Digital Health Literacy and Telemedicine in the Information Age: A Comprehensive Review and Future Prospects

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Abstract

In the digital era, advances in information technology have penetrated various aspects of life, including the health sector. This article reviews the importance of health literacy and digital literacy in facing the challenges of health information that is easily produced and disseminated in the digital world. Telemedicine or e-health is in the main spotlight in facilitating access to health services, while this research introduces a health literacy model with three level including functional, interactive, and critical. Digital literacy is described as a key skill in understanding, evaluating, and wisely utilizing online health information. The article also discusses the role played by the government and society in overcoming the spread of hoaxes and increasing digital literacy. Thus, by increasing health literacy and digital literacy, it is hoped that people can access correct health information and avoid misinformation, which will ultimately contribute to improving quality of life and welfare. In an increasingly digitally connected world, the ability to critically sort information and use technology wisely is key to maintaining the health and well-being of society. Therefore, joint efforts between the government, health institutions and the community in increasing health literacy and digital literacy are very important to face this ever-growing digital era.

Keywords: Telemedicine, E-Health, Health Literacy, Digital Literacy, Hoax, Health Information

1. Introduction

The development of information technology has become one of the main drivers of change in society's communication patterns, especially society which is increasingly adopting a digital lifestyle. The era of digitalization that we are currently experiencing has brought significant changes in how we communicate, access information and live our daily lives. In this context, communication tools and digital applications play a major role in shaping the social and cultural dynamics of society (Nair et al., 2020).

One of the key factors in this revolution is the development of internet technology. Until now, the internet has spread quickly and widely, allowing access to cyberspace by almost anyone. Even though there are still challenges in providing stable internet connections throughout Indonesia, the fact is that internet penetration continues to increase. According to the "Indonesian Internet User Penetration and Behavior 2017" survey conducted by the Indonesian Internet Service Providers Association (APJII) in collaboration with Teknopreneur, the number of internet users in Indonesia reached 143.26 million people, equivalent to 54.7 percent of the country's total population. This is concrete evidence that more and more Indonesian people are involved in using digital technology as an integral part of their daily lives (Lane et al., 2023).

Increasing internet penetration has a significant impact on the lives of Indonesian people. Information available on the internet is becoming increasingly easy to access, and the speed of obtaining information has had an impact on various aspects of daily life. In a situation where information is a valuable commodity, the presence of the internet has enabled people to access knowledge, news, services and entertainment more quickly and efficiently. However, with this speed also comes the challenge of sorting and filtering the information received so that it is useful and meets needs (Imhoff & Lamberty, 2020).

In an increasingly digital era, we are not only faced with an abundance of information, but also with serious challenges that arise along with the rapid spread of information. One problem that has emerged is the spread of false or misleading information, often referred to as "hoaxes." Hoaxes are false or fake news that is spread with a specific purpose, such as manipulating public opinion, creating chaos, or gaining personal gain. This challenge gives rise to anxiety and confusion in society, especially because the speed and ease of disseminating and accessing information is not always matched by the ability of the public to sort and assess the quality of the information they receive.

The development of digital technology and social media has presented the phenomenon of "information flooding" which makes some people become talkative or stuttered in sorting out the information they receive. This has created a major challenge in ensuring that the information disseminated in society is correct and trustworthy. This phenomenon has also triggered what is often referred to as "digital culture shock," in which society has had to adapt to new ways of accessing, processing, and sharing information.

One striking example is the spread of hoaxes around health issues, such as the controversy surrounding vaccination. A number of individuals or groups of people known as "anti-vaccines" do not agree with the use of vaccines and even spread misinformation about vaccines. This inaccurate information can unsettle the public and result in significant confusion. Propaganda associated with the spread of misinformation aims to influence public opinion and influence their decisions regarding vaccination.

Refusal to immunize is one of the serious impacts of spreading false information or hoaxes on social media. Dr. Jane Soepardi, Director of Health Surveillance and Quarantine at the Ministry of Health, identified a number of reasons behind low immunization coverage in several areas. One of them is rejection from parents, which can be caused by doubts about the quality of the vaccines used in mass immunization programs.

Fake news or hoaxes on social media also play an important role in influencing parents. A number of groups of parents have been exposed to hoax information related to vaccines that spread unfounded claims, such as claims that vaccines can cause paralysis or even death. However, in reality, when this is explored, there is no direct relationship between the vaccine and this condition. Apart from that, there are groups of parents who doubt the halalness of vaccines or assume that their children already have immunity and therefore do not need vaccines.

The spread of incorrect information occurs very quickly through social media and instant messaging applications such as WhatsApp, LINE, and the like. This phenomenon has a significant impact on people's beliefs and decisions regarding health issues, especially in the context of vaccination. This becomes more serious among people who do not have a deep understanding of health or have a low level of health literacy. Communities with limited levels of health literacy tend to be more susceptible to the influence of inaccurate information or hoaxes.

The influence of myths, beliefs passed down from generation to generation, and limited access to technology in rural areas play an important role in resistance to vaccination. In rural areas, where people still follow traditional customs and beliefs, there are doubts about the benefits of vaccination. Previous generations may not have taken vaccines, but were still able to survive, leading to a skeptical view of the need for vaccines. This factor is more pronounced in rural areas that have limited access to digital technology.

Meanwhile, urban communities who are more connected to digital technology tend to have easier access to information. However, even among a digitally connected society, there are people who still believe hoaxes related to vaccination. This highlights the importance of digital literacy, namely the ability to sort and assess information found online. The author notes that in virtual communities on social media, such as the group "Anti-Vaccination and Immunization Movement," there are members who are active in spreading anti-vaccination information and getting responses from other members who have similar views. This dynamic reflects how misinformation or hoaxes can develop within groups with similar views.

In overcoming the challenge of hoaxes, digital literacy becomes important. People who are active on social media must be equipped with the ability to sort correct and accurate information so that their activeness in seeking information does not have a detrimental impact. Digital literacy helps individuals understand how to check the accuracy of information, identify hoaxes, and avoid spreading misinformation.

Apart from digital literacy, health literacy is also important in dealing with health issues such as vaccination. Accurate, evidence-based information is critical in health decisions. Health hoaxes, especially those related to vaccines, can interfere with people's decisions and potentially harm their health. Therefore, education and increasing health literacy are very necessary to help people understand the importance of vaccination and sort out the correct information.

Comprehensive actions including overcoming hoaxes by providing accurate information, educating the public about the benefits of vaccination, and increasing digital literacy and health literacy are key to overcoming the problem of spreading misinformation and hoaxes related to health in society. This will support efforts to maintain and improve the quality of public health. The importance of health literacy and a deep understanding of health issues cannot be ignored. Educational efforts and increasing awareness of the importance of immunization, as well as providing accurate and reliable information, are very important steps in overcoming this challenge. This requires not only cooperation from governments and health institutions, but also active participation from citizens and communities in

fighting the spread of misinformation. Thus, it can be hoped that immunization coverage will increase and public safety and health will be better maintained.

2. Methodology

The research method applied in this paper is a qualitative method with a descriptive analysis approach. Data collection techniques are carried out through literature studies or library studies from various sources such as books, scientific works and journals related to written topics, especially those related to digital literacy and the spread of health information hoaxes on social media. Apart from that, the author also uses data obtained from the internet to provide a more complete picture of this phenomenon, and considers the role of social media as the main platform for disseminating health information, including hoaxes.

The qualitative method was chosen because it allows the author to explore a deeper understanding of the phenomenon being discussed. By analyzing descriptive data from various literature sources and data from the internet, the author can present comprehensive and detailed information regarding digital literacy and the spread of health information hoaxes in society.

It is important to note that the qualitative methods in this paper focus on the analysis and interpretation of qualitative data, not on collecting empirical data directly from the field. This is in line with the research objective to understand and explain the phenomenon of digital literacy and the spread of health information hoaxes on social media.

3. Results and Discussion

The development of digital technology has changed communication patterns between humans significantly. Communication technology plays a central role in the way we interact and communicate. It is important to note that communication technology can provide great benefits when used wisely and according to conditions and needs.

The generation that is active in following technological trends, especially in terms of gadget innovation, often has a high level of dependence on technology. They believe that technology is a key element in preparing for the future and enriching their lives. Apart from that, technology is considered a tool that can help make various daily activities easier. This has shaped certain characteristics for a generation often referred to as "digital natives."

For the digital native generation, information search patterns tend to be very dependent on communication technology, especially internet access. They are more comfortable and accustomed to accessing information through digital media, especially through social media platforms. The speed of accessing and sharing information in the digital environment has created a new paradigm for communicating and sharing knowledge.

However, there is another side to the impact of digital technology, namely the challenges that arise, such as the spread of hoaxes and false information on social media platforms. Although the digital native generation tends to be adept at using technology, they are also susceptible to incorrect or misleading information. Therefore, digital literacy is becoming increasingly important, even among generations who actively use technology.

A deep understanding of how to sort and assess information found online is a key skill that the digital generation must have, especially in the context of the spread of health information hoaxes. With strong digital literacy, this generation can be wiser in utilizing communication technology and ensure that the information they receive and disseminate is accurate and reliable.

The development of digital literacy and health literacy must be considered by the government, educational institutions and communities as a joint effort to fight the spread of health information hoaxes. In this way, the digital generation can live a smarter and safer digital life, and society as a whole can overcome the challenges that arise along with the development of information technology.

The neo-futurist approach is one of three approaches in responding to and understanding developments in communication technology. This approach has characteristics similar to those of the digital native generation. The neo-futurist flow reflects the legacy of the futurism school which has an uncritical belief in new changes. They believe that high-speed technology has extraordinary power and can overcome everything. This school places high hopes on technology in shaping and influencing life.

The digital native generation has different views and behavior from the generation who only got to know computers or learned about the internet later in life. The digital migrant generation may learn to use the internet, but not as quickly or intensively as the digital native generation who grew up with access to this technology from an early age. Differences in ability to obtain information give rise to increasingly wide information gaps. The more difficult it is to access the internet, the slower the information that can be received.

The main challenge faced is the information gap between generations. Today's young children learn more quickly about games or digital symbols than parents belonging to the digital migrant generation. They quickly adapt because they are used to the digital environment. Television also influences the information gap between generations. This

media introduces popular culture that is trending according to each generation. Each generation has different tastes due to growing up in different cultures and traditions.

Changes in communication patterns due to technological developments are a significant challenge for society, especially for the digital native generation, especially in terms of uncontrolled reception and dissemination of information on social media. With easy access and the abundance of information available via the internet, people must have the ability to sort and think critically about the information they are looking for so as not to fall into misleading information. In an era of fast and open information, digital literacy and the ability to assess the reliability of information are key skills that are very necessary.

3.1. E-Health in the Digital Era

With increasingly rapid technological advances, especially in Indonesia, there are now many internet-based applications available. This application is not only used for entertainment, but also to facilitate various activities, whether in terms of socializing or networking (social media), government activities (e-government), even health services (e-health).

Health issues are becoming increasingly important to discuss in Indonesia, especially in the context of the current digital era. In an era where health information can be produced and disseminated by anyone, even irresponsible parties whose credibility is doubtful, it is important for the public to obtain accurate and trustworthy information. Mistakes in trusting health-related information can have serious consequences, even leading to death.

Secretary of the Honorary Council of the Indonesian Journalists Association (PWI), pointed out that the hoaxes that are most widely spread in society are hoaxes related to health. According to Wina, hoaxes in the health sector tend to be spread more often by the public due to a lack of correct information regarding this matter. Therefore, the author believes that the phenomenon of the widespread spread of health hoaxes in society requires digital literacy as a step to overcome this problem. that the results of his research showed that around 27% of the approximately 1,000 hoaxes sampled in his research for approximately one year, from February 2016 to February 2017, were fake news related to health. This confirms that health issues are one of the topics most vulnerable to the spread of hoaxes in this digital era.

The results of an online survey regarding the national hoax outbreak conducted by Mastel (Indonesian Telematics Society) on February 7 2017 of 1,116 respondents within 48 hours showed that the type of health hoax was ranked third with 41.20%, below socio-political and SARA news hoaxes. This emphasizes that health issues are an important matter to discuss in Indonesia, especially considering that there are still many people who do not have adequate health literacy and digital literacy to fight hoaxes in society. Information from the survey conducted by Mastel includes an understanding of hoaxes, people's behavior in dealing with hoaxes, sources of dissemination of hoaxes, the impact of hoaxes on social life, and ways to deal with hoaxes.

The development of communication and information technology in Indonesia has had major implications for public health. One of the positive impacts of this development is the emergence of various digital applications, including consultation applications between doctors and patients. This application allows health consultations without being limited by distance, space or time. However, it is important for the public to understand that information obtained from online health applications must be treated critically. The public is expected to always verify the origin and credibility of the application and the sources in it.

This online health consultation application emerged as a result of advances in internet technology that enable long-distance health services, known as telemedicine or e-health. Telemedicine is a form of health service that involves medical activities such as diagnosis, examination, disease prevention, health education, research and evaluation, which are carried out remotely via electronic applications, computers and telecommunications technology. This makes it easier to exchange medical information from one location to another to support the implementation of medical procedures.

E-health, or telemedicine which is also known as e-health, has unique characteristics in various aspects such as type of interaction, type of data, and devices used. Interaction in e-health is real-time and store-and-forward, which means information can flow directly at any time, anywhere and at any time, while data can also be stored and forwarded in the form of information. The data type determines the format of data that can be transferred, whether in the form of text, sound, images, or a combination of the three. This type of data will influence the selection of information channels and network devices that are suitable for general or special purposes.

Basic applications in e-health include patient data recording and reporting, health service databases and evaluation, drug data recording and reporting, telecoordination, simple teleconsultation, and distance medical education.

The benefits of e-health include three interrelated aspects, namely patients, hospitals and doctors. For patients, the benefits include faster access to referral centers, first aid while waiting for direct assistance from a personal doctor, staying close to home so relatives can provide support, and selection of patients who require hospitalization. For hospitals, e-health ensures quality services for the public through an automated hospital operational system. Meanwhile, for doctors or paramedics, e-health accelerates information transformation, making decision making easier and increasing closeness to patients.

Although hospital-based e-health has a strong theoretical foundation, there are still obstacles to its acceptance and use by the public. Limited internet access and lack of public knowledge about health can be obstacles. Therefore, along with the development of online health applications, it is important for people to increase their health literacy.

3.2. Health Literacy

In this article, the author first explains the theory regarding health literacy which is the main concept in improving the level of public knowledge in the health sector. Nutbeam (2000) said that there were previous models of underestimation of the potential role of discussing health education which was intended as a determining factor in public health. This model highlights health literacy as a key outcome of health education. Here, Nutbeam tests the concept of health literacy by identifying the differences between functional health literacy, interactive health literacy and critical health literacy. Through this analysis, Nutbeam develops health literacy beyond just exchanging information or messages, but also develops the audience's ability to be able to read pamphlets and successfully make agreements or decisions. (Nutbeam, 2000)

Next, Nutbeam explained health literacy into 3 levels. Level 1, namely functional health literacy, reflects the results of traditional health education based on communication of factual information on health risks and how to use the health system. Some of these health literacy actions have limited objectives, directed at improving knowledge about health risks and health services as well as fulfilling planned or determined actions. Generally, some of these activities will produce individual benefits, but can also be directed at benefits for a group of people in an area, for example with health promotion, immunization and other programs. This does not invite interactive communication, nor does it develop developmental abilities and autonomy. An example of this form of action is the production of traditional patient information and education leaflets.

Level 2 is interactive health literacy, which reflects the results of approaches to health education that have developed over the past 20 years. This health literacy focuses on developing personal abilities in a supportive environment. This educational approach is aimed at increasing personal capacity to act independently of knowledge, more specifically to increase motivation and self-confidence to act on receiving advice. Most activities at this level will result in individual benefits rather than group benefits. Examples of this form of action can be found in many health education programs in contemporary schools that are directed at personal and social skill development and behavioral outcomes.

Level 3, critical health literacy, reflects cognitive abilities and development that are oriented to effectively support social action and political action, as well as individual action. In this paradigm, health education can involve communication that conveys information and capacity development that investigates the political and organizational possibilities of various forms of social, economic, and environmental health action. This type of health literacy can be more clearly linked to the benefits it provides to a group of people. Health education in this case would be directed at increasing the capacity of individuals and communities to act on the social and economic determinants of health. (Nutbeam, 2000)

Then Nutbeam (2000) explained that health literacy is one of the determinants of health and is a reflection of how an individual can understand, assimilate, and critique reflections on information about health and disease. Health literacy is a very important condition for improving the quality of mental and physical health. There are two components related to the definition of health literacy that can be considered, namely the first is the part that contains information and "making sense," and the other is the understanding and use of information aimed at "making choices." The second part also includes elements of self-management.

Health literacy represents cognitive and social skills that demonstrate an individual's motivation and ability to gain access, understand, and use information in ways that promote and maintain good health. Health literacy means more than the ability to read pamphlets and make successful decisions by improving people's access to health information and their capacity to use it effectively.

Health literacy is an empowerment activity. Increased abilities and competencies that people develop to search for, understand, evaluate, and use health information and concepts to make decisions, reduce health risks, and improve quality of life (Nutbeam, 2000). In this digital era, health information can be easily obtained. If people have adequate health literacy, then people are able to search for, understand, and even evaluate the health information they obtain so that it can later be disseminated and improve the quality of health in certain communities.

3.3. Digital Literacy

Digital literacy is important in the development of communication technology today. In Osterman (2013) it is explained that in the 21st century era, when technology is increasingly developing, literacy is needed, and there is already a consensus regarding the knowledge and abilities needed by a group of people to have digital literacy skills. According to Osterman, this digital literacy issue has been formulated by previous researchers to respond to increasingly developing technology.

There are four assumptions related to digital literacy. First, new literacies include the new abilities, strategies, dispositions, and social practices required by new technologies for information and communication. Second, new literacies are central to fulfilling participation in the global community. Third, new literacy regularly changes the definition of technological change, and fourth, new literacy is a variety of understandings regarding benefits from various points of view. (Osterman, 2013).

Regarding information literacy among students, information literacy for "higher education" defines a student who has information literacy skills, namely someone who can determine or decide the nature of the information needed, access the information needed effectively and efficiently, evaluate information and its sources appropriately. critical, and integrating selected information into basic knowledge and value systems, as an individual or as a member of a group, using information effectively to achieve specific goals, and understanding the many economic, legal, and social issues surrounding the use of information and access and use of information ethically and legally.

Then Martin & Grudziecki, (2006) stated that the definition of digital literacy is two main types of concepts, namely a conceptual definition and a set of standards intended to establish the normalization of digital literacy both nationally and internationally. Presentation of two types of definitions of digital literacy, namely "Typical conceptual definitions of digital literacy" and "Some typical standardized operationalizations of digital literacy".

Literacy means the ability to read and write to understand the information presented. People who have good digital literacy are people who are independent and agile in searching for information and have the ability to choose the type of information needed and have the ability to present information with the right intermediary so that the audience can easily understand the information conveyed (Lankshear & Knobel, 2006). Then in Lankshear & Knobel (2006) stated that Gilster identified four keys to digital literacy competencies, namely knowledge assembly, evaluating information content, searching the Internet, and navigating hypertext.

Meanwhile, according to Eshet (2012) the conceptual framework for the concept of digital literacy consists of (1) visual literacy of images or photos; (2) reproductive (information) literacy; (3) information literacy; (4) branching literacy; and (5) socio-emotional literacy. According to the author, the concept explained by Eshet-Alkalai is widely used and is relevant to current phenomena, especially the dissemination of health information on social media.

On social media, we often find the concept of digital literacy in the form of images or photos that provide information in the form of infographics with an attractive appearance so that it helps readers to be able to read the information presented more comfortably, flowingly and freely, as well as making it easier to understand the instructions and messages provided. represents a visual appearance. According to Alkalai & Amichai- Hamburger (2004), people who use visual photo literacy tend to have good memories and think with strong intuition. They decode messages and understand visual messages easily and fluently. As the author observes, this is often done by several media in Indonesia, such as Kompas and Tirto.id, which often display news in infographic form to make it easier for readers to grasp the content of the news or information and provide an attractive appearance to create interest in reading. This infographic is certainly very helpful for readers who tend to be less interested in reading texts or narratives in long form, because this feels boring for some people, especially Indonesian people who still have a low level of reading culture.

The concept of digital literacy in visual form is also used to disseminate public health information, whether from related agencies such as the Ministry of Health or also used by various mass media as the author mentioned previously. Apart from that, digital literacy using photo visuals is also developed using interactive multimedia which synchronizes with text messages, sound and also movement. This is what has been done by one of the mass media in Indonesia, namely Kompas, apart from presenting news narratives, Kompas also presents infographics and multimedia in the form of narrative, sound or music, and also motion in the videos it displays. Of course, this will be even more interesting and able to deliver content on target and help prevent information that misleads readers or hoaxes.

In Eshet (2012) it is explained that the development of the internet and other digital communication platforms has opened up new dimensions and opportunities for collaboration, learning, and sharing information in various forms such as learning communities, discussion groups, and chat rooms. However, this also raises various problems, for example, how do we ensure that the news about blood donations that is spread in chat rooms like WhatsApp is true news and not a hoax? Apart from that, should we open an email from someone we don't know but with an interesting subject but it turns out the email might contain a virus?

Related to this, it can be said to be socio-emotional literacy, namely internet users have the useful ability to know how to avoid the 'traps' of digital communication. According to Maalekuu et al., (2004), this is a new form of digital literacy that involves sociological and emotional aspects in the cyber world. Internet users who have socio-emotional literacy can be described as those who want to share data and knowledge with others, are able to evaluate information and think abstractly, and are able to collaborate to build knowledge.

According to notes on the results of research on the national hoax epidemic to overcome hoaxes that are spread in society, namely by carrying out mitigation in the form of eliminating stimulant factors which are dominated by socio-political and SARA issues, facilitating access to sources that can be used as references, providing effective legal action, as well as increasing public literacy through the role of government, community leaders and communities.

4. Conclussion

Based on the data presented in the article, we can conclude several important points:

a). Telemedicine (E-Health): Telemedicine, or e-health, is a health service that focuses on utilizing information and communications technology to facilitate access to health services. This includes real-time and store-and-forward interaction types, as well as a variety of data types, such as text, voice, and images. E-Health has major benefits for patients, hospitals, and doctors, including accelerated access to medical care and improved quality of healthcare services.

b). Health Literacy: Health literacy is a key concept in increasing people's knowledge about health. It includes three levels, namely functional, interactive, and critical health literacy. Health literacy helps individuals understand, assess, and make decisions related to their health. It also has an important role in decision making related to medical care.

c). Digital Literacy: Digital literacy is an individual's ability to access, understand, and use information conveyed through digital technology, especially the internet. This includes the ability to read, evaluate, and filter information that is widespread in the digital world. Digital literacy is needed in this digital era because health information and various types of knowledge are now more easily accessible online.

d). The Importance of Literacy in Dealing with Hoaxes: Digital literacy is also very important in dealing with the spread of hoaxes and false information on social media and digital platforms. The ability to identify incorrect information and avoid digital communication pitfalls is part of relevant socio-emotional literacy.

e). Role of Government and Community: To overcome the spread of hoaxes and increase digital literacy, the government, community leaders and communities play an important role. Mitigation is carried out by eliminating factors that trigger the spread of hoaxes, facilitating access to trusted sources of information, implementing effective legal measures, and increasing public literacy.

By increasing health literacy and digital literacy, people can be more effective in accessing and using correct health information, and can more easily avoid wrong and even dangerous information. This contributes to improving the quality of life and overall well-being of society.

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