

Assessment of Self-Treatment Knowledge, Beliefs and Practice during COVID-19 Pandemic among Egyptian Population: A Cross Sectional Study

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ABSTRACT

Background: Owing to absence of definitive treatment to coronavirus disease 2019 (COVID-19) and vaccine hesitancy, the general population sought information from various sources to prevent or treat the disease. Consequently, self-treatment (ST) was boosted in many parts of the world.

Aim: The current study aimed to assess ST knowledge, beliefs and practice during the COVID-19 pandemic among Egyptians.

Subjects and Method: A cross-sectional, anonymous online survey was conducted using different social media platforms to recruit participants. The survey assessed the sociodemographic characteristics, past COVID-19 infection and vaccination, exposure to ST, and reasons for ST.

Results: A total of 400 participants completed the questionnaire; their mean age was 34.9±11.5, females represented 67.8%, married (63.3%), living in urban areas (76.8%) and had chronic diseases (28%). About 67.5% had received vitamins or minerals, antibiotics or herbals or food supplements either due to ST (59.6%) or non-ST (40.4%). Among the ST group, vitamins were used by (81.9%), antibiotics (45.9%), and herbals and supplements (40.9%).

Conclusion: ST may delay medical advice seeking leading to worsening of the patient's health. Efforts to raise public awareness about risks of ST should be done by healthcare members especially in the media.

Keywords: Self-treatment; Drug use; COVID-19; Multivitamins; Antibiotics; Egypt

INTRODUCTION

In 11th March 2020, coronavirus disease 2019 (COVID-19) was declared a pandemic by the World Health Organization (WHO)⁽¹⁾. A global lockdown has been triggered by the COVID-19 pandemic, with many individuals feeling that their only option is to aid themselves, take care of themselves, and self-treat⁽²⁾. Public health and social measures (PHSMs) to limit spread of this pandemic include social distancing, wearing masks, regular hand wash, and staying at home⁽³⁾. Moreover, experts have advised adequate intake of vitamins, mineral products and herbal medicines to lower the risk and severity of infection as well as to bolster the immune system⁽⁴⁻⁶⁾. Up to April 2, 2022, about 468,8 million cases reported with 6.1 million deaths globally⁽⁷⁾. In Egypt, on April 2, 2022, the reported number of COVID-19 cases was 505,264 with 24,417 deaths⁽⁸⁾.

As a result of panic, public fear and misinformation about the COVID-19 pandemic, many people bought and saved medicines and started self-treatment⁽⁹⁾. Self-medication is defined by the WHO as self-treatment (ST) of known symptoms or illness by medications without physician consultation⁽¹⁰⁾.

It also includes the use or repeated use of previously prescribed drugs or buying prescribed drugs without consultation and illegitimate use of over the counter (OTC) drugs⁽¹¹⁾. The lockdown, implemented

during the COVID-19, significantly limited the access to health care providers, particularly in low-resource settings. In this context, the chance for exposure to ST and seeking medicine-related information from less reliable sources such as social and digital media has been increasing remarkably⁽¹²⁾.

This interest in online information about ST has been dramatically increased between 7th January and 1st June 2020, which was reflected in Google trend for ST searches⁽¹³⁾. Other sources for ST including family members, friends, neighbors, previous prescriptions and pharmacists have been recently documented⁽¹⁴⁾.

Egypt, a lower-middle-income country, has a significant challenge as a result of the COVID-19 pandemic: a suffering economy with limited resources, an insufficient health-care system and infrastructure. The Egyptian government's participation in disseminating COVID-19-related information through various media outlets is commendable. However, dealing with misconceptions and widespread misinformation and deception about COVID-19 therapy is a pressing concern⁽¹⁵⁾.

To the best of our knowledge no previous studies were done among the general population during the COVID-19 pandemic in Egypt about ST^(16,17). The current study aimed to assess the knowledge, beliefs, and

practice of ST during the COVID-19 pandemic among Egyptians.

Ethical approval

The study was approved by the Ethics Committee of the High Institute of Public Health, Alexandria University, Egypt. The study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards⁽¹⁸⁾. Participants were informed that their participation was voluntary, and their consent was obtained before administering the survey.

SUBJECTS AND METHODS

Study design and population

We conducted a cross-sectional, anonymous survey using an online questionnaire during the period from April 2021 to August 2021. The research team used social media platforms such as Facebook, Twitter, and WhatsApp, to recruit potential participants.

Data collection

People completed the survey after reading the online informed consent and agreeing on participating in the study. There was no compensation (either financial or other) for participating in this study and it was not allowed to submit more than one survey. The survey consisted of two sections. The first section included the sociodemographic characteristics (age, sex, residence, level of education, marital status, occupation, smoking, presence of comorbidities and past COVID-19 infection). The second section had questions covering utilization of ST (antibiotics, vitamins or minerals and herbal products or other supplements), knowledge and beliefs regarding ST, source of information for ST and why participants exposed themselves to ST. Based on the result of the study conducted by **Elden *et al.***, the proportion of Egyptian students exposed to ST was 77.7⁽¹⁹⁾. using EpiInfo v 7.2 power 80, precision 5%, the minimal required sample size was 267 subjects, we increased the sample size to 400 to compensate for stratifications and missing data.

Definition of self-treatment: Anyone who was taking either antibiotics, vitamins or herbals and food supplements without medical consultation, while if exposed after medical consultation was not classified as self-treatment.

Statistical analysis

Data were collected through SurveyMonkey then exported to Excel sheet for further processing. The collected data were wrangled, coded, and analyzed using Statistical Package for the Social Sciences (SPSS) version 25 (Chicago, USA). The quantitative variables were expressed using mean \pm standard deviation (SD). Whereas counts (percentages) were utilized to describe the categorical variables. The Chi-square test was used to estimate pairwise correlations between categorical variables. Finally, respondents were categorized (Yes/No) based on exposure to ST. $P < 0.05$ was considered significant.

RESULTS

In total, 495 subjects responded to the questionnaire, of them 95 responses were excluded due to incomplete data (56 subjects) or not fulfilling the inclusion criteria (39 subjects aged below 18 years). The mean age was 34.9 ± 11.5 years (ranged between 18 to 73 years), more than two-thirds were females (67.8%), married (63.3%) and lived in urban area (76.8%) mainly Cairo (48.8%). The majority of participants were highly educated (university education 93.3%) and work as clerks (50.5%). Regarding smoking 90% of participants were non-smokers while 26.5% suffered from chronic diseases. [Table 1].

Having chronic diseases and previous COVID-19 infection had significant statistical association with self-treatment. About 42.4% of respondents with chronic diseases versus 39.4% of respondents without chronic diseases were exposed to self-treatment. Higher proportion of respondents who did not get COVID-19 were exposed to self-treatment compared to those who got COVID-19 infection (42.8% vs 32.3% respectively).

Table 1. Respondent demographics and characteristics

Variable		Non-self-treatment group	Self- treatment group	p
Age	18-30 years	149 (37.3)	64 (42.9)	0.83
	31-45 years	199 (49.8)	77 (38.7)	
	46-60 years	32 (8.0)	13 (40.6)	
	Above 60 years	20 (5.0)	7 (35)	
Sex	Male	129 (32.3)	53 (41.1)	0.81
	Female	271 (67.8)	108 (39.8)	
Marital status	Single	147 (36.7)	64 (43.5)	0.31
	Married	253 (63.3)	97 (38.3)	
Residency	Rural	93 (23.2)	40 (43)	0.54
	Urban	307 (76.8)	121 (39.4)	
Sector	Alexandria	101 (25.3)	42 (41.6)	0.83
	Canal	16 (4.0)	6 (37.5)	
	Upper Egypt	45 (11.3)	21 (46.6)	
	Cairo	195 (48.8)	77 (39.4)	
	Delta	43 (10.8)	15 (34.8)	
Education	Non-university graduate	27 (2.5)	14 (51.8)	0.42
	University	373 (93.3)	147 (39.4)	
Occupation	Student	47 (11.8)	20 (42.5)	1.88
	Clerk	202 (50.5)	73 (36.1)	
	Professional	62 (15.5)	22 (35.5)	
	Handcrafter	9 (2.3)	6 (66.6)	
	Trader	8 (2.0)	4 (50)	
	Housewife	59 (14.8)	31 (52.5)	
	Pension	13 (3.1)	5 (38.4)	
Smoking	No	360 (90.0)	140 (38.8)	0.10
	yes	40 (10.0)	21 (52.5)	
Chronic diseases	Yes	106 (26.5)	45 (42.4)	0.59
	No	294 (73.5)	116 (39.4)	
Previous COVID-19 infection	Yes	119 (29.8)	51 (42.8)	0.015*
	No	167 (41.7)	54 (32.3)	
	Do not know	114 (28.5)	56 (49.1)	
Family members with COVID-19	Yes	236 (59)	103 (43.6)	0.10
	No	164 (41)	58 (35.4)	

*: Significant

About 67.5% (270/400) of studied participants used either vitamins or minerals, antibiotics or herbal products or food supplements during COVID-19 pandemic. Of them 59.6% (161/270) were in the ST group while 40.4% (109/270) were in the non-ST. In ST group, around 81.9% of participants used vitamins or minerals, 45.9% received antibiotics, and 40.9% received herbals or food supplements. ST group showed significantly higher rate of vitamins or minerals consumption compared to non-self-treatment group. Antibiotic consumption was significantly higher in the non-self-treatment group. The most commonly used herbals or food supplements were honey, lemon and nigella sativa (**Fig. 1**).

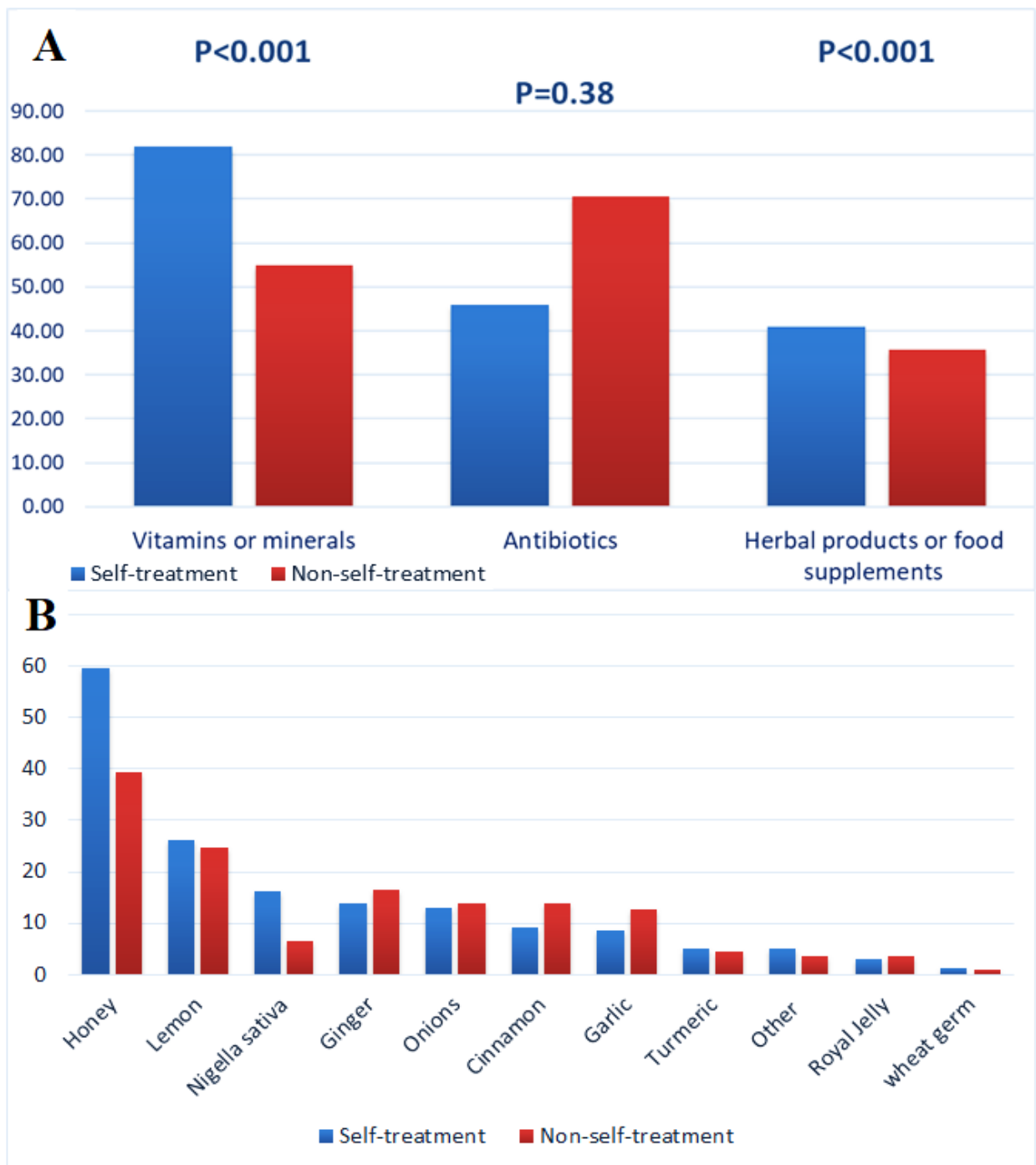


Fig. 1: (A) Difference between self-treatment and non-self- treatment groups in using vitamins or minerals, antibiotics and herbals or food supplements during COVID-19 pandemic. (B) Herbals and food supplements used during COVID-19 pandemic in both self- treatment and non-self-treatment groups

The most commonly used mineral in both groups was zinc with higher percentage in the ST group (30.4%) while the most commonly consumed vitamins were omega 3, vitamin C and vitamin D (Fig. 2A). Regarding antibiotic consumption, Azithromycin was the most commonly consumed antibiotic in both groups with higher percentage in the non-ST group (Fig. 2-B).

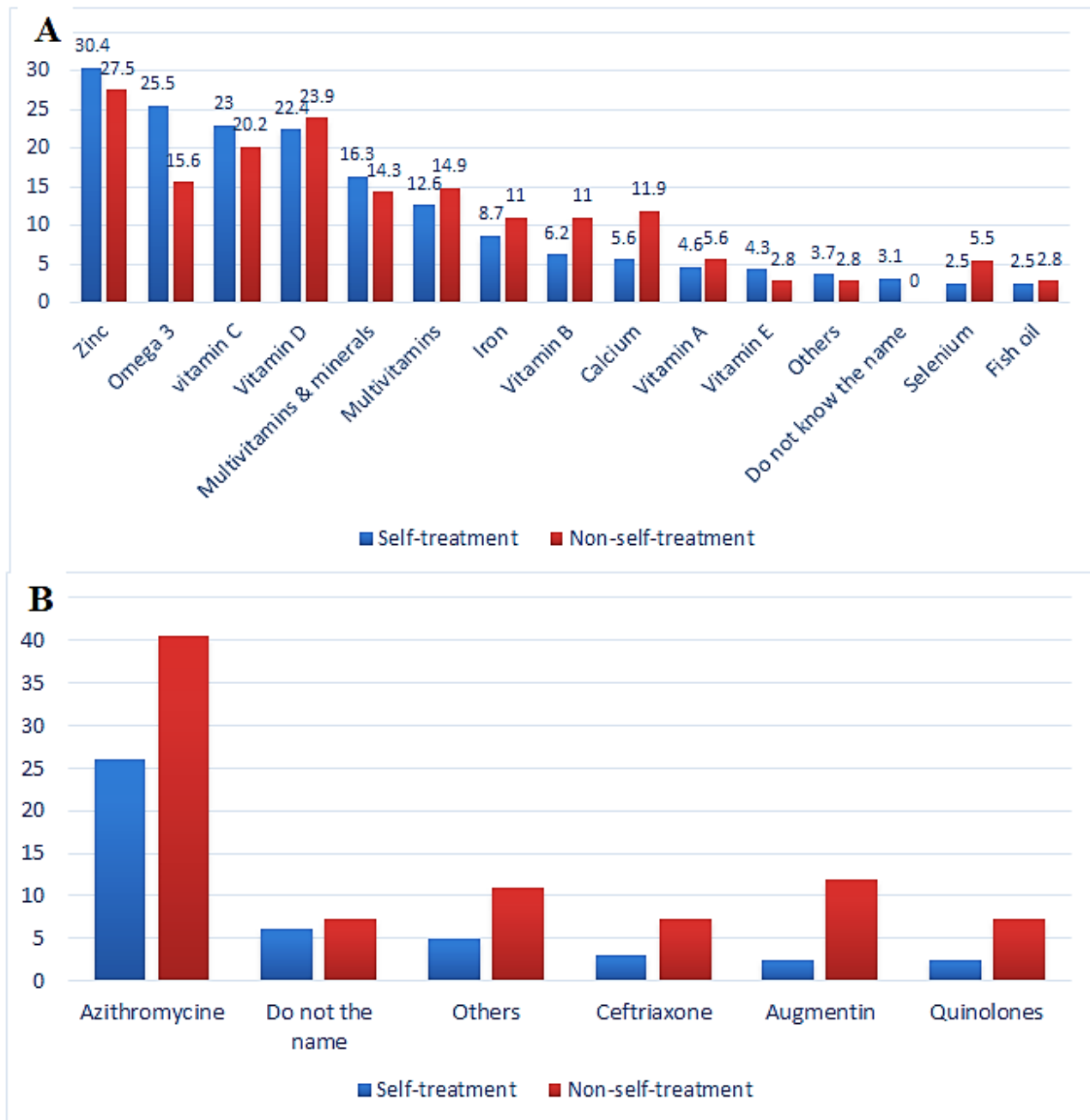


Fig. 2: (A) Vitamins or minerals used during COVID-19 pandemic in both self-treatment and non-self-treatment groups. (B) Antibiotics used during COVID-19 pandemic in both self-treatment and non-self-treatment groups.

Concerning Knowledge, beliefs and practice towards self-treatment using vitamins, supplements and antibiotics, there were significant difference between ST and non ST group when they were asked about their opinion about the following: vitamins and supplements should not be taken without medical consultation, taking vitamins and supplements regularly helps prevent COVID-19 infection, taking a lot of vitamins and supplements is good for health, antibiotics should be taken if you have been in contact with a case of corona and antibiotics can be used without medical consultation (Table 2).

Table 2: Knowledge, beliefs and practice regarding self- treatment using vitamins, supplements and antibiotics

	Non-self-treatment	Self-treatment	P
Vitamins and supplements should not be taken without medical consultation			
Agree	187 (78.2)	103 (64.0)	0.007*
Disagree	25 (10.5)	26 (16.1)	
Not sure	27 (11.3)	32 (19.9)	
Going to a doctor to prescribe some vitamins and supplements is ridiculous			
Agree	53 (22.2)	43 (26.7)	0.103
Disagree	163 (68.2)	94 (58.4)	
Not sure	23 (9.6)	24 (14.9)	
I don't consider taking vitamins and supplements is important			
Agree	36 (15.1)	17 (10.6)	0.142
Disagree	185 (77.4)	124 (77.0)	
Not sure	18 (7.5)	20 (12.4)	
Taking vitamins and supplements regularly helps prevent COVID-19 infection			
Agree	118 (49.4)	104 (64.6)	P=0.002*
Disagree	52 (21.8)	16 (9.9)	
Not sure	69 (28.9)	41 (25.5)	
It is normal to take vitamins and supplements when feeling tired			
Agree	122 (51.0)	100 (62.1)	0.057
Disagree	65 (27.2)	29 (18.0)	
Not sure	52 (21.8)	32 (19.9)	
Taking a lot of vitamins and supplements is good for health			
Agree	29 (12.1)	34 (21.3)	0.011*
Disagree	186 (77.8)	103 (64.4)	
Not sure	24 (10.0)	23 (14.4)	
I prefer to get vitamins and supplements through food			
Agree	213 (89.5)	132 (82.0)	0.052
Disagree	10 (4.2)	16 (9.9)	
Not sure	15 (6.3)	13 (8.1)	
Taking vitamins and supplements can lead to complications			
Agree	163 (68.5)	106 (65.4)	0.229
Disagree	24 (10.1)	11 (6.8)	
Not sure	51 (21.4)	45 (27.8)	
Antibiotics should be taken if you have been in contact with a case of corona			
Agree	33 (13.9)	34 (21.1)	0.041*
Disagree	169 (71.0)	95 (59.0)	
Not sure	36 (15.1)	32 (19.9)	
Antibiotics can be used without medical consultation			
Agree	21 (8.8)	35 (21.7)	<0.001*
Disagree	201 (84.5)	112 (69.6)	
Not sure	16 (6.7)	14 (8.7)	

*: Significant

Most participants believe that using vitamins or supplements will improve their overall health (73%) while 59% of participants believe they have deficiency in them. In most participants the source of information that made participants use antibiotics were specialized doctor (71%). However, only 33% of participants used vitamins or supplements based on medical advice by specialized doctor (**Fig. 3**).

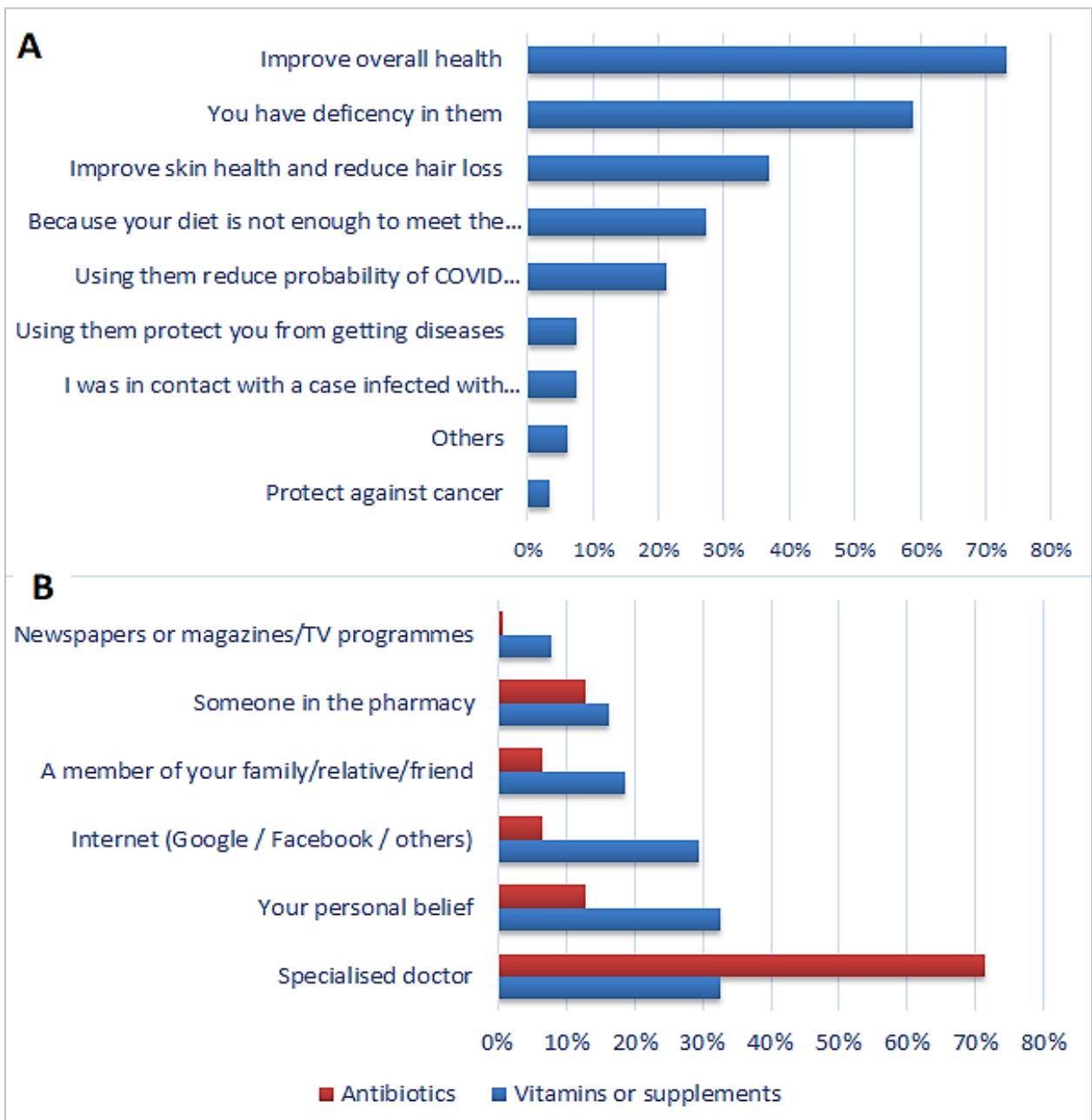


Fig. 3: (A) Reasons for taking vitamins and supplements. (B) Source of information for using antibiotics or vitamins and supplements.

DISCUSSION

Due to the rapid spread of COVID-19, many countries all over the world were forced to implement different PHSMs ⁽²⁰⁾. This may have hampered the availability of medicines in hospitals and prevented individuals from seeking medical attention. Consequently, the public health seeking behavior directed to non-pharmacological and self-management approaches to prevent infection. The current study was carried out to shed the light on the knowledge, beliefs and practice of ST among Egyptians during COVID-19 pandemic and the main predictors of such behavior.

The most common age among participants in ST group was between 18-30 years (42.9%) and more than one third of participants used vitamins or minerals based on information from the internet, newspapers and magazines or TV programs. Consequently, the high prevalence of ST among this age group could be since this age group has wide accessibility to internet services and social media, which could have influenced them. Online information may pose risks to public health, and the variety of alternative therapies provided on social media may encourage the general population to self-treat ⁽²¹⁾. Since the public relies on the internet and social media to gain sensitive information regarding the management of

COVID-19, there is a high likelihood that they will receive incorrect information and many people become hesitant to attend hospitals for COVID-19 tests⁽¹⁴⁾. As a result, the number of persons searching online to self-treat has increased significantly throughout this pandemic⁽²²⁾.

According to proportion of Egyptians who were exposed to ST during COVID-19 pandemic we found that 59.6% (161/270) of studied participants used either vitamins or minerals, antibiotics, or herbal products and food supplements during COVID-19 pandemic without consultation of health care providers. The predictors of ST were age, participant belief in using vitamins or antibiotics without physician consultation. The answers to the questions about vitamins and antibiotics were significant at the “not sure” answer which indicate that despite that people were not convinced with taking medication without medical consultation most of them did that.

This came in agreement with **Lam et al.**⁽²³⁾ who did a survey on the use of traditional, complementary and integrative medicine (TCIM) in Hong Kong and found that among the 632 respondents, 44% reported the use of at least one type of TCIM during the COVID-19 pandemic. Surprisingly, respondents in this study reported a decreased rate of TCIM use during the pandemic compared to the pre-pandemic period.

A study by **Sadio et al.**⁽²⁴⁾ on ST during COVID-19 in Togo reported that 34.2% of participants used at least one treatment without prescription. These treatments included modern treatments as well as traditional medicine. It was speculated that the proportion of participants exposed to ST could be due to the delay in finding definite treatment for COVID-19 and the power of social media, which has a significant impact on how people perceive and purchase products to prevent or cure COVID-19.

Our study showed that honey and lemon were the most used food supplement (59.6% and 26.1% respectively) in the ST group. Honey has a long history of being used to treat people's illnesses in different cultures around the world. Many review studies⁽²⁵⁾ found that honey could be used to fight COVID-19 infection because it can regulate the molecular targets that help virus attach and enter the host cell. In addition, honey may be able to control cellular signaling pathways like oxidative stress, inflammation, and apoptosis. While the high use of lemon could be due to the myth which spread through social media that SARS-CoV-2 cannot survive in acidic environments hence gargling with warm water with lemon or drinking lemon juice will destroy it. Neither drinking warm water with lemon, nor lemon juice, has been shown to protect against SARS-CoV-2 infection⁽²⁶⁾.

The most commonly used vitamins in ST group were vitamin C (23%) and D (22.4%). This came in accordance with **Sadio et al.**⁽²⁴⁾ study in which, vitamin C was used by approximately one-third (27.6%) of the participants. A high dose of vitamin C has been shown in several studies to be beneficial in the treatment of COVID-19^(27,28).

Elayeh et al.⁽²⁹⁾ found that 32.5% of Jordanians are using vitamin D as ST to treat or prevent COVID-19. There has been contradictory results and debate regarding the role of vitamin D in prevention or treatment of COVID-19^(30,31). While some studies reported the beneficial role of vitamin D in treatment or prevention of COVID-19^(32,33).

Zinc was the most commonly used mineral in our study in ST group (30.4%), which came in accordance with **Elayeh et al.**⁽²⁹⁾ who found that 44.8% of participants used zinc as ST. As a result of its immunomodulatory and antiviral characteristics, zinc is thought to be a critical mineral during COVID-19 infection⁽³⁴⁾

Our study showed that in 45.96% received antibiotics without consultation of health care providers, azithromycin (26.1%) was the most used antibiotic. This came in agreement with **Nasir et al.**⁽³⁵⁾ who studied ST in Dhaka City in Bangladesh where azithromycin (54.15%) was the most frequent antibiotic used during COVID-19 outbreak. However, in **Sadio et al.**⁽²⁴⁾ study, which was conducted in Togo, azithromycin was used by 1.2% of the sample as a ST. The low incidence of azithromycin use could be attributed to the drug's high cost and the fact that pharmacists in Togo has recently insisted on the sale of these drugs only with a prescription, even though the necessity of a prescription is not mandated by law.

In Egypt antibiotics are sold without prescription, which could result in antibiotic resistance due to illogical use of antibiotics. Unrestricted access to buy antibiotics and injudicious use may lead to a drug-resistant strains, treatment failure, and severe adverse effects. Moreover, it causes a delay in obtaining medical attention, resulting in delayed diagnosis and unreasonable treatment.

Most respondents believe that they can take antibiotics without physician consultation, and they do not believe that they should have physician consultation before taking vitamins or other supplements. In Egypt, ST is a major public health concern, particularly during the COVID-19 pandemic. Without appropriate scientific proof, a variety of medicines were utilized as COVID-19 preventive measures or to treat suspected symptoms. It is necessary to raise awareness and educate people about the dangers and possible risks of ST. Campaigns to raise awareness are essential for combating false claims regarding COVID-19 preventive drugs on social media. Future studies should focus on how social media affects

emotional well-being and enable health educators and campaigners create better programs to help the public receive the right information that would improve their health.

Limitation and strength

First, as our study is a web-based survey, it has the potential to selection or non-response bias. However, this method was totally effective in achieving the research objectives as because of the epidemic there were many constraints on where and how the survey questionnaire could be distributed. According to the annual survey on internet use in Egypt, which was conducted in January 2020, Internet penetration reached 54% and 91% of the population had a mobile phone. This method protected the safety of both interviewers and interviewees. **Second**, as a result of limited access to community members due to the pandemic, we adopted a non-random (convenient) sampling method. **Finally**, this study is an observational study, so it has restricted ability to determine causation, account for unmeasured confounders, or assess response stability.

Strength: Our study is considered the first study to investigate self-treatment in Egypt during COVID-19 pandemic. It included participants from different governorates all over Egypt.

CONCLUSION

ST may delay medical advice seeking leading to worsening of the patient's health. Efforts to raise public awareness about risks of ST should be done by healthcare members and pharmacists' involvement especially in the media. Antibiotics should be sold with prescription only as misuse of antibiotics could lead to future pandemic caused by antibiotics resistant bacteria. It is necessary to promote public awareness of the potential negative consequences and drug interactions that can emerge from overusing of vitamins and minerals, which are now used by the majority of people on a regular basis without a prescription or contact with a health care provider.

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Competing interests:

The authors have no relevant financial or non-financial interests to disclose.

Author contributions

All authors contributed to the study conception, design and data collection. Methodology and data analysis:

Ramy Mohamed Ghazy; Writing- original draft preparation: Asmaa Mohammad Moawad and Walaa Abdelhady Abdelhalim; Writing - review and editing: Sarah Hamed N. Taha. All authors read and approved the final manuscript

Data availability: The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available to protect the privacy of participants.

Code availability: Not applicable

Consent for publication: Not applicable.

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