Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Journal of Infection and Public Health 15 (2022) 1108–1117

Contents lists available at ScienceDirect

Journal of Infection and Public Health

journal homepage: www.elsevier.com/locate/jiph

Perceptions of COVID-19 symptoms, prevention, and treatment strategies among people in seven Arab countries: A cross-sectional study

Feras Jirjees[a,*], Muna Barakat[b], Qamar Shubbar[a], Bayan Othman[b], Hamzah Alzubaidi[a], Hala Al-Obaidi[c]

[a] College of Pharmacy, University of Sharjah, UAE
[b] School of Pharmacy, Applied Science Private University, Jordan
[c] College of Pharmacy and Health Sciences, Ajman University, UAE

ARTICLE INFO

Article history:
Received 22 March 2022
Received in revised form 13 August 2022
Accepted 29 August 2022

Keywords:
COVID-19
Self-treatment
Prophylaxis
Symptoms

ABSTRACT

Backgroup: the widespread COVID-19 infection worldwide has resulted in the inability of healthcare facilities to receive all infected patients; therefore, most are treated at home. In addition, factors such as high mortality, types and severity of symptoms, and the prevalence of unreliable information have prompted patients to resort to self-treatment.
Objectives: To assess prevention, treatment, degree of symptoms, and sources of information among patients with COVID-19 in Arab countries
Method: A cross-sectional study was conducted in seven Arab countries: Algeria, Egypt, Iraq, Lebanon, Libya, Tunisia, and the United Arab of Emirates. People who have recovered from COVID-19 completed the study questionnaire. Score of symptoms during and after COVID-19 infection has been calculated by giving the participants a list of 13 symptoms.
Results: A total of 3519 participants completed the survey. Mostly females (68.3%), and aged between 18 and 40 years old (59.4%). Prophylaxis treatments, including vaccines and antibiotics, have been used in around 40% of the participants. The total average score of symptoms during the infection period was found 7.31 ± 3.66 out of 13. However, the symptoms score upon recovery was low (0.48 ± 1.11 score). The significant associations with increased incidence of symptoms during infection were reported with older people, married, divorced or widowed, people with chronic diseases, and obese. Moreover, significant associations with decreased symptoms were reported with those who worked in the health sector, non- or ex-smokers, and vaccinated people.
Conclusion: The use of medication and other treatments to prevent infection with COVID-19 was common among the participants in the seven countries. Taking the vaccine was the only effect on the number of symptoms experienced by patients. Although nearly two years have passed since the onset of the disease, there is still a need to raise treatment awareness among patients at home.

Introduction

The World Health Organization (WHO) had declared COVID-19 as a pandemic disease in March 2020. Currently, the confirmed number of cases globally has reached up to 581 million and 6.4 million deaths [1]. The Eastern Mediterranean region had reported around 22.8 million confirmed cases and 345 thousand death cases in August 2022 [1].

The majority of those who recovered were treated at home with doctor-prescribed medication or medication self-treatment, primarily based on information from other infected people or social media [2,3]. Several drugs have proven clinical efficacy against COVID-19 infection, mainly in hospitals. In addition, most treatment guidelines are recommended prescribed medications based on the severity of symptoms and health status of patients [4]. Generally, the main recommendations for a patient at home are analgesic and rest [4]. For prevention, in late of 2020, the FDA approved the first vaccine to prevent COVID-19 infection [5].

* Correspondence to: College of Pharmacy, University of Sharjah, Sharjah 27272, UAE.
E-mail address: fjirjees@sharjah.ac.ae (F. Jirjees).

https://doi.org/10.1016/j.jiph.2022.08.019

Globally, the disease has caused widespread anxiety and fear among the population, mainly due to the increase in confirmed cases and the high death rate, which was exacerbated by the lack of an approved drug to treat it. In addition, the regulations of lockdown that have been issued and required for isolation when infected with the virus. These led billions of people to search in different sources of information for COVID-19 related topics online [6]. Where different information resources such as social media platforms contributed to distributing unproven medical information and increased self-medication practices [3,7]. These sources make communication between infected people easier and then sharing information related to treatment that mostly with no evidence. Therefore, many people who feel unwell have resorted to consuming various substances, including traditional medicine, to treat or prevent COVID-19 infection, without considering the safety and efficacy of the substance for the human body [8,9].

Self-medication is defined as taking any type of treatment by individuals to treat an illness or symptoms without physician consultation [10]. Potential risks associated with self-medication might lead to make the condition difficult to treat, delay the diagnosis, increase prevalence of antimicrobial drug resistance, and cause adverse drug reactions due to incorrect doses and dosage forms, and use the medication for longer than its intended duration [11]. One reason to make medication self-treatment is ability to collect prescribed drugs from the pharmacy without prescription. This issue is highly practiced in many countries in the Middle East region, including some medications which are used to treat patients with COVID-19 infection in hospitals such as antibiotics, oral cortisone, antivirals, and anticoagulants [12,13].

There are many types of symptoms occurred among infected people, and the most common types of symptoms are fever, cough, headache and fatigue. In addition, there are atypical symptoms such as skin disorders and diarrhea [14]. In general, symptoms have been reported diversely in people between countries. In addition, many people have reported persistence of some symptoms weeks after recovery from the infection [15].

Due to the regulation of lockdown and fear among the population and required for isolation when infected with the virus, many people have gone to use different sources of information to get information related to treatment such as social media that makes communication between infected people easier and then sharing information related to treatment that mostly with no evidence.

The study aimed to assess the experiences of COVID-19 patients from seven Arab countries, including the prophylaxis treatment used, treatment during infection, score of symptoms, and the factors influencing them.

Method

Study design

A cross-sectional study was conducted using a self-administered questionnaire. The survey was used to collect information among people who have recovered from COVID-19 including socio-demographic data, prophylaxis treatment used, drug treatment during infection, and types of symptoms.

The study was conducted in seven Arab countries: Algeria, Egypt, Iraq, Lebanon, Libya, Tunisia, and the United Arab of Emirates (UAE). People from both sexes aged ≥ 18 years from participating countries were invited to participate in the study. Exclusion criteria were: (a) people who did not contract COVID-19 and (b) people who were admitted to hospital due to COVID-19.

The questionnaire was distributed electronically, through Google Forms. The link to the survey preceded by introductory section about the study was sent via two social media platforms: Facebook and Instagram. The survey distribution period from June to August 2021. The cover section described the aim and objectives of the study and the voluntary nature of participation with a consent statement, that no written consent was needed, and that consent was assumed if recipients agreed to participate and completed the questionnaire. The questionnaire was terminated automatically if participants declined to take part. The participants were requested to complete the survey without consulting people, materials, textbooks or internet web pages.

Study instruments

The questionnaire was developed by the authors after an extensive review of the literature [9,16]. The final version of the questionnaire was composed of four sections. The first section designed to collect general sociodemographic and health data about the participants such as age, sex, occupation, level of education, health status, weight and height, and smoking and alcohol status. The second section included questions related to types of medications used as prophylaxis and during infections period. The third section was related to types, period and severity of symptoms of people who were infected with COVID-19. The fourth section included the sources of information about COVID-19 among the participants.

Score of reported symptoms during and after (more than 2 weeks) of COVID-19 infection has been calculated by giving the participants a list of 13 credential symptoms (fever, cough, loss of smell and taste, headache, tiredness, nose decongestion and sneezing, pain in the throat, pain in muscles and joints, diarrhea, abdominal pain, shortness of breath, problem with sleep, skin problem). The score of symptoms has been adapted and modified according to published literature [17,18]. Each symptom had two response choices, either yes/present or no/absent. Each symptom was scored based on whether it was present (score of 1) or absent (score of 0); thus, the overall symptoms' score ranges between (0 and 13). There were no cut-off scores implemented, that is, a higher score in each category represents a higher symptom in the same category. The questionnaire was in the Arabic language and reviewed by the authors and five academic members then subjected to a pilot testing by 10 people from different Arab countries to ensure clarity of the questions. Then, the questions were modified based on their feedback.

Study sample

Sample size calculation

The target sample size was estimated for each included country using Raosoft® software sample size calculator for the minimal sample size needed for unlimited population size using a confidence interval of 95%, a standard deviation of 0.5, a margin of error of 5%, the required sample size was 384 participants from each study population (country) [19].

Data analysis

Study data were analyzed using the 24th version of the statistical package for the social science (SPSS®). The mean ± standard deviation (SD) and frequency (or percentages) were used for continuous

Table 1
Sociodemographic characteristics of study participants (n = 3519).

Variable	Country								
	Algeria (n = 540)	Egypt (n = 402)	Iraq (n = 815)	Lebanon (n = 405)	Libya (n = 584)	Tunisia (n = 402)	UAE (n = 371)	Total (n = 3519)	P-Value
	No (%)								
Age (Year)									
• <17(The data of this category were filled by an adult on behalf of children)	2 (0.4)	7 (1.7)	14 (1.7)	10 (2.7)	4 (0.7)	4 (1.0)	20 (5.4)	61 (1.7)	< 0.001
• 18–40	378 (70.0)	253 (62.9)	433 (53.1)	254 (62.7)	327 (56.0)	205 (51.0)	241 (65.0)	2091 (59.4)	
• 41–64	135 (25.0)	129 (32.0)	346 (42.4)	130 (32.1)	222 (38.0)	178 (44.2)	92 (24.7)	1232 [35]	
• ≥ 65	25 (4.6)	13(3.2)	22 (2.7)	11 (2.7)	31 (5.3)	15 (3.7)	18 (4.8)	135 (3.8)	
Gender									
• Female	383 [71]	320 (79.6)	498 (61.1)	336 (83.0)	409 (70.0)	237 (58.9)	221 (59.5)	2404 (68.3)	< 0.001
• Male	157 [29]	82 (20.4)	317 (39.0)	69 (17.0)	175 (29.9)	165 (41.0)	150 (40.4)	1115 (31.6)	
Educational level									
• Non-educated	31 (5.7)	8 (2.0)	15 (1.8)	11 (2.7)	20 (3.4)	15 (3.7)	8 (2.1)	108 (3.06)	< 0.001
• Primary-School	22 (4.0)	9 (2.2)	45 (5.5)	36 (8.8)	17 (2.9)	27 (6.7)	20 (5.3)	176 [5]	
• Secondary-School	100 (18.5)	44 (11.0)	114 (14.0)	102 (25.1)	82 (14.0)	85 (21.1)	72 (19.4)	599 (17.02)	
• Bachelor	269 (50.0)	271 (67.4)	542 (66.5)	209 (51.6)	380 (65.0)	184 (45.7)	213 (57.4)	2068 (58.7)	
• Postgraduate	118 (21.8)	70 (17.4)	99 (12.1)	47 (11.6)	85 (14.5)	91 (22.6)	58 (15.6)	568 (16.1)	
Employment status									
• Student	14 (2.6)	12 (3.0)	37 (4.5)	19 (4.7)	20 (3.4)	14 (3.4)	53 (14.2)	169 (4.8)	< 0.001
• Employed in health sector	77 (14.2)	39 (9.7)	82 (10.0)	30 (7.4)	79 (13.5)	26 (6.4)	55 (14.8)	388 (11.02)	
• Employed in non-health sector	259 (48.0)	170 (42.2)	440 (54.0)	140 (34.5)	257 (44.0)	238 (59.2)	128 (34.5)	1632 (46.3)	
• Retired	26 (4.8)	13 (3.2)	43 (5.3)	12 (2.9)	26 (4.4)	21 (5.2)	14 (3.7)	155 (4.4)	
• Housewife	125 (23.1)	125 (31.0)	154 (19.0)	152 (37.5)	164 (28.0)	71 (17.6)	75 (20.2)	866 (24.6)	
• Non-employed	39 (7.2)	43 (10.7)	59 (7.2)	52 (12.8)	38 (6.5)	32 (7.9)	46 (12.3)	309 (8.7)	
Marital status									
• Single	95 (17.6)	38 (9.5)	106 (13.0)	80 (19.7)	80 (13.6)	82 (20.3)	122 (32.8)	603 (17.1)	< 0.001
• Married	422 (78.1)	340 (84.5)	663 (81.3)	310 (76.5)	468 (80.1)	295 (73.3)	237 (63.8)	2735 (77.7)	
• Divorced or Widowed	23 (4.2)	24 (6.0)	46 (5.6)	15 (3.7)	36 (6.1)	25 (6.2)	12 (3.2)	181 (5.1)	
Pregnancy status (During COVD-19 infection)									
• No	353 (65.3)	306 (76.1)	476 (58.4)	327 (80.7)	377 (64.5)	230 (57.2)	213 (57.4)	2282 (64.8)	< 0.001
• Yes	30 (5.5)	14 (3.4)	22 (2.7)	9 (2.2)	32 (5.4)	7 (1.7)	8 (2.1)	122 (3.4)	
• Not applicable	157 (29.0)	82 (20.4)	317 (38.9)	69 (17.0)	175 (29.9)	165 (41.0)	150 (40.4)	1115 (31.6)	
Breastfeeding status (During COVD-19 infection)									
• No	346 (64.0)	300 (74.6)	466 (57.1)	314 (77.5)	373 (63.8)	220 (54.7)	207 (55.7)	2226 (63.2)	< 0.001
• Yes	37 (6.8)	20 (5.0)	32 (3.9)	22 (5.4)	36 (6.1)	17 (4.2)	14 (3.7)	178 (5.0)	
• Not Applicable	157 (29.0)	82 (20.4)	317 (38.9)	69 (17.0)	175 (29.9)	165 (41.0)	150 (40.4)	1115 (31.6)	
Household status									
• Living Alone	37 (6.8)	13 (3.2)	10 (1.2)	10 (2.4)	13 (2.2)	17 (4.2)	24 (6.4)	124 (3.5)	< 0.001
• Living with Family	500 (92.6)	388 (96.5)	801 (99.3)	393 (97.0)	568 (97.2)	377 (93.7)	312 (84.0)	3339 (94.8)	
• Living With others (not family)	3 (0.5)	1 (0.24)	4 (0.5)	2 (0.5)	3 (0.51)	8 (2.0)	35 (9.4)	56 (1.6)	
Smoking status									
• Non-smoker	435 (80.5)	282 (70.1)	548 (67.2)	161 (39.7)	406 (69.5)	277 (68.9)	255 (68.7)	2364 (67.1)	< 0.001
• Smoker	95 (17.6)	108 (26.8)	247 (30.3)	241 (59.5)	159 (27.2)	96 (23.8)	108 (29.1)	1054 (30.0)	
• Former smoker	10 (1.8)	12 (3.0)	20 (2.4)	3 (0.74)	19 (3.2)	29 (7.2)	8 (2.1)	101 (2.8)	
Alcohol status									
• No	538 (99.6)	394 (98.0)	792 (97.1)	393 (97.0)	579 (99.1)	387 (96.2)	355 (95.6)	3438 (97.7)	< 0.001
• Yes	2 (0.4)	8 (2.0)	23 (2.8)	12 (2.9)	5 (0.85)	15 (3.7)	16 (4.3)	81 (2.3)	
Chronic disease status									

(*continued on next page*)

Table 1 (*continued*)

Variable	Country								
	Algeria (n = 540)	Egypt (n = 402)	Iraq (n = 815)	Lebanon (n = 405)	Libya (n = 584)	Tunisia (n = 402)	UAE (n = 371)	Total (n = 3519)	P-Value
• Cardiovascular diseases	78 (14.4)	119 (26.9)	203 (24.9)	76 (18.7)	110 (18.8)	60 (14.9)	66 (17.7)	712 (20.2)	< 0.001
• Diabetes	29 (5.3)	47 (11.7)	53 (6.5)	22 (5.4)	49 (8.3)	23 (5.7)	20 (5.3)	243 (7.0)	
• Thyroid disease	43 (8.0)	19 (4.7)	34 (4.1)	27 (6.6)	19 (3.2)	15 (3.7)	16 (4.3)	173 (5.0)	
• Asthma	17 (3.14)	19 (4.7)	24 (2.9)	24 (5.9)	25 (4.2)	16 (3.9)	22 (5.9)	147 (4.1)	
• Immunological disorders	11 (2.0)	16 (4.0)	8 (0.9)	5 (1.2)	11 (1.88)	3 (0.7)	8 (2.1)	62 (1.7)	
• Kidney and Liver diseases	4 (0.74)	4 (1.0)	20 (2.4)	3 (0.7)	11 (1.88)	6 (1.4)	4 (1.0)	52 (1.47)	
• Neurological disorder	35 (6.4)	26 (6.46)	54 (6.6)	36 (8.8)	29 (4.9)	24 (5.9)	14 (3.7)	218 (6.2)	
• Psychological disorder	11 (2.0)	6 (1.5)	5 (0.61)	1 (0.25)	3 (0.5)	7 (1.7)	6 (1.6)	39 (1.1)	
• Others	33 (6.1)	36 (9.0)	34 (4.1)	25 (6.1)	29 (4.9)	26 (6.4)	14 (3.7)	197 (5.6)	
Obesity status									
• Underweight	10 (1.85)	4 (1.0)	14 (1.7)	9 (2.2)	9 (1.5)	16 (3.9)	8 (2.1)	70 (2.0)	< 0.001
• Normal	186 (34.3)	60 (15.0)	206 (25.2)	150 (37.0)	118 (20.2)	130 (32.3)	121 (32.6)	971 (27.5)	
• Overweight	205 (38.0)	162 (40.3)	302 (37.0)	126 (31.1)	216 (36.9)	170 (42.2)	112 (30.1)	1293 (36.7)	
• Obese	100 (18.5)	96 (23.8)	194 (23.8)	74 (18.2)	136 (23.2)	67 (16.6)	80 (21.5)	747 (21.2)	
• Morbid-Obese	39 (7.2)	80 (20.0)	99 (12.1)	46 (11.3)	105 (17.9)	19 (4.7)	50 (13.4)	438 (12.4)	

and categorical variables respectively. The Chi-square test was used to identify significant difference in sociodemographic variables between countries, and for the frequencies < 5 Fisher's exact test was used. Binary logistic regression analyses were undertaken using the incidence of symptoms during COVID-19 infection (yes/no) as the outcome. Univariable and multivariable logistic regression were used to test the predictors for symptoms during COVID-19 infection. Variables that were found to be significant on a single predictor level ($P < 0.25$), using univariable logistic regression analysis, were entered into multivariable logistic regression analyses. Variables were selected after checking their independence, where Pearson's correlation coefficient (r) less than 0.9 indicates the absence of multicollinearity between the independent variables in regression analysis. In the logistic regression analysis, variables that were independently associated with score of symptoms during COVID-19 were identified. Statistical significance was considered at $P \leq 0.05$.

Results

Sociodemographic characteristics

A total of 3519 participants completed the survey from the seven Arab countries. Most participants were aged 18–40 years old (59.4%), married (77.7%) and 68.3% were females. More than half of the respondents were bachelor's degree holders (58.7%) and almost half (46.3%) were employed in non-health sectors. Most of participants were non-smokers (67.1%) and above the normal weight (70.3%). The most common chronic diseases among participants were cardiovascular diseases (20.2%), and diabetes mellitus (7.0%). Table 1 shows sociodemographic characteristics and health status of participants.

Regarding prophylaxis used among participants before infection with COVID-19, 39.9% of the participants used at least one therapy. Most participants who used prophylaxis therapy were from the UAE and Iraq with 49.1% and 45.0%, respectively. Main types of prophylaxis therapy were vitamins and dietary supplements, including vitamin C and zinc. The use of herbal products as prophylaxis against the COVID-19 infection was most commonly reported by participants from Algeria at 31.8%. Antibiotics were used by more than 5% of participants in most countries, the highest being in Algeria with 10.4%. The used of vaccine among participants' prior the COVID-19 infection was recorded more than 20% in three countries: Tunisia, the UAE, and Libya with 37.7%, 29.8%, and 21.8%, respectively. Fig. 1 shows prophylaxis therapy used among participants in the seven countries.

Fig. 2 represents the types of treatment \ used among study participants during COVID-19 infection. Vitamins and dietary supplements were the most commonly used treatment in almost all countries: lowest in Egypt at 19.7% and the highest in the UAE at 27.1%, followed by antibiotics and herbs products. In addition, antiviral, corticosteroids, bronchodilator (inhaler), and anticoagulants were used among the participants in the study.

The symptoms of COVID-19 infection during infection (for two weeks) and upon recovery for at least 2 weeks were measured and given number of symptoms out of 13 scores. The total average score from all countries for symptoms during COVID-19 infection among participants was found (7.31 ± 3.66 scores), while after the infection was (0.48 ± 1.11 scores) as represented in Table 2. The highest score of symptoms during COVID-19 infection was reported among Algerian participants (7.69 ± 3.15 scores) and the lowest was reported among Lebanese participants (6.81 ± 3.96 scores). With regard to scores after COVID-19 infection, the highest was found among UAE participants (0.59 ± 1.37 scores) while the lowest was among Tunisians (0.23 ± 0.70 scores).

Regarding the reported symptoms during COVID-19 infection, more than half of the participants from all countries reported fever, cough, fatigue, nasal congestion and sneezing, sore throat, muscles

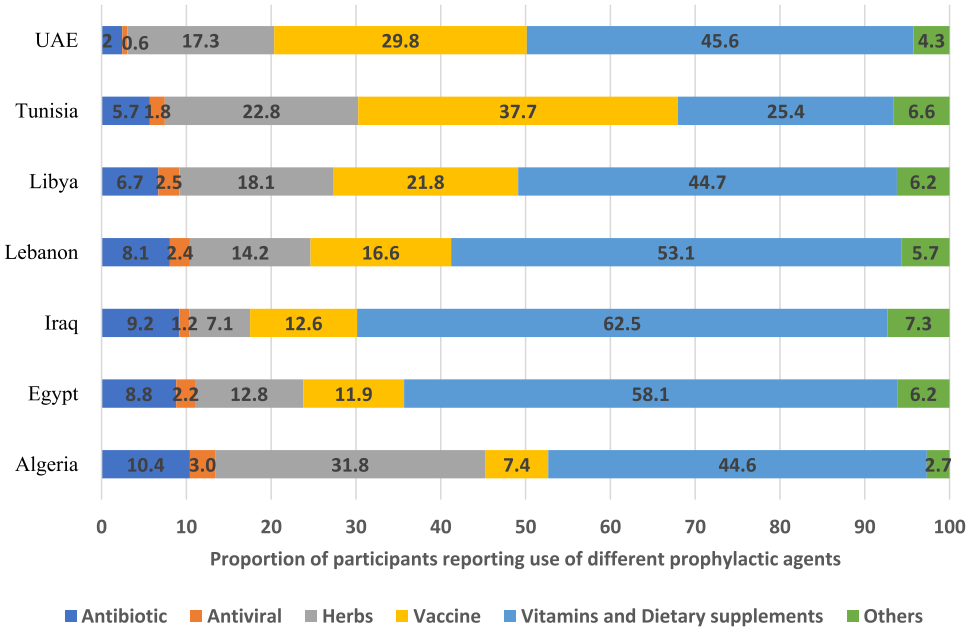

Fig. 1. Type of prophylaxis therapy used among study participants (n = 3519) prior to infection with COVID-19.

and joints pain, diarrhea and abdominal pain. Followed by shortness of breath and sleeping problems. Minority reported skin related problems as represented in Fig. 3.

Following COVID-19 infection (more than 2 weeks) the most reported symptoms among study participants from different countries included nasal decongestion and sneezing, headache, cough, diarrhea, and sleeping problems. Followed by sleeping problems, fatigue and the loss of smell and taste as represented in Fig. 4.

Logistic regression model of association between socio-demographic characteristics and score of symptoms during COVID-19 infection among the study participants is represented in Table 3. A significant positive correlation was found between score of

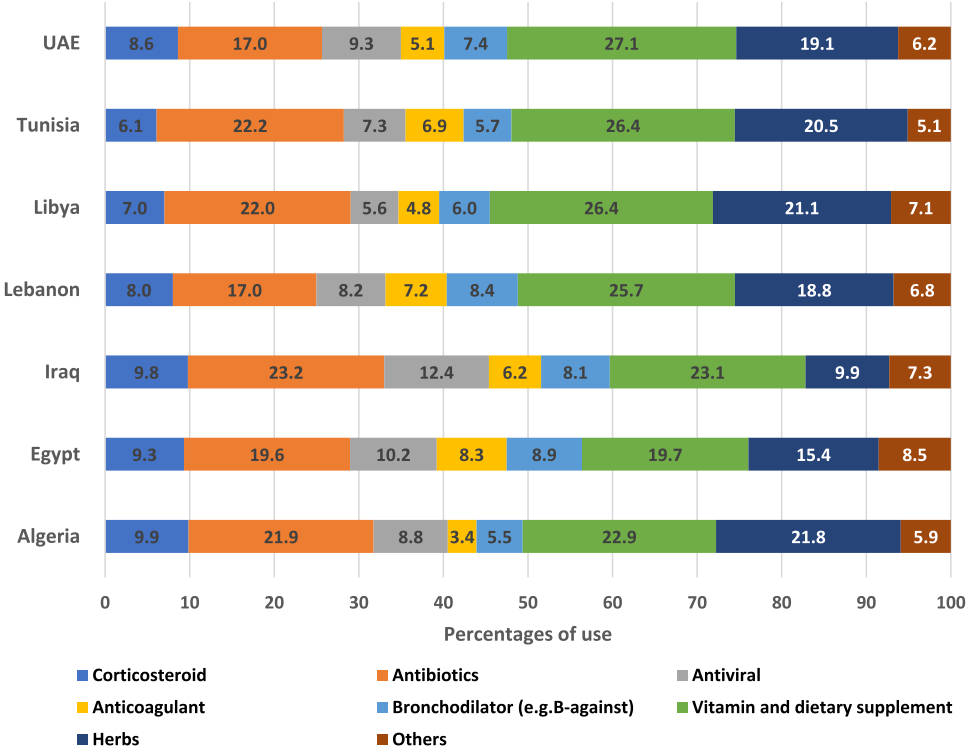

Fig. 2. Type of treatment therapy used among study participants (n = 3519) during infection with COVID-19.

Table 2
Score of symptoms during and after (more than 2 weeks) COVID-19 infection.

Country	Score of symptoms out of 13	
	During	After
Algeria (n = 540)	7.69 ± 3.15	0.56 ± 1.29
Egypt (n = 402)	7.50 ± 3.58	0.47 ± 1.35
Iraq (n = 815)	7.72 ± 3.49	0.56 ± 1.34
Lebanon (n = 405)	6.81 ± 3.96	0.48 ± 1.27
Libya (n = 584)	7.16 ± 3.49	0.50 ± 1.11
Tunisia (n = 402)	7.32 ± 3.50	0.23 ± 0.70
UAE (n = 371)	6.95 ± 3.77	0.59 ± 1.37
Total (n = 3519)	7.31 ± 3.66	0.48 ± 1.11

symptoms and age ≥ 65 (p = 0.049), employment in health-related sector (p = 0.04), marital status (divorced p = 0.018 or widowed p = 0.012), chronic disease (p = 0.041) and obesity (p = 0.033). On the other hand, a significant negative correlation was found between score of symptoms and smoking status (non-smoker (p = 0.028), and former smoker (p = 0.016).

Source of Information

With regards to participants' source of information about COVID-19, the majority of participants from all countries reported the physician as their main source. Social media was the second most commonly reported by Algerian, Libyan, and Tunisian participants, while pharmacists were the second most commonly reported source in Iraq, Lebanon and UAE followed by social media and family. On the other hand, participants from Egypt reported infected or recovered people as their second source of information after physician followed by pharmacist, social media, and friends. The sources of information about COVID-19 infection are reported in Fig. 5.

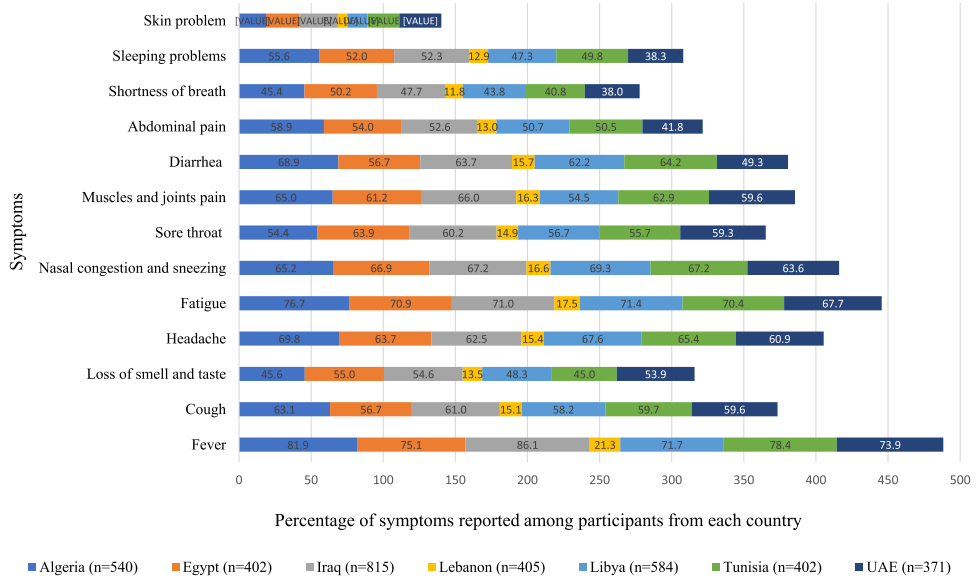

Fig. 3. Symptoms during COVID-19 infection among the study participants from different countries (n = 3519).

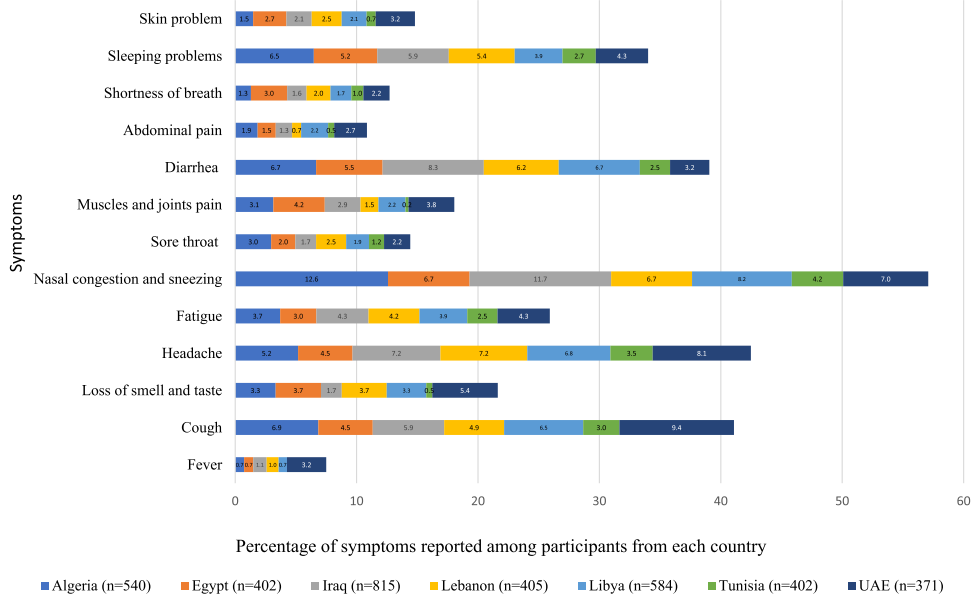

Fig. 4. Percentages of reported symptoms after COVID-19 infection (more than 2 weeks) among the participants from different countries.

Table 3
Multivariable Binary logistic regression model of association between socio-economic characteristics and incidence of symptoms during COVID-19 infection among the study participants (n = 3519).

Variable	Beta	OR (CI-95%)	P-Value
Age (Ref= < 18 years)			
18–40	1.143	0.99(0.294–4.443)	0.847
41–64	1.271	1.11(0.339–4.757)	0.722
≥ 65	1.321	1.23(0.52–1.664)	**0.049**
Gender (Ref=Male)			
Female	0.408	0.31(0.096–1.729)	0.224
Educational level (Ref=non-Educated)			
Primary-School	1.547	1.41(0.63–3.799)	0.342
Secondary-School	0.705	0.55(0.218–2.274)	0.558
Bachelor	0.978	0.86(0.586–1.631)	0.931
Postgraduate	1.171	1.05(0.602–2.276)	0.642
Employment status (Ref=Employed in non-health sector)			
Employed in health sector	0.331	0.28(0.115–0.952)	**0.04**
Retired	1.246	1.12(0.427–3.632)	0.688
Housewife	1.352	1.19(0.784–2.331)	0.278
Non-employed	0.972	0.79(0.484–1.956)	0.938
Country (Ref=Algeria)			
Egypt	1.498	1.32(0.686–3.271)	0.311
Iraq	0.849	0.78(0.384–1.879)	0.687
Lebanon	1.213	1.18(0.613–2.400)	0.579
Libya	1.143	1.06(0.518–2.52)	0.741
Tunisia	1.696	1.49(0.785–3.661)	0.179
UAE	1.891	1.68(0.856–4.148)	0.115
Marital status (Ref=Single)			
Married	2.08	1.99(1.134–3.814)	**0.018**
Divorced or widowed	3.641	3.12(3.641–10.014)	**0.012**
Household status (Ref=Living Alone)			
Living with Family	0.569	0.37(0.121–2.684)	0.476
Living With others (not family)	0.805	0.77(0.214–3.036)	0.749
Smoking status (Ref=Smoker)			
Non-smoker	-0.661	0.56(0.269–0.889)	**0.028**
Former smoker	-0.852	0.79(0.216–0.991)	**0.016**
Pregnancy status (Ref=No)			
Yes	1.123	0.98(0.356–3.542)	0.844
Breastfeeding status (Ref=No)			
Yes	1.763	1.67(0.795–3.912)	0.163
Alcohol status (Ref=No)			
Yes	0.481	0.28(0.13–1.787)	0.275
Chronic disease status (Ref=No)			
Yes	1.129	1.05(0.756–0.992)	**0.041**
Obesity status (Ref= Normal)			
Underweight	-1.244	1.1(0.069–9.185)	0.334
Overweight	-0.311	0.12(0.268–1.89)	0.090
Obese	-1.935	1.03(0.058–0.991)	**0.033**
Morbid-Obese	-3.175	3.0(0.089–3.612)	0.124
Type of prophylaxis (Ref=Vitamin and dietary supplement)			
Antibiotic	-4.847	4.3(0.034–14.172)	0.965
Antiviral	-1.23	1.1(2.891–15.77)	0.856
Herbs	-0.616	0.51(1.54–16.34)	0.936
Vaccine	-0.138	0.08(0–0.002)	**0.006**
Others	-0.783	0.66(2.332–19.553)	0.999
Type of treatment (Ref=Vitamin and dietary supplement)			
Corticosteroid	0.194	0.06(0.004–14.782)	0.412
Antibiotics	5.537	5.2(0.13–235.35)	0.371
Antiviral	1.369	1.2(0.002–82.85)	0.923
Anticoagulant	0.996	0.81(0.003–35.955)	0.951
Bronchodilator (e.g. B-against)	9.738	9.1(2.566–3.123)	0.012
Herbs	1.645	1.5(0.536–1.765)	0.089
Others	4.295	4.0(0.092–30.922)	0.207

Significance measure at P < 0.05, presented in bold.

Discussion

The study included data from recovered COVID-19 patients (n = 3519) who were treated at home from seven Arab countries, describing the use of preventive treatment before infection with the Corona virus, the practice of self-treatment during infection, and the occurrence of symptoms among participants during infection and after recovery. Female and adult participants aged 18–41 years were the highest in all countries. Several prescription and nonprescription drugs, with no evidence of some of them treating or preventing infection or symptoms, were used among the participants. The physicians and social media were the most common sources of information among the participants in all countries. Our findings found association between demographic characteristics and health status of several participants and the incidence of symptoms of COVID-19 infection among study participants such as elderly patients (> 65 years old), smoker, obese people, patients with chronic disease, and vaccinated people which is similar with published studies in many communities around the world [20–22]. In addition, there are other uncommon factors that have association with severity of symptoms such as being single and working in the health sector.

The COVID-19 pandemic has posed detrimental health, social and psychological challenges on public's wellbeing [23]. Such consequences accompanied with the lack of effective treatments provoked people's precautionary measures to use prophylaxis therapies including the use of antiviral, antibacterial and other therapeutics already in use for other diseases in addition to the use of vitamins and dietary supplements [13,24]. Vitamins (including vitamin C and D) as well as zinc and selenium, were emphasized as potentially beneficial for individuals with respiratory viral infections [25], based on a theory that these substances might play a role in stimulating the immune system that could be used to treat/prevent COVID-19; however, dietary supplementation and vitamins intake was not linked to prevent or treat COVID-19 [26]. Nevertheless, the consumption of these supplements was significantly increased with the emergence of this pandemic hoping to provide some protection or reduction of disease severity [27,28]. Similarly, our study findings reported that almost half of the participants were using vitamins and dietary supplements as prophylactic therapy before COVID-19 infection. The use of these vitamins and supplements were reported in many published studies during COVID-19 pandemic. More than half of the participants (56.0%) were reported in two studies: in Pakistan among medical students (n = 489) [29], and in the UAE among general population (n = 2060) [30]. Another study included three countries, UK, USA, and Sweden (n = 445,850), more than half of people used at least one vitamin and/or dietary supplement during COVID-19 pandemic [31]. Also these materials were highly used among patients in many other countries with various ratios such as in Poland [32], Bangladesh [33], and Togo [34]. In addition, the use of dietary supplement was increased many folds during COVID-19 as reported in a study from Lebanon [35].

In the current study, taking the vaccine was only the prophylactic factor that has significant association with severity of symptoms during COVID-19 infection among the participants. Although COVID-19 remains with no cure up till this day, developed vaccines remain a safe and highly effective solutions to reduce the risk and severity of the disease [36]. A high rate of COVID-19 vaccine hesitancy among Middle Eastern Arabs was reported, affecting people's likelihood to receive the COVID-19 vaccine [36,37]. According to our study findings, UAE and Tunisia participants were more approving on receiving the vaccine compared to other participants in other countries specially Algeria and Egypt, in compliance with what was reported in earlier studies [38]. Also, the recorded symptoms scores were generally lower in the high vaccinated countries compared with other countries, either during the infection period or after the recovery. This variation in vaccination hesitancy among participants from different countries could be due to different economic, social and political conditions, in addition to public's trust in their national health agencies [37]. As well as education and national awareness, combined with other factors such as the prevalence and mortality rates of COVID-19 among these countries plays a crucial role in deciding peoples' approaches to protect and treat themselves before and during the COVID-19 infection [38].

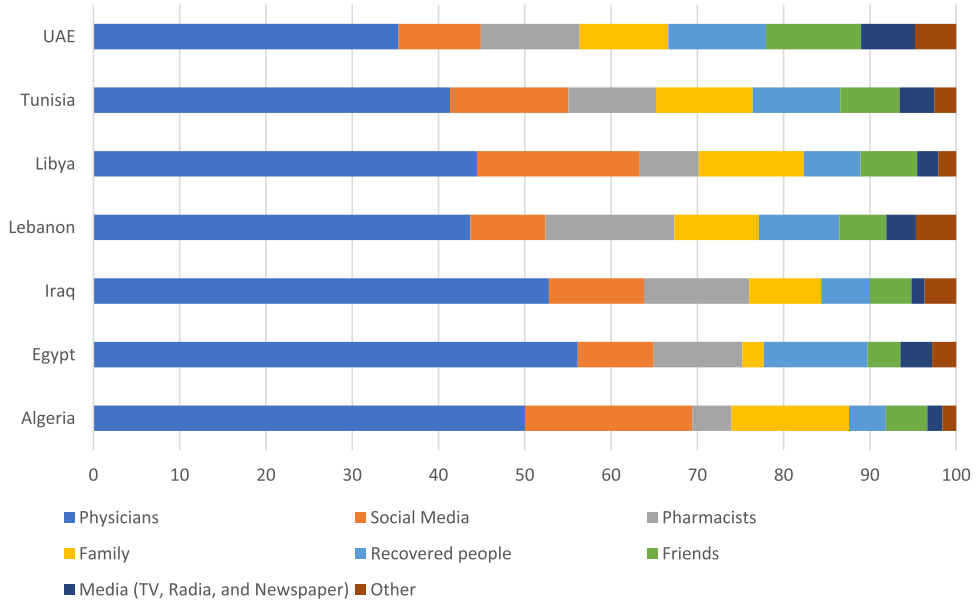

Fig. 5. Sources of information about COVID-19 among the study participants (n = 3519) from different countries.

Several common symptoms have been associated with COVID-19 infection among the participants such as fever, cough, fatigue, muscle or body ache, diarrhea and headache [39]. The severity of COVID − 19 infection varies among individuals from mild to highly severe symptoms. According to our study findings a significant positive correlation was found between score of symptoms and several factors such as age > 65 years, employment in health-related sector, marital status (divorced or widowed), chronic disease and obesity. Similar to our findings factors, the findings of two systemic reviews and meta-analysis included of hundreds studies around the world that factors: increasing age, the presence of chronic diseases and the presence of obesity increased the risk of severe illness [28,29]. In another studies, married, divorced and widowed participants recorded higher symptoms scores than single people. However, some studies reported that married people have better quality of life which is coming from family support for the patients and lower stress level and anxiety among the married people [40–42]. In addition, there was no association reported between marital status and symptoms in another study [43]. In our study, people who are working in health-sector stated lower symptoms scores compare with employed in non-health sector. This result is controversial with a study conducted in UK [44].

As well as several studies have examined the impact of COVID-19 and the lasting symptoms on patients after several months (including fatigue, muscle aches and sleep difficulties) [45]. The findings of this study indicated that many participants from all countries severed from symptoms that persisted after recovered from the infection. However, these symptoms are much less than symptoms during the period of infection. It is reported that 10–70% of individuals who were previously infected suffered from various physical and neuropsychiatric symptoms that persisted for several months after recovery of the infection which is described as “long COVID-19″ [15,46]. Long-term COVID-19 symptoms is a term used to describe a group of miscellaneous symptoms in people who have recovered but reporting lasting symptoms of the infection that are distinct from those of patients recovering from severe COVID-19 or have had the usual symptoms for a longer period than usual (including fatigue, muscle pain, headache, sleep difficulties, and cognitive dysfunction) [15,46]. However, risk factors for developing long COVID are not known yet as there is no reported association between the severity of COVID-19 infection during the acute illness phase and the likelihood of developing symptom burden at follow-up leading to long-COVID syndrome [46].

Regarding participants’ sources of information about COVID-19 infection, similar to previous studies, the results reported that physicians were the main source of information sought in all countries. This highlights the crucial role of health care providers in delivering accurate and reliable information regarding the COVID-19. Expectedly, social media came in second place, following physicians in most countries considered an important source of information [47]. However, the easiness and accessibility of social media can lead to incomplete and misleading information about the virus [48]. Thus, providing trusted sources that assure clarity and reliability among populations regarding COVID-19 information is vital to fight misconceptions and false information speculating around.

There are some limitations in the study. The cross-sectional design of the study is not without limitations as causality cannot be established. Furthermore, issues related to the questionnaire such as the difficulty of distributing the survey, and the level of understanding of the questions among the participants; however, the understanding of the questions was evaluated among the Arab peoples. Also, participants may not feel comfortable giving answers that present themselves unfavorably, which creates a source of bias. Finally, social media can only be used to distribute the survey to people who are literate and have internet access and a social media account.

Future researches are needed to evaluate the reasons for using drugs (self-treatment) and other substances to prevent and treat COVID-19 infection in people. In addition, there are some socio-economic factors that need more focus for evaluation such as marital status and work in the health sector, which may have an impact on people dealing with COVID-19 infection. Finally, there is a need for more research in the future that focus on the long-term effect of COVID-19 infection on people in the region.

Conclusion

The study indicated the use of several drugs and treatments to prevent infection with the COVID-19 virus and treat patients at home. However, several symptoms were also observed among patients; some persisted even two weeks after recovery. In addition, specific demographic characteristics and treatments influenced the

severity of symptoms, such as vaccination, obesity, non-smoking, and older age. The primary sources of information among participants were health care providers and social media, but the choice of treatment was often inconsistent with health organizations' recommendations.

There is a need for more awareness and attention to treatment among patients being treated at home to avoid unnecessary treatment and adverse effects of medication.

References

[1] WHO. Weekly epidemiological update on COVID-19, 10 August 2022, World Health Organization, Available at https://www.who.int/publications/m/item/weekly-epidemiological-update-on-covid-19—10-august-2022.

[2] Marlon J. , Maibach E. , Ballew M. , Bergquist P. , Goldberg M. , Gustafson A. et al. Who do Americans trust most for information about COVID-19?, 2020. Yale University and George Mason University. New Haven, CT: Yale Program on Climate Change Communication.

[3] Roozenbeek J, Schneider CR, Dryhurst S, Kerr J, Freeman ALJ, Recchia G, et al. Susceptibility to misinformation about COVID-19 around the world. R Soc Open Sci 2020;7(10):201199https://doi.org/10.1098/rsos.201199

[4] Jirjees F, Saad AK, Al Hano Z, Hatahet T, Al Obaidi H, Dallal Bashi YH. COVID-19 treatment guidelines: do they really reflect best medical practices to manage the pandemic? Infect Dis Rep 2021;13(2):259–84. https://doi.org/10.3390/idr13020029

[5] FDA. FDA Approves First COVID-19 Vaccine Approval Signifies Key Achievement for Public Health. 2021. Available at https://www.fda.gov/news-events/press-announcements/fda-approves-first-covid-19-vaccine.

[6] Broom D. Coronavirus has exposed the digital divide like never before. World Economic Forum. 2021. Available at https://www.weforum.org/agenda/2020/04/coronavirus-covid-19-pandemic-digital-divide-internet-data-broadband-mobbile/.

[7] Quincho-Lopez A, Benites-Ibarra CA, Hilario-Gomez MM, Quijano-Escate R, Taype-Rondan A. Self-medication practices to prevent or manage COVID-19: A systematic review. PLoS One 2021;16(11):e0259317https://doi.org/10.1371/journal.pone.0259317

[8] Malik M, Tahir MJ, Jabbar R, Ahmed A, Hussain R. Self-medication during Covid-19 pandemic: challenges and opportunities. Drugs Ther Perspect 2020:1–3. https://doi.org/10.1007/s40267-020-00785-z

[9] Quispe-Cañari JF, Fidel-Rosales E, Manrique D, Mascaró-Zan J, Huamán-Castillón KM, Chamorro-Espinoza SE, et al. Self-medication practices during the COVID-19 pandemic among the adult population in Peru: a cross-sectional survey. Saudi Pharm J 2021;29(1):1–11. https://doi.org/10.1016/j.jsps.2020.12.001

[10] WHO. Guidelines for the Regulatory Assessment of Medicinal Products for use in Self-Medication. 2000. World Health Organization, Geneva, Available at https://apps.who.int/iris/bitstream/handle/10665/66154/WHO_EDM_QSM_00.1_eng.pdf.

[11] Ruiz ME. Risks of self-medication practices. Curr Drug Saf 2010;5(4):315–23. https://doi.org/10.2174/157488610792245966. PMID: 20615179.

[12] Alhomoud F, Aljamea Z, Almahasnah R, Alkhalifah K, Basalelah L, Alhomoud FK. Self-medication and self-prescription with antibiotics in the Middle East-do they really happen? A systematic review of the prevalence, possible reasons, and outcomes. Int J Infect Dis 2017;57:3–12. https://doi.org/10.1016/j.ijid.2017.01.014

[13] Jirjees F, Ahmed M, Sayyar S, Amini M, Al-Obaidi H, Aldeyab MA. Self-medication with antibiotics during COVID-19 in the Eastern Mediterranean region countries: a review. Antibiotics 2022;11(6):733. https://doi.org/10.3390/antibiotics11060733

[14] Gan JM, Kho J, Akhunbay-Fudge M, Choo HM, Wright M, Batt F, et al. Atypical presentation of COVID-19 in hospitalised older adults. Ir J Med Sci 2021;190(2):469–74. https://doi.org/10.1007/s11845-020-02372-7

[15] WHO. Post COVID-19 condition (Long COVID). 2021. Available at https://www.who.int/srilanka/news/detail/16–10-2021-post-covid-19-condition.

[16] Wegbom AI, Edet CK, Raimi O, Fagbamigbe AF, Kiri VA. Self-medication practices and associated factors in the prevention and/or treatment of COVID-19 Virus: a population-based survey in Nigeria. Front Public Health 2021;9:606801.

[17] Galal I, Hussein A, Amin M, Saad M, Zayan HE, Abdelsayed M, et al. Determinants of persistent post-COVID-19 symptoms: value of a novel COVID-19 symptom score. Egypt J Bronc– 2021;15(1):10. https://doi.org/10.1186/s43168-020-00049-4

[18] Cadegiani FA, Zimerman RA, Campello de Souza B, McCoy J, Pereira E, Costa RA, et al. The AndroCoV clinical scoring for COVID-19 Diagnosis: a prompt, feasible, costless, and highly sensitive diagnostic tool for COVID-19 based on a 1757-patient cohort. Cureus 2021;13(1):e12565https://doi.org/10.7759/cureus.12565

[19] Raosoft® Software. Sample Size Calculator. Raosoft Inc; 2004 (Available at). http://www.raosoft.com/samplesize.html.

[20] Zhang H, Wu Y, He Y, Liu X, Liu M, Tang Y, et al. Age-related risk factors and complications of patients with COVID-19: a population-based retrospective study. Front Med (Lausanne) 2022;8:757459https://doi.org/10.3389/fmed.2021.757459

[21] Gesesew HA, Koye DN, Fetene DM, et al. Risk factors for COVID-19 infection, disease severity and related deaths in Africa: a systematic review. BMJ Open 2021;11:e044618https://doi.org/10.1136/bmjopen-2020-044618

[22] Ko JY, Danielson ML, Town M, Derado G, Greenlund KJ, Kirley PD, et al. COVID-NET surveillance team. risk factors for coronavirus disease 2019 (COVID-19)-associated hospitalization: COVID-19-associated hospitalization surveillance network and behavioral risk factor surveillance system. Clin Infect Dis 2021;72(11):e695–703. https://doi.org/10.1093/cid/ciaa1419

[23] Parsons Leigh J, Fiest K, Brundin-Mather R, Plotnikoff K, Soo A, Sypes EE, et al. A national cross-sectional survey of public perceptions of the COVID-19 pandemic: self-reported beliefs, knowledge, and behaviors. PLoS One 2020;15(10):e0241259https://doi.org/10.1371/journal.pone.0241259

[24] Bartoszko JJ, Siemieniuk RAC, Kum E, Qasim A, Zeraatkar D, Ge L, et al. Prophylaxis against covid-19: living systematic review and network meta-analysis. BMJ 2021;373:n949. https://doi.org/10.1136/bmj.n949

[25] de Faria Coelho-Ravagnani C, Corgosinho FC, Sanches FLFZ, Prado CMM, Laviano A, Mota JF. Dietary recommendations during the COVID-19 pandemic. Nutr Rev 2020;79(4):382–93.

[26] Dehghani-Samani A, Kamali M, Hoseinzadeh-Chahkandak F. The role of vitamins on the prevention and/or treatment of COVID-19 Infection; a systematic review. Mod Care J 2020;17:3.

[27] Günalan E, Cebioğlu İK, Çonak Ö. The popularity of the biologically-based therapies during coronavirus pandemic among the google users in the USA, UK, Germany, Italy and France. Complement Ther Med 2021;58:102682.

[28] Agrawal S, Goel AD, Gupta N. Emerging prophylaxis strategies against COVID-19. Monaldi Arch Chest Dis 2020;90:1.

[29] Yasmin F, Asghar MS, Naeem U, Najeeb H, Nauman H, Ahsan MN, et al. Self-medication practices in medical students during the COVID-19 pandemic: a cross-sectional analysis. Front Public Health 2022;10:803937https://doi.org/10.3389/fpubh.2022.803937

[30] Radwan H, Hasan H, Jaafar Z, Abbas N, Rashed Saif E, Al Kitbi M, et al. Diets and dietary supplements used during the COVID-19 pandemic in the United Arab Emirates: a cross-sectional survey. Saudi Pharm J 2022;30(4):421–32. https://doi.org/10.1016/j.jsps.2022.01.019

[31] Louca P, Murray B, Klaser K, Graham MS, Mazidi M, Leeming ER, et al. Modest effects of dietary supplements during the COVID-19 pandemic: insights from 445 850 users of the COVID-19 Symptom Study app. BMJ Nutr Prev Health 2021;4(1):149–57. https://doi.org/10.1136/bmjnph-2021-000250

[32] Puścion-Jakubik A, Bielecka J, Grabia M, Mielech A, Markiewicz-Żukowska R, Mielcarek K, et al. Consumption of food supplements during the three COVID-19 waves in Poland-focus on zinc and Vitamin D. Nutrients 2021;13(10):3361. https://doi.org/10.3390/nu13103361

[33] Ahmed I, Hasan M, Akter R, Sarkar BK, Rahman M, Sarker MS, et al. Behavioral preventive measures and the use of medicines and herbal products among the public in response to Covid-19 in Bangladesh: a cross-sectional study. PLoS One 2020;15(12):e0243706https://doi.org/10.1371/journal.pone.0243706

[34] Sadio AJ, Gbeasor-Komlanvi FA, Konu RY, Bakoubayi AW, Tchankoni MK, Bitty-Anderson AM, et al. Assessment of self-medication practices in the context of the COVID-19 outbreak in Togo. BMC Public Health 2021;21(1):58. https://doi.org/10.1186/s12889-020-10145-1

[35] Mohsen H, Yazbeck N, Al-Jawaldeh A, Bou Chahine N, Hamieh H, Mourad Y, et al. Knowledge, attitudes, and practices related to dietary supplementation, before and during the COVID-19 pandemic: findings from a cross-sectional survey in the lebanese population. Int J Environ Res Public Health 2021;18(16):8856. https://doi.org/10.3390/ijerph18168856

[36] Abu-Farha R, Mukattash T, Itani R, Karout S, Khojah HMJ, Abed Al-Mahmood A, et al. Willingness of Middle Eastern public to receive COVID-19 vaccines. Saudi Pharm J 2021;29(7):734–9. https://doi.org/10.1016/j.jsps.2021.05.005

[37] Kasrine Al Halabi C, Obeid S, Sacre H, Akel M, Hallit R, Salameh P, et al. Attitudes of Lebanese adults regarding COVID-19 vaccination. BMC Public Health 2021;21(1):998. https://doi.org/10.1186/s12889-021-10902-w

[38] Guidry JPD, Laestadius LI, Vraga EK, Miller CA, Perrin PB, Burton CW, et al. Willingness to get the COVID-19 vaccine with and without emergency use authorization. Am J Infect Control 2021;49(2):137–42. https://doi.org/10.1016/j.ajic.2020.11.018

[39] CDC. Symptoms of COVID-19. 2022. Available at https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html (Accessed 23 November 2021).

[40] Pijls BG, Jolani S, Atherley A, Derckx RT, Dijkstra JIR, Franssen GHL, et al. Demographic risk factors for COVID-19 infection, severity, ICU admission and death: a meta-analysis of 59 studies. BMJ Open 2021;11(1):e044640https://doi.org/10.1136/bmjopen-2020-044640

[41] Purba FD, Kumalasari AD, Novianti LE, Kendhawati L, Noer AH, Ninin RH. Marriage and quality of life during COVID-19 pandemic. PLoS One 2021;16(9):e0256643https://doi.org/10.1371/journal.pone.0256643

[42] Stavem K, Ghanima W, Olsen MK, Gilboe HM, Einvik G. Prevalence and determinants of fatigue after COVID-19 in non-hospitalized subjects: a population-based study. Int J Environ Res Public Health 2021;18(4):2030. https://doi.org/10.3390/ijerph18042030

[43] Zou S, Liu ZH, Yan X, Wang H, Li Y, Xu X, et al. Prevalence and correlates of fatigue and its association with quality of life among clinically stable older psychiatric patients during the COVID-19 outbreak: a cross-sectional study. Glob Health 2020;16:119. https://doi.org/10.1186/s12992-020-00644-6

[44] Mutambudzi M, Niedwiedz C, Macdonald EB, Leyland A, Mair F, Anderson J, et al. Occupation and risk of severe COVID-19: prospective cohort study of 120 075 UK Biobank participants. Occup Environ Med 78. 2020. p. 307–14. https://doi.org/10.1136/oemed-2020-106731. Epub ahead of print. Erratum in: Occup Environ Med. 2022 Feb;79(2):e3.

[45] Chidambaram V, Tun NL, Haque WZ, Majella MG, Sivakumar RK, Kumar A, et al. Factors associated with disease severity and mortality among patients with COVID-19: A systematic review and meta-analysis. PLoS One 15. 2020. https://doi.org/10.1371/journal.pone.0241541

[46] Huang C, Huang L, Wang Y, Li X, Ren L, Gu X, et al. 6-month consequences of COVID-19 in patients discharged from hospital: a cohort study. Lancet 2021;397(10270):220–32. https://doi.org/10.1016/S0140-6736(20)32656-8

[47] Sykes DL, Holdsworth L, Jawad N, Gunasekera P, Morice AH, Crooks MG. Post-COVID-19 symptom burden: what is long-COVID and How should we manage it? Lung 2021;199(2):113–9.

[48] Cuan-Baltazar JY, Muñoz-Perez MJ, Robledo-Vega C, Pérez-Zepeda MF, Soto-Vega E. Misinformation of COVID-19 on the internet: infodemiology study. JMIR Public Health Surveill 2020;6(2):e18444.