Public Knowledge of Herbal Medicine for Respiratory Viral Infection in Saudi Arabia

Ghudair Tashan Alanazi, BSc. Pharm, Pharm.D, MSc. Clin Pharm, Diploma of Epid, Critical Care Clinical Pharmacist, Internal Medicine Clinical Pharmacist, MOH, Hafrbatin, SAUDI ARABIA.
Yousef Ahmed Alomi*, Critical Care Clinical Pharmacists, TPN Clinical Pharmacist, Freelancer Business Planner, Content Editor, and Data Analyst, Riyadh, SAUDI ARABIA.
Murouj Almaghrabi, Department of Medicine and Surgery, College of Medicine, Umm Al-Qura University, Makkah, SAUDI ARABIA.
Ghadeer Alhazmi, Department of Medicine and Surgery, College of Medicine, Umm Al-Qura University, Makkah, SAUDI ARABIA.
Menwer Tashan Zaid Alanazi, BSc, MSc, Senior Specialist Clinical Biochemistry Clinical Toxicology. Poison Control and Medical Forensic Chemistry Center, MOH, Hafrbatin, SAUDI ARABIA.
Mohammad Almatrafi, Department of Medicine and Surgery, College of Medicine, Umm Al-Qura University, Makkah, SAUDI ARABIA.
Ghaida Alzahrani, Department of Medicine and Surgery, College of Medicine, Umm Al-Qura University, Makkah, SAUDI ARABIA.

Correspondence:
Dr. Yousef Ahmed Alomi, BSc. Pharm, MSc. Clin Pharm, BCPS, BCNSP, DiBA, CDE, Critical Care Clinical Pharmacists, TPN Clinical Pharmacist, Freelancer Business Planner, Content Editor and Data Analyst, Riyadh 11392, Riyadh, Saudi Arabia.

Phone no: +966504417712
E-mail: yalomi@gmail.com

Received: 13-01-2022;

Accepted: 10-04-2022.

Access this article online

www.ptbreports.org

DOI: 10.5530/PTB.2022.8.16

ABSTRACT

Aim: This survey analysis investigated indevisuals' knowledge of herbal medications to treat common respiratory viral infections. **Methods:** A self-administered, structured questionnaire was sent to the public online, including questions on the responders' demographics and questions about different herbal medications and their use to treat viral respiratory infections. Data analysis was executed through the survey SPSS program. **Results:** Four hundred eighty-six individuals responded to this questionnaire; 89.92% of the responders were from the west area, and 56.49% were in the age group between 18 and 30. The most herbal medications used for respiratory viral infections was honey 364 (78.79%), and lemon juice 327 (71.24%), followed by Ginger 288 (64.43%) and Mint 292 (64.04%%) While the least herbal medicine used was Sambucus nigra 26 (6.09%) and Licorice 26 (6.68%). The most herbal medicine not known among responders was Sambucus nigra 147 (34.43%), Sugarcane 136 (31.48%), and Radish 135 (31.47%%). Herbal medicines usages were significantly higher among males, except for cloves and miswak; their use was significantly higher among females. Retired individuals (p value<0.001), high income (p-value<0.001), non-healthcare professionals (p-value=0.003), age group between 51 to 60 years old (p-value<0.001), married individuals (p-value<0.001) all had higher knowledge level about herbal medications use in viral respiratory infections. The survey's reliability was tested by Mac 0.96, Cronbach 0.958, Gultman 2 0.961, and Gultman 6 0.973. **Conclusion:** The level of knowledge about herbal medicine use among individuals in Saudi Arabia is inadequate. Awareness of the general public about herbal medications should be improved.

Keywords: Knowledge, Herbal medications, Respiratory infections, Viral, Saudi Arabia.

INTRODUCTION

The vast majority of the general public in developing countries use herbal and complementary medicinal agents to treat common disease conditions.[1] In the middle east, particularly Saudi Arabia, herbal medicine is commonly increasing.[2] Also, developed countries have seen growing use of herbal medicine because of the belief in natural safety. However, herbal agents should be used cautiously to reduce side effects or even fatal complications.[3] Furthermore, many general practitioners and family medicine doctors currently use herbal medications, especially treating chronic diseases or common acute conditions, such as respiratory infections.[4] In the United States, there was a three-fold elevation in the use of herbal medications and herbal supplements by patients without consultation.[5] Currently, it has been reported that up to 50% of the public in developed countries prefer using herbal medications compared to medications of chemical origin.[6]

In Saudi Arabia, herbal medications and supplements are available over the counter in community pharmacies or with different formulations.[7] Besides some traditional markets, for instance, perfumey and herbal supplements shops, roasters and mills shops, and small or big grocery shops. Most Saudi Arabia residents use herbal medicines as self-medication, without the referral to a healthcare professional, especially to treat the common cold and cough symptoms.[8] An advertisement usually biases their choice of a particular product through different media channels. Furthermore, individuals may use herbal medicines in combination, leading to serious interactions.[9,10]

Despite the widespread use of herbal medicines, it has been proposed that the reason for individuals not consulting their doctors or pharmacists about these medications is that individuals consider them natural, harmless products.[11] Furthermore, some individuals believe that healthcare professionals do not have enough information to guide them with herbal medications. All this can be attributed to a lack of knowledge about the use of herbal medicines.[12,13] To present, data in Saudi Arabia on the public's knowledge about the use of herbal medications to treat viral respiratory infections is still unclear. Accordingly, the present study explores the Saudi public's knowledge of herbal medicines for respiratory viral infections.

MATERIALS AND METHODS

Study design and sample size

A quantitative cross-sectional survey study was carried out in Saudi Arabia through a self-administered electronic questionnaire from September to November 2020. The study included all citizens from Saudi Arabia, while incomplete responses or responses from outside Saudi Arabia were excluded.

Data collection

An online self-developed questionnaire was distributed to members of the public in all regions in Saudi Arabia after assessmet of the questionnaire validity by three expert consultednts in the field and piloted on 20 participants. The survey mainly focused on collecting demographic data, including locations, gender, material status, age, responder qualifications, occupational status, and monthly income. In contrast, the second part of the questionnaire included questions on herbal medicine and its usages. Besides, the resources of information about herbal medications for respiratory viral infections. A 5-point Likert response scale system was used. The survey had been distributed to a convenient sample of public responders. It was through social Media of WhatsApp and telegram, and personal contact. The reminder message is sent every 1-2 weeks. The completed survey and Saudi public will be included in the final analysis.

Statistical Analyses and Sample Size

According to the previous litterateur, the sample was calculated with unlimited population size, population percentage 50%, with a confidence level 95% with z score of 1.96 and margin of error 5%, and drop-out rate 10%. As a result, the sample size calculation will be equal a minimum sample of 418 with the power of study of 80%.[14-16] The response rate required of calculated sample size at least 60-70 % and above.[16,17] The survey was validated through the revision of expert reviewers and pilot testing. Besides, the reliability tests McDonald's ω, Cronbach's α, Guttman's 2, and Guttman's. The data analysis was completed through the survey monkey system. Besides, the statistical package of social sciences (SPSS), Jeffery's Amazing Statistics Program (JASP), and Microsoft excel sheet version 16 with description and frequency analysis, good fitness analysis, correlation analysis, inferential analysis between independent variables responders. The STROBE (Strengthening the reporting of observational studies in epidemiology statement: guidelines for reporting observational studies) steered the current study's reporting.[18,19]

Ethical Consideration

An informed consent was sought from each participant prior to answering the questionnaire. No personal information were obtained from the participants, such as names or phone numbers. And they were aware that their participation is voluntary and they can withdrawal anytime.

RESULTS

Four hundred and eighty-six responders participated in this online questionnaire. Only participants who completed all the sections in the questionnaire were included. The questionnaire's reliability was tested through Mac 0.960, Cronbach 0.958, Gultman 2 0.961, and Gultman 6 0.973. Socio-demographics of responders and analysis of the questionnaire are shown below.

General Characters of responders

Out of 486 participants, 89.92% of the responders were from the west area with statistically significant differences with other regions (p<0.001), and 94.62% had a Saudi nationality. Also, 80.45% were females, with statistically significant differences in males (p<0.001), where 59.17% were single. As for the age of the responders, it was categorized into seven sub-categories. The most prevalent age group was between 18 and 30 years old, with 56.49% of the responses with statistically significant differences with age levels (p<0.001). All socio-demographic data is shown in detail in Table 1.

Social and professional information of the responders

Regarding the responders' education level, 66.1% had a bachelor's degree, while 46.27% were still students, and only 23.44% were employees, with statistically significant differences among all occupational jobs (p<0.001). Monthly income was also evaluated; it has been shown that 53.69% had an income <3000 SR with statistically significant differences with other income types (p<0.001). Participants were also asked if they were working in the medical field. Only 18.32% were healthcare practitioners, while 53.85% of these practitioners were physicians with statistically significant differences between specialties (p<0.001), as shown in Table 2.

Independent variable analysis

Age

There is no statistically significant difference between males and females in different regions, ages, material status, nationality, healthcare provider

Table 1: The socio-demographic data of responders to the questionnaire.

Nationality	Response Count	Response Percent	*p*-value
Central area	11	2.26%	<0.001
North area	6	1.23%	
South area	20	4.12%	
East area	12	2.47%	
West area	437	89.92%	
Answered question	**486**		
Skipped question	**0**		
Nationality	**Response Count**	**Response Percent**	
Saudi	457	94.62%	<0.001
Non-Saudi	26	5.38%	
Answered question	**483**		
Skipped question	**3**		
Gender	**Response Count**	**Response Percent**	
Female	391	80.45%	<0.001
Male	95	19.55%	
Answered question	**486**		
Skipped question	**0**		
Material Status	**Response Count**	**Response Percent**	
Single	284	59.17%	<0.001
Married	187	38.96%	
Divorced	9	1.88%	
Answered question	**480**		
Skipped question	**6**		
Age	**Response Count**	**Response Percent**	
<18	32	6.60%	<0.001
18 - 30	274	56.49%	
31 - 40	81	16.70%	
41 - 50	58	11.96%	
51 - 60	22	4.54%	
61 - 70	15	3.09%	
> 70	3	0.62%	
Answered question	**485**		
Skipped question	1		

Table 2: Social and professional information of responders.

Responder Qualifications	Response Count	Response Percent	*p*-value
Doctorate	10	2.08%	<0.001
Master's degree	28	5.82%	
Bachelor's degree	318	66.11%	
Diploma	21	4.37%	
High school	99	20.58%	
Intermediate School	3	0.62%	
Primary School	1	0.21%	
Not educated	1	0.21%	
Answered question	**481**		
Skipped question	**7**		
Occupational status	**Response Count**	**Response Percent**	
Employee	113	23.44%	<0.001
Non-employee	109	22.61%	
Retried	37	7.68%	
Student	223	46.27%	
Answered question	**482**		
Skipped question	**4**		
Monthly income	**Response Count**	**Response Percent**	
< 3000 SR	233	53.69%	<0.001
3001-6000 SR	37	8.53%	
6001-9000 SR	38	8.76%	
9001-12000 SR	44	10.14%	
> 12000 SR	82	18.89%	
Answered question	**434**		
Skipped question	**52**		
Are you a health care practitioner (Medical Doctor- Dentist- Pharmacist- Nurse- Others?	**Response Count**	**Response Percent**	
Yes	87	18.32%	<0.001
No	388	81.68%	
Answered question	**475**		
Skipped question	**11**		
If you are a health care practitioner, you are a	**Response Count**	**Response Percent**	
Physician	49	53.85%	<0.001
Dentist	6	6.59%	
Pharmacist	8	8.79%	
Nurse	28	30.77%	
Other (please specify)	66		
Answered question	**91**		
Skipped question	**395**		

or public, and healthcare professionals specialties ($p>0.05$). In contrast, the male 12(63%) is higher than female 3(0.74%)in age 61 years old and above with statistically significant difference ($p<0.05$). The male has higher academic qualifications than females master degree 12(12.77%) vs. 17(4.24%) or diploma 9(9.57% vs. 14(3.49%) while females more had of bachelor's degree 271(67.58%) vs. 53(56.38%) with statistically significant difference ($p<0.05$). The males more employed than female 32(34.04%) vs. 84(20.9%), and more retried 19(2021%) vs. 18(4.48%), while more females of non-employed 111(27.61%) vs. 8(8.51%) with statistically significant difference ($p<0.05$). The males had a higher monthly income (>12,000 SR) than females, 27(30%) vs. 56(15.77%). In contrast, the female had lower monthly income than males, 200(56.34%) vs. 37(41.11%), with a statistically significant difference ($p<0.05$).

Healthcare Providers vs. Public

There is no statistically significant difference between responders healthcare providers and public residents in living regions, gender, nationality, monthly income ($p>0.05$). However, the age of healthcare providers is higher than the public with (18-30 years) 72(80.9%) vs. 196(49.25%). In contrast, the people higher than professionals in ages (41-50 years) with percent 58(14.57%) vs. 1(1.12%), and age (51-60) with percent 22(5.53%) vs. 0(0%) with statistically significant difference ($p<0.05$). Most healthcare professionals were single 70(80.46%) vs. public 208(52.66%), while the majority of public responders were married 180(45.57%) vs. healthcare professionals 16(18.39%) with statistically significant difference ($p<0.05$). The healthcare providers had more bachelor's degree 70(79.55%) than public 248(62.78%), while the public had a more high school degree 90(22.78%) than healthcare providers 10(11.36%) with statistically significant difference ($p<0.05$). The public responders had more non-employment 106(26.77%) and retired 37(9.34%) than healthcare providers 12(13.64%) and 0(0%) respectively. In contrast, the healthcare providers had more student qualifications 56(63.64%) than public responders 160(40.4%), with a statistically significant difference ($p<0.05$).

Nationality

There is no statistically significant difference between Saudi and non-Saudi in the different regions came from, ages group, gender, material status, educational levels, occupational status, monthly income, healthcare provider or public, and healthcare professionals specialties ($p>0.05$)

Independent variable correlation

There is a positive association between age and material status and monthly income with spearman results (0.738) and (0.566) respectively, while the Kendal taw was (0.678), (0.499) with statistically significant ($p<0.001$). In contrast, there was a negative association between age and occupational status with spearman results (-0.582) and Kendal taw (-0.83) with statistically significant ($p<0.001$). There was a positive association between material status and monthly income of spearman results was (0.518) and Kendal taw (0.476) with statistically significant ($p<0.001$). While there was a negative correlation between material status and occupational level, spearman's results were (-0.627) and Kendal taw (-0.580)with statistically significant ($p<0.001$). There is a negative correlation between occupational levels and monthly income with spearman results (-0.578) and Kendal taw (-0.501) with statistically significant (<0.001).

Herbal medications used over the last 12 months

Responders were asked to choose from a list of herbs they used within the last 12 months. These herbal medications are commonly used for the treatment of viral respiratory infections. It has been shown the

most herbal medicines used for respiratory viral infections was honey 364 (78.79%), and lemon juice 327 (71.24%), followed by Ginger 288 (64.43%) and Mint 292 (64.04%%) While the least herbal medicine used was Sambucus nigra 26 (6.09%) and Licorice 26 (6.68%). Additionally, the most herbal medicine not known used for respiratory viral infections was Sambucus nigra 147 (34.43%), Sugarcane 136 (31.48%), and Radish 135 (31.47%%) with statistically significant differences among responders (p<0.001), As shown in Table 3.

Sources of information about herbal medications

Participants were also asked about their sources of information about herbal medications; they chose from different sources. For example, 79.14% depended on their family and friends to get information, while only 13.83% got information from physicians, and 6.35% got information from pharmacists, as shown in Table 4.

DISCUSSION

In the past two years, when public emergency and pandemic occurred with SARS-2 and coronavirus, various drug therapy had been conducted as management. All treatments had different positive or negative results. Regular medications did the majority of the studies. Alternative medications or herbal therapy have been tried. The use of herbal medicines is currently increasing, especially in the era of the COVID-19 pandemic. Some recent reports have shown herbal agents' effectiveness and safety in treating respiratory viral infections.[20] However, these agents

Table 3: Use of herbal medications within the last 12 months.

Herbal Name	Yes		No		I do not know about it for dental management		Total	*p*-value
Myrrh	23.18%	102	45.68%	201	31.14%	137	440	<0.001
Black seed (fennel flower)	53.88%	243	27.72%	125	18.40%	83	451	<0.001
Honey	78.79%	364	12.34%	57	8.87%	41	462	<0.001
Cinnamon	44.04%	196	38.88%	173	17.08%	76	445	<0.001
Mint	64.04%	292	21.05%	96	14.91%	68	456	<0.001
Green tea	45.84%	204	34.83%	155	19.33%	86	445	<0.001
Olive oil	50.00%	223	34.53%	154	15.47%	69	446	<0.001
Ginger	64.43%	288	25.28%	113	10.29%	46	447	<0.001
Salt and water	46.86%	209	36.77%	164	16.37%	73	446	<0.001
Pomegranate peel	13.33%	58	56.78%	247	29.89%	130	435	<0.001
chamomile	30.45%	134	50.45%	222	19.09%	84	440	<0.001
lemon juice	71.24%	327	18.30%	84	10.46%	48	459	<0.001
Garlic	41.70%	186	42.38%	189	15.92%	71	446	<0.001
Licorice	6.68%	29	62.44%	271	30.88%	134	434	<0.001
thyme	28.77%	126	50.46%	221	20.78%	91	438	<0.001
Aniseed	41.69%	183	41.46%	182	16.86%	74	439	<0.001
caraway	11.86%	51	60.47%	260	27.67%	119	430	<0.001
turmeric	31.59%	139	44.55%	196	23.86%	105	440	<0.001
coconut oil/water	12.04%	52	56.71%	245	31.25%	135	432	<0.001
Sesame oil	29.77%	131	50.23%	221	20.00%	88	440	<0.001
Fenugreek	17.74%	77	55.99%	243	26.27%	114	434	<0.001
Dates	45.82%	203	29.57%	131	24.60%	109	443	<0.001
Sugarcane	9.26%	40	59.26%	256	31.48%	136	432	<0.001
Cumin	34.69%	153	42.18%	186	23.13%	102	441	<0.001
Radish	12.59%	54	55.94%	240	31.47%	135	429	<0.001
Fennal	27.17%	119	49.32%	216	23.52%	103	438	<0.001
Onion	31.65%	138	46.33%	202	22.02%	96	436	<0.001
Boswellia serrata	31.60%	140	47.40%	210	20.99%	93	443	<0.001
Saussurea costus	23.41%	103	52.05%	229	24.55%	108	440	<0.001
Sambucus nigra	6.09%	26	59.48%	254	34.43%	147	427	<0.001
Anise	37.84%	165	44.04%	192	18.12%	79	436	<0.001
Garden cress	18.29%	79	53.01%	229	28.70%	124	432	<0.001
						Answered	**471**	
						Skipped	**15**	

Table 4: Sources of information about herbal medications.

Answer Choices	Responses	
From parents, family members, or friends.	349	79.14%
Internet	222	50.34%
educational books or articles	59	13.38%
educational lectures	28	6.35%
social media	106	24.04%
Physicians	61	13.83%
Pharmacists	28	6.35%
traditional doctors	38	8.62%
Complementary Doctor	51	11.56%
Other (please specify)	15	3.40%
Answered	441	
Skipped	45	

should be used cautiously. Accordingly, the understanding of individuals' knowledge of herbal agents is crucial.[21] Besides, The public tried various herbal during the coronavirus course. However, the knowledge of using herbal medications to treat a viral infection with emphasis on COVID-19 is not widely known in Saudi Arabia or gulf and Arabic countries. The present investigation aimed to evaluate the knowledge of individuals living in Saudi Arabia towards using herbal medications in the treatment of viral respiratory infections.

The study demonstrated that's the majority of responders from the west region of the kingdom of Saudi Arabia, young age with student occupational status and single with low monthly income. That's be excepted because the data collectors (authors) were students at the college of medicine at Um Alora university located in the west region and properly collected from their society. The characters of the sample study have consisted of two parts. The majority part with public residents and healthcare providers. The public was older age, married, non-employments with low salary and academic qualifications while healthcare providers were young responders age, single, with employments, academic qualifications. Those characters were excepted, and it reflected the practice. In both groups, there was no difference in gender or nationality, monthly income. The responder's demographic data was good the reflected the actual characters of Saudi populations. It might lead to the actual behavior of using herbal medications during viral infection, emphasizing coronavirus. There was a medium positive correlation between age and marriage status and high financial income, while fouls negative correlation occupational status with younger age and students positions while old age with higher academic qualifications including mater science degree had a negative association. Besides, the negative correlation of income and occupational status reflected the reliable social practice.

The study demonstrated that the level of knowledge of responders was inadequate and below-average levels. Furthermore, the most herbal medications used for respiratory viral infections, including COVID-19 was honey, lemon juice, followed by Ginger and Mint. Those herbal medicines are well known socially for usage during viral infection. However, the efficacy and safety of those herbal medications during viral infection with emphasis on COVID-19 are not well established yet. Knowledge about the use of herbal medicines has been evaluated in different settings. Roy *et al.*[22] assessed Indian patients' and doctors' knowledge about using complementary and alternative medicines for various indications. Roy *et al.*[22] demonstrated that healthcare professionals' knowledge and their use of herbal medications were significantly higher than non-medical patients. Also, Roy *et al.*[22] showed a low level of knowledge in patients and doctors.

Most responders used traditional resources from family or friends or internet or social as primary resources of herbal used for viral respiratory infections, including covid-19. In contrast, the responders do not widely use the physicians or pharmacists for herbal medicine information for viral infection indication and might lead to inadequate knowledge of these aspects. Similarly, the study by Gyasi *et al.*[23] in Ghana examined the knowledge about using herbal medications among patients. Gyasi *et al.*[23] included 324 patients and demonstrated that the general public's knowledge level was low, with family and friends representing the primary source of information for patients. At the same time, patients did not consider healthcare professionals a source of information about herbal medicines.[23]

On the contrary, the present study participants depended mainly on family and friends as the primary source of information about herbal medications. In comparison, only 13.83% relied on physicians as a source of information. This abstinence from seeking medical advice on herbal medicines can explain the low level of knowledge among patients. Also, Mensah *et al.*[24] evaluated patients' knowledge about using herbal medications to treat malaria. The study included 189 malaria patients and five traditional medicine providers. Mensah *et al.*[24] demonstrated that less than a third of the patients knew about herbal medicine to treat malaria.

In contrast, practitioners showed a better level of knowledge of herbal medications. Therefore, although the present study examined the knowledge about herbal medicines in respiratory viral infections, it supports the findings of Mensah *et al.*[24] regarding the low level of knowledge of patients towards herbal medicines. However, the knowledge of healthcare professionals was insufficient. Therefore, all healthcare providers emphasizing the pharmacist should take an active role in providing patients education on herbal medicine in use or viral respiratory illness highlighting covid-19.

Additionally, the present study had some limitations; the participants' responses depend mainly on the responders' subjective opinion towards their use of herbal medications, affecting the findings' reliability. Nevertheless, the current study is considered the first investigation in Saudi Arabia to evaluate individuals' knowledge of herbal medicines for respiratory viral infections.

CONCLUSION

Knowledge about herbal medications among Saudi residents regarding their use for viral respiratory infections is inadequate and below-average levels, especially among residents with low socioeconomic and low educational levels. Decision-makers should consider these findings in Saudi Arabia to improve residents' knowledge through public campaigns in media and public venues about the benefits and risks of herbal medications, not only for respiratory infections but also for common acute and chronic conditions.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

Consent for Publications

Informed consent was obtained from all the participants

Ethical Approval

This research is exempted from research and ethical committee or an institutional review board (IRB) approval.

https://www.hhs.gov/ohrp/regulations-and-policy/decision-charts-2018/index.html

ABBREVIATIONS

MOH: Ministry of Health; **KSA:** Kingdom of Saudi Arabia; **SPSS:** Statistical package of social sciences; **JASP:** Jeffery's Amazing Statistics Program; **STROBE:** Strengthening the reporting of observational studies epidemiology; **SARS-2:** Severe acute respiratory syndrome coronavirus 2; **COVID-19:** Coronavirus disease 2019.

ORCID ID

Yousef Ahmed Alomi https://orcid.org/0000-0003-1381-628X

REFERENCES

1. Mousa HAL. Prevention and treatment of influenza, influenza-like illness, and common cold by herbal, complementary, and natural therapies. J Evid Based Complementary Altern Med. 2017;22(1):166-74. doi: 10.1177/2156587216641831, PMID 27055821.
2. Al Akeel MM, Al Ghamdi WM, Al Habib S, Koshm M, Al Otaibi F. Herbal medicines: Saudi population knowledge, attitude, and practice at a glance. J Family Med Prim Care. 2018;7(5):865-75. doi: 10.4103/jfmpc.jfmpc_315_17, PMID 30598925.
3. Amato-lourenço LF, Galvão S, Weger LA De HPS. Since January 2020, Elsevier has created a COVID-19 resource center with free information in English and Mandarin on the novel coronavirus COVID- 19. The COVID-19 resource center is hosted on Elsevier Connect, the company's public news and information. Antiviral Res. 2018;149:118-42.
4. Ershova IB, Osypova TF. Phytotherapy of acute respiratory viral diseases. Actual Infectol. 2017 February;0(4.13):73-82.
5. van Andel T, Carvalheiro LG. Why urban citizens in developing countries use traditional medicines: the case of Suriname. Evid Based Complement Alternat Med. 2013;2013:687197. doi: 10.1155/2013/687197, PMID 23653663.
6. Liu Q, Zhou YH, Ye F, Yang ZQ. Antivirals for respiratory viral infections: Problems and prospects. Semin Respir Crit Care Med. 2016;37(4):640-6. doi: 10.1055/s-0036-1584803, PMID 27486742.
7. Harnett J, Oakes K, Carè J, Leach M, Brown D, Cramer H, *et al.* The effects of *Sambucus nigra* berry on acute respiratory viral infections: A rapid review of clinical studies. Adv Integr Med. 2020;7(4):240-6. doi: 10.1016/j.aimed.2020.08.001, PMID 32864330.
8. Fintelmann V, Albrecht U, Schmitz G, Schnitker J. Efficacy and safety of a combination herbal medicinal product containing *Tropaeoli majoris* herba and *Armoraciae rusticanae* radix for the prophylactic treatment of patients with respiratory tract diseases: a randomised, prospective, double-blind, placebo-controlled phase III trial. Curr Med Res Opin. 2012;28(11):1799-807. doi: 10.1185/03007995.2012.742048, PMID 23083066.
9. Jayawardena R, Sooriyaarachchi P, Chourdakis M, Jeewandara C, Ranasinghe P. Enhancing immunity in viral infections, with special emphasis on COVID-19: A review. Diabetes Metab Syndr. 2020;14(4):367-82. doi: 10.1016/j.dsx.2020.04.015, PMID 32334392.
10. Li T, Peng T. Traditional Chinese herbal medicine as a source of molecules with antiviral activity. Antiviral Res. 2013;97(1):1-9. doi: 10.1016/j.antiviral.2012.10.006, PMID 23153834.
11. Tabatabaei-Malazy O, Abdollahi M, Larijani B. Beneficial effects of anti-oxidative herbal medicines in diabetic patients infected with covid-19: A hypothesis. Diabetes Metab Syndr Obes. 2020;13:3113-6. doi: 10.2147/DMSO.S264824, PMID 32943897.
12. Abd-Alla HI, Sweelam HM, El-Kashak WA, El-Safty MM. Evaluation of Immune Boosting Properties and Combating of Multiple Respiratory Viral Infections by fifteen Euphorbiaceae Plant Extracts. Pharmacogn J. 2019;11(6s):1490-503. doi: 10.5530/pj.2019.11.230.
13. Panyod S, Ho CT, Sheen LY. Dietary therapy and herbal medicine for COVID-19 prevention: A review and perspective. J Tradit Complement Med. 2020;10(4):420-7. doi: 10.1016/j.jtcme.2020.05.004, PMID 32691006.
14. Charan J, Biswas T. How to calculate sample size for different study designs in medical research? Indian J Psychol Med. 2013;35(2):121-6. doi: 10.4103/0253-7176.116232, PMID 24049221.
15. Pourhoseingholi MA, Vahedi M, Rahimzadeh M. Sample size calculation in medical studies. Gastroenterol Hepatol Bed Bench. 2013;6(1):14-7. PMID 24834239.
16. Ezhumalai DG. How Big A Sample Do I Require?. Annals of SBV. 2017;6(1):39-41. doi: 10.5005/jp-journals-10085-6113.
17. Johnson TP, Wislar JS. Response rates and nonresponse errors in surveys. JAMA. 2012;307(17):1805-6. doi: 10.1001/jama.2012.3532, PMID 22550194.
18. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP. The strengthening the reporting of observational studies in epidemiology (STROBE) statement: guidelines for reporting observational studies. PLOS Med. 2007;4(10):1623-7. doi: 10.1371/journal.pmed.0040296.
19. Von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. Available from: http://www.thelancet.com. Vol. 370; 2007.
20. Galabov AS, Nikolaeva-glomb L, Mukova L, Remichkova M, Georgieva I, Cseuz M. Large-scale antiviral activity screening of a triplex mixed herbal extract. 2017;5(5):169-76.
21. Lateef Mousa HA. Prevention and treatment of viral infections by natural therapies. J Prev Infect Control. 2015;1(1):7-10. doi: 10.21767/2471-9668.10004.
22. Roy V, Gupta M, Ghosh RK. Perception, attitude and usage of complementary and alternative medicine among doctors and patients in a tertiary care hospital in India. Indian J Pharmacol. 2015 March;47(2):137-42. doi: 10.4103/0253-7613.153418, PMID 25878370.
23. Gyasi RM, Siaw LP, Mensah CM. Prevalence and pattern of traditional medical therapy utilisation in Kumasi Metropolis and Sekyere South District, Ghana. J Ethnopharmacol. 2015;161(February):138-46. doi: 10.1016/j.jep.2014.12.004, PMID 25523371.
24. Mensah CM, Gyasi RM. Use of herbal medicine in the management of malaria in the urban-periphery, Ghana. J Biol Agric Healthc. 2012;2(11):113-22.