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Healthcare Logistics & Supply Chain Management in Health Industry of Indonesia Based on the Telemedicine

Carolina Kuntardjo

¹Faculty of Law Airlangga University, Indonesia.
drcarolinabedah@yahoo.com

Abstract— **The essential mission of logistics and supply chain management is to efficiently plan, organize, and coordinate the movement of goods from a point of origin to a point of consumption. Analyzing and aligning supply chain goals with a patient-first approach enables healthcare organizations to reduce costs while improving patient outcomes. With Patient Direct, a care delivery solution from HRS, this paper provides patients with the telehealth equipment they need when they need it by telemedicine. Telemedicine which is used interchangeably with the term telehealth is the remote delivery of healthcare to patients through information and communication technology, including communication between two or more health professionals who are not in the same location. Thus, it needs secure transmission of medical data through text, sound, image, or video. This system can be a tele-education, tele-monitoring, tele-consultation, or tele-intervention. Telemedicine has several benefits, both for health professionals and medical institution as well as for the patients, especially for the development of healthcare delivery in remote area and also to make interaction between healthcare professional faster. However, telemedicine still has lack of regulation in Indonesia. There is still no regulation about license for the health professional and safety of medical data. Ethical problems in telemedicine are also still an issue, especially about patient's confidentiality, and also it can weaken doctor-patients relationship. According code of ethics, a doctor must examine the patients first before making a diagnosis and treatment, which cannot be done with telemedicine. The lack of regulation and ethical consideration make telemedicine in Indonesia still has some problems and need a challenge for improvement.**

Keywords— *telemedicine, supply chain, logistic, doctor-patient relationship, communication technology, health industry*

1. Introduction

Logistic is the part of supply chain management that is responsible to effectiveness and efficiency of forward and back ward of work flow among production to end user. The world of health, especially in the field of health services, has made rapid progress in the world recently. Indonesia, as one of the developing countries in Southeast Asia, is also trying to keep abreast of developments in the form of health services according to the Industrial Revolution 4.0 era, including the telemedicine health care system that uses a lot of advances in information and communication technology.

Health is one of human rights, as stated in the 1945 Constitution of the Republic of Indonesia Article 28H, "Every person has the right to live physically and mentally, dwell, and get a good and healthy environment and has the right to obtain health services" . Therefore, all groups of Indonesian people must get proper health services wherever they are. Unfortunately, realizing health care equally for all people of Indonesia, an archipelago which has more than 17,000 islands, is not an easy task; geographical conditions have almost always been obstacles to equal distribution of health services in Indonesia [1].

Health services using conventional a method, a face-to-face service between a patient and health professional, in this case a doctor, are often difficult to realize in remote areas where reaching those areas is not easy. One way to realize health services impartially and can reach people in remote areas or even in disaster areas which are hard to reach with the existing transportation is by telemedicine system. This is the initial spirit of developing this system. Indonesian people deserve to get information, including health services through various means, one of which is through information technology. This is stated in Article 28G of the 1945 Constitution of the Republic of Indonesia, "Everyone has the right to communicate and obtain information to seek, obtain, possess, store, process and convey information using all types of available channels".

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It is undeniable that the development of information and communication technology in the health sector in Indonesia is not in line with existing regulations. Consequently, health professionals, especially doctors, are currently in an uncertain position in telemedicine services. With the rise of malpractice lawsuits from patients to doctors, unclear regulations will endanger the position of doctors in doctor-patient relationships in telemedicine. On the other hand, the principles of medical ethics originating from the four principles of bioethics, namely non-maleficence, beneficiary autonomy, and justice, seem to be under-considered in telemedicine. In the code of medical ethics in 2012 article 2 is stated, " A doctor must always make professional decisions independently, and maintain professional behavior in the highest measure". Professional behavior here can be interpreted that the doctor must examine the patient first before giving therapy based on the diagnosis made, where this is almost impossible to do with telemedicine. Another thing from the ethical side is that telemedicine will have an impact on the fading relationship between doctor and patient because there is no face-to-face service [2].

2.   Healthcare Logistics

From delivering prescriptions to providing patients transportation to and from the doctor, innovation in healthcare logistics facilitates the evolution of a new kind of value-based supply chain. The healthcare supply chain's goals must be reexamined in order to fit a new patient-centered model of care delivery, adapting to the individual needs of agencies along the way. This will help improve patient outcomes while also strengthening long-term supply chain goals between partners by utilizing a holistic approach to supply chain management that centers both patients and clinicians. Telemedicine originated from a Greek word 'tele' which means far, and a Latin word 'medicus' which means health services by health workers. The term telemedicine, which in the world of health began to be known since the 1970s and is defined as "healing at a distance", has become familiar in Indonesia, along with the advancement of the health care system and the development of the 4.0 Industrial Revolution era in the world, especially in the health sector. Besides Telemedicine, there is also another familiar term called telehealth which are often said to have the same definition with telemedicine. In fact, there is a

slight difference between these two terms. World Health Organization (WHO) provides different terms for telemedicine and telehealth. Telehealth is defined as the integrated communication system in health services, especially in "protecting and promoting health" while telemedicine is the use of the system in terms of "curative medicine". In other words, it can be interpreted that telehealth is more related to WHO activities internationally dealing with public health including health education, public and community health, health system development, and epidemiology while telemedicine is more directed at the clinical aspect [3, 4]. The difference between telemedicine and telehealth can be illustrated as in Figure (1) below [5]:
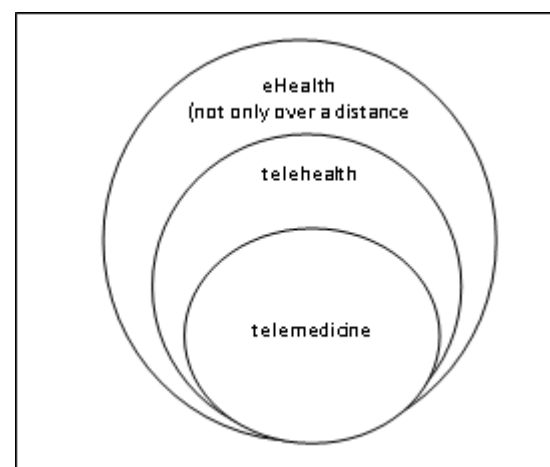

Fig. 1. eHealth, Telehealth, and Telemedicine

In general, telemedicine can be referred as to the use of information and communication technology (ICT) to provide medical services from a separate distance or non face-to-face service. Communication facilities used can be in the form of telephones, video calls, internet sites, or other sophisticated communication tools [6]. This communication can occur between health professionals and patients, as well as between health professionals, such as in tiered consultations from general practitioners to specialists. Although WHO provides a slightly different definition between telemedicine and telehealth, both of these terms can be used interchangeably.

Telemedicine in its implementation is divided into two concepts, real time (synchronous) and store-and-forward (asynchronous). Synchronous telemedicine requires the presence of two communicating parties at that moment because interaction is needed. Whereas asynchronous telemedicine is done by collecting medical data

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which is then sent to the doctor to be evaluated offline, so asynchronous telemedicine does not require the presence of both parties at that time. The telemedicine system recommended in Indonesia based on the Indonesian Doctors Association's guidelines on telemedicine is divided into five as follows [5]:

1. Tele-expertise, telemedicine that connects general practitioners with specialist doctors or between specialist doctors, for example, in reading photos/teleradiology.
2. Tele-consultation, telemedicine that connects patients with doctors.
3. Tele-monitoring, telemedicine which is used by health workers to monitor various parameters of the patient's body virtually.
4. Tele-assistance, telemedicine used to provide guidance to patients, for example, in the rehabilitation process.
5. Tele-robotic or referred to as tele-intervention, a remote control of a robot in a tele-surgery.

3. History and Development of Telemedicine supply chain

Telemedicine actually began to be known since the late 1960s in the USA, that was, since the introduction of the 'close circuit telephone system'. Initially this system was used as a means of education and long-distance consultation between the Nebraska Psychiatric Institute and regional health services. In 1965, a cardiac surgeon, Michael DeBakey, performed a cardiac surgery in the USA and transmitted live surgery procedures to a hospital in Geneva, Switzerland using the Comsat's Early Bird satellite. At that time the telephone was used in the health sector at the time of the 'summon emergency assistant', getting a second opinion, giving advice on remote health services, and to monitor the condition of patients remotely [3].

Long before that, in 1927, there was a live consultation video between doctors and patients, known as 'radio-doctor'. In 1950 satellites were also used to communicate health services in remote Alaskan countryside, with the guideline issued by the Indian Health Service. At that time doctors in the city could monitor patients remotely and provided therapy through doctors in the countryside through radio calls [7].

At that time, it was expected that telemedicine would make the practice of medicine more effective and efficient. Nevertheless, in 1970, the development of telemedicine seemed to be unprogressive. This occurred because [3].

1. the high cost of the technology
2. the poor quality of the image
3. a lack of uptake a services
4. an inability to interface telemedicine with mainstream health care provision

The most widely used telemedicine is teleradiology, which reaches 70% of all radiology practices in the USA using teleradiology systems. Teleradiology was started in 1950 by a Canadian radiologist [8].

Comparison of the development of telemedicine in several countries in the world can be seen in the following description [9]:

3.1 South Korea

Telemedicine in South Korea began with electrocardiography data transfers in the early 20th century. In 1993, interviews and medical examinations were conducted by Kyungpook National University Hospital and Chonnam National University Hospital with health facilities in areas with low levels of health services (Uljin, Gurye) using PSTN (Public Switched Telephone Network). Nonetheless, there was no further development of telemedicine due to the social environment, undeveloped technology, and the absence of an adequate legal system. The revision of the Korean Medical Law in 2002 became the start of a legal system that supports telemedicine in the country. Until the revision of the Medical Law in 2013, there was no national telemedicine program. Thus, telemedicine is not quite popular in Korea, which was only 0.1% based on a survey conducted in 2013-2014. In July 2015, Korea provided telemedicine for areas with low health services. The Korean Government organized the ETCT (Emergency Telemedicine Cooperation Treatment) for emergency cases through consultation from doctors in rural areas to doctors in large hospitals in urban areas.

3.2 European Union

European Union countries consider that telemedicine is important due to the increasing number of chronic diseases and limited resources, especially for elderly people. In Germany, telemedicine has been carried out since 1990, with patient monitoring being carried out. Research conducted in 2012 found that 31% of hospitals and

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15% of clinics used the telemedicine system for doctor-patient consultation.

3.3 USA

The American Telemedicine Association was first formed in 1993, and the Health Insurance Portability and Accountability Act (HIPPA) which regulates the use of health information was created in 1996. At present HIPPA is considered the most comprehensive telemedicine law and is widely used by other countries. Telemedicine has been used extensively, for example, the Medical Body Area Network (MBAN) project which uses separate mobile-frequency to effectively monitor a patient's condition. Doctors can monitor the health status of patients from anywhere. More than 60% of health care institutions and 40% to 50% of all hospitals in the USA use telemedicine.

In the USA there are 100,000 telemedicine consultations in one month. Although this figure seems large, but the number of doctor-patient consultations in the USA is 80 million in one month [10].

3.4 Indonesia

Indonesia as a member of the Asia Pacific Association for Medical Informatics (APAMI) is still lagging behind in telemedicine. Until 1999 health informatics was still unknown. In 2001 Indonesia used satellites for inter-island health communication. In 2003 the low-speed communication system was used as internet access through a pocket radio. Communication between doctors in remote areas and doctors in big cities can only be done via email. In 2004 PT Telkom created a web-based medical information system using WAP (Wireless Access Protocol). From now on the technology used has begun to develop using video-phones that allow video-streaming to be carried out. Telemedicine technology continues to develop until 2010. Telemedicine is included as part of the biomedical technique, one of which is the existence of a medical station that facilitates telemedicine both in real time teleconsultation and in store-and-forward. In 2011, MMS was used as a technology for audio and video streaming in the mobile environment. In 2013 e-health application was used to diagnose heart and lung disease, and in 2014, e-mail and telephone were used as a means of communication for mental health in Aceh [11].

4. Benefits and Constraints Of supply chain in Telemedicine

In a 2019 Cardinal Health survey, 42% of respondents said supply chain work takes too much time away from patient care and 45% of front-line providers say that manual supply chain tasks have a "very" or "somewhat" negative impact on patient care.2 By rethinking the supply chain to make it work for clinicians, we can develop logistics services to reduce clinician burnout while enabling caregivers to spend more time interacting directly with patients. The benefits of telemedicine can be felt more in developing countries, where health needs are primarily basic health needs. This is mainly to get access to health services. Telemedicine is expected to increase effectiveness and access, through consultation, evaluation, diagnosis, and provision of remote therapy. Telemedicine will help improve the quality of life in patients with chronic diseases. Telemedicine will also reduce referrals to health facilities that are far outside their regions. Unfortunately, only about 20% of developing countries have and implement telemedicine policies. From Figure 2 below, it can be seen the percentage of countries that have telemedicine policies [4]:
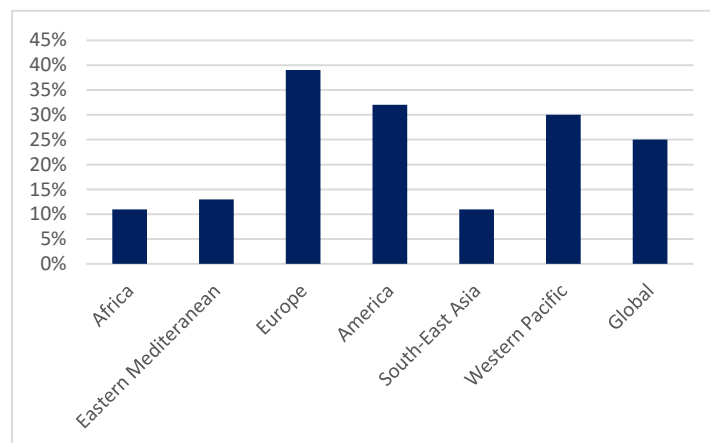
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Fig 2. National telemedicine policies by WHO region

Based on the telemedicine policy issued by the Ministry of Health of Republic of Turkey, the aims of telemedicine are [8]:

1. Collection of all images and information about a patient in common electronic field
2. The creation of a safe and fast way to share the information by relevant physician
3. To digitize hospital process
4. Use of information and communication technologies in the remote delivery of health care services
5. The creation of a digital hospital concept
6. Alleviating the shortage of experts in the field of medical imaging (in teleradiology)
7. Complicated cases, made a quick consultation
8. The provision of information and experience sharing among physicians
9. The creation of tools that help diagnose accurately and quickly
10. Ensuring the quality and precision of the evaluations of patients
11. Reducing hospital costs and increase productivity

Moreover, doctor can gain information from the patients' surrounding as well as be available for 24-hour service. The reduced waiting time for hospital queues will reduce mortality rate. Specialist doctors will reach more people and more patients will feel satisfied. Statistical information related to health will also be faster and easier to obtain.

In addition to the various benefits of telemedicine, there are several obstacles that cannot be denied, especially related to legal and ethical issues, including those related to licensing, accreditation and service standards, confidentiality of patient medical records, cases that can lead to suspected malpractice, clinical guidelines, and financing. In the next section of this paper, each of these constraints will be described [12].

5.   Telemedicine In Indonesia

According to the Central Bureau of Statistics data based on the 2010 population census, the population of Indonesia is 237,641,326 people, consisting of 46.79% living in urban areas and 50.21% living in rural areas. The distribution of the population of Indonesia is uneven. For examples, Sumatra, which covers 25.2% of Indonesia's territory, is inhabited by 21.3% of the population. Java, with an area of 6.8% is inhabited by 57.5% of the population, Kalimantan with an area of 28.5% is inhabited by 5.8% of the population, Sulawesi with an area of 9.9% is inhabited by 7.3% of the population, Maluku with an area of 4, 1% is inhabited by 1.1% of the population, and Papua which is 21.8% is inhabited by 1.5% of the population, with a population growth rate of 1.49% per year [13].

The uneven distribution of population and the imbalance between the population and the area, of course, will have an impact on the distribution of health services. For example, the frequent unavailability of transportation facilities to reach health service centers, especially for the areas located in mountainous geographical conditions or those whose lands are separated by the sea. Or worse, if the infrastructure facilities in the field of transportation is yet well provided. Not only that, the distribution of health workers both doctors and other health practitioners is also uneven. Only 20% of health workers are scattered in remote areas; the

rests choose to work in urban areas that have adequate facilities. The government has tried to overcome this matter of health worker disparities with various programs for medical graduates such as with the internship program, where the placement of internship physicians participating in the official bond is obliged to carry out tasks through placement in public health facilities designated by the Minister, as stated in article 14 item 2 of the Regulation of the Minister of Health of the Republic of Indonesia Number 39 of 2017 concerning Organizing the Internship of Doctors and Dentists Indonesia, which states "the placement of doctors post internship is carried out for one year in the framework of equitable distribution of health services to the community". Nevertheless, the distribution of health services is still difficult to realize.

Telemedicine application in Indonesia still has several obstacles that still need to be paid attention and developed even though it is not easy, including [5]:

1. Development of communication infrastructure, especially internet networks that have not been evenly distributed in Indonesia; currently, internet is still inaccessible in very remote areas.
2. The availability of hardware and software which still requires expensive costs in its procurement.
3. Human resources both in terms of quality and quantity. Skills of reliable human resources are needed to avoid human errors.
4. The existence of a technological gap between health care providers and the community that is imbalance between urban areas and remote areas will hamper the implementation of telemedicine even though the equipment is available.
5. Inadequate regulation to regulate the use of digital formats.
6. Authentication, privacy, and data security that have not been fully guaranteed from the hands of irresponsible people. On the one hand, improving this data security system will certainly increase costs in the operation of the telemedicine system.
7. Service financing system for telemedicine communication service providers. There is a possibility that costs are too minimum, or exceeding the budget due to unnecessary consultations.

8. It is feared that the quality of data and services will decrease due to the absence of face-to-face service. In addition, it is also feared that the data accuracy being sent through telemedicine has a low quality so that it can affect the process of diagnosing and providing therapy.
9. Relationships between patients and health professionals and between health professionals that are not done directly will reduce the quality of the relationship.

6. Legal Aspect Of Telemedicine

Indonesian society is now increasingly familiar with communication and information technology, especially with the increasingly easy and inexpensive way to get an internet connection. Moreover, telecommunication devices such as mobile phones ae getting affordable. This development certainly brings positive and negative impacts to the community in terms of information and communication. The positive impact of this development is that people can get access to health care services in terms of accessing the information as well as the services easier. Purchasing drugs or medicines through online pharmacies is now an easy thing to do although it is undeniable that more and more people can purchase drugs online without a prescription which might lead to drug abuse.

In addition, the existence of cybermedicine an internet technology used to disseminate clinical and non-clinical information to the general public encourages the practice of telemedicine in the health care system because the public is getting accustomed to the model of doctor-patient relationship through the internet facilities for treatment services. The existence of cybermedicine ease people to obtain information about health, but this also makes many people try to diagnose their own diseases based on the internet sources, which are often unreliable or incompetent [14].

Initially telemedicine aimed at developing health services for remote communities. This is evident in *Permenkes* (Regulation of the Minister of Health) Number 90 Year 2015 on Organizing Health Services in Remote and Very Remote Areas Health Service Facilities Article 15 which states that the development of health care patterns in remote and very remote zone health care facilities, one of which is carried out with telemedicine-based health services. Meanwhile, Article 19 states that, "telemedicine-based health services as referred to in article 15 letter d aim to provide benefits in

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increasing the accuracy and speed of medical diagnosis and medical consultation at first-level health care facilities and referral levels at advanced level health care facilities that do not have certain health workers."

The advancement of communication technology in Indonesia which has also increasingly penetrated the world of health in general and medical field, particularly related to telemedicine, has yet to have a strong legal protection. The existing laws and regulations of the Minister of Health are not yet enough to regulate telemedicine practices in Indonesia. It must be taken into consideration that inadequate regulations can have an impact on the risks of malpractice lawsuits for doctors who perform health services by telemedicine. On September 30, 2007, the World Medical Association (WMA) issued recommendations related to telemedicine stating, "The WMA and National Medical Association should encourage the development of national legislation and international agreements on subjects related to the practice of telemedicine, such as e-prescribing, physician registration, liability, and the legal status of electronic medical records." For example, Malaysia has the Telemedicine Act of 1997, India has the Telemedicine Act of 2003, and California USA has the Telehealth Advancement Act of 2011 [5]. In Indonesia the legal basis related to the implementation of telemedicine is as follows:

- Law Number 29 of 2004 concerning Medical Practices
- Law Number 11 Year 2008 concerning Information and Electronic Transactions
- Law Number 44 of 2009 concerning Hospitals
- Government Regulation Number 46 of 2014 concerning Health Information Systems
- Government Regulation Number 47 of 2016 concerning health service facilities
- Regulation of the Minister of Health Number 269 of 2008 concerning Medical Records.
- Minister of Health Regulation No. 2052 of 2011 concerning Practice License and Implementation of Medical Practice
- Regulation of the Minister of Health Number 36 of 2012 concerning the medical confidentiality
- Regulation of the Minister of Health Number 90 of 2015 concerning Implementation of Health Services in Health Care Facilities in Remote and Very Remote Areas

- Regulation of the Minister of Health No. 409 of 2016 concerning Test Hospitals for Telemedicine Service Programs Based on Video Conference and Teleradiology
- Regulation of the Minister of Health Number 46 of 2017 concerning the National e-Health Strategy
- Minister of Health Regulation No. 20 of 2019 concerning the Implementation of Telemedicine among Health Service Facilities
- Minister of Communication and Informatics Regulation number 4 of 2016 concerning Information Security Management Systems

Although Minister of Health Regulation No. 20 of 2019 concerning the Implementation of Telemedicine among Health Service Facilities was ratified on July 30, 2019, the Minister of Health only regulates the implementation of telemedicine among health service facilities, rather than between doctors and patients personally while this trend of health care services is currently happening more and more including with the existence of online doctor-patient consultation application. This is clearly written in Article 1 paragraph 1 and 2 of the PMK, namely:

1) Telemedicine is the provision of long-distance health services by health professionals using information and communication technology, including the exchange of information on diagnosis, treatment, prevention of illness and injury, research and evaluation, and continuing education of individual and community health service providers.

2) Telemedicine service between health service facilities is referred to as telemedicine services carried out between one health care facility and another health care facility in the form of consultations to establish diagnosis, therapy, and or disease prevention.

Even in article 6 it is mentioned more specifically that the health care service facility providing consultation referred to are hospitals, while the health care service facility receiving consultation are other hospitals, first level health care service facility, and other health care service facility. It was added to article 13 that the health care service facility of consultation provider and recipient must be registered.

Some legal issues that still do not have a strong foundation include:

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6.1 healthcare supply chain

We found that, in Indonesia, healthcare supply chain is a new concept. Operations and co-ordinations across players are still neglected. It seems that most hospitals focus only on healthcare performance and undermine its own operational performance. However, supply chain problems, data inconsistency, fragmented system, and inefficient business process, affect not only at operational performance but also lead to negative impacts to patient safety. Due to these problems, it should not only be solved individually but it requires all players in the industry to start implementing supply chain thinking and collaborate with their partners to alleviate the problems. It can be said that the proposed framework is the first step to urge all healthcare players and policy makers to be aware of these problems.

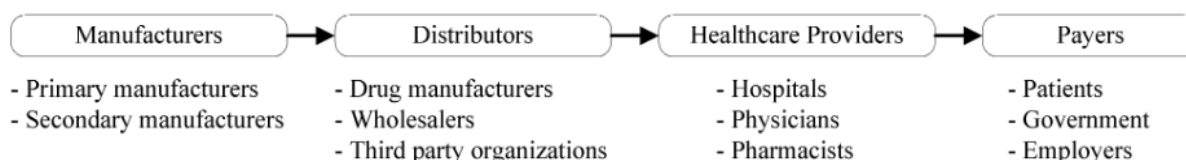| Manufacturers	Distributors	Healthcare Providers	Payers
- Primary manufacturers - Secondary manufacturers	- Drug manufacturers - Wholesalers - Third party organizations	- Hospitals - Physicians - Pharmacists	- Patients - Government - Employers

Figure 3. Healthcare supply chain

The same thing was also stated in Minister of Health Regulation Number 2052 of 2011 concerning Practice License and Implementation of Medical Practice Article 4, that three licenses were granted for health service facilities owned by government, private, or individual practice. Moreover, Government Regulation Number 47 of 2016 Article 4 mentions the types of health services in question, and in the second paragraph it is stated that "in a certain situation, to fulfill health services and the development of health science and technology, the Minister of Health may determine the types of health service facilities other than the types mentioned in paragraph 1." In this case, telemedicine can be considered as a type of health service facility provided by the government in the context of developing science and technology, but unfortunately until now it has not been clearly regulated and more detailed about physician individual practice in telemedicine.

Likewise, if seen from Article 41 of the Law on Medical Practice, doctors conducting medical practices are required to put up a medical practice nameplate, otherwise, according to Article 79 of the same law will be subject to a maximum fine of IDR 50,000,000. A doctor who conducts telemedicine practices will automatically violate this.

Unlike the Minister of Health Regulation No. 20 of 2019 regarding the Implementation of Telemedicine between Health Service Facilities, in this rule the doctors who conduct telemedicine practices are only doctors who serve in a hospital so that the doctor automatically has a doctor's license at that hospital, and health services that are conducted are between health care facilities in accordance with the Minister of Health Regulation, and not as an practitioner.

6.2 Security and Confidentiality of Patient Data

On September 2018, the Indonesian Medical Association (IDI) Executive Board issued a handbill Number 010838/PB/A.3/09/2018 regarding Information and Technology-Based Medical Services. Nonetheless, this raised questions because the existence of this handbill implied that as if doctors could conduct telemedicine practices as long as they had a valid doctor's license although the existing laws are yet to provide clear rules concerning this matter. In another perspective, this handbill can give a warning to doctors who conduct telemedicine practices to pay attention to several things including the obligation to maintain the confidentiality and security of the patient's personal data.

A doctor, in a doctor-patient relationship, must maintain medical confidentiality. This is clearly stated in the Law on Medical Practice Article 48 and Law Number 36 of 2014 concerning Health Workers Article 51. In Law Number 36 of 2009 concerning Health Article 57 states that every person has the right to confidential personal health conditions. If this is violated, it will be subject to imprisonment and fines according to Article 322 of the Criminal Law and according to the Regulation of Minister of Health 36 of 2012 concerning the Medical Confidentiality Article 15. In addition, in the Medical Practice Law Article 66, Health Act Article 58, Law Number 44 of 2009 concerning Hospitals are stated that a patient can request

compensation if he feels disadvantaged, one of which is in terms of medical confidentiality.

According to the Minister of Communication and Informatics Regulation Number 4 of 2016 concerning Information Security Management Systems, information security is maintaining confidentiality, integrity, and availability of information. Health services are classified as a legal entity that carries out public services. Therefore, hospitals that carry out telemedicine practices must maintain the security of their information. Referring to this regulation, it is necessary to standardize the implementation of an electronic system by providing an Information Security Management system certificate issued by a certification body.

6.3 Medical Records and Informed Consent

In carrying out a medical practice, a doctor must make a patient's medical record. This is stated in Article 46 of the Medical Practice Law and the sanctions are contained in article 79. The regulation regarding medical records is the Minister of Health Regulation Number 269 of 2008 concerning Medical Records. In Article 2 it is stated that medical records must be written, complete, and clear, or electronically. Medical records using electronic information technology are further regulated by separate regulations. Unfortunately, there are no further rules regarding this even after more than ten years this Minister of Health Regulation was made. As a result, this will cause obstacles in the implementation of telemedicine practices, especially concerning the legal basis and clear rules about medical records. Therefore, it will cause problems when a medical dispute occurs if there are no good and qualified electrical medical records that can be used as evidence in a trial.

Unclear rules about medical records will also be tangent to informed consent that should be given by patients after receiving a doctor's explanation and being willing to get therapy from a doctor. Although in telemedicine practices the doctor does not take any actions or interventions on the patient, it is undeniable that the administration of drugs as a therapy can pose risks for patients such as allergic reactions to certain drugs. So, it is better for drugs that might cause side effects to the patient to still be given special information, even a written informed consent is necessary. Article 53 of the Medical Practice Law states that patients are obliged to provide complete and honest information about their current and past health problems. In telemedicine practices where generally, there is no face-to-face relationship between a doctor and a patient, it is difficult for the doctor to assess the honesty of the patients regarding their current or previous disease history. For example, doctors will be difficult to find out if their patients have experienced an allergic reaction to a certain drug if they are not telling the truth. As a result, if allergic reaction occurs after taking the drug prescribed by doctors through telemedicine and the patients charge a lawsuit, it will be difficult to prove.

7. Ethical Dilemma in Telemedicine

Legal issues in the health sector cannot be separated from ethical issues as well as the legal issues related to telemedicine. The absence of clear rules will also intersect with ethical issues. In the medical field, the ethics used as the basis are the principles of bioethics consisting of [15]:

1. Autonomy and respect for autonomy
2. Non-maleficence or in the Hippocrates' oath known as "first do no harm"
3. Beneficence
4. Justice

In the relationship between health professionals, in this case doctors, and patients, these four principles are emphasized on the existence of veracity, privacy, confidentiality, and fidelity. It is obvious here that in telemedicine things that become problems and obstacles in law also become problems in ethics.

Communication is the key point in the relationship between doctors and patients as well as collaboration between health professionals in the provision of therapy. Communication can be done verbally as well as non-verbally. Non-verbal communication appears in body language, gestures, and mannerisms. In communication using technological means where there is no face to face between doctors and patients, non-verbal communication is not possible. The purpose of this communication is educating, collaborating, coordinating, understanding, decision making, and parenting. Shared decision making in a doctor-patient relationship as a form of patient autonomy in which doctors and patients express their opinions before making decisions is also more difficult to realize [16]. The most valued in traditional health care is comfort and compassion of human being, which can only be realized if doctors and patients meet face to face [17].

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There are several ethical issues in the doctor-patient relationship and between health professionals in telemedicine practices including [8]:

- Insufficient clinical information transfer to the opposite site

- Broken communication between doctors and patients

- Inaccurate and unclear reporting, one of which is caused by inadequate transmission of medical images .

- Security of personal health information maintained in electronic form.

- To what extent the responsibility of a physician for a patient in a consultation.

- What to do next if the communication between health professionals fails to meet an agreement.

- The issue of informed consent that will affect trust as the basis for doctor-patient relationships.

In the doctor's code of ethics which refers to Hippocratic oath, Article 2 states that a doctor must always make professional decision makings independently and maintain professional behaviour in the highest measure. Whereas Article 7 states that a doctor must only provide a statement and opinion that have been verified. In medical education, a doctor is taught to conduct a careful physical examination before establishing the diagnosis and providing therapy for patients, even though anamnesis also has a role of 20% in the diagnosis. Surely, a physical examination of a patient cannot be carried out in telemedicine practices. Thus, it is not impossible that the diagnosis will not be made accurately. It will harm the patients. If the diagnosis is inaccurate, doctors can't do the beneficence and non-maleficence principle for patients.

The current regulation on telemedicine in Indonesia which is the Minister of Health Regulation Number 20 of 2019 concerning the provision of telemedicine services between health care facilities in Article 15 regulates the service fee of telemedicine. Based on that, the service fee is charged to the requesting consultation health care facility. The principle of justice as one of the principles of bioethics in doctor-patient relationships must also pay attention to justice for doctors. It is impossible for a doctor as a professional who must be ready to conduct

consultations within 24 hours as stated in this Minister of Health Regulation not to get proper medical service fee.

8.   Conclusion

Telemedicine is an example of the use of information and communication technology in the health field based on the supply chain. Indonesia as an archipelago whose geographical condition sometimes makes it difficult to reach by transportation requires a telemedicine system in the distribution of health services for its people in accordance with the mandate of the 1945 Constitution. Unfortunately, the desire to implement telemedicine in Indonesia and the progress that has been made is not supported by a strong regulatory foundation, so that it is prone to malpractice lawsuits for health workers. Telemedicine can occur between health professionals and patients as well as between health professionals in consultation. Whereas, based on the time telemedicine is divided into two types, real time and store-and-forward type.

Developing countries really need telemedicine in health services. Unfortunately, there are only a few developing countries that properly use telemedicine services and have policies regarding the implementation of telemedicine. Telemedicine practices are not only for carrying out equitable health services, but also for reducing referral rates. Indonesia should develop a telemedicine system because of geographical factors, population distribution, and the unequal distribution of health workers. Yet, there are still many obstacles faced in the implementation of telemedicine in Indonesia, especially in terms of regulation and ethics. In fact, it can be said that the implementation of telemedicine is still half measures, especially the authority in charged with this matter; Ministry of Health.

The latest regulations regulating telemedicine is the Minister of Health Regulation Number 20 2019 regarding telemedicine between health care facilities. In fact, currently there are many telemedicine practices which are not between health service facilities, but between doctors and patients personally. So, it can be said that the implementation of telemedicine practices carried out between doctors and patients personally these days does not have reliable legal protection even though there are still many problems rising related to regulations that have already existed before;

among them is the absence of doctors' permission to carry out telemedicine even though the doctor already has a doctor's license. Although the handbill issued by the Indonesian Doctors Association there is a statement that the doctors who implement telemedicine practices must be a doctor who has a doctor's license, the handbill is not a regulation and cannot be a legal basis. In terms of the safety and confidentiality of patient data, there is no guarantee on that due to the absence of standardization system for the management of the safeguarding of health information certified by certain institutions even though the confidentiality factor plays a very important role in the relationship of health professionals and patients in accordance with the existing regulations.

In relation to the electronic medical records, since the Minister of Health Regulation Number 269 of 2008 concerning with medical records has been issued up to now, there has been no specific regulation regulating electronic medical records. In the implementation of telemedicine, medical records in electronic form are extremely needed. These medical records need special attention because it deals with electronic informed consent in telemedicine. It is necessary to think about how patients can give consent through electronic informed consent where patients do not directly sign the form because informed consent will be very necessary in the administration of drugs that pose a risk and will be needed as evidence in the event of a medical dispute.

Ethically, based on the principles of bioethics comprising beneficence, non-maleficence, autonomy, and justice, there are still many obstacles in telemedicine practices, especially the fading interpersonal relationships in doctor-patient relationships. Telemedicine can reduce information sharing between doctors and patients which is risky in establishing diagnosis and administration of therapy. Lacking communication between doctors and patients can affect trust, which of course this trust problems will affect the openness of patients to convey information about their health. In the implementation of telemedicine at this time, it is not possible for a doctor to conduct a physical examination directly on a patient. This is contradictory with the code of ethics and existing laws that doctors must act professionally, for example, doctors can only provide information and therapy after checking the truth themselves in a

patient examination. In terms of justice for doctors, there is currently no regulation regarding the provision of medical service fees for doctors who conduct telemedicine.

By identifying inefficiencies in the healthcare supply chain, we've been able to design solutions to increase efficiency, drive down cost, and improve positive patient outcomes. From managing kit inventory to sanitizing devices, Patient Direct improves space utilization while reducing labor costs, allowing clinicians to invest more resources directly into patient care. With the use of a patient-first, end-to-end supply chain solution like Patient Direct, the future of expanding access to telehealth looks bright.

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