 0.0001, also had highest frequency in using supplements before COVID-19 pandemic with p value 0.02. Old age groups were the

lowest in using supplementations mainly due to lacking information about its importance with p value 0.01 [6].

Table 5: Correlations of education level.

		Education				P value
		Primary count	Secondary count	Bachelor count	Postgraduate studies count	
Corona infected	No	2	36	100	37	0.76
	Yes	0	7	24	6	
Chronic diseases	None	2	19	82	32	0.05
	Pulmonary disease	0	3	16	1	
	Cardiovascular disease	0	8	6	3	
	Diabetes	0	4	5	0	
	Metabolic disease	0	6	7	7	
	Renal disease	0	1	2	0	
	Neurological disease	0	2	6	0	
Washing hands	No	0	1	0	0	0.63
	Sometimes	0	6	16	6	
	Yes	2	36	108	37	
Face mask	No	0	4	3	1	0.35
	Sometimes	0	8	15	5	
	Yes	2	31	106	37	
Social distancing	No	0	3	0	1	0.08
	Sometimes	0	12	36	8	
	Yes	2	28	88	34	
Used to supplements	No	0	31	66	35	0.0001
	Sometimes	2	1	9	0	
	Yes	0	11	49	8	

Prophylaxis corona	No	0	33	66	31	0.03
	Sometimes	0	0	2	0	
	Yes	2	10	56	12	
Why not used	None	2	9	57	14	0.06
Supplements	Lack of information	0	32	61	29	
	Costly	0	2	4	0	
	Lack of time	0	0	2	0	
Discussed supplements	No	0	32	96	33	0.08
	Yes	2	11	28	10	
Source of info	None	0	14	25	14	0.13
	Medical personnel	2	11	48	15	
	Social media	0	13	31	13	
	Friends and family	0	5	20	1	
Decrease risk of infection	No	2	32	67	31	0.02
	Yes	0	11	57	12	
Type of supplements	Folic	0	1	3	0	0.23
	Multivitamins	0	3	6	4	
	Natural sources	0	2	2	0	
	None	0	4	5	3	
	Omega 3	0	2	20	4	
	Vitamin C	2	17	72	20	
	Vitamin D	0	13	16	12	
	Zinc	0	1	0	0	
Cause of usage	Not applicable	0	16	22	15	0.0001
	Better appetite	2	4	24	5	
	Enhance immunity	0	20	70	14	
	Therapeutic	0	3	8	9	
Improvement	Not applicable	0	2	0	0	0.0001
	Better appetite	0	0	2	5	
	Better mood	2	12	24	10	
	Enhanced immunity	0	9	55	9	
	None	0	20	43	19	

Table 5 showed that those who hold a bachelor degree had the highest incidence of using supplements even before pandemic with p value 0.0001, also they used it for prophylaxis from COVID-19 with p value 0.03, also they believed that it decrease the incidence of infection with

COVID-19 with p value 0.02, in addition they mainly used it to enhance their immunity with p value 0.0001, they also felt improvement in immunity and mood with p value 0.0001 [7].

Table 6: Correlations of employment.

		Employment				P value
		Unemployed count	Student count	Non-medical profession count	Medical profession count	
Corona infected	No	23	20	56	76	0.04
	Yes	0	3	10	24	

Chronic diseases	None	12	15	43	65	0.2
	Pulmonary disease	0	4	5	11	
	Cardiovascular disease	5	2	4	6	
	Diabetes	2	0	2	5	
	Metabolic disease	2	0	7	11	
	Renal disease	0	1	2	0	
	Neurological disease	2	1	3	2	
Washing hands	No	0	0	1	0	0.51
	Sometimes	4	4	11	9	
	Yes	19	19	54	91	
Face mask	No	2	0	3	3	0.49
	Sometimes	2	1	9	16	
	Yes	19	22	54	81	
Social distancing	No	0	0	2	2	0.94
	Sometimes	7	7	17	25	
	Yes	16	16	47	73	
Used to supplements	No	15	13	38	66	0.49
	Sometimes	1	3	2	6	
	Yes	7	7	26	28	
Prophylaxis corona	No	19	7	42	62	0.01
	Sometimes	0	0	0	2	
	Yes	4	16	24	36	
Why not used supplements	None	7	15	23	37	0.08
	Lack of information	16	7	39	60	
	Costly	0	1	4	1	
	Lack of time	0	0	0	2	
Discussed supplements	No	15	18	54	74	0.39
	Yes	8	5	12	26	
Source of info	None	6	4	15	28	0.01
	Medical personnel	8	9	17	42	
	Social media	4	4	22	27	
	Friends and family	5	6	12	3	
Decrease risk of infection	No	21	10	36	65	0.003
	Yes	2	13	30	35	
Type of supplements	Folic	3	1	0	0	0.0001
	Multivitamins	2	0	6	5	
	Natural sources	0	0	0	4	
	None	2	0	5	5	
	Omega 3	1	5	16	4	
	Vitamin C	7	13	29	62	
	Vitamin D	7	4	10	20	
	Zinc	1	0	0	0	

Cause of usage	Not applicable	9	3	16	25	0.34
	Better appetite	1	5	10	19	
	Enhance immunity	12	13	30	49	
	Therapeutic	1	2	10	7	
Improvement	Not applicable	2	0	0	0	0.02
	Better appetite	0	1	1	5	
	Better mood	5	5	17	21	
	Enhanced immunity	6	9	28	30	
	None	10	8	20	44	

Table 6 showed that respondents who have a medical profession also had the highest incidence of infection with p value 0.02, also they depend on medical personnel as source of their information with p value 0.01, students believed that multivitamins decreased the incidence of infection with p value 0.003, medical

personnel had taken vitamin C as the main supplement with p value 0.0001, regarding improvement they felt enhancement of immunity with p value 0.02 [8].

Table 7: Correlations of smoking.

		Smoking			P value
		Nonsmoker count	Ex-smoker count	Smoker count	
Corona infected	No	115	10	50	0.83
	Yes	23	3	11	
Chronic diseases	None	85	8	42	0.45
	Pulmonary disease	13	2	5	
	Cardiovascular disease	13	2	2	
	Diabetes	7	0	2	
	Metabolic disease	10	1	9	
	Renal disease	2	0	1	
	Neurological disease	8	0	0	
Washing hands	No	0	0	1	0.32
	Sometimes	20	0	8	
	Yes	118	13	52	
Face mask	No	2	0	6	0.01
	Sometimes	17	0	11	
	Yes	Yes 119	13	44	
Social distancing	No	3	0	1	0.3
	Sometimes	32	2	22	
	Yes	103	11	38	
Used to supplements	No	86	11	35	0.24
	Sometimes	10	0	2	
	Yes	42	2	24	
Prophylaxis corona	No	87	9	34	0.21
	Sometimes	0	0	2	
	Yes	51	4	25	
Why not used supplements	None	56	7	19	0.01

	Lack Of information	81	6	35	
	Costly	1	0	5	
	Lack of time	0	0	2	
Discussed supplements	No	100	11	50	0.26
	Yes	38	2	11	
Source of info	None	40	0	13	0.02
	Medical personnel	48	9	19	
	Social media	31	2	24	
	Friends and family	19	2	5	
Decrease risk of infection	No	85	7	40	0.7
	Yes	53	6	21	
Type of supplements	Folic	4	0	0	0.12
	Multivitamins	6	3	4	
	Natural sources	1	0	3	
	None	10	0	2	
	Omega	3 15	2	9	
	Vitamin C	70	8	33	
	Vitamin D	31	Ex	10	
	Zinc	1	0	0	
Cause of usage	Not applicable	43	0	10	0.002
	Better appetite	16	6	13	
	Enhance immunity	67	4	33	
	Therapeutic	12	3	5	
Improvement	Not applicable	2	0	0	0.11

Table 7 showed that ex-smokers had the highest frequency in using face masks with p value 0.01, they had not used supplements due to lack of information about it with p value 0.01, non-smokers used supplements to enhance immunity mainly with p value 0.002.

DISCUSSION

This study defined the uses of medicinal supplements and the rate of consumption during the COVID-19 pandemic among the Kingdom of Saudi Arabia. Besides, this study evaluated the supplements usage rate during the pandemic and to identify the perception for COVID-19 infection prevention.

In our study, a total of 212 individuals responded to our online self-administered questionnaire and males represented the majority of the sample as 64.4%, while 35.4% were females. In another study in Saudi Arabia carried by Hamad S, et al. showed that a total of 5,258 individuals participated in this study and more than half, 57.1% were females [9]. In our study, Females depends mainly on social media as a source of information while males depend on medical personnel as a source of their information.

In another study in Saud Arabia, social media and the internet were the sources for knowledge of information. Females were more aware of this information through the internet than males. Unlike in another study in Saudi Arabia, Abdullah Y, et al. showed no difference between males and females about knowing information from social media. But, another study in Regina carried by Gordon, et al. found that social media works to transmit fake news about COVID-19, which may cause concealment of real information.

In our study, males took vitamin C and D as the leading supplements while females had vitamin C and folic acid to enhance their immunity. Also, another study in Saudi Arabia showed that vitamin C was the most commonly used food supplement to increase immunity and reduces the chance of contracting COVID-19.

In our study, ex-smokers had the highest frequency in using face masks and they had not used supplements due to lack of information and non-smokers used supplements to enhance immunity mainly.

In another study in Ireland showed that it is recommended that all smokers take vitamin D daily to boost their resistance to COVID-19.

In our study showed that older respondents had a higher frequency of chronic diseases. Another study in China showed that severe medical conditions were significantly higher in older patients than younger patients, such as high blood pressure, diabetes, heart disease and COPD.

Our study was the first study in the Middle East showed that students believed that multivitamins decreased the incidence of infection and the medical personnel had taken vitamin C as the primary supplement to enhance immunity [10].

Limitations of this study

The primary limitation of our study design is that because the exposure and outcome are simultaneously assessed, there is generally no evidence of a temporal relationship between exposure and outcome. Besides, the use of medical supplements should be evidence-based to ensure patient safety.

Recommendations

There is no significant changes in the risk of preventing the viral infections in general (especially COVID-19 with supplemental usage for boosting immunity.

CONCLUSION

In general, females depends mainly on social media as a source of information while males depend on medical personnel as a source of their information. Also, males took vitamin C and D as the leading medical supplements. In contrast, females took vitamin C and folic acid because they were supplements to boost their immunity. However, males took them to improve immunity and appetite and males felt improved in their immunity and mood, while the females felt better in their immunity only.

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