

Original Research**Indonesian Traditional Medicines: The Use Before And During The COVID-19 Pandemic At Online Pharmacy Networks In Indonesia****Happy Elda Murdiana^{1*}, Mega Karina Putri², Dewi Rahmawati³, Aloysia Yossy Kurniawati⁴**^{1,4} Faculty of Pharmacy, Immanuel Christian University, Indonesia² Departement of Pharmacy, Akbidyo College of Health Science, Indonesia³ Faculty of Pharmacy, Anwar Medika University, Indonesia**ABSTRACT**

Background: Many countries' use of traditional medicine during the COVID-19 pandemic aims to increase immunity and reduce symptoms caused by COVID-19. The use of traditional medicine, either alone or in combination with "western medicine" has become a concern for many countries to overcome the COVID-19 pandemic when drugs and vaccines are in the process of discovery and procurement.

Methods: The main sales data obtained are included and excluded so that they can be compared, then coded according to the distribution permit classification, route of administration, country of origin, and usage claims. The analysis of the effect of the route of administration and country of origin is based on chi-square (chi-square count > chi-square table), which states that both have an effect.

Results: The significance of the use of traditional medicines based on claims ($p < 0.05$) before and during the COVID-19 pandemic was not significantly different.

Conclusion: There is an effect of using Indonesian traditional medicine by classification of the route of use and country of origin. It is only a claim to help maintain liver health, which has a significant difference in the use of Indonesian traditional medicines before and during the COVID-19 pandemic, but the percentage of sales is decreasing.

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INTRODUCTION

Traditional medicine is an ingredient in the form of plant, animal, mineral, extract preparations (gelenica), or a mixture of these materials that have been used for generations for treatment and can be applied according to the norms prevailing in society Indonesia National Agency of Drug and Food Control (BPOM RI, 2019). The use of traditional medicine among Indonesian people is quite large. Basic Health Research 2013 data states that the proportion of households that use traditional medicine

in urban areas is 17.2%, and in rural areas it is 13.2% (Ministry of Health of the Republic of Indonesia, 2013).

Therapy for COVID-19 antivirus and the prevention of the symptoms that accompany COVID-19 still needs to be proven. The government's efforts to break the chain of the spread of the COVID-19 virus by requiring all Indonesian citizens to vaccinate up to three times. Several drugs are used to treat symptoms, such as corticosteroids to treat the inflammation that can cause cytokine storms (Soy et al., 2020). The use of synthetic drugs can reduce symptoms quickly, but the use of corticosteroid drugs has many side effects (Grennan & Wang, 2019).

Handling COVID-19 to prevent the spread is to increase the body's resistance. Increasing stamina or immunity is important to prevent COVID-19, and herbal remedies are an option to increase immunity (Maharani & Fernandes, 2021). Indonesia has already acknowledged herbal plants and has used them for generations (Sumarni et al., 2019).

Temulawak, sambiloto, cinnamon, clove, lemongrass, and ginger are Indonesian herbal plants that have an immunostimulant effect by increasing the response of B cells and T cells to produce antibodies and stabilize the number of lymphocytes, NK cells, and CD4+ expression (Sianipar, 2021). In Kalimantan, Indonesia, 3 herbal remedies have the function of increasing immunity; those are Pasak Bumi (*Eurycoma longifolia* Jack.), Akar Kuning (*Coscinium fenestratum* (Gaertn.) Colebr.), and Dayak Onion (*Eleutherine bulbosa* (L.) Merr) (Maharani & Fernandes, 2021). Traditional Chinese Medicine (TCM) is the best therapy and treatment option for COVID-19 (Zhao et al., 2021).

Traditional herbal remedies are used in China with a combination of "western medicine" while in India to improve the healing of COVID-19, which is proven by improving symptoms (Ganguly & Bakhshi, 2020). The integration of traditional Chinese medicine and western medicine can eliminate fever, cough with phlegm, fatigue, chest tightness, and anorexia in the symptoms of COVID-19 and provide a better effect that does not increase the side effects of COVID-19 (Liu et al., 2020). Saudi society also understands that natural ingredients such as honey, black seeds, lemon, and ginger can increase immunity but do not protect against COVID-19 (Abdullah Alotiby & Naif Al-Harbi, 2021).

Allium sativum, *Olea Europaea*, *allium cepa*, *zingiber officinale*, *thymus maroccanus*, *eucalyptus globules*, *Curcuma xanthorrhiza*, and several other herbs in the Lamiaceae family, Cupressaceae, were used in Morocco during the COVID-19 pandemic to treat respiratory complaints, especially those containing essential oils (Alami et al., 2020). For centuries, aromatherapy has been used in the Unani Medicine method in Egypt and India for the treatment of several diseases, and several studies have proven the effective anti-microbial and antiviral effects of essential oils (Fatima et al., 2021). There are a lot of Indonesian people who use traditional medicine, which is marketed in many network pharmacies for the treatment of COVID-19.

This study aims to compare the use of Indonesian traditional medicines before and during the COVID-19 pandemic based on their sales in online pharmacy networks in Indonesia.

MATERIALS AND METHOD

This study is a quantitative cross-sectional study with retrospective data collection through sales main data at K24 Klik online pharmacies throughout Indonesia. The study

was conducted without any intervention in the sample. Data collection with the total sample method was carried out in February 2021 with data taken from sales of Indonesian traditional medicines from January to December 2019 (before the pandemic) and January to December 2020 (during the pandemic).

The sales data of Indonesian traditional medicines were extracted from the main data and then coded based on the sales classification at the K24 Klik online pharmacy and the Circular Permit Number (NIE) issued by BPOM, resulting in data from as many as 159 different types of traditional Indonesian medicines that could be compared. The comparison of the percentage of sales illustrates the number of uses in the community. Data on Indonesian traditional medicines is classified based on the efficacy test required by BPOM, country of origin, and route of administration to determine the effect of use before and during the pandemic based on the chi-square test.

The data on the effects of using Indonesian traditional medicines based on claims of use were processed with an unpaired T-test with data on more than 2 types/brands of drugs and the Mann-Whitney test if the T-test did not meet the requirements. Data processing is carried out by using SPSS.

RESULTS

Based on the method of manufacture, the types of claims for use, and the level of proof of the efficacy of Indonesian traditional medicines, they are divided into three categories: Domestic Traditional Medicines (TR) (Jamu), Standardized Herbal Medicines (OHT), and Phytopharmaceuticals (FF). Based on research data, it was found that the percentage of sales of Indonesian traditional medicines in online pharmacy networks in Indonesia is shown in Table 1.

Table 1. Shows the percentage of sales of Indonesian traditional medicine by distributor permit

Classification	Percentage (%) N=159
TR (Domestic Traditional medicine)	79
TL (Licensed Domestic Traditional Medicine)	1
TI (Imported Traditional Medicine)	7
HT (Standardized Herbal Medicines)	7
FF (Phytopharmaceutical)	3
QD (Domestic Quasi)	2
SD (Domestic Supplement)	1

There has been an increase in sales of Indonesian traditional medicines based on the distribution permit classification according to the Indonesia National Agency of Drug and Food Control, which is shown in Table 2.

Table 2. Sales Improvement of Indonesian Traditional Medicines based on distribution permit classification

Indonesia national agency of drug and food control categories	2019	2020	Percent (%) increase/decrease
TR (Domestic Traditional Medicine)	3267	6550	100.49
OHT (standardized herbal medicine)	462	611	32.25
TI (Imported Traditional Medicine)	1632	2114	29.53
QD (Quasi Domestic)	129	332	157.36

Indonesia national agency of drug and food control categories	2019	2020	Percent (%) increase/decrease
SD (Domestic Supplements)	11	2	-81.82
FF (Phytopharmaceutical)	73	347	375.34
TL (licensed domestic Traditional Medicine)	24	38	58.33
Total	5598	9994	78.53

The number of sales based on the origin of traditional medicines is shown in Table 3.

Table 3. Sales of Indonesian traditional medicine by country of origin

Country of Origin	Percentage (%) N= 159
Domestic Product	93
Imported Product	7

Based on the route of use of Indonesian traditional medicine, oral used are more sold than topical drugs. The details can be seen in table 4.

Table 4. Percentage of sales of Indonesian Traditional Medicine by rute of use

Rute of use	Percentage (%) N=159
External medicine	16
Internal medicine	84

The effect of Indonesian traditional medicines based on country of origin and route of use before and during the COVID-19 pandemic is shown in Table 5.

Table 5. The effect of Indonesian traditional medicines based on country of origin and route of use

Medicine Category	Chi-square table	Chi-square count	Meaning
Domestic and Imported Traditional Medicines	3.81	3,974	Has any Effect
Traditional medicine for oral and topical use	3.81	125.827	Has any Effect

Based on the classification of claims for traditional Indonesian medicines in this study, the results are shown in Table 6.

Table 6. Differences in the use of Indonesian traditional medicines based on claims before and during the COVID-19 pandemic

Classification based on claims	Percentage (%) of sales comparison before and during the pandemic	p-value sig p<0.05
Helps maintain heart health	-48.00	0.00
Reduce internal heat	83.15	0.994

Classification based on claims	Percentage (%) of sales comparison before and during the pandemic	p-value sig p<0.05
Help the healing process and increase albumin levels	-35,90	1.00
Relieve cough	56.79	0.760
Helps lower cholesterol and LDL levels	-50	-
Helps relieve colds	238.75	0.699
Relieve hemorrhoids	137.14	0.830
Breast milk booster	190	-
Helps shed kidney stones	132.86	1.00
Helps heal burns	-0.14	-
Increase endurance (immunity)	200.65	0.417
Helps maintain prostate health	209.09	1.00
Helps increase male stamina	34.94	1.00
Body warmer, relieve flatulence, avoid insect bites	47.62	0.825
Increase appetite	56.00	0.825
Help overcome and control Diabetes Mellitus	-52.94	0.513
Lose weight by reducing fat	-68.52	0.939
Relieve toothache	165.77	1,000
Antioxidant	35,48	0.793
Helps reduce cough and cold symptoms	180.56	1,000
Launch and reduce menstrual pain	18.18	1,000
Help launch defecation	221.15	-
Warm the body	88.98	0.244
Relieve typhoid (fever) / help maintain body health	178.57	1,000
Improve blood circulation	112.12	1,000
Increase platelets	37.14	-
Prevent insect bites	129.41	-
Look at women's health	-83.33	1,000
Antimicrobial	192.31	-
Relieve pain	703.57	0.507
Help stop bleeding	273.08	-
Antivirus	-14.71	-
Treat wounds	-40	-
TOTAL	51.69	

DISCUSSION

The highest percentage of domestic traditional medicine sales is 79% (Table 1). Most of the Indonesian traditional medicines circulating are still licensed for traditional medicine. There are still a few Indonesian traditional medicines that are licensed as OHT (Standardized Herbal Medicines) and FF (Phytopharmaceuticals). Based on Indonesia's National Agency of Drug and Food Control data in 2017, there are more

than 12,000 types of traditional medicinal products, 64 types of OHT products, and 20 types of phytopharmaceuticals (Widowati et al., 2020).

Indonesian National Agency of Drug and Food Control data for July 2021 states that Indonesia has 26 types of FF (phytopharmaceuticals) (Indonesia National Agency of Drug and Food Control (BPOM RI), 2022). It was recorded by the Indonesian National Agency of Drug and Food Control that until 2022, the registered traditional medicines reached 14,987 brands, 99 OHT, and 35 FF (phytopharmaceuticals) that have NIE (Bisnis, 2022). Therefore, the percentage of traditional medicine is at most a natural product in proportion to the amount of circulation in Indonesia.

The use of Indonesian Traditional Medicine experienced a total increase of 78.53%. Based on the details in table 2, it can be seen that domestic traditional medicines increased by 100.49%, domestic quasi increased by 157.36%, and phytopharmaceuticals also increased by 375.34%, but the need for domestic health supplements decreased by 81.82%. Before the COVID-19 pandemic, the Ministry of Health of the Republic of Indonesia had urged the public to use OHT and FF (Phytopharmaceuticals) as promotive and preventive efforts, especially to maintain body resistance (Kementerian Kesehatan Republik Indonesia, 2019).

During the COVID-19 pandemic, the need for traditional Indonesian medicines increased due to public awareness about increasing immunity. Indonesia's National Agency of Drug and Food Control also gives priority to registration for licensing of Indonesian traditional medicines and health supplements with claims to maintain immunity. From January to July 2020, NIE (Marketing Permit Number) has been issued for 178 traditional medicines, 3 phytopharmaceuticals, and 149 domestic health supplements with properties to help maintain body immunity (Indonesia National Agency of Drug and Food Control, 2020).

The Indonesian government encourages the use of herbal medicine as an immune booster. For example, the use of ginger, which contains essential oils as an anti-inflammatory and antioxidant, helps relieve coughs (Biro Komunikasi dan Pelayanan Masyarakat Kementerian Kesehatan RI, 2021). The decrease in the need for health supplements during the COVID-19 pandemic in Indonesia is inversely proportional to data in several developed countries, such as the United States, UK, France, and Poland, which experienced an increase in sales of health supplements during the first wave of the COVID-19 pandemic with claims of prophylactics for COVID-19 through the mechanism of increasing immunity (Rando et al., 2021).

This is a possible lack of information from the Indonesian people about health supplement products that increase immunity to prevent the transmission of COVID-19. The circulation of domestic traditional medicines is greater than imported products among the people of Indonesia (table 3). This cannot be separated from the history of the existence of traditional Indonesian medicine that existed in the Mesoneolithic era with the discovery of fossils of herbal medicine-making equipment made of stone.

The use of herbs for treatment has been listed in inscriptions since the 5th century AD on the reliefs of Borobudur, Prambanan, and Pelataran temples in the 8th–9th centuries AD. Usada Bali, which is a description of the use of herbs written in Old Javanese, Sanskrit, and Balinese on palm leaves in the years 991–1016M. A complete description of herbal medicine is contained in the Centini fiber, written by Kanjeng Gusti Adipati Anom Mangkunegoro III in 1810–1823 (Andriati & Wahjudi, 2016), so only the development of Indonesian traditional medicines remains in clinical trials.

According to the regulation of the Head of the Indonesian National Agency of Drug and Food Control No. 12 of 2014, the finished product based on its use is divided into internal medicine and external medicine. The sales of the internal product (84%) are more than the external product (16%) (Table 4). Internal medicine consists of chopped preparations, *Simplicia* powder, and other preparations, such as instant powder, granules, effervescent tablets, lozenges, pastilles, lunkhead (Penang), film strips, and internal medicine liquid.

External medicine consists of liquid preparations, are liquid external drugs, semi-solid preparations such as ointments and creams, and solid preparations in the form of *parem*, *pilis*, *tapel*, patch/plaster, and suppositories for hemorrhoids (Indonesia National Agency of Drug and Food Control, 2014). Traditional Indonesian medicinal products with the highest NIE are in internal medicinal preparations with various claims. While external medicinal products are in the form of essential oils that are smeared in the form of *oleum cocos*, *oleum cajuputi*, *oleum citronella*, *oleum eugenol*, most of which claim to be limited to warming the body and avoiding insect bites.

Based on the calculation of the data (Table 5), there is an effect of using Indonesian traditional medicines in the period before and during the pandemic. Based on the classification of the country of origin and routes of use by patients where the data is taken from the number of sales. This proves that the use of Indonesian traditional medicines during the COVID-19 pandemic is a promotive and preventive alternative for the Indonesian people when the COVID-19 drugs and vaccines are still being researched and procured.

A comparison of the use of Indonesian traditional medicines before and during the COVID-19 pandemic shows a significant difference in only those traditional medicines that claim to help maintain liver health. However, it can be seen in table 3 that the percentage of overall sales increased by 51.69%. In use with claims to reduce internal heat, help relieve coughs, help relieve colds, increase immunity, and antioxidants associated with COVID-19 symptoms also increased in percentage.

The insignificance of the increase in the use of Indonesian traditional medicines may be due to the fact that data has not been properly disseminated to the public about clinical trials of Indonesian traditional medicines that have the potential as antioxidants and increase immunity during the COVID-19 pandemic. Thus causing public fear about the consumption of Indonesian traditional medicines to relieve symptoms and signs or even to take traditional medicine together with "western medicine". Whereas the composition of Indonesian traditional medicines circulating with claims to increase immunity and as antioxidants have a lot of supporting scientific evidence, such as *echinacea purpurea* extract, *Oryza sativa glutinosa*, *Curcuma xanthorrhiza rhizoma*, *nigella sativa semen*, *Vitis vinifera* (grape seed) extract, mangosteen rind extract (*Garcinia*) (*mangostana* Linn.), date palm juice (*Phoenix Dactylifera*), and *Phyllanthus niruri* (*meniran*), and a mixture of cardamom, ginger, rock fruit, clove leaves, and honey has been clinically proven to increase endurance.

Echinacea purpurea (EP) is traditionally used as an infection therapy and for wound healing and has an immunostimulator effect with regulatory T cells (Treg) mechanisms playing a role in immune regulation in vivo. Research has shown that decreased Treg number and function, associated with increased function of CD4-antigen-presenting cells (APCs), may contribute to enhanced immune function by EP (H.-R. Kim et al., 2014). Research related to data stated that *Oryza sativa glutinosa* stated that a dose of 200-1000 mg/L was able to inhibit hydrogen peroxide-induced

genotoxicity in mononuclear leukocytes, so it was beneficial for health promotion by reducing oxidative stress in cellular models (Sangkitikomol et al., 2015).

Crude polysaccharide extract (CPE) isolated from *Curcuma xanthorrhiza* roxb in the study of Kim et al., (2007), can stimulate macrophage immune function mediated in part by specific activation of Nuclear Factor-kappa B (A. J. Kim et al., 2007). Various symptoms of patients infected with COVID-19 show the importance of immune regulation in the human body. Cases of high levels of pro-inflammatory cytokines and Acute Respiratory Distress Syndrome (ARDS) are factors that increase the severity and mortality of COVID-19 patients.

Immune modulation is the only way of regulating the immune system. The components of *nigella sativa*, namely thymoquinone, nigellidine, and hederin are known to be useful for anti-inflammatory and strong antioxidants in obstructive respiratory disorders and strengthen immune responses on a molecular basis (Kulyar et al., 2021). An ayurvedic formula in the form of a mixed decoction of *Ocimum tenuiflorum*, *Cinnamomum Verum*, *Piper nigrum*, *Zingiber officinale*, and *Vitis vinifera* is recommended to increase immunity against infections caused by the novel coronavirus (COVID-19).

This ayurvedic formulation not only modulates the pathways involved in enhancing immunity but also modulates several pathways that contribute to the development of multiple disease pathogenesis, which would add to the beneficial effects in comorbid hypertension and diabetes patients (Khanal et al., 2022). Xanthone compounds in mangosteen fruit (*Garcinia mangostana* Linn.) have biological activities, including antioxidant and anti-inflammatory effects. The pericarp and yellow sap of xanthone compounds in the mangosteen fruit show much higher radical scavenging activity and iron-reducing antioxidant potential compared to the epidermis (Sukatta et al., 2014).

Research by Al-Farsi et al., (2005) stated that fresh dates contain antioxidants, anthocyanins, carotenoids, phenolics, free phenolic acids, and bound phenolic acids, but after drying in the sun, antioxidants and carotenoids are lost, while the total content of free and bound phenolic and phenolic acids is reduced increased significantly (Al-Farsi et al., 2005).

A review stated that *Phyllanthus niruri* L. (meniran) has traditionally been used as a cure for diseases such as kidney stones, chronic liver disease, diabetes, and viral infections. The use of this versatile ethnomedicinal herb is related to its several pharmacological properties such as immunomodulation, antiviral, antibacterial, diuretic, antihyperglycemic, and hepatoprotection.

P. niruri plant, with its immunomodulators, has been scientifically proven in various clinical trials for the treatment of chronic hepatitis B, pulmonary tuberculosis, vaginitis, and varicella-zoster infection. In such diseases, an effective immune system is essential for the successful treatment and eradication of the pathogen. The *P. niruri* plant has been shown to modulate and activate the immune system.

The utilization of nature-derived immunomodulatory agents, either alone or in combination with available antibiotics or antivirals, is undoubtedly promising and of clinical importance (Rubianto Tjandrawinata et al., 2017).

CONCLUSION

Based on research conducted in online pharmacy networks in Indonesia, there was an increase in the use of Indonesian traditional medicines before and during the

pandemic based on the classification of Indonesia's National Agency of Drug and Food Control licensing except for the sale of domestic health supplements. There is an effect of using Indonesian traditional medicine before and during the pandemic for the classification of the route of drug use and the country of origin of traditional medicine. Only Indonesian traditional medicines with claims to help maintain liver health had a significant difference ($P < 0.005$) in terms of their use before and during the COVID-19 pandemic, but the percentage of sales is decreasing

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