

Attitude and Practice on Herbal Usage for Prevention and Management of COVID-19 among Diabetic Patients at Tertiary Hospital in Sri Lanka

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ABSTRACT

Background: Herbal medicine usage is common amongst people in the COVID-19 pandemic. Sri Lanka has a rich history of using herbs to treat various diseases, which is embedded in an Indigenous system of medicine. The existence of diabetes as a risk factor for COVID-19 creates a greater tendency among diabetic patients to use herbal usage. **Aim:** The study aims to describe the attitudes and practice of herbal usage and associated factors on herbal usage among patients with diabetes at a tertiary hospital in Sri Lanka. **Materials and Methods:** It is a hospital-based cross-sectional descriptive study. Four hundred and twenty-seven patients with diabetes were included in this study. Data were collected using an interviewer-administered questionnaire and data extraction form and analyzed using SPSS version 23. The chi-square test was used to assess the association between herbal usage and factors at the 95% confidence interval and a p-value less than 0.05 was considered a significant association. **Results:** Out of 427 patients, 72.1% used herbals to prevent and manage COVID-19. Coriander and ginger were the most commonly used herbals. Only 27.3% of patients revealed their herbal usage to the doctor. Socio-demographic factors such as Education level (0.000) had a significant association with herbal usage. Additionally, the disease-related factors such as duration of disease (0.041) and complication of diabetes (0.039) had a significant association with herbal usage. **Conclusion:** Most of the patients have a positive attitude towards herbal usage. Healthcare professionals should be aware of the patient's herbal usage, especially among diabetic patients with low level of education, having diabetic complications and having diabetes for a long period when treating them.

Keywords: Herbal usage, Attitude, Practice, Diabetes, Patients, COVID 19, Sri Lanka.

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INTRODUCTION

The Novel Coronavirus Disease 2019 (COVID-19), which is also recognized as SARS-CoV-2, is a communicable disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus¹ that belongs to the Coronaviridae family. They are enclosed and are RNA viruses with a single strand.² Coronaviruses produce primarily respiratory tract infections.³

In Sri Lanka, the first confirmed locally acquired case of COVID-19 was reported on 11th March 2020.⁴ COVID-19 symptoms involve fever, sore throat, shortness of breath, coughing and fatigue and it may be mild and moderate disease (81% of cases) or severe (14% of cases). In 5%, life-threatening illness has happened

with respiratory failure, multiple organ dysfunction or failure and septic shock.⁵ Risk factors of COVID-19 infection comprise co-morbidity like diabetes and age, where the elderly are at an increased risk of infection.^{6,7}

Diabetes mellitus is one of the foremost causes of mortality and morbidity worldwide. It has many severe complications that are strongly associated with its severity. Natural herbal treatments have a long history compared to conventional medicine in Sri Lanka for treating and managing diabetes mellitus.⁸ Unregulated immune response, changed expression of ACE2 enzyme and dysfunction of the endothelial system in diabetic patients make them more vulnerable to COVID-19 infection.⁷

People have also used herbal medicines to treat diabetic-related complications for many years. Many studies advocate that herbal medicines can be used as an adjuvant to prescribed medications to treat COVID-19 in diabetic patients and can also be used as a source to find newer therapeutic targets for COVID-19. However,



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well-designed clinical studies and experiments must confirm their advantages in preventing COVID-19 with diabetes.⁹

Herbal medicines can enhance the host antiviral immune response and increase the chance of survival in COVID-19.¹⁰ According to past data from preceding coronavirus infections, natural medication substantially reduces the development of complications during COVID-19 infection, specifically in high-risk patients. Considering the immune enhancer action of herbal medicines, some of the well-known natural immune boosters are beneficial for COVID-19 prevention.¹¹ Since diabetic patients are more vulnerable to severe complications due to COVID-19, their immunity should be enhanced to prevent complications when they are infected with COVID-19.

The population of Sri Lanka depends on herbs to treat diseases despite the availability of Western medicinal systems. Besides medicinal plant resources in Ayurveda, herbs are widely used in Sri Lankan homes to produce immunity, fight infectious diseases and cook. Herbal drugs play a significant role in native preventive care, with many Sri Lankans relying on traditional medicines.¹²

The COVID-19 pandemic has affected numerous aspects of human life, including the use of herbal medicine and the perspectives of Sri Lankan people concerning these medications. The usage of herbals during the COVID-19 pandemic in Sri Lanka has not been previously researched. Understanding the practices, attitudes and associated factors on herbal usage during this pandemic is important before treating patients. The research will provide a better understanding of the attitude practice and factors affecting herbal use by healthcare providers and the general public. Thus, the primary focus of this study is to assess people's attitudes and practices regarding the usage of herbals for the prevention of COVID-19 and to determine the factors associated with practice.

MATERIALS AND METHODS

Study design

A Hospital based descriptive cross-sectional study was carried out on 427 diabetes patients who were treated at the diabetes Center of Teaching Hospital Jaffna between November 2021 and June 2022. Patients with diabetes who had been attending the Teaching Hospital Jaffna's diabetic clinic for at least six months and both males and females who were at least eighteen years old were included in the study. Patients with severe disabling and/or bedridden conditions, those who are unable to cooperate, those who are unable to hear or speak and those who are mentally affected, as revealed by history and/or investigation, were excluded from this study.

Sample size calculation: The sample size was calculated by the following formula:

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

n=Sample size; Z=Critical value of specific confidence (95%); p=Preliminary estimation of the proportion of given characteristics; d=Acceptable amount of absolute error; Z=1.96 (Critical value of specific confidence (95%)); p=0.49 (Preliminary estimation of the proportion of given characteristics); d=0.05 (Acceptable amount of absolute error).

A study was conducted in Vietnam, where 49% of the respondents had used herbals during COVID-19 (Nguyena *et al.*, 2021). p-value of 0.49 was used to calculate the sample size.

$$n = \frac{(1.96)^2 \times 0.49 (1 - 0.49)}{(0.05)^2}$$

$$n = 384$$

Then, the non-response rate was assumed to be 10%. The final sample size was 427.

Study Procedure

The number of patients attending the diabetic Centre is around 20 per day; there are 5 clinic days per week. The average number of patients who attend diabetic center is around 100 per week. Therefore, there is a total of 400 patients per month. The data collection period was six weeks. Therefore, every diabetic patient attending the diabetic Centre was included in the study till get the sample size of 427 (Figure 1).

The data were gathered by using interviewer-administered questionnaires and data extraction forms. The questionnaire was developed in English and validated by supervisors. Finally, the questionnaire was translated into Tamil and Sinhala using language experts and cross-checked. A data extraction form was used to extract data regarding the type of diabetes, duration of diagnosis with diabetes, medications taken, side effects experienced, complications and other disease statuses from the patient's medication records book.

Ethical clearance was obtained from the Ethical Review Committee of the Faculty of Medicine, University of Jaffna, Sri Lanka. The participants were assured of the confidentiality of collected data during the study.

The pretest was conducted on 20 diabetic patients and the understandability and clarity of the questionnaire were assessed. Their suggestions were incorporated to improve the questionnaire and a pretested questionnaire was used in the main study.

Before data collection, informed written consent was obtained from selected patients.

Statistical Analysis

The collected data were analyzed using SPSS (Statistical Package for the Social Sciences) version 23. The Chi-square test assessed the association between practice and factors and a p-value less than 0.05 was considered statistically significant.

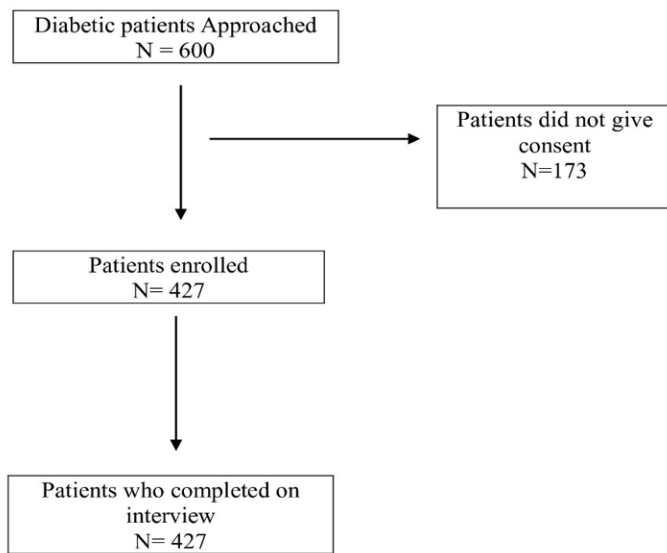


Figure 1: Consort Flow chart of Selected Diabetic Patients.

RESULTS

Socio-demographic and disease-related factors of the patients

The description of participants is depicted in Table 1. The majority (63.7%) were females and the mean age of patients was 56.98 (S.D±13.534) years, as mentioned in Table 1. Most participants had completed their education at the primary level and more than half of the patients were non-workers. A majority of patients were type 2 diabetic patients and were on oral hypoglycaemic medication, being diagnosed as diabetic less than or equal to 10 years ago. There was no major diabetic complication in the majority of patients.

Attitude towards Herbal Usage

Most patients had a positive attitude toward herbal usage (Table 2). Most patients are satisfied with herbal usage over Western medicine and their outcomes and reported that herbals are safe to use. Also, they reported that herbals can be in any quantity and used regardless of age. However, most agreed that herbal usage alone was not enough for prevention.

Practice related to herbal Usage

According to Table 3, most patients (72.1%) were herbal users. Coriander is the most used herb; most patients have used leaves of the plant. The decoction was the most common preparation used by patients. Many patients have taken commercial products and herbs. *Kabasura* was the most commonly used commercial product. Nearly half of the patients used herbs monthly or occasionally.

Table 1: Socio-demographic and Disease-related factors of the study population (n=427).

Characteristics		No. of respondents (%)
Age	Less than 60	213 (49.9)
	Equal or more than 60	214 (50.1)
Gender	Male	155 (36.3)
	Female	272 (63.7)
Marital status	Unmarried	21 (4.9)
	Married	385 (90.2)
	Divorce/Separated	4 (0.9)
	Widowed/widower	17 (4.0)
Religion	Buddhist	1 (0.2)
	Hindu	350 (82.0)
	Islam	5 (1.2)
	Christian	71 (16.6)
Education level	Primary	56 (13.1)
	Secondary	256 (60.0)
	Tertiary	85 (19.9)
	Diploma/Certificate course	11 (2.6)
	Graduate	19 (4.4)
Employment status	Government staff	25 (5.9)
	Private staff	117 (27.4)
	Retired	23 (5.4)
	No employment	25 (5.9)
	Housewife	218 (51.1)
	Self-employed	19 (4.3)
Duration of disease	=<10 years	278 (65.2)
	>10 years	149 (34.8)
Type of diabetes	Type 1	7 (1.6)
	Type 2	417 (97.7)
	Gestational diabetes	3 (0.7)
Current Western medication	Oral hypoglycaemic drugs	358 (83.8)
	Insulin	20 (4.7)
	Both	49 (11.5)
Complications of diabetes	No complication	224 (52.5)
	Present	203 (47.5)
Other medical problems	No other medical condition	124 (29.04)
	Present	303 (70.96)

Source of information on herbal usage

Based on Table 4, most patients got information about herbals from family members. Among respondents, more than half of patients did not inform the physician about using herbals.

Table 2: Attitude on herbal usage for COVID-19 (n=427).

Attitude items	Strongly Agree n (%)	Agree n (%)	Uncertain n (%)	disagree n (%)	Strongly Disagree n (%)
Herbals can be more effective than Western medicine /vaccines for preventing COVID-19.	22 (5.2)	267 (62.5)	44 (10.3)	89 (20.8)	5 (1.2)
Herbals are most safe to use.	22 (5.2)	308 (72.1)	48 (11.2)	49 (11.5)	0.0 (0.0)
Using herbal medicine with Western medicine is more beneficial than Western medicine alone in COVID-19.	15 (3.5)	178 (41.7)	75 (17.6)	142 (33.3)	17 (4.0)
It is better to try herbals for COVID-19 before going to doctors.	31 (7.3)	287 (67.2)	22 (5.2)	79 (18.5)	8 (1.9)
Herbals can be used in any quantity for prevention of COVID-19.	8 (1.9)	237 (55.5)	23 (5.4)	156 (36.5)	3 (0.7)
Satisfaction with herbal medicine for COVID-19 is greater than that of Western medicine.	11 (2.6)	264 (61.8)	78 (18.3)	69 (16.2)	5 (1.2)
Satisfaction with the outcomes of herbal usage for COVID-19.	15 (3.5)	288 (67.4)	23 (5.4)	101 (23.7)	0.0 (0.0)
Taking herbals saves lives, even if infected with COVID-19.	3 (0.7)	228 (53.4)	65 (15.2)	100 (23.4)	31 (7.3)
Herbals alone are not enough for COVID-19 prevention.	30 (7.0)	283 (66.3)	33 (7.7)	77 (18.0)	4 (0.9)
Herbals can be consumed regardless of the age of the patients.	27 (6.3)	208 (48.7)	33 (7.7)	149 (34.9)	10 (2.3)

n=Frequency; %=Percentage.

Symptoms treated and facing problems related to herbal usage

Table 5 summarizes that the most common purpose for using herbals, as stated by 47.4% of users, was to treat/ reduce symptoms of COVID-19. Among the main symptoms of colds treated are fever, cough, sore throat and runny nose, as reported by users.

Association of socio-demographic factors and influence of disease on herbal usage

Table 6 presents the association between socio-demographic characteristics, disease-related factors and herbal usage. Education level, duration of disease and complications of diabetes were significantly associated with herbal usage. Age, gender, marital status, religion, employment status, current Western medications and other co-morbidities had no significant association with herbal usage.

DISCUSSION

COVID-19 has had a greater influence on the healthiness and economy of the global population; diabetes alone has been a burden to the health of a patient as well as psychological impacts.¹³⁻¹⁵ The patients had inclined to traditional medicines for better control of diabetes; the positive impact of traditional medicines, including herbals, on diabetes has created a greater tendency for herbals

to be used by diabetic patients for COVID-19 control.^{9,16,17} The presence of diabetes is a risk factor for COVID-19 and the chances of more complications arising in a patient with diabetes when infected with COVID-19.¹⁸⁻²¹ Diabetic patients take more precautions during the pandemic and herbal usage is one such precaution. Herbals also have risks associated with their use in treatment. This study assesses the level of attitude and practice on using herbals to prevent COVID-19 amongst the diabetic patients attending the Diabetic Centre of Jaffna Teaching Hospital as well as the impact of socio-demographic and disease-related factors on them.

The socio-demographic factors of the current study were consistent with those of Nguyena *et al.*²² In this study, most respondents were female (63.7%) and the mean age was 56.98±13.53 years, though the Nguyena *et al.* study revealed that females were 64.6% and the mean age was 26.8±7.6 years.

The present study revealed that patients have a positive attitude towards herbal usage. More than three-fourths of patients agreed that they believe herbals are safe to use and most respondents were more satisfied with herbal medicine for COVID-19 than Western medicine. This finding is consistent with the study done by Nguyena *et al.*²² where nearly 70% of respondents agreed with the statement that herbal medicines are safe with no side effects

Table 3: Practice of herbal usage of participants (n=427).

Variables		Frequency (%)
Usage of herbals	Yes	308 (72.1)
	No	119 (27.9)
Type of herbal	Coriander	220 (18.8)
	Ginger	145 (12.4)
	Tulsi (Holy basil)	145 (12.4)
	Big thyme	138 (11.8)
	Nightshade	129 (11.0)
	Lime	87 (7.4)
	Cumin	59 (5.1)
	Neem	56 (4.8)
	Turmeric	50 (4.3)
	Tea	51 (4.4)
	Tree turmeric	31 (2.7)
	Vasaka (Malabar nut)	24 (2.1)
	Liquorice	21 (1.8)
	Balloon vine	12 (1.0)
Part of plant use	Leaf	617 (52.8)
	Seed	279 (23.9)
	Rhizome	195 (16.7)
	Bark	45 (3.9)
	Root	21 (1.8)
	Fruit	11 (0.9)
Method of preparation of herbal.	Decoction	259 (84.1)
	Steam	28 (9.1)
	Juice	7 (2.3)
	Crushed	6 (1.9)
	Powdered	6 (1.9)
	Natural form	1 (0.3)
	Oil	1 (0.3)
Used herbal and commercial polyherbal product.	Yes	150 (48.7)
	No	158 (51.3)
Commercial polyherbal product.	Kabasura	78 (25.3)
	Samahan	33 (10.7)
	Koththamalli packet	21 (6.8)
	Pas paspanguwa	7 (2.2)
	Suwardarani	6 (1.8)
	Gotukola syrup	3 (0.9)
	Blackseed oil	1 (0.3)
	Form of the commercial polyherbal product.	Decoction
Powder		46 (30.9)
Natural form		21 (14.1)
Syrup		3 (2.0)
Oil		1 (0.7)

Variables		Frequency (%)
Frequency of herbal use.	Daily	63 (20.5)
	Weekly	99 (32.1)
	Monthly/ occasionally	146 (47.4)

Table 4: Source of information on herbal usage of participants (n=427).

Variables		Frequency (%)
Source of information	Family member	149 (48.4)
	Friends	47 (15.3)
	Media	52 (16.9)
	Traditional healers	44 (14.3)
	Other diabetic patients	12 (3.9)
	Physician (western)	2 (0.6)
	Self	2 (0.6)
	Patients who informed the Physician	Yes
No		224 (72.7)

Table 5: Purpose of herbal use, symptoms treated and barriers to herbal usage among participants (n=427).

Variables		Frequency (%)
Purpose of using	treatment/ reduce symptoms of COVID-19	146 (47.4)
	to improve immunity	70 (22.7)
	as a precaution	30 (9.7)
	more than one reasons	62 (20.1)
Symptoms treated	Cold	161 (31.5)
	Fever	91 (17.8)
	Cough	86 (16.8)
	Sore throat	70 (13.7)
	Runny nose	62 (12.1)
	Headache	20 (3.9)
	Diarrhoea	11 (2.2)
Loss of taste/smell	10 (2.0)	

and 65% of the respondents were satisfied with the responses when using herbal medicine. Our study revealed that most patients agreed that herbals could be more effective than Western medicine for preventing COVID-19. This was inconsistent with the study by Aldahish *et al.*²³ where only 22% of participants agreed that alternative and complementary therapies might effectively fight COVID-19 and are substitutes for vaccines. The present study revealed that 45.2% of participants agreed that taking herbal with Western medicine is more beneficial than Western medicine alone in COVID-19. This was inconsistent with the study by

Table 6: Association between socio-demographic factors and influence of disease on herbal usage. (n=427).

Category	Using Herb	No HERB use	p value
Age (median)	Less than 60	149 (70.0)	0.317
	Equal or more than 60	159 (74.3)	
Gender	Male	108 (69.7)	0.393
	Female	200 (73.5)	
Marital status*	Unmarried	14 (66.7)	0.844
	Married	279 (72.5)	
	Other	15 (71.4)	
Religion	Hindu	257 (73.4)	0.202
	Others	51 (66.2)	
Education level*	Up to primary	49 (87.5)	0.000
	Secondary	201 (78.5)	
	Tertiary and above	58 (50.4)	
Employment status*	Workers	108 (67.1)	0.054
	Retired	14 (60.9)	
	Non workers	186 (76.5)	
Duration of disease	<10	171 (68.4)	0.041
	>=10	131 (77.4)	
Current western medication	Non-insulin	258 (72.1)	0.946
	Insulin	50 (72.5)	
Complications of diabetes*	No complication	152 (67.9)	0.039
	One complication	97 (81.5)	
	More than one	59 (70.2)	
Other co-morbidity*	Presence of co-morbidities	218 (71.9)	0.895
	No co-morbidities	90 (72.6)	

Statistically significant at $p < 0.05$; n-Frequency; %-Percentage; *Marital status, educational level and ethnicity, *Type of diabetes, a complication of diabetes and other co-morbidity; p values were taken from Fisher's exact test.

Ilori *et al.*²⁴ where 75.3% of participants agreed that a system of medicine that integrates therapies of both conventional medicine and complementary and alternative medicine would be more effective than either conventional medicine or complementary and alternative medicine provided independently. The present study revealed that 74.5 % of respondents agreed that it is better to try herbals for COVID-19 before going to the doctor. This is consistent with the study by Jasamai *et al.*²⁵ which reported that most patients have the attitude of using Complementary Alternative Medicine before going to medical professionals. This study revealed that 55 % of participants agreed that herbals can be consumed regardless of the age of patients. This was inconsistent with Hanan *et al.*, study²⁶ where only 21.1 % of participants agreed that herbal preparations are suitable for all ages. The present study revealed that 64.4 % of participants agreed that they were more satisfied with herbal medicine for COVID-19 than Western medicine. This was inconsistent with the study by Zaidi *et al.*²⁷ where 37.9 % of participants felt that herbal medicines were better for them than conventional or allopathic medicine. Many of the respondents reported having used herbs for prevention or for treatment of symptoms like COVID-19 (57.4%); in a study

that was conducted in Saudi Arabia by Alyami *et al.*,²⁸ 14.9% of respondents reported having used or currently using herbal products for protection from the COVID 19 disease. A study was carried out in Vietnam by Nguyena *et al.*²² during the COVID-19 pandemic. Among participants, 49% used herbal medicine to cure various types of symptoms associated with common sicknesses.

The current study revealed that 72.1% of diabetic patients have used herbals to prevent COVID-19. This is inconsistent with other study in which 57.4% only used herbals in Uganda by Musoke *et al.*,²⁹ According to the different studies, persons with diabetes who are diagnosed with COVID-19 may benefit from using herbal remedies in addition to prescription medications.^{9,30} In the present study, coriander 18.8% was the major herb, followed by ginger 12.4%, tulsi 12.4%, big thyme 11.8% and nightshade 11.0% were used as herbals. However, in the study by Nguyena *et al.*,²² reported that ginger was found to be the most used herbal medicine (79.1%) and followed by honey (74.7%). In another study by Musoke *et al.* 2021, ginger (40.7%) and lemon (40.3%) were used as herbal medicines to prevent COVID-19. Ginger was the most commonly used herbal in many studies. A current

study exhibited that a decoction named *Kabasura* was popular among the respondents during the COVID-19 period. This was comparable to research by Musoke *et al.*,²⁹ on COVIDEX, an herbal supplement authorized for use in Uganda and Singh *et al.*,³¹ on the use of medicinal herbs as a potent immune enhancer in India.

The current study shows that family members were the main sources of information for herbal usage. This was not consistent with a study by Alyami *et al.*,²⁸ in which 39.4% of respondents got their information from social media and the Internet. The symptoms treated included cold, fever, cough and sore throat. This was consistent with a study by Nguyena *et al.*,²² in which herbal medicines were mainly used to treat sore throat, nasal congestion, cough and fever.

The present study revealed that education level ($p=0.000$), duration of disease ($p=0.041$) and complications of diabetes ($p=0.025$) were significantly associated with herbal usage. Age, gender, marital status, religion, employment status, current Western medication and other co-morbidities failed to show significant association. Though Nguyena *et al.*,²² showed marital status ($p=0.026$) only was significantly associated with herbal usage and gender, age, religion, education and occupation didn't associate with herbal usage. A study by Medagama *et al.*,⁸ reported that female was significantly associated with complementary and alternative medicine use ($p=0.01$), while the age, duration of diabetes, presence of co-morbidities and complications of diabetes failed to show an association. Different results in these studies were due to different populations.

These findings could benefit health professionals who are involved in delivering patient care since beliefs and attitudes towards herbals are likely determinants of patients' use of them, not only for preventing COVID-19, but one may expect similar attitudes and practice patterns in other therapeutic areas. Healthcare professionals should closely monitor the usage of herbals among patients in order to provide safe and effective treatment to the patients.

CONCLUSION

The usage of herbals during the COVID-19 pandemic was common among diabetic patients. There is a positive attitude among patients with diabetes toward herbal usage for the prevention of COVID-19. Coriander and ginger were known as the most frequently used herbs by patients. Therefore, Healthcare professionals should be aware of the patient's herbal usage while taking a clinical history and managing patients, especially patients with low levels of education, having diabetic complications and having diabetes for a long period.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

COVID-19: Coronavirus Disease 2019; **SARS-CoV-2:** Severe acute respiratory syndrome coronavirus 2; **ACE2:** Angiotensin-converting enzyme 2; **SPSS:** Statistical Package for the Social Sciences; **COVIDEX:** A local medicinal herb as a supportive drug treatment for COVID-19 and other virus infections.

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