Telemedicine Management in Public Health Education at Bitung City Health Office

RinnyMeilani Tinangon[1], Harol R. Lumapow[2], Fientje J.A. Oentoe[3], Jeffry Sony Junus Lengkong[4], Viktory Nicodemus Joufree Rotty[5*]

Corresponding Author: Viktory Nicodemus JoufreeRotty

[1,2,3,4,5]Management of Education, Universitas Negeri Manado, Indonesia

[*]E-mail:viktoryrotty@unima.ac.id

Abstract

Objective:This study seeks to examine the planning, implementation, and assessment of Telemedicine Services in Public HealthEducation in the city of Bitung.**Method**: This study is qualitative in nature. This research was conducted at the Bitung City Health Office. This study's data source comprises of two types of sources: primary and secondary data sources. **Result:**The results indicated that the Planning of Telemedicine Services in Public Health Education in Bitung City begins with the preparation of human resources, including both resource individuals (Medical/Paramedic) and IT personnel, facilities, infrastructure, and equipment. In addition to developing health materials that will be distributed to the community, planning includes the creation of budget postings that will be utilized in telemedicine services. During the Covid-19 pandemic, the installation of telemedicine services in the form of teleconsultation went smoothly in the city of Bitung via the PSC 119 hotline number, which grew in popularity. In addition, the Bitung Digital Medical application includes a telemedicine service. In addition to utilizing existing social media such as websites, Facebook, and Instagram, the delivery of products and healthcare services also makes use of these platforms. **Conclusion**: The planning of telemedicine services as a health education attempt at the Bitung City Health Office has been carried out well, but the implementation is still not well programmed, as well as the evaluation which has not been comprehensive. The implementation of good telemedicine management can improve public health education. Hence, cross-sectoral cooperation is needed such as cooperation with the information and telecommunications service, education office and other sectors and there is a need for government regulations that can regulate the mechanism of this telemedicine service so that this telemedicine service can improve public health education.

KeyWords: Telemedicine Management, Public Health Education, Health Office

DOI Number: 10.48047/NQ.2023.21.4.NQ23013 **Neuro Quantology 2023; 21(4): 118-130**

Introduction

The dissemination of health-related information to the general public, or to specific groups or individuals, is public health education, a subset of non-formal education. In the hopes that readers can obtain useful information about health from this letter. Finally, it is hoped that this intelligence will lead to changed behaviors. In other words, the presence of such education can influence changes in target behavior.

Due to the rapid advancement of science and technology, people require health services that are quick, accurate, and available at any time. It is believed that the digital revolution played a significant influence in the realization of a new style of health service in Indonesia, where health services can now be accessed online and are no longer limited by location or time. Along with the spread of the COVID-19 pandemic, this remote health service is gaining in popularity and utilization.

In Indonesia, telemedicine services have been available since the 1990s, however conversations are still limited to telephone calls (Soegijoko, 2010). After 2010, technological advancements in the medical field, including the variety of services, increased rapidly. Since 2012, the ministry of health has been developing telemedicine as a trial project. Among the health services that utilize technology, telemedicine is one that continues to be modified and updated in response to technological advancements, such as the widespread use of Android and internet technologies in Indonesia.

Telemedicine is expanding to include not only consultations between health workers within hospitals or between hospitals, but also consultations between doctors and patients, as well as the use of the technology as a medium for the dissemination of health materials to the general public.

Previous telemedicine research includes that of Sari and Wirman(2021), who revealed that Telemedicine served as a medium for medical advice during the COVID-19 Pandemic in Indonesia. Furthermore, study on the use of telemedicine as a solution to health services in Indonesia during the COVID-19 pandemic (Lubis, 2021), research on health education through online media on the knowledge and behavior of cervical cancer prevention in women of reproductive age in Sikka district (Adesta & Nua, 2021). Additionally, studies on pregnant women have been used to inform research on how to improve maternal and neonatal COVID-19 prevention knowledge and behavior(Yuliani & Amalia, 2020). Telemedicine and social media have also been used to inform health education based on the ability of healthy families to deal with the COVID-19pandemic (Rohmah et al., 2022). There is also a mixed method study on finding factors related to the unequal use of telemedicine in Norway (Alami et al., 2017), Cross Sectional Research on the implementation and application of Telemedicine in China (Cui et al., 2020), a pilot study of telemedicine on the initial evaluation of general surgery patients in clinics and hospitals (Schroeder, 2019).

Currently, there is only a government regulation regarding the implementation of telemedicine services between health care facilities (Regulation of the Minister of Health of the Republic of Indonesia) Number 20 of 2019. Likewise, the Decree of the Minister of Health of the Republic of Indonesia number HK.02.02/Menkes/409/2016 concerning Hospitals for Trial Hospitals for Telemedicine Service Programs based on video-conferencing and teleradiology, as well as in the Decree of the Minister of Health of the Republic of Indonesia number 01.07/Menkes/650/2016 concerning hospitals and public health center(*puskesmas*) testing telemedicine service programs and in the Decree of the Minister of Health of the Republic of Indonesia number HK.01.07/Menkes/4829/2021 concerning service guidelines health services through telemedicine during the COVID-19 pandemic, everything was limited to regulation of telemedicine services between health facilities. Likewise with the recommendation of the Indonesian Doctors Association regarding Telemedicine in the future of digitalizing health in Indonesia, which only regulates the implementation of telemedicine within the scope of professional organizations, not yet at the level of public health education.

Another factor that has a significant impact on the deployment of telemedicine services in public health education is the geographical makeup of Indonesia, which is made up of hundreds of islands, and the uneven distribution of improvements like internet and energy networks. Bitung as a “Mini Indonesia” is one of the small towns located at the northern end of the 'trunk' of the island of Sulawesi, precisely in North Sulawesi Province. It is widely recognized as the world's most comprehensive administrative region. This city is extremely unusual because it possesses practically all of the natural potential of the region that God has endowed with land area, sea area, mountains, hills, straits, beaches, and woods all at once. Today, the city of Bitung has launched the Bitung Digital city program, whose vision is the realization of an independent, prosperous, and distinctive Digital city Bitung based on mutual cooperation. One of the program's flagship initiatives is to create a digital smart village by providing 1.000 WiFi points and 15.000 Android cellphones to 15.000 heads of 69.000 households. The application of telemedicine in public health education in the city of Bitung is supported by a thriving ecosystem.

In light of these conflicting realities and expectations, it is hoped that telemedicine services will be managed well so that public health education can be developed in accordance with the Ministry of Health of the Republic of Indonesia's priority program for digital health transformation in Indonesia. As a result, after considering the context that has been presented thus far and taking into account the researchers' aim to investigate the management of telemedicine services at the health office as well as the advantages of doing so for the purpose of enhancing the quality of public health education in the city of Bitung, we have come to the conclusion that the following should be done. Based on this background, this study aims to analyze the planning, implementation and evaluation of Telemedicine Services in Improving Public Health Educationin Bitung City.

Literature Review

Management

Management is getting done through other people. This definition seems incomplete, because management is the enforcer in the organization to achieve goals. Besides that, it is also necessary to explain how other people achieve goals through cooperation. Therefore, the definition that later developed was that "management is the process of achieving goals through the activities and cooperation of other people" (Daryanto, 2013). According to Terry, management is a process, namely an activity consisting of four sub-activities, each of which is a fundamental function. The four sub-activities which in management are known as POAC are planning, organizing, actuating, controlling.

Education Management

An arrangement in the field of educational work that is carried out through planning, organizing, staffing, coaching, coordinating, communicating, motivating, budgeting, controlling, monitoring, evaluating, and reporting activities in a methodical manner in order to achieve educational goals in a quality manner is referred to as education management (Komariah & Munawaroh, 2021). The management function as a characteristic of education arises from the need to give direction to developments, both qualitatively and quantitatively in school operations. The increased complexity due to the breadth and number of programs has stimulated attempts to systematically detail and practice administrative procedures. This effort has resulted in descriptions of successful practices and constructive principles(Rohiat, 2010).

Telemedicine

The goal of telemedicine is to improve a patient's health through the remote exchange of medical information, such as that used in the diagnosis, treatment, and prevention of illness and injury. Telemedicine services can take place anywhere there is connection between healthcare providers and patients/community members or between healthcare providers themselves, and this includes the use of telephone, email, video chats, smartphone applications, WhatsApp, websites, and social media. Telemedicine can be used for many different things, such as group therapy, nursing services, patient recovery education and training, public health professional training, and the transfer of medical pictures (Aziz & Abochar, 2015; Kemenkes, 2019).

There are difficulties in areas such as infrastructure, operations, management, policies, standards, legal, awareness, acceptance, etc. In order to realize the full potential of telemedicine, the following considerations must be given careful attention:

a. Lack of adequate infrastructure.
b. Lack of proper integration with traditional healthcare systems.
c. Lack of specialized and skilled health care professionals.
d. Lack of awareness and trust. People are inherently resistant to change and reluctant to have confidence in new services.
e. Inadequate number of service centers for medical devices used in remote healthcare.
f. There is no global standard for different tools and file formats for Health data and storage which complicates interoperability.
g. There is no legal framework that

precisely defines the responsibilities and obligations of each stakeholder and legal action in case of non-compliance (Pramanik et al., 2019)

Health Education

To achieve the highest possible level of public health, one strategy is to educate the people on the importance of making healthy lifestyle choices. When applied to the field of healthcare, education becomes health education. Health education, from an educational perspective, is a form of educational practice. Accordingly, health education refers to the application of educational principles to the health industry. Because learning occurs through education, one can expect to progress as an individual, as a community, and as a society as a whole through the educational process. Health education is defined as an effort or activity to assist individuals, groups, or communities in improving their behavioral abilities to reach the level of his health is optimal. This definition stems from the idea that education is a process through which individuals, groups, or communities move from ignorance to knowledge about the values of health and from inability to overcome their own health problems.

Health status is affected by one's actions, living conditions, access to healthcare, and genetics, as stated by Blum in (Soekidjo, 2012). The application of public health education to the resolution of community behavior problems is feasible. Meanwhile, as stated by Notoatmodjo (2012), health education is an initiative to assist people, groups, and communities in enhancing their behavioral capacities to attain optimal health. According to Wood in (Ali, 2010), public health education consists of a series of activities designed to improve people's health-related habits, attitudes, and knowledge, and to encourage them to voluntarily adopt practices that will improve or preserve their health. According to Steward in (Ali, 2010), health education is a component of health and medical programs that includes a strategy to alter individual and community behavior in order to facilitate the attainment of treatment, rehabilitation, disease prevention, and health promotion goals. Grout agrees, saying that the goal of public health education is to change people's attitudes and actions toward health so that they better reflect scientific knowledge. Stuart asserted that health education, by focusing on promotion and prevention rather than treatment and rehabilitation, can effectively alter the health habits of individuals, communities, and even entire populations. Public health education is planned to encourage individuals and communities to adopt healthier lifestyles by the dissemination of accurate and relevant information and the promotion of positive role models, as mandated by Law on Health No. 23 of 1992. Besides that, the World Health Organization defines health education as an initiative to elevate the status of health in society, equip individuals with the skills necessary to work independently or in teams, facilitate the implementation of strategies to improve one's lifestyle, and promote the growth of adequate health care infrastructure. In a similar vein, the World Health Organization defines health education as an initiative to elevate health's social value, equip individuals to take action on their own or in groups, facilitate the pursuit of healthy lifestyle goals, and support the growth and improvement of preexisting health services.

From the above, it is clear that public health education is a vital component of the health service program, which attempts to raise the community's knowledge, awareness, willingness, and capacity to live a healthy lifestyle and actively engage in health initiatives. There is a process of altering people's knowledge, attitudes, and behavior from deliberately harmful to consciously healthy. This health education employs a way of disseminating messages and embedding beliefs consistently and persistently until individuals are aware, knowledgeable, receptive, desirous, and able to implement the message. Individuals, families, groups, and communities, both healthy and sick, are the primary focus of public health education activities. This public health education endeavor is implemented at health service institutions, such as hospitals, families, communities, and other locations.

According to Notoatmodjo (2012), the scope of public health education may be viewed from three different perspectives: the target

dimension, the implementation location, and the degree of health services. Individuals, organizations, and communities are the three targets for public health education in the dimension of targets. On the basis of the location of implementation, health education is further subdivided into health education in hospitals, schools, and the community. On the service level dimension, health education is separated into health promotion health education, health education for special protection, health education for early diagnosis and rapid treatment, health education for the limitation of disability, and health education for rehabilitation.

Several fundamental concepts of public health education must be considered in its execution, including the fact that health education is a collection of experiences that can be conducted anywhere and at any time, so long as they can influence health knowledge, attitudes, and behavior. In essence, health education cannot be imposed on others; rather, the individual, group, and community will willingly modify their health-related habits and behaviors.

Public health education is a form of informal education including the dissemination of health messages to the general public, groups, or individuals. With the goal that this message would help people, communities, or individuals achieve a deeper understanding of health. Therefore, it is expected that this knowledge will influence conduct. In other words, the existence of such education can influence changes in the behavior of the target.

All health workers, regardless of their type and level, are basically health educators. In the midst of society, health workers are role models in the health sector. For this reason, health workers must have attitudes and behaviors that are in accordance with health values.

In the process of health education, in order to obtain effective results, educational aids or media are needed. The function of the media in education is as a teaching tool to convey information or messages about health. Media has multiple meanings, both viewed in a limited and broad sense. The emergence of various kinds of definitions due to differences in viewpoints, aims and objectives. AECT (Association for Education and Communicative Technology) in Harsoyo (2002) interprets media as all forms that are used in the process of distributing information. NEA (National Education Association) defines media as anything that can be manipulated, seen, heard, read, or discussed along with the instruments used for these activities.

According to Edgar Dale in (Santoso et al., 2020), in the field of education, the usage of media/materials/learning tools frequently employs the Cone of Experience principle, which necessitates learning media such as textbooks, teacher-created learning materials, and "audio-visual" materials. Media has numerous connotations, both in a narrow and expansive sense.

Telemedicine as a means of providing long-distance health services to the public can be used as a medium in public health education, where health education materials contained in telemedicine services can be disseminated to the public regardless of distance and time. This is one of the features of telemedicine as a medium in public health education.

Framework

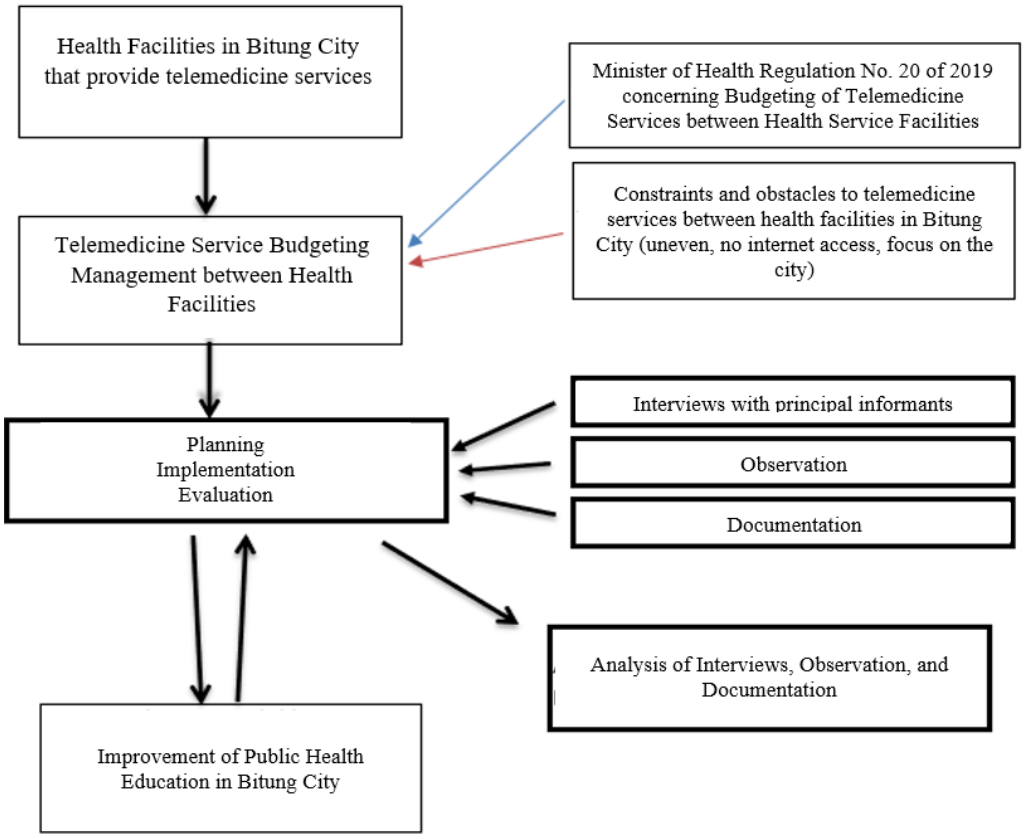

Figure 1: Framework of Thinking

Material and Method

This research was a qualitative research. The Bitung City Health Office was the site for this study. The data sources for this study consisted of two sources, namely primary and secondary data sources.

In this study, the triangulation technique was used, in which the researcher combined three techniques, namely participant observation, in-depth study and documentation study. Data collected from interviews, observations or documentation notes as well as field notes by researchers using descriptive methods. The analysis technique carried out covers the two main objectives of this study, which include analyzing data on the planning, implementation, and evaluation of telemedicine service management at several designated health facilities and measuring the benefits of telemedicine service management for improving public health education in Bitung City, North Sulawesi.

Results and Discussion

Telemedicine Planning Services in Public Health Education at Bitung City Health Office

The government of the City of Bitung for 2021 – 2026 has a vision, namely the realization of a Digital City of Bitung that is Independent, Prosperous and Characteristic based on Mutual Cooperation. This vision clearly reveals the word digital. Digital According to the Big Indonesian Dictionary (KBBI), means related to numbers for certain calculation systems; related to numbering. However, in its development, the word digital refers to the development of information and communication technology.

In accordance with the expectations of the Mayor and Deputy Mayor of Bitung that in response to uncertainty, injustice and discrimination, it is necessary to digitize the area. In the sense that the government that is run should be based on the Electronic Based Government System (also known as SPBE). For the City of Bitung, in this new management, SPBE implementation will be

increasingly encouraged so as to be able to improve people's welfare.

As an elaboration of the Vision and Mission of the Mayor and Deputy Mayor of Bitung, there are 8 (eight) Leading Programs that must be realized during the reign of the Mayor and Deputy Mayor of Bitung in accordance with the leadership period, namely 2021 – 2024, where the flagship program is number one is to realize digital smart village kelurahan, through the provision of a thousand WiFi points and 15 thousand Android cellphones to 15 thousand households out of 69 thousand households. This provides an excellent ecosystem in implementing telemedicine services in the city of Bitung, Digital City.

Based on the data obtained both through interviews and observations, the effort to prepare telemedicine service planning at the Bitung City Health Office is good. There has been planning for a long time regarding telemedicine which involves cross-sectoral involvement. Collaboration with the Information and Communications Office of the city of Bitung regarding health service applications and providing health information online. Training has been given to human resources involved in the telemedicine process.

The health office already has an innovation, namely the Bitung Digital Medical Application, an application that is similar to health applications processed by the private sector such as Halodoc, Alodokter, Docquity and so on.

Besides, the Bitung City Health Office also has a hotline that can be used by the community to access health services. This Hotline line was very popular during the COVID-19 pandemic, especially for patients who were self-isolating at home, they asked questions about medicines to be taken and ways to self-isolate that were safe but also comfortable.

There is also PSC (Public Service Center) 119, which will receive medical consultation from the community, but if there are still problems or worsening of the disease, the PSC 119 Team with an ambulance filled with doctors and paramedics will go directly to the community's house.

In the Bitung City Health Office Strategic Plan (Renstra) for 2021 – 2026, a telemedicine provision program has been compiled in health service facilities (code 1.02.02.2.02.30) with a budget of 10 million for telemedicine services at health facilities that have telemedicine in the health center (*puskesmas*) work unit.

Education in health promotion intervention activities is one approach that is often used with the aim of providing knowledge, information and to develop the necessary skills so that individuals/groups can make informed choices about certain health behaviors.

There are 3 learning aspects in health education activities, namely cognitive (information and understanding), affective (attitudes and feelings) and behavior (skills). Through online media the learning process also occurs and involves the three aspects above. The advantage of using online media in the learning process is that users can interact with each other, so that even though they are in various places a two-way communication process still occurs. Previous research has involved cognitive and affective aspects, namely educational activities to prevent anemia during menstruation in young women in one of the junior high schools in Mataram City which showed results after online educational activities knowledge increased by 11% from 22,2 to 33,3% and there was an increase in scores on attitude measurement after online education by 3,53% from 45,83% to 48,33% (Puspitasari et al., 2020).

Another research related to health education and its effect on behavior has been shown in health education research through WhatsApp media in changing smoking behavior among high school students in a private school in Pangkep Regency (Yusriani & Acob, 2020), the study showed that the average behavioral results in the leaflet media education group increased from 4.36 +- 1.46 to 6.47 +- 1.67 ($p < 0.0005$) while in the WhatsApp group it increased from 4.82 + - 1.84 to 5.80 +- 0.87 ($p < 0.0005$).

The use of online media as a channel for health education certainly has advantages and disadvantages. The advantages of online media are the rapid dissemination of information and the various forms of content presented, such as text, photos, audio, video. In addition, users of online media can interact with each other from anywhere and at any time. On the other hand, the use of online media as a health education

channel has drawbacks, namely the intervention target needs to have a supporting device and a stable internet connection and long-term use of online media can cause eye fatigue and eye health problems (Leonita & Jalinus, 2018).

Telemedicine Implementation Services in Public Health Education at Bitung City Health Office

As a result of the success of the PSC 119 hotline, which rose to prominence in particular during the COVID-19 pandemic, telemedicine services in the form of teleconsultations were successfully implemented in the city of Bitung. Bitung Digital Medical additionally provides a telemedicine service. If there is interaction between health workers and patients / the community, telemedicine services take place on already established social media platforms like websites, Facebook, and Instagram.

According to Bloom's theory in (Notoatmodjo, 2010) highlight that in the process of health education there are three domains that want to be changed, namely cognitive affective and psychomotor. Some of the learning principles include that 1) health education is an integral process not solely oriented towards changes in knowledge aspects but in all human aspects that can respond to physical changes such as in postpartum mothers; 2) Health education is an active activity, meaning that it involves all the senses and expresses, for example, active listening, visualizing, deciding and demonstrating or doing.

The theory put forward by Soekidjo (2012) states that an attitude has not automatically materialized in an action. To manifest an attitude into a real action, supporting factors or a condition are needed that allow the attitude to be positive. Based on the analysis carried by Setiawati et al. (2020) showed that with increased knowledge due to being given health education leads to an increase in positive attitudes towards puerperal danger signs that can occur besides that there are also many factors that influence attitudes, not only knowledge but also personal experience or the influence of other people who are more dominant.

Zubaidah & Suharni (2014) said that education is defined as the influence of the environment on the individual to produce permanent or permanent changes in behavior, thoughts and attitudes. Parental education will affect as knowledge in the care of their children carry out parenting. Health education consists of various methods such as print media, namely booklets, leaflets, flyers, flip charts, posters, and electronic media, namely television and radio.

Audiovisual media convey information with sound characteristics and images. Used for learning interactions to develop children and absorb knowledge through what is seen, heard and can achieve goals.

The communication of medical knowledge is essential. Network programs, point-to-point connections, links to monitoring centers, and web-based e-health patient service sites are the four mechanisms identified by the American Telemedicine Association for transmitting medical data. The network initiative connects outlying health care facilities to urban and suburban tertiary care hospitals, as well as rural community health centers.

The service is used to keep an eye on patients with lung, heart, fetal, and other diseases. While the internet may be used by some monitoring systems, ordinary landlines or wireless landlines are more commonly used for direct patient-clinic communication. Sites for e-health patients are built on the internet to facilitate direct customer service and information requests. This service also includes links to websites that offer direct patient treatment.

Considering the fast expansion of telemedicine, its benefits must have played a role. Telemedicine reduces distances and saves patients time by bringing healthcare closer to them. Not only do patients benefit from telemedicine services, but physicians and other healthcare professionals may swiftly contact faraway patients and colleagues. Additionally, telemedicine eliminates the expense and hassle of travel. The use of telemedicine decreases the length of hospital stays for patients and improves the treatment of chronic illnesses.

Due to the inability to undertake physical exams in telemedicine, some experts argue that medical safety cannot be ensured, and the

duty for patient privacy and safety is not explicitly attributed to doctors providing telemedicine services (Chaet et al., 2017; Cotet & Benjamin, 2013; Hall & McGraw, 2014). Due to this reason, a new telemedicine law should be enacted to regulate its application and precisely define medical obligations. Another impediment to the growth of telemedicine is the ineffective health-care system.

The study shows that most hospitals believe that telemedicine is effective and can improve the level of hospital medical services, which is consistent with the results of many studies that evaluate telemedicine positively this is in line with the results of the study. Study of D'Haeseleer et al., 2020; Khairat et al., 2019; Zakaria et al., 2019 show that as the frequency of consultations increases, primary care providers can significantly improve knowledge acquisition.

In conclusion, this article has illustrated how telemedicine has benefited healthcare delivery, education, community development, and cultural changes. The importance of collaborator commitment to maintaining a productive telemedicine cooperation is also highlighted. The need of regular meetings, consistent attendance, and committed patient care by employees at both locations is emphasized. Achieving success also requires having the backing of the appropriate institutions.

The scope of utilization of telemedicine includes the provision of health services remotely, be it in terms of clinical, educational, to administrative services which can be carried out by transferring audio, video and graphic information. The factors that influence the use of telemedicine are there is support from the organization and culture of the community for the provision of infrastructure, support from politics, adequate technological infrastructure, the existence of supporting regulations, and a society that can accept this progress. In general, telemedicine can help reduce the risk of exposure to disease, can reduce medical costs, and reduce the time spent traveling to health facilities. In telemedicine there are several sections including:

Teleconsultation is a technology that provides services in the form of convenience for patients to consult with doctors without having a face-to-face meeting so that it can be done remotely. Teleconsultation is expected to assist patients in receiving information regarding suspected diagnoses, treatment of diseases, information to improve people's physical and mental health. Teleconsultation also helps the JKN program to ensure that all Indonesian people can access health services without exception (Triana et al., 2021). Teleconsultation is the first thing that has been done in telemedicine services since 1969. At all locations in this study teleconsultation was also used between paramedics and doctors or between doctors and specialists.

TeleUSG (Ultrasonography) is part of telehealth in Indonesia, the development of TeleUSG aims to detect and estimate the fetus in ultrasound images (Munthe et al., 2018). The main function of TeleUSG is to automatically measure fetal biometry and detect fetal growth disturbances (Ariyanti & Kautsarina, 2017). In 2022 the Ministry of Health is running a teleUSG program by providing ultrasound devices complete with personal computers (PCs) to almost all puskesmas in Indonesia. Clearly, this ateemppt was accompanied by training for representatives of doctors at the puskesmas, recipients of ultrasound equipment and PC assistance for its implementation.

TeleEKG (Electrocardiography) is made for early detection and monitoring of heart disease with three main components including EKG sensors, PC or smartphone, and server. The EKG sensor is used with the aim of obtaining a heartbeat signal from the patient, then it is recorded and processed for further classification in diagnosing the patient's condition automatically, so that it can be known whether the patient is in normal condition or has symptoms of heart disease (Ariyanti & Kautsarina, 2017).

From the results of the interviews it can be concluded that telemedicine services are supported by several factors. Kruse et al. (2018) mentioned the factor that supports telemedicine is the cost factor because telemedicine lowers the cost of care. According to Langarizadeh et al. (2017) telemedicine supporting factors consist of organizational elements, culture, support from doctor directors and equipment funding.

Meanwhile, Correia et al., 2017; Maher et al. (2016) factors that support telemedicine are government and political regulations, public acceptance, political support, available technological infrastructure and referral protocol mechanisms from telemedicine. Further, Alami et al. (2017) add that factors that support telemedicine are strategic governance factors, organizational and professional dimensions, and economic and financial dimensions.

Technological infrastructure factors because telemedicine expansion is necessary but success depends on a strong telemedicine infrastructure. Complex telecommunications requirements and the availability of high-speed broadband access are necessary for the everyday use of telemedicine (Mouchtouris et al., 2020).

The factor of organizational rules and regulations due to the existence of a law that requires insurance service providers not to refuse telemedicine financing also supports the implementation of telemedicine. Through the existing telecommunications equipment in rural and urban hospitals through the Telemedicine Network (Schroeder, 2019). Financial factors due to cost savings because telemedicine can save travel costs and time costs incurred during treatment.

The Health Insurance Administration Agency (BPJS) through BPJS circular letter number 1 of 2022 concerning the Development of a Health Service System and Telemedicine-Based Payment System in the Health Insurance Program, determines the amount of payment for telemedicine services.

All patients agreed on the advantages of Telemedisin including no risk of infection, no need to travel, and no long waits. Patients are satisfied with video calls and they want to use telemedicine for future follow-up (Li, Chan, Huang and Cheng, 2020).

Technological infrastructure factor because doctors feel 100% satisfied with the Telemedicine tool and find it easy to use (Fieux et al., 2020). Financial factors as women report that telemedicine helps reduce the costs, travel and time burdens associated with attending two in-person visits (Ehrenreich et al., 2019). Infrastructure factor because in providing optimal telemedicine services patients check the address to check the nearest satellite and all patients are satisfied with telemedicine services and can communicate clearly with service providers. Service providers use video conferencing technology (Lin et al., 2018).

The introduction and maintenance of telemedicine services are affected by a number of issues. Administrative, organizational, behavioral, technical, sociological, economical, and political explanations are often needed for these forms of systems. This means that telemedicine services require constant and multi-dimensional monitoring from the planning phase through the evaluation of performance. The assessment framework should also take into account a number of sub-factors for each service dimension. In economics, for instance, it is important to consider not just costs and advantages for various parties, but also insurance coverage and reimbursement, when making assessments.

Telemedicine Evaluation Services in Public Health Education at Bitung City Health Office

Because there was no well-programmed evaluation of the implementation of telemedicine programs at health offices that were part of this study, the results cannot be used as a reference for the future deployment of telemedicine services. Only the number of individuals who view the website as well as the number of likes and comments on the Facebook and Instagram side media are taken into consideration for the evaluation. Obviously, this does not paint a complete picture of the ways in which telemedicine services have been successfully implemented. The community service index is used at the Health Office to evaluate the overall quality of the health services provided, and it currently has a score of 79.98. It does not evaluate telemedicine programs in any particular manner.

Health care information system evaluations, according to Ammenwerth & De Keizer (2005), need to take into account the views of a wide range of people and groups, including "actors" such as individuals, "organizations," and "communities," as well as "artifacts" such as technologies, "environments," and

"interactions" between these factors. The outputs and outcomes of the evaluation should be thought of in relation to the immediate outcomes and intermediate objectives. Medical, technological, psychosocial, organizational, commercial, political, and societal concerns must all be taken into account when assessing the efficacy of telemedicine. As a reaction, the purpose of this study is to create a holistic framework by assimilating various aspects of other, more fundamental evaluation methods.

A well-developed telemedicine system will address the imbalance in the number of doctors in big cities and remote areas, particularly in certain specialists. This telemedicine service can be in the form of doctor-patient or doctor-patient telemedicine communication. Unfortunately, until now, the doctor-patient telemedicine services that are developing in Indonesia are in the form of forum or chat services and are forum- or cellphone-based applications, making it difficult for people in remote areas who do not yet have access to the internet and do not have smart phones capable of operating these applications. As a result, telemedicine services that were originally intended to overcome distance and geographical restrictions are actually limited by distance.

An alternative is to build a government-based telemedicine system that uses telephone media, for example combined with other emergency services such as 911 in developed countries, because telephone networks reach more remote areas than the internet. In this study, Bitung City also has PSC 119 services. Other alternatives can be negotiated with IDI as a medical professional organization after seeing and assessing local facilities and infrastructure.

However, there are a number of obstacles that must be overcome in order to put it into practice, including technological limitations, data security and patient privacy concerns, governmental rules, organizational norms, and specific patient issues (Sulistiadi, 2020). Consequently, the government must maintain its presence in the realm of telemedicine by establishing rules and continuing to collaborate with hospitals and medical professionals (Machmud et al., 2020; Sulistiadi, 2020).

Despite the promise for telemedicine services to enhance the quality and accessibility of healthcare services, the success rate of their implementation has been unsatisfactory. Numerous individuals interested in the implementation of telemedicine services have released guidelines and frameworks that might be utilized by others.

This review confirms the necessity for a comprehensive implementation strategy that covers technology, organizational structure, change management, economic feasibility, social effect, perceptions, usability, evaluation and evidence, laws, regulations, and governance. Existing ideas that have been created and validated in other settings that potentially aid in the implementation of telemedicine services have been identified.

Conclusions

Based on the results Telemedicine Service Planning in Public Health Education in Bitung City begin with the preparation of human resources both from informants (medical/paramedical) and from IT personnel, preparation of facilities and infrastructure and equipment used. Planning also involves preparing health materials to be distributed to the public, as well as budget items to be used for telemedicine services.

The implementation of telemedicine services in the city of Bitung in the form of teleconsultation went well with the hotline number at PSC 119 which was the prima donna especially during the COVID-19 pandemic. In addition, there is also a telemedicine service in the Bitung Digital Medical application. Provision of health materials and services also uses existing social media such as websites, FB and IG.

However, there has not been a thorough evaluation of telemedicine services because this is a newly implemented program. The new evaluation looks at the overall community satisfaction index of 79.98%, the number of consultations on the hotline number and visits to the website, the number of followers, the number of likes and comments on each post.

In this case, we suggest that Telemedicine can be developed further, not only as a means of medical consultation, but massively developed

in the form of health promotion, delivery of routine and various health materials so that public health education becomes broader. Therefore, it needs to be supported by an adequate and affordable internet network in all places. A government regulation is needed that regulates the telemedicine service mechanism so that it does not stand alone between providers, both private and government.Cross-sectoral cooperation is needed, such as cooperation with the Information and Communication Service and the Education Office so that Telemedicine services are used as media in public health education.For future researchers, it is hoped that they will be able to do more in-depth research focused on just one part, be it planning, implementing or evaluating telemedicine services in public health education.

References

Adesta, R. O., & Nua, E. N. (2021). Pendidikan Kesehatan Melalui Media Online Terhadap Pengetahuan Dan Perilaku Pencegahan Kanker Serviks Pada Wus Di Sikka. *Jurnal Ilmu Keperawatan Maternitas*, *4*(1), 15–26.

Alami, H., Gagnon, M.-P., Wootton, R., Fortin, J.-P., & Zanaboni, P. (2017). Exploring factors associated with the uneven utilization of telemedicine in Norway: a mixed methods study. *BMC Medical Informatics and Decision Making*, *17*(1), 1–15.

Ali, Z. (2010). Dasar-dasar pendidikan kesehatan masyarakat dan promosi kesehatan. *Jakarta: Trans Info Media*.

Ammenwerth, E., & De Keizer, N. (2005). An inventory of evaluation studies of information technology in health care. *Methods of Information in Medicine*, *44*(01), 44–56.

Ariyanti, S., & Kautsarina, K. (2017). Techno-economic study on telehealth in Indonesia. *Buletin Pos Dan Telekomunikasi*, *15*, 43–54.

Aziz, H. A., & Abochar, H. (2015). Telemedicine. *Clinical Laboratory Science*, *28*(4), 256–259.

Chaet, D., Clearfield, R., Sabin, J. E., & Skimming, K. (2017). Ethical practice in telehealth and telemedicine. *Journal of General Internal Medicine*, *32*(10), 1136–1140.

Correia, A., Azevedo, V., & Lapão, L. V. (2017). Implementation of telemedicine in Cape Verde: influencing factors. *Acta Medica Portuguesa*, *30*(4), 255–262.

Cotet, A. M., & Benjamin, D. K. (2013). Medical regulation and health outcomes: the effect of the physician examination requirement. *Health Economics*, *22*(4), 393–409.

Cui, F., Ma, Q., He, X., Zhai, Y., Zhao, J., Chen, B., Sun, D., Shi, J., Cao, M., & Wang, Z. (2020). Implementation and application of telemedicine in China: cross-sectional study. *JMIR MHealth and UHealth*, *8*(10), e18426.

D'Haeseleer, M., Eelen, P., Sadeghi, N., D'Hooghe, M. B., Van Schependom, J., & Nagels, G. (2020). Feasibility of real time internet-based teleconsultation in patients with multiple sclerosis: interventional pilot study. *Journal of Medical Internet Research*, *22*(8), e18178.

Daryanto, H. M. (2013). Administrasi dan Manajemen sekolah. *Jakarta: Rineka Cipta*.

Ehrenreich, K., Kaller, S., Raifman, S., & Grossman, D. (2019). Women's experiences using telemedicine to attend abortion information visits in Utah: a qualitative study. *Women's Health Issues*, *29*(5), 407–413.

Fieux, M., Duret, S., Bawazeer, N., Denoix, L., Zaouche, S., & Tringali, S. (2020). Telemedicine for ENT: Effect on quality of care during COVID-19 pandemic. *European Annals of Otorhinolaryngology, Head and Neck Diseases*, *137*(4), 257–261.

Hall, J. L., & McGraw, D. (2014). For telehealth to succeed, privacy and security risks must be identified and addressed. *Health Affairs*, *33*(2), 216–221.

Kemenkes, K. (2019). *Petunjuk teknis pelaksanaan bulan kapsul vitamin A terintegrasi program kecacingan dan crash program campak*. STIKES PERINTIS.

Khairat, S., Liu, S., Zaman, T., Edson, B., & Gianforcaro, R. (2019). Factors determining patients' choice between mobile health and telemedicine: predictive analytics assessment. *JMIR MHealth and UHealth*, *7*(6), e13772.

Komariah, N., & Munawaroh, F. (2021). Manajemen Pendidikan Keluarga Dalam Mengembangkan Karakter Anak. *Al-Afkar: Jurnal Keislaman & Peradaban*, *9*(1), 41–52.

Kruse, C. S., Atkins, J. M., Baker, T. D., Gonzales, E. N., Paul, J. L., & Brooks, M. (2018). *Factors influencing the adoption of telemedicine for treatment of military veterans with post-traumatic stress disorder*.

Langarizadeh, M., Moghbeli, F., & Aliabadi, A. (2017). Application of ethics for providing telemedicine services and information technology. *Medical Archives*, *71*(5), 351.

Leonita, E., & Jalinus, N. (2018). Peran Media Sosial dalam Upaya Promosi Kesehatan: Tinjauan Literatur. *INVOTEK: Jurnal Inovasi Vokasional Dan Teknologi*, *18*(2), 25–34.

Lin, J. C., Crutchfield, J. M., Zurawski, D. K., & Stevens, C. (2018). Implementation of a virtual vascular clinic with point-of-care ultrasound in an integrated health care system. *Journal of Vascular Surgery*, *68*(1), 213–218.

Lubis, Z. I. (2021). Analisis Kualitatif Penggunaan

Telemedicine sebagai Solusi Pelayanan Kesehatan di Indonesia pada Masa Pandemik COVID-19. *Physiotherapy Health Science (PhysioHS)*, *2*(2), 76–82.

Machmud, M., Chairun Nasirin, N., Salahudin, S., & Tawakkal, B. (2020). Artificial intelligence in the public health sector: The use of telemedicine in Indonesia during COVID-19. *Palarch's Journal Of Archaeology Of Egypt/Egyptology*, *17*(7), 10106–10118.

Maher, A., Malmir, R., & Alimohamadzadeh, K. (2016). Establishment background and factors affecting the success of telemedicine provision. *International Journal of Travel Medicine and Global Health*, *4*(1), 25–30.

Mouchtouris, N., Lavergne, P., Montenegro, T. S., Gonzalez, G., Baldassari, M., Sharan, A., Jabbour, P., Harrop, J., Rosenwasser, R., & Evans, J. J. (2020). Telemedicine in neurosurgery: lessons learned and transformation of care during the COVID-19 pandemic. *World Neurosurgery*, *140*, e387–e394.

Munthe, M. Y., Priyambadha, B., & Arwani, I. (2018). Pengembangan Sistem Telehealth Dengan Diagnosis Penyakit Otomatis Berbasis Web. *Jurnal Pengembangan Teknologi Informasi Dan Ilmu Komputer E-ISSN*, *2548*, 964X.

Notoatmodjo, S. (2010). *Ilmu perilaku kesehatan*.

Pramanik, P. K. D., Nayyar, A., & Pareek, G. (2019). WBAN: Driving e-healthcare beyond telemedicine to remote health monitoring: Architecture and protocols. In *Telemedicine technologies* (pp. 89–119). Elsevier.

Puspitasari, C. E., Dewi, N. M. A. R., Aini, S. R., Pratama, I. S., Erwinayanti, G., Wahyuningsih, I., & Ariani, F. (2020). Edukasi Pencegahan Anemia Saat Menstruasi Pada Remaja Putri. *Jurnal Pepadu*, *1*(4), 529–536.

Rohiat, R. (2010). Manajemen sekolah: Teori dasar dan praktik. *Bandung: Refika Aditama*.

Rohmah, M. K., Anwari, F., & Nurdianto, A. R. (2022). Edukasi Kesehatan Berbasis Ketangguhan Keluarga Sehat Dalam Menghadapi Pandemi COVID-19 Berbasis Telemedicine Dan Media Sosial. *Konferensi Nasional Pengabdian Masyarakat (KOPEMAS) 2021*.

Santoso, B., Susanto, E., Widyawati, M. N., Rahman, W. A., & Rajiani, I. (2020). Revitalizing School Dental Health Effort through" Model 222" as a Strategy to Achieve Caries-Free Indonesia 2030. *Systematic Reviews in Pharmacy*, *11*(2).

Sari, G. G., & Wirman, W. (2021). Telemedicine sebagai Media Konsultasi Kesehatan di Masa Pandemic COVID 19 di Indonesia. *Jurnal Komunikasi*, *15*(1), 43–54.

Schroeder, C. (2019). Pilot study of telemedicine for the initial evaluation of general surgery patients in the clinic and hospitalized settings. *Surgery Open Science*, *1*(2), 97–99.

Setiawati, P., Setyawati, E., & Palin, Y. (2020). *Pengaruh pendidikan kesehatan menggunakan media audiovisual terhadap pengetahuan sikap dan perilaku ibu nifas di RS dr. R. Hardjanto Balikpapan Tahun 2020*. http://repository.poltekkes-kaltim.ac.id/1030/2/SKRIPSI PERA SETIAWATI REVISI FIX %281%29.docx.pdf

Soegijoko, S. (2010). Mobile Telemedicine System with Multi Communication Links for Developing Countries. *Telemedicine and IT Infrastructure At Hospital Build Asia–Exhibition and Congress, Singapore*, 12–13.

Soekidjo, N. (2012). Promosi kesehatan dan perilaku kesehatan. *Jakarta: Rineka Cipta*, 131–132.

Sulistiadi, W. (2020). A Systematic Review: Challenges and Evaluations Related to Telemedicine as a Healthcare's Hope to Tackle COVID-19. *International Conference of Health Development. COVID-19 and the Role of Healthcare Workers in the Industrial Era (ICHD 2020)*, 194–201.

Triana, D., Hardiansyah, H., Yunita, S., Haniyah, M., Sulistiyorini, E. N., Ambarsarie, R., Anggraini, R., Yunita, E., & Sariyanti, M. (2021). Telekonsultasi Dalam Rangka Pemutusan Rantai Penularan COVID-19 di Kota Bengkulu. *Dharma Raflesia: Jurnal Ilmiah Pengembangan Dan Penerapan IPTEKS*, *19*(2), 217–224.

Yuliani, D. R., & Amalia, R. (2020). Meningkatkan pengetahuan dan perilaku pencegahan COVID-19 maternal neonatal melalui pendidikan kesehatan secara online: studi pada ibu hamil. *Jurnal Riset Kebidanan Indonesia*, *4*(2), 66–71.

Yusriani, Y., & Acob, J. R. U. (2020). Education through whatsapp media in changing of smoking behavior among senior high school students. *Kesmas: Jurnal Kesehatan Masyarakat Nasional (National Public Health Journal)*, *15*(3).

Zakaria, A., Maurer, T., Su, G., & Amerson, E. (2019). Impact of teledermatology on the accessibility and efficiency of dermatology care in an urban safety-net hospital: A pre-post analysis. *Journal of the American Academy of Dermatology*, *81*(6), 1446–1452.

Zubaidah, U., & Suharni, S. (2014). *Hubungan Pola Asuh Orang Tua dengan Tingkat Kemandirian Personal Hygiene pada Anak Retardasi Mental di SLB Negeri 2 Yogyakarta*. STIKES'Aisyiyah Yogyakarta.