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Insurance, Policy, Knowledge Level and Epidemiology As Factors Affecting Demand And Supply of Pharmaceutical Product

Noor Cahaya[1], Hananditia Rachma Pramestutie[2], Anita Kumala Hati[3], Eka Kartika Untari[4], Pinasti Utami[5]

[1,2,3,4,5]Doctoral Graduate Program, Faculty of Pharmacy, Universitas Gadjah Mada, Yogyakarta, Indonesia.

[1.] Department of Pharmacy, Faculty of Mathematics and Natural Sciences, Universitas Lambung Mangkurat, Banjarbaru, Indonesia.

[2.] Department of Community Pharmacy, Faculty of Medicine, Brawijaya University, Malang, Indonesia.

[3.] Pharmacology and Clinical Pharmacy Department, Department of Pharmacy, Faculty oh Health, Universitas Ngudi Waluyo, Ungaran, Indonesia

[4] Pharmacy Department, Medical Faculty, Tanjungpura University, Pontianak, Indonesia

[5] Pharmacology and Clinical Pharmacy Department, School of Pharmacy, Faculty of Medical and Health Science, Muhammadiyah University, Yogyakarta, Indonesia

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A B S T R A C T

Fulfillment of drug availability is always a challenge from year to year and is determined by supply and demand issues for pharmaceutical drugs. Good management of drugs and pharmaceutical supplies is important in health services. This is related to the quality of health services and the efficiency and effectiveness of the budget. This review study aims to examine the factors that influence drug supply and demand simultaneously with a different perspective from other studies, namely, the focus is to simultaneously discuss the effects of health insurance financing schemes, registration regulations for pharmaceutical products and imports of pharmaceutical products, the level of pharmacist knowledge, changes in disease patterns, disasters, and wars on drug supply and demand. The research design that was used in this study is a narrative review. The data sources that were used are PubMed, Science Direct, Scopus, and Google Scholar. The inclusion criteria in this study are all research related to the demand for pharmaceutical supplies and drugs that will be reviewed in the study, either in the form of original research, reviews, or reports. The results obtained articles consisting of 8 articles related to health insurance financing, 6 articles related to registration regulation of pharmaceutical products and import of pharmaceutical products, 5 articles related to pharmacist knowledge level, 3 articles related to changes in disease patterns, and 3 articles related to disasters and wars. Based on the 25 articles that were used as data in this study, it was found that the factors that influence the supply and demand of pharmaceutical supplies are health insurance financing, regulation of registration drug processes and imports of pharmaceutical products, level of knowledge of pharmacists as pharmaceutical service providers, changes in disease patterns, disasters, politics, and war.

Kata kunci: Demand Supply, Policy, Insurance, Pharmaceutical Product, Disasters

* *Corresponding* author: Noor Cahaya, *Department of Pharmacy, Faculty of Mathematics and Natural Sciences, Universitas Lambung Mangkurat, Banjarbaru, Indonesia*,.
E-mail: *noorcahaya@ulm.ac.id*

INTRODUCTION

Drugs are one of the important components in health services, therefore the availability of sufficient and sustainable drugs in various health facilities will greatly determine the quality of health services and in the end will make the budget more efficient and effective (1). Fulfillment of drug availability has always been a problem from year to year. So that drugs are always available at health facilities, it is necessary to manage drugs properly and correctly in health facilities. Drug management consists of several interrelated elements, namely planning, requesting, receiving, storing, distributing, controlling used and recording and reporting. In carrying out drug management, coordination from various parties is needed to avoid drug vacancies. Drug shortages are a global problem affecting low, middle and high income countries. Many countries have developed various strategies to solve this problem (2,3).

Availability of drugs can not be separated from the effect of supply and demand of drugs. Not only drugs, this also applies to other pharmaceutical supplies that are also needed and used in health services. The availability of drugs in a health care facility is influenced by various factors. The scarcity of pharmaceutical supplies is due to problems in the supply of pharmaceutical supplies, demand for pharmaceutical supplies and regulations related to the supply of pharmaceutical supplies. Problems arising from the supply of pharmaceutical supplies also range from problems in manufacturing, unavailability of raw materials, logistics problems and business problems. Drug shortages affect economic, clinical and humanistic aspects (2,4).

There are many factors that affect the supply and demand of pharmaceutical supplies, including health insurance financing, regulation of registration of pharmaceutical products and imports of pharmaceutical products, level of knowledge of pharmacists as pharmaceutical service providers, changes in disease patterns, disasters, and wars. In previous studies, a narrative review has never been conducted on the factors that affect the supply and demand of pharmaceutical supplies. Whereas there are valuable lessons to be learned from other countries' experiences and other papers, can be reviewed to have the conclusions of any aspect that would influence in supply and demand. This review study will examine the factors that affect the supply and demand of pharmaceutical supplies, both drugs and medical devices, focusing on financing schemes from health insurance, regulation of registration of pharmaceutical products and import of pharmaceutical products, level of knowledge of pharmacists as pharmaceutical service providers, changes in patterns of disease, disaster, and war.

METHODS

This study uses a narrative review method from various studies related to the factors that affect the supply and demand of pharmaceutical supplies, both drugs and medical devices, focusing on financing schemes from health insurance, regulation of registration of pharmaceutical products and import of pharmaceutical products, level of pharmacist knowledge as a pharmaceutical service provider, changing disease patterns, disasters, and wars. Search literature using several databases, namely PubMed, Science Direct, Scopus and Google Scholar. The literature obtained is in the form of original research, review articles and in the form of case studies. Several suitable literatures were collected, selected, summarized and discussed.

RESULTS AND DISCUSSION

The results of this study using several databases, namely PubMed, Science Direct, SCOPUS, and Google Scholar, obtained 25 articles related to the theme raised. Of the 25 appropriate articles, consisting of the topic of insurance financing schemes using 8 articles, the topic of regulation of pharmaceutical product registration and import of pharmaceutical products using a total of 6 articles, the topic of pharmacist knowledge on drug management using 5 articles and the topic of changing disease patterns as many as 3 articles and 3 articles related to disasters and wars.
The following is a discussion of each topic.

A. The Influence of Health Financing Scheme by Insurance on Demand and Supply of Medicines

The financing scheme in health insurance has an impact on the demand and supply of drugs. Demand for certain drugs is not correlated with demographic characteristics, but tends to be influenced by premium subsidies from insurance companies (5). The imbalance between the health financing budget through the insurance program and the costs paid results in "temporary poverty", which if it cannot be covered, there will be a sale of assets and savings, or borrowing debt (6,7). The strategy has a negative long-term effect on earnings and the ability to deal with future problems. Another consequence is neglecting treatment, resulting in a decline in health and a decrease in human resources as a long-term impact.

In general, a review of the empirical literature shows that health insurance can effectively increase the utilization of health services and reduce the direct financing of health costs, although the evidence is sometimes mixed (8). Based on information asymmetric theory and empirical

evidence shows that when individuals get full health insurance, they tend to access more health services than if they had to pay the full cost, this is known as moral hazard in health insurance (9–11).

A cost-sharing system which requires a person to pay a portion of the cost of medical services is a typical instrument used by many health systems to solve the problem of overconsumption, leading to the classic trade-off between providing incentives for appropriate behavior, preventing overconsumption, and reduce risks to individuals and protect them from negative health threats (12).

Table 1. The influence of insurance financing factors on supply and demand for drugs

Author	Setting	Method	Result
Robert Sparrowa, Asep Suryahadi, Wenefrida Widyanti, (2013) (8)	Indonesia, 2005-2006	National Socioeconomic Survey	Social health insurance increases access to health care and demand for drugs due to increased demand for outpatient services for the poor and the most vulnerable to disasters, so the government launched the Aseskin program in Indonesia which is fully subsidized by the government.
Colleen Carey, (2021) (5)	USA, 4 years	*Canonical model*	A $1 increase in subsidies would result in a $0.40 reduction in out-of-pocket costs and an increased response to drug demand, these data are used to estimate the sustainability of government subsidies.
Michela Ponzo, Vincenzo Scoppa, (2021) (12)	12 months, 2013	RCT	Individuals who are exempt from cost sharing will have a significantly increased pattern of prescription drug consumption (up about 20%).
Hanna Rättö,Terhi Kurko, Jaana E. Martikainen, Katri Aaltonen, (2021) (13)	Finland, January 2014 - December 2018	Retrospective analysis	The increase in cost sharing will reduce the consumption of needed drugs even though there is a drug cost sharing ceiling mechanism. The impact of increasing co-payments on the consumption of type 2 antidiabetics in Finland is to protect patients from high co-payment expenses.
Michael Kirsch, et al; (2020) (14)	January 2013 - September 2016	retrospective cohort study	Fully subsidized treatment was associated with an increase in opioid drug refills compared with no subsidies.
Kevin A. Look., Prachi Arora,; (2016) (15)	2009 – 2011	*The Medical Expenditure Panel Survey*	Undesirable positive effect of increased coverage for prescription drug insurance. This will reduce self-expenditure on prescription drugs
Ausmita Ghosh, Kosali Simon, Benjamin D. Sommers; 2019 (16)	pharmaceutical retail, 2013 – 2014	Retrospektif analysis from database;	Individuals who pay outside the guarantee are reduced due to insurance coverage which then has an impact on increasing drug prescriptions.
Carlo V. Fiorio, Luigi Siciliani, 2010 (17)	Pharmacy	Retrospektif analysis	An increase of one EURO co-payment could reduce the number of prescriptions per capita by 4% and public pharmacy spending per capita by 3.4%. In contrast, a reduction of one EURO co-payment could increase the number of prescriptions per capita by 3.4%, and public pharmaceutical spending per capita by 4.9%.

Based on the 8 articles reviewed, it was found that insurance financing schemes can affect the demand and supply of drugs. Low premium insurance and subsidies for full health coverage will increase demand for medicines (8,14). Health insurance financing by implementing cost sharing or co-payment will reduce the demand or need for drugs, because patients have to pay for part of the total health financing themselves (5,12,13,15–17). Research conducted by Ponzo (12) shows the relevant estimates of the cost-sharing exemption on Diagnostic Tests and Prescription Drug Consumption. Individuals who obtained total cost-sharing exemption on diagnostic tests increased from 0.25 to 0.41, while those on prescription consumption increased from 49% to 57%.

Increased cost sharing is associated with reduced use of essential drugs, especially by vulnerable populations (18–21). Antidiabetic use in the United States is declining due to increased co-payments (22), On the other hand, an increase in use and adherence to antidiabetics occurs after a decrease in cost sharing (23). Higher cost sharing has also been shown to have a negative effect on the initiation of secondary prevention drugs, including hypoglycemic drugs (24).

Full cost sharing of opioid medication received by low-income patients has an impact on opioid refilling habits compared to patients receiving partial subsidies (25), These results are consistent with previous findings showing that

decreased cost sharing was associated with increased drug replenishment (14).

Pharmaceutical financing in OECD member countries (26) implementing a cost-sharing policy. The cost-sharing policy has two main objectives: i) reducing moral hazard, by suppressing patients' low demand for drugs, and, ii) this policy is also expected to increase revenue for the government. Cost sharing that is implemented will reduce the number of recipes per capita by 0.046. Cost sharing of one Euro can reduce the number of recipes per capita by 0.026 (17).

B. Registration Regulation of Pharmaceutical Products and Import of Pharmaceutical Products

Acces to medicines is a challenge for pharmaceutical companies who want to register their medicines. The existence of a registration policy can ensure that circulating drugs are guaranteed efficacy, safety, and quality (27). However, based on the experience of pharmaceutical companies in the direction of harmonization, it has its own obstacles so that it has the potential to affect the availability of drugs and requires large costs for pharmaceutical companies that want their products to be marketed. Research data shows that developing countries for drug registration fees show between 1-5 times the income per capita of health in their country (28). In regulation, not only drug products are regulated, drug information must also follow existing regulations. Some regulations require strict requirements at the level of marketing and use of drugs (29). The following is a summary of the results of the review regarding the regulation of registration of pharmaceutical products and the import of pharmaceutical products in various countries.

Table 2. Review of Registration Regulation of Pharmaceutical Products and Import of Pharmaceutical Products

Author	Setting	Methods	Result
Muia M.D (2013) (30)	Kenya	Descriptive primary and secondary data	There have been time extensions and delays in the procurement process, although regulations aim to regulate the process.
Poh J *et al* (2011) (31)	Singapore	*Brief overview*	Singapore has a Health Sciences Authority (HSA) which formalizes the procedures and requirements for registration of biosimilar products.
Bhutta *et al* (1996) (32)	Pakistan	Surveys in doctors' private hospitals and clinics	Individuals who are exempt from cost sharing will have a significantly increased pattern of prescription drug consumption (up about 20%).
Yu et al (2010) (18)	China	This study is based on literature review by searching electronic databases and official web pages of the Chinese government	China's economic transition and healthcare reform have caused a number of shortfalls in the pharmaceutical market. This occurs as a result of market and government failures is that all suppliers prefer more expensive drugs. New drug pricing mechanisms are the key to current pharmaceutical reforms and should be implemented in coordination with other health system reforms.
Kaplan *et al* (2003) (28)	34 countries in the world	Sent a questionnaire by Internet pharmaceutical policy discussion group and followed this with facsimile submission of the same document to the drug regulatory authority	Developing countries for drug registration fees show between 1-5 times the income per capita of health in their country
Narsai et al (2012) (33)	Africa	Cross-sectional descriptive. Research is conducted across pharmaceutical companies, both local and multinational	A total of 33 responses were received Noting that most regulatory authorities in Africa have limited resources, harmonization of drug registration policies will make a positive contribution in ensuring the safety, quality and efficacy of drugs. Pharmaceutical company experience shows that country-specific regulatory requirements are a barrier to registering and supplying drugs to African countries. In particular, GMP inspections, GMP inspection costs, and country-specific labeling are cited as major issues.

Based on the results of the 6 articles reviewed, there are differences in terms of the authority that regulates registration and import regulations for pharmaceutical products. In Singapore, the licensing authority for medicinal products is carried out by the Health Sciences Authority (HSA). In HSA there are Health Products Regulations Groups (HPRG) which regulate the fulfillment of quality, safety, and efficacy standards of health products based on international standards. Licensed medical products, including drugs and biologic products sold and supplied in Singapore are governed by the pharmaceutical legislation (31).

In China the registration of pharmaceutical products is submitted to a pharmaceutical authority called the State Food and Drug Administration (SFDA). From 1986 to 2006, Chinese companies independently developed only forty categories of chemical drugs. To overhaul drug administration, the SFDA tightened the drug registration review process by implementing the "Drug Registration Administration Act" which was amended in October 2007(34). This amendment commits to improving registration procedures by tightening drug assessment and approval standards to increase focus on drug safety and encourage innovation (34).

In Pakistan there is a de-registration process, namely the elimination of drugs that are already on the market and the prohibition of the same drugs from entering the market. In 1990, Pakistani authorities withdrew a pediatric antimotility formulation from the market. A survey conducted by Bhutta & Balchin (1996) assessed the effectiveness of the withdrawal of the drug and assessed the possible effects of substitution of the drug. It was found that most of the recalled products were from retail/pharmacies, although these products were still on the black market. Efforts to replace drugs that were withdrawn showed a more serious problem, namely that de-registration products were used inappropriately (mis-use) from products intended for adult subjects. One of the ways to overcome this problem is through a legal mechanism to adjust the level of access to drugs so that drugs are in national coverage, as well as determining the conditions for drug handling to be allowed only to health workers prescribing and dispensing drugs. (29).

The limited availability of drugs in the country causes the import of drugs from other countries. One of the stages of efforts to control the disease can be seen from the adoption of the DOTS (Directly Observed Treatment Short-course) program as a national strategy in Kenya to control Tuberculosis (TB). There are several policy options that regulate the increase in drug financing, namely getting direct attention from policy makers involving government regulations and imports from other countries (30).

In Canada the price of prescription drugs is cheaper, which triggers other countries to import drugs from that country. A legal import application must include the purpose of importing the drug, the country of origin of the drug that can be imported, safety standards, regulatory requirements, and fees to be paid based on government regulations. Supporters of the policy believe that if imports from other countries are legalized, there will be sufficient quantities of drugs and will significantly affect drug prices on the world market. On the other hand, the safety of imported drugs and the issue of cost savings will be low if foreign governments limit the number of drugs released or the pharmaceutical industry limits the supply of drugs sold to foreign countries (30). Anticipating this, the Kenyan government issued regulations related to the import of drugs, one example of which is the Kenya Industrial Property Bill (2001). This bill allows Kenya to import and manufacture more affordable HIV drugs for HIV/AIDS and other diseases (30).

In Africa, the impact of government policies on drug registration affects pharmaceutical companies across countries. Africa has difficulty in supplying drugs between countries, because there are barriers, namely special requirements that are specific to each country. A study of 33 members of the South African Pharmaceutical Industry Association (PIASA) in which 26 respondents came from the PIASA Regulation working group and 7 from the PIASA Export working group. It was noted that since most regulatory authorities in Africa have limited resources, harmonization of drug registration policies will make a positive contribution in ensuring the safety, quality and efficacy of drugs. The experience of pharmaceutical companies shows that country-specific regulatory requirements are a barrier to registering and supplying drugs to African countries. In particular, GMP inspection, GMP inspection costs, and country-specific labeling are cited as the main problems (33).

C. Knowledge Level of Health Workers as Pharmaceutical Service Providers

One strategy to prevent drug shortages is to properly manage pharmaceutical supplies. Drug management has a role in maintaining and increasing the rational and economical use of drugs in health service units through the provision of drugs of the right type, right amount, right time and place. The existence of good drug management in health care units has several positive impacts, namely the implementation of rational prescribing; development and improvement of drug services that can guarantee several things, namely the delivery of the correct

drug to the patient, the right dose and amount, a good drug container that can guarantee the quality of the drug, and clear and correct information to the patient; and improve the efficiency of drug use. Improper drug management in health care units can have a negative impact both medically and economically. If poor drug management can result in a decrease in the quality of services to patients or the community and a leak in the drug logistics budget (35).

Level of knowledge is related to drug management in health facilities. A person's actions are influenced by knowledge, attitudes, beliefs, beliefs, values, traditions and so on related to health. These factors, especially positive ones, facilitate the realization of behavior. The knowledge that a person has is the initial trigger for behavior, including behavior at work. Knowledge is indispensable in changing mindsets and behavior (36,37).

Good knowledge about drugs will have an impact on the drug management process, from planning, procurement, storage, to drug distribution. If the knowledge of drug governance is not good, then the drug management officers will be confused in managing the availability of drugs, drug storage, drug distribution, and services to patients causing drug management to be hampered, so that it will have a major impact on the health care process for patients. The following table contains the level of knowledge of health workers in this case who are in charge of providing pharmaceutical services related to drug management.

Table 3. Review of Knowledge Level of Health Workers in Drug Management

Author	Setting	Method	Result
Herlinawati *et al* (2020) (38)	Indonesia, Kuningan district	Analytical observational approach cross sectional.	Respondents who have a level knowledge about drug management is not good as many as 38 respondents (71.7%). There is a significant relationship between the level of knowledge about drug management and drug management at the Primary Health Care
Aryani *et al* (2016) (39)	Indonesia, Banyumas district	Analytical observational approach cross sectional.	Drug managers at the Primary Health Care consist of pharmacists and non-pharmacist. Pharmacists respondents have a higher level of knowledge (40.5%) compared to non-pharmacist (10.8%). There is a relationship between the level of knowledge of the pharmacy unit manager and the management of drugs at the Banyumas District Primary Health Care
Hariadini *et al* (2021) (40)	Indonesia, Malang district	Analytical observational approach cross sectional.	The level of knowledge of respondents related to drug management is in the high category, namely pharmacists (2 people) and Pharmaceutical Technicians (11 people), the medium category is Pharmaceutical Technician (1 person). Knowledge of drug managers does not have a significant relationship with the three indicators (indicator of the level of conformity of drug availability with the national formulary, indicator of the level of conformity of drug availability with disease patterns, indicator of conformity level of drug availability with percentage of expired drugs)
Waluyo *et al* (2015) (36)	Indonesia, Asmat district, Mappi, Merauke and Boven Digoel	Analytical observational approach cross sectional.	The description of drug management is as follows: planning accuracy 114.02%, drug availability with disease pattern 170.87%, essential medicine 70.16% and generic drugs 87.87%, drug procurement has not been entirely in accordance with the contract book 77.00%, drug availability 75.75%, damaged or expired drugs 7.01% and empty drugs 0.37%, distribution accuracy 57.68% and deviation of the number of drugs distributed 17.30%.
Athiyah *et al* (2019) (37)	Indonesia	Analytical observational approach cross sectional.	A total of 949 KF pharmacists (100% response rate) participated in the study. The majority of pharmacists show score well in terms of knowledge and attitudes in terms of drug management. Pharmacist knowledge related to drug management has a mean of 22.73 with a maximum value of 24 and a minimum value of 14

Based on 5 articles that were reviewed with settings in several regions of Indonesia, it was found that there was a significant relationship between the level of knowledge and drug management. The better the level of knowledge of drug managers, the better the availability of quality and guaranteed drugs so that they can provide optimal services for the community. To be able to maintain this, it is necessary to make efforts to increase knowledge about drug management and carry out programs such as seminars, training and workshops for drug management officers, in this case pharmacists. It is hoped that all drug management officers can work professionally with sufficient understanding and experience in managing drugs (38).

D. The Changing Patterns of Disease, Disaster, Politics and War

Changes in disease patterns affect supply and demand for pharmaceutical supplies. Parallel epidemiological transitions between demographic transitions and technological transitions that result in changes in disease patterns from communicable diseases to non-communicable diseases (NCDs). This epidemiological shift is thought to be triggered by changes in socio-economic, environmental, and population structure factors such as smoking behavior, lack of activity, high fat and calorie diet, and alcohol intake, all of which are estimated to be the risk of developing NCDs. (41).

Shifts in disease patterns will affect the pattern of prescribing a therapy, especially therapy in the management of NCDs. This will certainly have an impact on the management of drugs and medical devices, especially in terms of demand for drugs and medical devices aimed at the prevention or treatment of NCDs.(42).

In response to the global burden on NCDs, the World Health Organization (WHO) has developed a Global Action Plan that includes a target of 80% drug availability and affordability of essential medicines for the prevention and treatment of diabetes, cardiovascular disease and respiratory disease in both public and private health facilities. The following are some studies that show an overview of the availability of drugs for the treatment of PTM in several countries (Table 4).

Table 4. Review of the availability of drugs for the treatment of NCDs in several countries

Author	Setting	Method	Result
Robertson et al., 2015 (43)	Tanzania	Survey based on the World Health Organization and Health Action International Manual (WHO/HAI).	Availability of several drugs such as metformin, glibenclamide, insulin, ACEI antihypertensives, beta blockers and Calcium Channel Blockers are in suboptimal amounts.
Kristina et al, 2020 (44)	Indonesia	Survey based on the World Health Organization and Health Action International Manual (WHO/HAI).	The availability of drugs for NCDs (diabetes, hypertension, and cardiovascular disease) is suboptimal.
Elias et al., 2017 (45)	India	Survey	Majority of households depend on private facilities for diabetes and hypertension treatment due to lack of facilities laboratory and frequent stockouts of drugs at the Primary Health Care

In addition to globalization, climate change is also a risk factor in changing disease patterns. The World Health Organization (WHO) predicts that climate change will have a very negative impact on world health. Climate change, one of which is rising temperatures, this will accelerate the spread of vector-borne diseases, resulting in increased demand for vaccines.

The existence of a disaster also has a role related to the supply and demand of pharmaceutical supplies. In March 2020, the world health agency, WHO (World Health Organization) issued a decision that the COVID-19 virus outbreak was a pandemic. The COVID-19 pandemic is a form of non-natural disaster. The emergence of the COVID-19 pandemic caused the demand for medical products in the form of drugs and medical devices to quickly exceed supply. During the COVID-19 pandemic, the need for a large number of products is increasing, including critical and essential medicines. There have been multiple reports of critical drug shortages during the COVID-19 pandemic. For example, intravenous sedation required for mechanical ventilation needs (46). The rapid increase in demand for drugs also results in drug shortages when local, national and global supply chains cannot keep up or keep up (47).

During the pandemic, the production process is hampered so that another problem arises, namely the non-issue of pharmaceutical supplies to the buying countries, causing scarcity or disruption of the domestic drug supply chain in each buying country. In addition to production

problems, there are also distribution problems where the lockdown conditions that were widely enforced in the early days of the COVID-19 pandemic caused restrictions on domestic and cross-border movement, thus having a major impact on how pharmaceutical supplies were transported and shipped during this period.

Table 5. Review of the Effect of the Pandemic on Drug Availability

Author	Setting	Methods	Result
Burry et al., 2020 (46)	N/A	Narrative Review	During the COVID-19 pandemic, there was a shortage of medicines in various countries, due to a sudden and large spike in demand, also supported by local, national, and international supply chains that were unable to keep up with the surge. Therefore, an approach is needed through coordination between places/regions or countries to balance supply and demand or optimize drug availability.
Wu et al., 2020 (48)	China	Review	During the COVID-19 pandemic, there was a shortage of masks due to the implementation of a universal mask use policy in all countries and the emergence of public panic. This results in the scarcity of masks and the need for masks for health workers is also a major problem that arises. Therefore, in a pandemic condition, it is necessary to have an effective public communication that must be considered together with the policies that will be issued so that the control of the supply of masks or other personal protective equipment can be carried out optimally.
Okeagu et al., 2021(49)	N/A	Review	Hospitals are experiencing the greatest difficulty during the COVID-19 pandemic, there is a significant shortage of materials such as masks, ventilators, intensive care unit capacity, and personal protective equipment (PPE). This occurs due to supply and demand imbalances or disruptions in the supply chain. Around 80% of active pharmaceutical ingredients (API) are imported from China and India, so the production capabilities of the two countries will determine the supply chain for countries that obtain supplies from these two countries. Therefore, a strategy is needed in the form of diversifying supply sources, increasing the diversification of resources for domestic products by improving technology, developing proactive budgeting strategies, reliable and appropriate management in supporting preparedness during a pandemic, identifying recurring problems so that potential shortages can be estimated and maintaining and improve communication during the pandemic crisis

Conflicts and wars have contributed to the supply and demand for pharmaceutical supplies. The conflict that occurred in Yemen is an example that politics and war have serious impacts and consequences for the pharmaceutical and public health sectors. Hospitals, health centers, and facilities, drug warehouses and pharmaceutical factories destroyed by the conflict have exacerbated the health situation with shortages of medicines, an increase in chronic diseases, and many epidemics and casualties. To properly address the health crisis, there must be a well-functioning health and pharmaceutical sector. However, under conditions of conflict in Yemen, there is a very severe shortage of supplies of essential medicines and vaccines. Conflicts, sieges and ongoing import restrictions affect the availability and quality of medicines. The supply of medicines is limited to private pharmacies and aid provided by humanitarian organizations, and it is reported that the price of medicines has increased by 71%, about 80% of drugs enter Yemen through illegal channels, and about 40% of counterfeit medicines. There is a serious shortage of essential medicines for acute and chronic diseases and life-saving medicines. Some drugs have also disappeared from the market due to the difficulty of importing and the high taxes imposed on drugs. Only 18% of drugs available for primary care facilities and 46% for hospitals. Lack of electricity supply also results in poor storage of drugs, which affects the stability and efficacy of drugs, especially products that require cold chain storage (50).

CONCLUSION

Health insurance financing strategies can affect the demand and supply of pharmaceutical supplies. Implementation of cost sharing or co-payment can reduce demand for drugs, while increasing subsidies or providing full subsidies to health insurance participants will increase demand for drugs. It occurs at all ages and in acute or chronic disease. The existence of regulations can affect the drug registration process and the import of pharmaceutical products which have an impact on the availability of drugs. Other factors that affect the supply and demand of

pharmaceutical supplies are the level of knowledge of health workers as pharmaceutical service providers, changes in disease patterns, disasters, politics and wars. In order to avoid a vacancy of pharmaceutical supplies in health facilities, a pharmacist must be able to carry out proper management of pharmaceutical supplies.

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