

# KNOWLEDGE, ATTITUDE AND PRACTICES ON USAGE OF MEDICINAL PLANTS PRE AND POST COVID-19 AMONG WOMEN

Shilpa S<sup>1</sup> Anitha M C<sup>2</sup>

<sup>1</sup>Student, Department of food science and Nutrition, Nehru Arts and Science College, Coimbatore, Tamil Nadu

<sup>2</sup>Assistant professor, Department of food science and Nutrition, Nehru Arts and Science College, Coimbatore, Tamil Nadu

\*\*\*

## Abstract

### Background

Coronavirus disease 2019 (COVID-19) is defined as an illness caused by a novel coronavirus, now called Severe Acute Respiratory Syndrome Coronavirus 2 leading to infections from the common cold to more serious diseases such as Middle East Respiratory Syndrome and Severe Acute Respiratory Syndrome.

The lack of treatment options for COVID-19 has raised many anxieties among populations worldwide, which has led to several attempts to seek out alternative options to stop the transmission of the disease or to alleviate the progression of the infection, including focusing more on preventive measures and therefore the use of medicinal plants, natural products and herbal extracts and medicinal plants to increase immunity and decrease the probability of getting infected.

By evaluating public knowledge and awareness about the coronavirus, deeper insights into existing public perception and practices can be gained, thereby helping to discover attributes that influence the public in adopting healthy practices and responsive behavior.

### Aim

This study's aim is to investigate the knowledge, attitudes and practices (KAP) on usage of medicinal plants during pre and post covid-19 among women, toward COVID-19 during the pandemic spike

### Methodology

This was a cross-sectional study, carried out over a period of six months, and involving a structured and validated questionnaire. It was conducted among women of age group above 18 years on the selected population of Kerala.

### Result

### Conclusion

From this study, it can be concluded that Scientific research also need to be conducted for reliable and trusted evidence to rise the confidence among the consumers. Furthermore, it will help to empower the local community in enhancing their economic status. And suggest that policymakers provide further educational campaigns that increase population knowledge about the disease transmission routes and preventive measures. In addition, the use of herbal products should be evidence-based to ensure patient safety.

**Key Words:** coronavirus, Medicinal plants, Herbal plants, public knowledge.

## 1.INTRODUCTION

Coronavirus disease 2019 (COVID-19) is defined as an illness caused by a novel coronavirus, now called Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2; formerly called 2019-nCoV). SARS-CoV-2 belongs to the larger family of ribonucleic acid (RNA) viruses, leading to infections from the common cold to more serious diseases such as Middle East Respiratory Syndrome (MERS-CoV) and severe acute respiratory syndrome (SARS-CoV-2). The main symptoms of COVID-19 have been identified as fever, dry cough, fatigue, myalgia, shortness of breath, and dyspnoea. COVID-19 is an evolving respiratory infection that was first discovered in December 2019, in Wuhan city, Hubei Province, China. SARS-CoV-2 leading to infections, from the common cold to more serious diseases. (Mohammed K. Al-Hanawi et.al.,2020). The Severe Acute Respiratory Syndrome-related Coronavirus II or novel coronavirus (COVID-19) infection has been declared world pandemic resulting in thousands of deaths in countries around the world. The disease appeared in late December 2019 in Wuhan (China) as a result of zoonotic transmission. (Bachir Benarba1 et.al.,2020). The Severe Acute Respiratory Syndrome-related Coronavirus II or novel coronavirus (COVID-19) infection has been declared world pandemic resulting in thousands of deaths in countries around the world. The disease appeared in late December 2019 in Wuhan (China) as a result of zoonotic transmission. (Bachir Benarba1 et.al.,2020). According to the first World Health Organization (WHO) report of the novel coronavirus on December 31, 2019, of the 88,913 cases worldwide, 90% were from China. On December 16, 2020, the total number of confirmed cases of COVID-19 in the world was 71,919,725. Since then, attempts have been made to discover a vaccine and to develop efficient antiviral drug. (Mohammad Reza Heydari et al.,2021). The main symptoms of COVID-19 have been identified as fever, dyspnoea, fatigue, shortness of breath, myalgia, and dry cough. COVID-19 is characterized by rapid transmission and can occur by close contact with an infected person. The details on the disease are developing. As such, this may not be the only way the transmission is occurring. COVID-19 has spread extensively and rapidly, from Wuhan city, to other parts of the world, threatening the lives of many people. By the end of January 2020, the World Health Organization announced a public health emergency of international concern and called for the collective effort of all countries, to prevent its rapid spread. Later, the WHO declared COVID-19 a "global pandemic". (Mohammed K. Al-Hanawi et.al.,2020). The first case of Covid-19 in India was reported on January 30 2020, in Kerala, a southern state in India. The Kerala government under advice from the central improved its health and hygiene department and bought in vivid containment, isolation, tracking and other measures

to speedily block the community spread. Along With other concern issues, the government with strict measures could resist the immediate spread of the disease, there by flattening the curve while almost altogether other states, the number of the patients spiked. Kerala captured the eye of Worldwide Medias and was appreciated for the efficient management of Covid-19. The Government of Kerala implemented a series of actions to fight against the pandemic. In order to trace, identify and test all travelers with a possible travel history to Wuhan, a health advisory was constituted beginning January 15, 2020. Running awareness programs, such as, 'Break the Chain' initiative, activating committee system to manage responsibilities, regular outreach to home quarantined persons, ensuring the availability of essential commodities, categorizing and ensuring available response mechanisms such as, material resources, conducting sanitation and cleanliness drives volunteers and medical resources, and ensuring special consideration to vulnerable populations, such as persons with comorbidities or undergoing special treatments senior citizens. (Jayesh S et al.,2020). The lack of treatment options for COVID-19 has raised many anxieties among populations worldwide, which has led to several attempts to seek out alternative options to stop the transmission of the disease or to alleviate the progression of the infection, including focusing more on preventive measures and therefore the use of medicinal plants, natural products and herbal extracts and medicinal plants to increase immunity and decrease the probability of getting infected. (Hamad S. Alyami,2020). Medicinal Plants are commonly used by the local people as an option for health care. However, the extent to which consumers are knowledgeable on the advantages of medicinal plants cannot be ascertained as there's a lack of research being administered to access the level of knowledge. Furthermore, the knowledge about medicinal plants were transferred by verbal communication from one generation to another generation and cause poor transmission in transferring the knowledge (Nalini Arumugam,2019). Medicinal plants are the natural parts, which are used at least or without processing for treating diseases at different regions. The phytochemicals of medicinal plants have direct or indirect therapeutic effects to prevent and treat several infectious and non-infectious diseases. More than 80% of the world populations including India, china with many developing and developed countries depends on traditional drugs as the main source of health care, where a major portion is occupied by medicinal plants. Discovery of the vaccine and the practice of effective therapeutic agents is essential to prevent the outbreak of COVID-19. So, this review article aims to summarize the potential perspective use of medicinal plants against coronavirus disease. (Md. Golap Hossain et al.,2020). WHO guidelines 2004 on safety monitoring of herbal medicines in pharmacovigilance systems stated that there is a widespread misconception that natural remedies are harmless and carry no risk. This common belief was confirmed by several studies which ascertained that one main reason behind the interest in herbal medicines is the notion that all herbal products due to their natural origin are safe and effective. As a consequence of this belief, side effects (unintended effect of a drug related to its pharmacological properties) of herbal

medicines and adverse events (unwanted medical occurrence that may present during treatment with a drug) that may arise from their consumption are often overlooked. There is also, the possibility of interaction between herbal medicines and the conventional medicines which might cause serious health problems. On the other hand, patients have very limited reliable resources concerning the use of herbal medicines and the most common sources of advice on herbal medicines are friends and relatives. As far as the herbal medicines are concerned, then physicians are not in a better situation than patients since physicians themselves lack the relevant knowledge and hence they are unable to give informed advice to their patients. Indeed, it was found that the majority of patients are not disclosing the use of herbal medicines to their physicians. This lack of communication between patients and physicians is a serious problem that supports the need for healthcare professionals to be aware of herbal medicines use alongside conventional medicines. The same assertion was confirmed by several studies which reported that the gap between acceptance of herbal medicines and the poor knowledge that healthcare professionals have about these remedies reflects the need for educational intervention (Mahmood Hilal et al.,2016). The above-mentioned problems raise the need for further research to provide adequate information concerning the use of herbal medicines toward integrating them into the healthcare system. Despite the fact that the Arabian Gulf region has a long tradition of herbal therapies, the number of relevant studies is very limited. (Amin and Mousa, 2007). Knowledge is required to utilize the potentials of medicinal plants. Adequate information is needed prior to use any herbal medicines and product. Normally, the traditional medicine man or 'bomoh' passed the traditional herbal knowledge from generation to generation via verbal communication. The younger people appear to be quite familiar with the good impacts of herbal medicine and food supplements. However, they have lack experience and knowledge on them. A study revealed that herbal medicine was frequently used by people but they have lack of knowledge on its correct usage. There is a need for seeking medical officer's advice before using herbal medicines. Attitude is the perceptive, motivational, emotional and cognitive beliefs that influence the practice or behaviors of an individual in a positive or negative way. Attitudes are learned by observing behavior of people in environments with different social & economic pressures. (Nalini Arumugam,2019). Majority of respondents consumed medicinal plants during covid-19. They believed the use of herbal medicine is safe, natural, higher accessibility and cultural belief to treat many illnesses. Furthermore, herbal products were generally cheap compared to conventional medicine. The medicinal plants practitioners used the mixture of medicinal plant based on them formulations with prayers, religious or ritual recites before hands them to their patients. The usages of medicinal plants as traditional medicine increased due to awareness on the effectiveness to cure the disease. Despite of medicinal plants benefit towards health; it can also act as pesticides. Chemical pesticide is the conventional and favorable way by farmers to encounter pest infestation through faster and easier method. Major factors of misuse of medicinal plants are misconception,

ignorance, criminal intentions and accidental poisoning therefore, intensive public awareness about the medicinal plants is essential to avoid the misuse of plants. (Nalini Arumugam,2019). By evaluating public knowledge and awareness about the coronavirus, deeper insights into existing public perception and practices can be gained, thereby helping to discover attributes that influence the public in adopting healthy practices and responsive behavior. Assessing public knowledge is also important in tip efforts. So that, this study's aim is to investigate the knowledge, attitudes and practices (KAP) on usage of medicinal plants during pre and post covid-19 among women, toward COVID-19 during the pandemic spike. (Mohammed Khaled Al-Hanawi et al.,2020).

### 1.1 Objectives

- ✓ To analyze and access the knowledge, attitude and practice of medicinal plants among women during pre-post covid-19
- ✓ To educate the women on usage of medicinal plants regularly

### 1.2 Methodology

#### Selection of population

Data collection was done among women in Kerala pre and post covid-19.

#### Selection of sample

Sample size was 100 women of age group 18 years above and those who were willing to participate in the study was collected.

#### Data collection

Tools and Technique constructed for primary data is pretested well designed questionnaire to assess socio demographic data and health covariates of the selected population. Demographic data includes age (18 above), gender (female) and socio-economic status. Health covariates included body mass index (BMI) measured through questions about height and weight, with response options available in both metric and imperial units.

#### Socio-Economic status

India, a country with vast differences among people based on their economy so this is assessed using revised Kuppaswamy Scale 2012 as tabulated below;

Socio-Economic Category	Monthly Income (Rs)
Upper	≥ 32,050
Lower 4,809- 1,600/ and less	
Upper Middle	12020-32,049
Middle/Lower Middle	12,019-8,010
Lower/Upper Lower	8,009-4,810
Lower	4,809-1600/ and less

\* Revised Kuppaswamy Scale 2012

For of the convenience, we have merged upper middle and Middle/lower Middle income to a category of middle SES,

in the same way lower SES comprises of lower/ upper lower and lower income

### Anthropometry

#### Height and weight

Height and Weight were estimated using questionnaire from the participants.

#### BMI

BMI, age and sex, specific percentile values for children both boys and girls (CDC,2000) Underweight, Normal, Overweight, and Obese. In clinical practice, BMI for age growth charts can be used to determine an adolescent's BMI for age percentile and to track relative weight status through childhood to adolescence.

BMI	Percentiles
<5 <sup>th</sup> percentile	Under weight
≥5 <sup>th</sup> to <85 <sup>th</sup> Percentile	Normal weight
≥85 <sup>th</sup> Percentile to <95 <sup>th</sup> Percentile	Overweight/ At Risk
≥95 <sup>th</sup> Percentile	Obesity

\*CDC, 2000

BMI percentiles were calculated using the online calculator for grouping the selected pre-Adolescents according to the BMI category. At risk (≥85 Percentile to <95th Percentile) individuals were termed as 'Overweight' adolescents and obese individuals who were considered for the study

#### knowledge, Attitude and Practices (KAP)

The lack of treatment options for COVID-19 has raised many anxieties among populations worldwide, which has led to several attempts to seek out alternative options to stop the transmission of the disease or to alleviate the progression of the infection, including focusing more on preventive measures and therefore the use of medicinal plants, natural products and herbal extracts and medicinal plants to increase immunity and decrease the probability of getting infected. By evaluating public knowledge and awareness about the coronavirus, deeper insights into existing public perception and practices can be gained, thereby helping to discover attributes that influence the public in adopting healthy practices and responsive behavior.

So that, this study's aim is to investigate the knowledge, attitudes and practices (KAP) on usage of medicinal plants during pre and post covid-19 among women, toward COVID-19 during the pandemic spike.

#### INCLUSION CRITERIA

Inclusion criteria for this study were the women of age group above 18 and those who are willing to participate in the survey.

#### EXCLUSION CRITERIA

Exclusion criteria includes the women of age group below 18 and those who are not willing to participate in the survey

### 1.3 Result and Discussions

#### Age and gender distribution of the selected women (N=100)

The Age and gender wise distribution of the selected women was given in table below:

**Table I** Age and gender distribution of the selected women (N=100)

Age and gender distribution of the selected women (N=100)

Sl. No	Age	Gender	
		Women	
		Number	Percent
1	18-25	63	63
2	26-35	17	17
3	36-45	9	9
4	46-50	9	9
5	Above 50	2	2
Total		100	

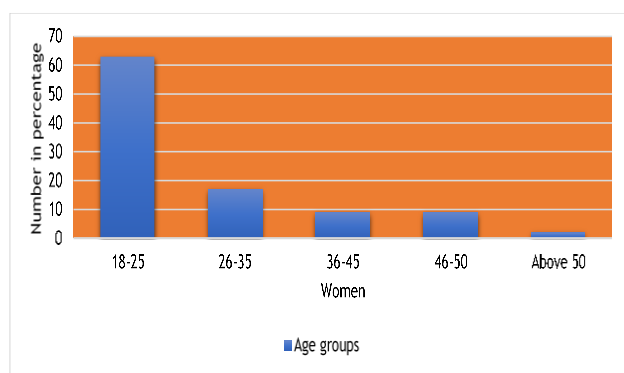


Figure 1

Majority of the selected women came under age group of 18-25 (63 %) and followed by the age group (26-35) and (9 percent) of them are in the age group 36-45 as well in 46-50 and (2%) were included in above 50 age group.

**Socio-Demographic Profile of selected women**

**Table II** Socio-Demographic Profile of Selected women are given below; (N=100)

Sl.No	Socio-economic class	Gender	
		Women	
		Number	Percent (%)
1	Upper	15	15
2	Upper middle	54	54
3	Lower middle	25	25
4	Upper lower	6	6
5	Lower	0	0
Total		100	

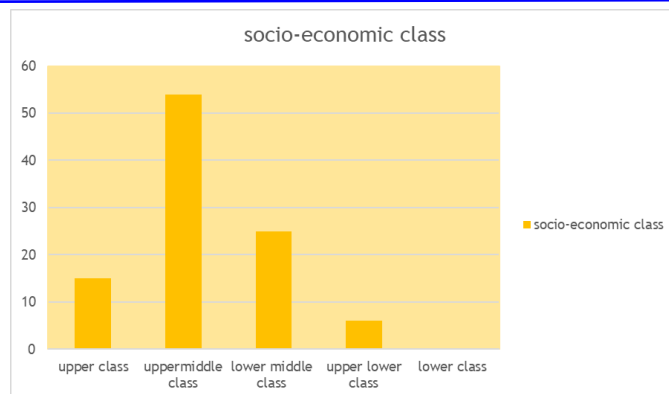


Figure 2

Socio-economic class Table-5 of the selected women depicts that (15 percent) of women were upper class and majority of them were in upper middle class and (25 percent) of women were in upper lower class and other were in upper lower class (6 percent).

**Knowledge, Attitude and Practices (KAP)**

Knowledge, Attitude and Practices (KAP) on medicinal plants usage of the selected women during pre and post covid-19 was given in the table below. The number of respondents who correct answers was given below;

**Table III** Knowledge of the Selected women (N=100)

Sl.NO	Knowledge	Pre Covid-19		
		Yes	No	Maybe
1	Do you believe about the healing power of medicinal plants	84	3	13
2	Do you know about the proper usage of medicinal plants	26	40	34
3	Do you know about the properties of medicinal plants	38	32	30
4	Do you think medicinal plants works more than pills	47	19	34
5	Do you believe medicinal plants are safe	14	10	76
6	Do you know that medicinal plants are cheaper	20	25	55
	Total mean percentage			

From this table, majority of women were believing about the healing power of medicinal plants and minority 3 percent were not aware about the healing power of medicinal plants. Majority of the selected women (38 percent) were not known about the properties of medicinal plants and 32



percent were only known about the usage of medicinal plants. Majority of the selected women (40 percent) were aware about the proper usage of medicinal plants and least (26 percent) were not aware about it. And majority of the selected women (47 percent) were sure about the medicinal plants work more than pills, also minority (19 percent) not accepts that. Majority of selected women are not sure about the safety of medicinal plants (76 percent) and only 14 percent were believing that medicinal plants are safe.25 percent of selected women were not known that the medicinal plants are cheaper and 20 percent were known that they were cheaper.

**Table IV** Attitude of the Selected women (N=100)

Experimental Group (n=100)							
Sl.NO	Attitude	Pre Covid-19			Post Covid-19		
		Agree	Dis-agree	Neither	Agree	Dis-agree	Neither
1	Medicinal plants have beneficial effect	92	2	6	94	1	5
2	medicinal plants have placebo effect	51	8	41	53	6	41
3	Medicinal plants have higher accessibility	61	15	24	56	20	24
4	Medicinal plants have fewer side-effects than conventional medicines	77	8	15	77	8	15
5	Medicinal plants have significant interactions with conventional medicines	54	11	35	54	11	35
6	Medicinal plants can cure all type of diseases	45	19	36	48	18	34

7	Medicinal plants can combine in any way you like and with any foods	46	40	14	45	41	14
8	Medicinal plants are safer than manufactured medicine	67	11	22	70	10	20

From this table ;92 percent of selected women agree that the medicinal plants are beneficial during pre-covid 19 and 94 percent during post- covid 19,among 2 percent during pre-covid 19 and one percent during post covid-19 disagree with this .51 percent of selected women agree that medicinal plants have placebo effect during pre-covid 19 and 53 during post covid-19,also 8 percent disagree with this during pre-covid-19 and 6 percent disagree with post covid-19.About the higher accessibility 61 percent agreeing during pre-covid-19 and 56 during post covid-19.and 15 percent disagree with this during pre-covid-19 and 20 percent' with post covid-19.medicinal have fewer side effects than conventional medicines believing 77 percent during pre-covid-19 and same as post covid-19 and disagreeing 8 percent of selected women same as in pre and post covid-19.Interaction of medicinal plants with conventional medicine is agreeing 54 percent of selected women during pre-covid-19 and same as post covid-19.also disagreeing 11 percent during pre-covid 19 and post- covid 19.45 percent of women agree with the statement medicinal plants cure all type of disease during pre-covid-19 and 48 percent during post covid-19 and 19 percent and 18 percent were disagreeing during post covid-19.67 percent of women agree with that medicinal plants are safer than manufactured during pre-covid-19 and 70 percent of them during post covid-19.

**Table III** Practice of the Selected women (N=100)

Experimental Group (n=100)							
Sl.NO	Practice	Pre Covid-19			Post Covid-19		
		Yes	No	Maybe	Yes	No	Maybe
1	Use medicinal plants for self-treatment	73	15	12	80	12	8
2	If you took herbs whilst on prescription medicine, did you check it was safe to mix	57	16	27	55	18	27
3	Would you consider growing your own herbs	12	9	79	30	4	66

4	Do you recognize drinking herbal teas as medicinal	74	12	14	80	10	10
5	Have you informed your medical doctor about using medicinal plants	49	27	24	40	20	40
6	Did you experience any unwanted effects from medicinal plants	31	61	8	31	61	8
7	Recommend medicinal plants to others	66	17	17	70	5	25

From this table ;73 percent of selected women use medicinal plants for self-treatment during pre-covid-19 and 80 were in post covid 19.other 15 percent of selected women not use for self-treatment during pre-covid 19 and 12 percent of them in post covid 19.57 percent of selected women check the prescription and safety during pre-covid 19 and 55 during post covid 19.Among them 16 Percent were not check during pre-covid-19 and 18 percent during post covid-19.79 percent of selected women may consider to grown their own herbs during pre-covid-19 and 66 percent during post covid 19.majority (74 percent ) and (80 percent) were consider herbal teapost covid-19 and 19 percent and 18 percent were disagreeing during post covid-19.67 percent of women agree with those medicinal plants are safer than manufactured during pre-covid-19 and 70 percent of them during post covid-19.

#### 1.4 CONCLUSIONS

This study is anticipated positive behavior on medicinal plants consumption. From this study, it can be concluded that Scientific research also need to be conducted for reliable and trusted evidence to rise the confidence among the consumers. Furthermore, it will help to empower the local community in enhancing their economic status. The results of the study showed that a majority of the study population were using some or the other form of herbal medicines/medicinal plants and the respondents felt that herbal medicines were mostly preferred to conventional medicines since they are more efficacious and have minimal side effects, also the strongest influence for the use of herbal medicines were family and friends. The findings of our study demonstrated that the general population in Kerala has a moderate level of knowledge about the proper usage of medicinal plants. A considerable proportion of the population reported the use of herbal products or food supplements in order to protect themselves from the

disease. We suggest that policymakers provide further educational campaigns that increase population knowledge about the disease transmission routes and preventive measures. In addition, the use of herbal products should be evidence-based to ensure patient safety.

#### 1.5 REFERENCES

- [1] Arumugam, N. (2019). Knowledge, attitudes and practices (KAP) towards medicinal plants among Malaysian consumers. *Medicinal Aromat Plants*.
- [2] Babich, O., Sukhikh, S., Prosekov, A., Asyakina, L., & Ivanova, S. (2020). Medicinal Plants to Strengthen Immunity during a Pandemic. *Pharmaceuticals*.
- [3] Alyami, H. S., Orabi, M. A., Aldhabbah, F. M., Alturki, H. N., Aburas, W. I., Alfayez, A. I., ... & Alsuhaibani, N. A. (2020). Knowledge about COVID-19 and beliefs about and use of herbal products during the COVID-19 pandemic: A cross-sectional study in Saudi Arabia. *Saudi Pharmaceutical Journal*, 1326-1332.
- [4] Kumar, S. U., Kumar, D. T., Christopher, B. P., & Doss, C. (2020). The rise and impact of COVID-19 in India. *Frontiers in medicine*, 7, 250.
- [5] Bhat, B. B., Udupa, N., Ligade, V. S., Khan, S., & Sreedhar, D. (2019). Assessment of knowledge and attitude of patients on herbal medicine use in Udupi region, Karnataka, India. *Tropical Journal of Pharmaceutical Research*, 117-121.
- [6] Malan, D. F., & Neuba, D. F. (2011). Traditional practices and medicinal plants use during pregnancy by Anyi-Ndenye women (Eastern Côte d'Ivoire). *African journal of reproductive health*.
- [7] Hossain, M. G., Paul, D., Ali, M. A., Huda, M. N., Alam, M. S., Mahmood, S., & Hamooh, B. T. (2020). The Perspectives of Medicinal Plants for COVID-19 Treatment: A Review. *Journal of Agricultural Science & Engineering Innovation (JASEI)*, 10-17.
- [8] Kumar, S. U., Kumar, D. T., Christopher, B. P., & Doss, C. (2020). The rise and impact of COVID-19 in India. *Frontiers in medicine*, 7, 250.
- [9] Asmelashe Gelayee, D., Binega Mekonnen, G., Asrade Atnafe, S., Birarra, M. K., & Asrie, A. B. (2017). Herbal medicines: personal use, knowledge, attitude, dispensing practice, and the barriers among community pharmacists in Gondar, Northwest Ethiopia. *Evidence-Based Complementary and Alternative Medicine*, 2017.
- [10] Yang, Y.; Islam, M. S.; Wang, J.; Li, Y.; Chen, X.; 2020. Traditional Chinese medicine in the treatment of patients infected with 2019-new coronavirus (SARS-CoV-2): A review and perspective. *Int. J. Biol. Sci.* 2020, 1708-17.46
- [11] Ahmad, A.; Rehman, M. U.; Alkharfy, K. M. An alternative approach to minimize the risk of coronavirus (Covid-19) and similar infections. *Eur. Rev. Med. Pharmacol. Sci.* 2020, 4030-34.
- [12] Fakim, A. G. Medicinal plants: Traditions of yesterday and drugs of tomorrow. *Mol. Aspects Med.* 2006, 27, 1-93
- [13] Lubbe, A.; Verpoorte, R. Cultivation of medicinal and aromatic plants for specialty industrial materials. *Ind. Crops Prod.* 2011, 34, 785-801.
- [14] Luo, H.; Tang, Q.L.; Shang, Y.X.; Liang, S.-B.; Yang, M.; Robinson, N.; Liu, J.-P. Can Chinese medicine be used for

prevention of Corona Virus Disease 2019 (COVID-19)? A review of historical classics, research evidence and current prevention programs. *Chin. J. Integr. Med.* 2020, 26, 243–250.

[15] Uzun, M.; Kaya, A. Ethnobotanical research of medicinal plants in Mihalgazi (Eski,sehir, Turkey). *J. Pharm. Biol.* 2016, 54, 1194863.

[16] EL Alamlab, A., Fattah, A., Chait, A., 2020. Medicinal plants used for the prevention purposes during the covid-19 pandemic in Morocco. *J. Analytical Sci. Appl. Biotechnol.*, 2, 4–11.

[17] Smith RD. Responding to global infectious disease outbreaks: lessons from SARS on the role of risk perception, communication and management. *Soc Sci Med.* (2006) 63:3113–23. doi: 10.1016/j.socscimed.2006. 08.004

[18] Wu, Z., & McGoogan, J. M. (2020). Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: Summary of a report of 72,314 cases from the Chinese Center for Disease Control and Prevention. *Journal of the American Medical Association*, 323, 1239-1242. <https://doi.org/10.1001/jama.2020.2648> PMID:32091533

[19] Asaad, A., El-Sokkary, R., Alzamanan, M., & El-Shafei, M. (2020). Knowledge and attitudes towards Middle East respiratory syndrome-coronavirus (MERS-CoV) among health care workers in south-western Saudi Arabia. *Eastern Mediterranean Health Journal*, 26(4), 435-442.

[20] X. Chen, C. O. Ung, H. Hu et al., "Community pharmacists' perceptions about pharmaceutical care of traditional medicine products: a questionnaire-based cross-sectional study in Guangzhou, China," *Evidence-Based Complementary and Alternative Medicine*, vol. 2016, pp. 1–10, 201647

[21] W. Sweileh, E. Abu Arrah, A. Abu Taha et al., "Dispensing practices, attitudes and knowledge of pharmacists towards herbal products in palestine," *Ibnosina Journal of Medicine and Biomedical Sciences*, vol. 5, no. 3, pp. 123–130, 2013.

[22] World Health Organization., "National policy on traditional medicine and regulation of herbal medicines: report of a WHO global survey. World Health Organization; 2005".

[23] M. N. Al-Arifi, "Availability and needs of herbal medicinal information resources at community pharmacy, Riyadh region, Saudi Arabia," *Saudi Pharmaceutical Journal*, vol. 21, no. 4, pp. 351–360, 2013.

[24] Vaidyanathan G. People power: how India is attempting to slow the coronavirus. *Nature.* (2020) 580:442. doi: 10.1038/d41586-020-01058-5

[25] World Health Organization (WHO), 2004. Guidelines on safety monitoring of herbal medicines in pharmacovigilance systems. [Online; accessed April 2014].

[26] Qian Z, Travanty EA, Oko L, Edeen K, Berglund A, Wang J, Ito Y, Holmes KV, Mason RJ. Innate immune response of human alveolar type ii cells infected with severe acute respiratory syndrome-coronavirus. *Am J Resp Cell Mol.* 2013; 48:742–8.

[27] Zhao S, Lin Q, Ran J, Musa SS, Yang G, Wang W, Lou Y, Gao D, Yang L, He D, Wang MH. Preliminary estimation of the basic reproduction number of novels coronavirus (2019-nCoV) in China, from 2019 to 2020: a data-driven analysis in the early phase of the outbreak. *Int J Infect Dis.* 2020; 92:214–7

[28] Zunyou Wu and Jennifer M McGoogan. Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: summary of a report of 72 314 cases from the chinese center for disease control and prevention. *Jama*, 2020.

[29] Sandip Mandal, Tarun Bhatnagar, Nimalan Arinaminpathy, Anup Agarwal, Amartya Chowdhury, Manoj Murhekar, Raman R Gangakhedkar, and Swarup Sarkar. Prudent public health intervention strategies to control the coronavirus disease 20

[30] EL Alamlab, A., Fattah, A., Chait, A., 2020. Medicinal plants used for the prevention purposes during the covid-19 pandemic in Morocco. *J. Analytical Sci. Appl. Biotechnol.*, 2, 4–11

[31] Ceccarelli, M., Berretta, M., Rullo, E. V., Nunnari, G., and Cacopardo, B. (2020). Editorial–Differences and similarities between Severe Acute Respiratory Syndrome (SARS)-CoronaVirus (CoV) and SARS-CoV-2. Would a rose by another name smell 48 as sweet? *Eur. Rev. Med. Pharmacol. Sci.* 24, 2781–2783. doi: 10.26355/eurrev\_202003\_20551

[32] M. Spiteri, E. Attard, A. Serracino-Inglott, and L. M. Azzopardi, "Compilation of an herbal medicine formulary for herbal substances in malta and its usefulness amongst healthcare professionals," *Journal of Young Pharmacists*, vol. 5, no. 1, pp. 22–25, 2013.

[33] D. K. Raynor, R. Dickinson, P. Knapp, A. F. Long, and D. J. Nicolson, "Buyer beware? Does the information provide with herbal products available over the? counter enable safe use?" *BMC Medicine*, vol. 9, no. 94, Article ID 174194, 2011.

[34] M. N. Al-Arifi, "Availability and needs of herbal medicinal information resources at community pharmacy, Riyadh region, Saudi Arabia," *Saudi Pharmaceutical Journal*, vol. 21, no. 4, pp. 351–360, 2013.

[35] Ekor M. The growing use of herbal medicines: Issues relating to adverse reactions and challenges in monitoring safety. *Front. Pharmacol*, 2014;10:1–10.