Journal of World Future Medicine, Health and Nursing, 2(1) - Feb 2024 119-132

E-Health and Digital Transformation in Increasing Accessibility of Health Services

Loso Judijanto [1], Hendra Nusa Putra [2], Benny Novico Zani [3], Dadang Muhammad Hasyim [4], Muntasir [5]

[1] *IPOSS Jakarta, Indonesia*
[2] *Sekolah Tinggi Ilmu Kesehatan Dharma Landbouw Padang, Indonesia*
[3] *Sekolah Tinggi Ilmu Kesehatan Raflesia, Indonesia*
[4] *Sekolah Tinggi Ilmu Kesehatan Karsa Husada Garut, Indonesia*
[5] *Universitas Nusa Cendana, Indonesia*

Corresponding Author: Loso Judijanto, E-mail; losojudijantobumn@gmail.com

Article Information:
Received February 10, 2024
Revised February 19, 2024
Accepted February 21, 2024

ABSTRACT

In many countries, accessibility of healthcare remains a major challenge, especially in remote rural and urban areas. This research is relevant because of the push towards the application of technology in the healthcare sector to improve healthcare accessibility worldwide. The objectives of this study are to evaluate the role of e-Health in improving healthcare accessibility, explore the impact of digital transformation in improving the quality and coverage of healthcare services, and to draw conclusions about the implications of e-Health implementation and digital transformation in the context of improving healthcare accessibility. This research method uses a literature analysis approach to collect and analyze data from various sources of information related to e-Health and digital transformation in health services. The results of this study show that the implementation of e-Health and digital transformation has brought significant impact in improving the accessibility of health services, especially through the utilization of telemedicine, electronic medical records, and health applications. This has enabled easier access for individuals to obtain medical consultations and health information, especially for those living in remote areas. The conclusion of this study shows that e-Health and digital transformation have great potential in improving healthcare accessibility. By continuing to develop and integrate technology in the health sector, we can achieve the greater goal of providing more equitable and affordable healthcare to the global community. These steps can help reduce disparities in access to healthcare and improve people's overall quality of life.

Keywords: *Accessibility, E-Health, Digital Transformation*

Journal Homepage https://journal.ypidathu.or.id/index.php/jnhl

How to cite: Judijanto, L., Putra, N, H., Zani, N, B., Hasyim, M, D., Muntasir, Muntasir. (2024). E-Health and Digital Transformation in Increasing Accessibility of Health Services. *Journal of World Future Medicine, Health and Nursing*, 2(1), 119-132. https://doi.org/10.70177/health.v2i1.720

Published by: Yayasan Pendidikan Islam Daarut Thufulah

INTRODUCTION

Health is a valuable asset that must be well maintained by every individual (Aliffiro Naufal & Muklason, 2022). Health is the main focus of every individual and society. It encompasses physical, mental and social aspects that affect a person's quality of life (Bull et al., 2020). Having a good understanding of health is key to living a productive and fulfilling life. In a broader view, health is not just about the absence of disease, but also about balance and holistic well-being. Healthcare plays a crucial role in maintaining and improving the overall health of the community (Yassine et al., 2017). By providing appropriate access, health services can help reduce mortality, improve quality of life, and provide protection against preventable diseases and conditions. Through a wide range of services and a comprehensive approach, health services aim to meet the health needs of individuals and communities (Qiu et al., 2020). It also includes aspects of prevention, treatment, rehabilitation, and education that are essential to achieving a healthier society as a whole.

Health is very important in everyday life. The importance of health is such as maintaining productivity and quality of life (Mulyasari et al., 2023). Good health allows one to be more productive and enjoy life better. When a person feels physically and mentally healthy, they have enough energy to go about their daily activities well. Better decision-making. Optimal health allows one to make better decisions in various aspects of life, including in career, finance, and social relationships (Zhou et al., 2020). Furthermore, strong Interpersonal relationships. Good health also supports the formation and maintenance of healthy relationships with others. When a person feels good physically and mentally, they tend to be more open to interacting and building positive relationships. In the world of health, there are certainly some challenges in achieving optimal health. These challenges can be in the form of unhealthy lifestyles. Unhealthy lifestyles, such as lack of physical activity, poor diet, and excessive smoking or drinking, can be a major challenge in achieving good health. Secondly, access to health services in many parts of the world, access to quality health services is still a big problem (Ahmad et al., 2016). This can be due to economic factors, geography, or lack of health infrastructure. Stigma towards mental health problems There is still a social stigma associated with mental health problems, which can discourage people from seeking help or talking about their mental health conditions.

Review of Literature

1. E-Health and Digital Transformation

E-Health combines information technology with health to provide healthcare services, diagnosis, treatment, monitoring, and information management electronically. It includes the use of mobile apps, electronic medical records (EMR), telemedicine, medical sensors, and online platforms for consultation with healthcare professionals. E-Health is constantly evolving and has great potential to transform more aspects of Healthcare delivery (Sodhro et al., 2018). Integration of more advanced technologies such as artificial intelligence (AI) can provide more accurate

diagnosis and more personalized care (Bai et al., 2019). In addition, collaborative initiatives between the technology industry and the healthcare sector can produce new breakthroughs that bring positive changes in meeting the health needs of people globally. Furthermore, digital transformation has expanded the accessibility of health services by overcoming several barriers such as distance, cost, and limited resources (Lee et al., 2020). Now, people can easily access health information, get remote consultations, and manage their medical conditions through internet-connected devices. Design Digital transformation has expanded the accessibility of healthcare by overcoming several barriers such as distance, cost, and limited resources (Juwaini, 2023). Now, people can easily access health information, get remote consultations, and manage their medical conditions through internet-connected devices.

Digital transformation has penetrated into various sectors of life, and healthcare is no exception (Till, 2014). Advances in information and communication technology have brought about significant changes in the way healthcare is provided, accessed, and managed. E-Health, as a result of this digital transformation, has become one of the most paradigm-shifting innovations in the Healthcare industry (Chen et al., 2019). In its application, E-Health has several benefits in the world of health. The benefits of E-Health in improving accessibility to health services are many, including. First, easier and faster access. Through online platforms and mobile applications, patients can access health services without having to physically come to a medical facility. This is especially beneficial for those who live in remote areas or have limited mobility. Secondly, it is cost-effective. E-Health can reduce transportation costs and time spent going to the hospital or clinic (Isernia et al., 2019). In addition, the use of technology also enables efficiency in health administration processes. Thirdly, it improves the quality of healthcare services. With electronic medical records, a patient's medical information is instantly available to healthcare professionals who need it. This enables faster diagnosis and more precise treatment.

2. Accessibility of Health Services

Accessibility of health services is a key foundation in the provision of equitable and responsive health services for every individual, not least in various walks of life. This phenomenon not only includes the physical availability of health facilities, but also includes financial, geographical, cultural, and social aspects that affect a person's ability to get proper medical care. Accessibility of health services is a basic principle in creating a level playing field for the entire community (Negro-Calduch et al., 2021). This involves the development of health infrastructure that includes the availability of facilities, trained medical personnel, and adequate distribution of medicines. In this case, there are steps that must be taken to improve the accessibility of health services. Steps in improving healthcare accessibility include supportive policies, such as universal health coverage, subsidy programs for vulnerable groups, and initiatives to provide affordable healthcare services (McKhann et al., 1984). In addition, the use of technology, such as telemedicine, is also a solution to overcome geographical barriers and improve access to medical consultations. The availability of equitable access to

healthcare can have a significant impact on the overall health of a community (Huda, 2007). When people have better access to health services, it can reduce mortality from preventable diseases, extend life expectancy, and improve overall quality of life (Preti et al., 2020). Creating better accessibility to health services is an emerging challenge that requires a holistic approach (Janz & Becker, 1984). In the process, collaboration between the government, health institutions, and communities is essential to ensure that every individual has equal access to appropriate and quality health care.

Health care refers to any type of service provided to promote, prevent, treat, and restore the overall health of individuals or populations (Zeadally et al., 2016). It encompasses a wide range of activities aimed at maintaining health, diagnosing illness, providing medical care, and providing support and rehabilitation for patients. Health care has several aspects that must be considered. These important aspects of health care can be in the form of the first one health promotion (Nantabah et al., 2019). This health promotion is an effort to increase public awareness about the importance of a healthy lifestyle, hygiene, a balanced diet, exercise, and other activities that can maintain good health (Gale et al., 2013). Second, disease prevention. Health care also involves disease prevention measures with vaccination, screening, and education to reduce the risk of developing certain diseases. Third is diagnosis and treatment. Diagnosing diseases and providing appropriate treatment is an integral part of healthcare (Fitriarti, 2019). This involves the use of medical technology, laboratory tests and other medical interventions. Fourth is post-illness or injury care. After a person becomes ill or sustains an injury, healthcare also includes follow-up care, rehabilitation, and support for the patient's full recovery. Fifth, long-term care. For chronic illnesses or long-term medical conditions, healthcare involves ongoing management, supervision, and long-term care that can help patients live their daily lives.

There are several previous research opinions. The first research according to Fitriarti, (2019), with the research title Urgency of Digital Literacy in Counteracting Health Information Hoaxes in the Digital Age. The results of his research state that although the community is already skilled in digital media or social media, it also needs to be given digital education related to the use of information spread in the digital era in order to become a wise and critical society in using social media. The second research according to Rachmani et al., (2023), with the research title Measurement of Digital Health Literacy of Penadaran Village Health Cadres Using SI-Cerdik. The results of his research explain that DHLC (Digital Health Literacy Competencies for Citizen) is one way to measure health literacy that has been tested for validity and reliability using a questionnaire. The measurement results in the form of pre-test and post-test were statistically processed using the Wilcoxon Test. The final results of the post-test measurement showed statistically significantly different from the pre-test. The third research according to (Yusuf et al., 2023), with the research title Exploration of New Graduate Nurses' Attitudes Toward Computers in Health Services. The results of his research state that the PATCH description of new graduate nurses is divided into two categories, namely feels comfortable 50 (76.9%)

and confident 15 (23.1%). The average score for each PATCH item consisting of 50 statements was found to be the highest stating that computers are very useful tools (1.88), then in the health sector, computers can store many documents, wanting to become proficient in using computers with a mean value (1.85).

Research conducted by previous researchers is different from the research that researchers do. Meanwhile, the researcher's research is entitled E-Health and Digital Transformation in Improving Accessibility of Health Services. The results of this study indicate that the implementation of e-Health and digital transformation has had a significant impact in improving the accessibility of health services, especially through the use of telemedicine, electronic medical records, and health applications. This has enabled easier access for individuals to medical consultations and health information, especially for those living in remote areas. In addition, there are many opportunities that can be utilized in the application of E-Health in health services. These benefits include providing appropriate access, meeting individual and community health needs, encouraging healthy behaviors and promoting health-supportive lifestyles, realizing the effective use of appropriate therapies, medications, and other medical interventions.

RESEARCH METHODOLOGY

Before conducting research, it is necessary to determine in advance what type of research is used in the study. The type of research used in this research is literature analysis to collect and analyze data from various sources of information related to e-Health and digital transformation in health services (Malik et al., 2022). Me he assessment analysis research method is a systematic approach to compiling, evaluating and summarizing findings from various relevant literature sources in a particular field of study. This approach is used to present a comprehensive understanding of a particular topic and integrate existing research results. By analyzing the existing literature, a review analysis can identify research gaps or areas that have not been adequately covered by previous research. This research design is the first step to conducting research. In this study using secondary data where the data obtained is not from direct researchers. Data sources are obtained by conducting a review analysis. The results of the review analysis can be a strong foundation for formulating further research, establishing a theoretical framework, or determining future research directions.

The steps in conducting the review analysis are first, identifying relevant literature on the topics of "E-Health and Digital Transformation" and "Accessibility of Health Services". Conduct searches in academic databases such as PubMed, Google Scholar, or other databases to track down articles, journals, books, and other publications related to the theme (Marques & Ferreira, 2020). Be sure to include keywords such as "E-Health", "digital healthcare", "access to healthcare", and so on. After identifying relevant literature, the next step is to select the most relevant and high-quality sources. Consider selecting articles published in reputable journals, works by experts in the field of E-Health and healthcare, and empirical research that can provide

strong insights into the topic of the article (Bohr & Memarzadeh, 2020). Furthermore, the data and information collected from the selected literature can then be categorized based on the main themes that emerge, such as the implementation of digital technology in health services, the role of E-Health in improving accessibility of health services, challenges faced, benefits achieved, and so on. Identify key findings related to each theme and gather evidence to support these findings from the selected literature.

Then conduct a comparative analysis between the different approaches, case studies or findings found in the literature. Compare the proposed solutions, their potential impact, and their advantages and disadvantages in the context of improving accessibility of health services. Then evaluate the suitability of the findings and recommendations found in the literature to the specific context faced in the field of E-Health and health services, such as in the context of a specific country, a specific health system, or a specific population. After an in-depth analysis of the relevant literature, synthesize the key findings, recommendations, and arguments that emerged. Provide a clear and systematic summary of the article's contribution to our understanding of how E-Health and digital transformation can improve healthcare accessibility. The final step is to identify gaps in the literature reviewed. Which points still require further research, what challenges remain unsolved, and recommended future research or development directions based on the findings from the literature analysis.

RESULT AND DISCUSSION

E-Health or electronic health is a concept that integrates information and communication technology in the provision of health services (Haggerty, 2017). Digital transformation in healthcare has increased the accessibility of healthcare in ways never before imagined. In this digital era, technology has provided the possibility to access health information, medical consultations, and monitoring of health conditions through online platforms, connecting patients with healthcare providers more quickly and efficiently. One of the main benefits of E-Health is the increased accessibility of healthcare for the community. With online health services, patients no longer need to physically visit a health facility to obtain consultation or health information. This allows individuals living in remote or hard-to-reach areas to still gain access to healthcare services. In addition, E-Health also enables the development of telemedicine, where medical consultations can be conducted virtually through video calls or text messages. This is particularly beneficial for patients who find it difficult to gain access to certain doctors or specialists, reducing geographical barriers to quality healthcare.

In addition, digital transformation has also enabled remote health monitoring through wearable devices and health apps. Patients can monitor their own health conditions, such as heart rate, blood glucose level, or blood pressure, and the results of this monitoring can be sent directly to the treating doctor. Thus, doctors can more easily monitor the patient's health conditions without the need to meet in person. This is especially important for patients with chronic conditions that require regular monitoring, minimizing physical visits to health facilities and allowing patients to keep better control of their health conditions. The utilization of technology has also enabled the electronic storage and exchange of health

information, which facilitates coordination between the various healthcare providers involved in a patient's care. With electronic medical records, patient health information can be accessed more easily by medical personnel who need the information, minimizing the risk of errors in diagnosis and treatment. In addition, E-Health has also made it possible to manage schedules and appointments online, making it easier for patients to make appointments with doctors or rearrange schedules if needed.

Digital transformation has brought great impact in various sectors, including in improving the accessibility of health services. With digital technology, healthcare has become more accessible and efficient for the public. The following are some of the ways in which digital transformation has improved healthcare accessibility. The first is through telemedicine. One form of digital transformation in healthcare is through telemedicine. Through online platforms, patients can consult with doctors or medical personnel virtually, without the need to come to a health facility. This is very beneficial for patients who live in remote areas or have limited mobility. Telemedicine also allows doctors to provide diagnosis and drug prescriptions through virtual consultations, reducing the time and cost required by patients to get treatment. Secondly through mobile Health Apps. Mobile health apps are also an important part of digital transformation in healthcare. These apps can provide users with accurate and reliable health information, and allow patients to monitor their health conditions independently. Some apps even come with vital sign monitoring and medication reminders, helping patients take better care of their health. With mobile health apps, access to medical and healthcare information has become easier for the general public. The third is through Electronic Health Records (EHR). Electronic medical record systems have changed the way patient data is stored and accessed by healthcare providers. With EHRs, patient medical information becomes more accessible and integrated across different healthcare facilities. This allows medical personnel to access a patient's medical history more quickly and accurately, ultimately improving efficiency in healthcare delivery. Patients can also easily share their medical data between different healthcare providers, enabling better care coordination.

Furthermore, through Remote Monitoring Devices. Remote monitoring devices have enabled patients with certain medical conditions to be monitored continuously without the need to be at the healthcare facility. For example, patients with heart disease or diabetes can use monitoring devices that send data directly to their doctors, allowing for quick intervention if needed. This helps in preventing complications that require emergency treatment and allows patients to remain in their own environment, while still getting coordinated care. In addition, there is Artificial Intelligence (AI) in Diagnostics. Advancements in artificial intelligence technology have brought a huge impact in the field of medical diagnostics. AI systems can be used to analyze medical images, laboratory test results, and other clinical data with a high degree of accuracy. This helps in detecting diseases quickly and accurately, assisting doctors in making better decisions in patient care. In addition, AI can also help in predicting the risk of disease in patients based on existing health data, enabling more effective preventive interventions. Next Online Health Education. Digital transformation has also enabled healthcare providers to provide online health

education to the public. With digital health education platforms, information on healthy lifestyles, disease prevention, chronic disease management, and other health topics can be accessed by the public more easily. This helps in improving people's health literacy, which in turn can reduce the incidence of preventable diseases. Chatbots for Healthcare. The presence of chatbots in healthcare has enabled better accessibility for the people. Chatbots can provide basic health information, answer common questions regarding illnesses, and even assist in determining whether one needs to seek further medical treatment. This is particularly useful for meeting people's health information and consultation needs during off-hours at health facilities.

In improving the accessibility of health services, digital transformation also requires an approach that takes into account various aspects, such as technological infrastructure, public digital literacy, and supporting regulations. The following are some important factors to consider in implementing digital transformation to improve healthcare accessibility. 1. Technology Infrastructure. To implement digital transformation in health services, adequate technological infrastructure is needed, including fast and stable internet access, as well as integrated computerized systems in various health facilities. Not only that, health service providers also need to ensure the security and confidentiality of patient data in the use of digital technology. 2. Digital Literacy. Improving the accessibility of health services through digital transformation also requires improving the digital literacy of the community. Patients need to understand how to properly use telemedicine platforms, mobile health apps, and remote health monitoring tools, as well as understand security and privacy in the use of health technology. 3. Availability of Skilled Human Resources. Implementing technology in healthcare requires human resources who are skilled in the management and utilization of the technology. Medical and healthcare staff need to be trained to effectively use EHR systems, interpret data generated by remote monitoring devices, and interact with patients through telemedicine platforms. 4. Regulatory and Policy Aspects.Supportive regulations and policies are essential in implementing digital transformation in healthcare. This includes the regulation of patient data security, telemedicine practice licenses, and legal recognition of diagnoses and prescriptions through virtual consultations. Clear and supportive regulations will help increase public trust in digital health services.

In implementing digital transformation in healthcare, the roles of the government, healthcare institutions, and the private sector are crucial. Collaboration between these various stakeholders will support the development of health technology and ensure better accessibility of health services for the community. The government can play an important role in supporting digital transformation in healthcare through the provision of adequate technology infrastructure, investment in training medical personnel to use health technology, and the development of policies that support the use of telemedicine and mobile health applications. The government can also work with healthcare institutions to develop regulations that ensure the security and confidentiality of patient data in a digital environment. Health institutions, be it hospitals, clinics, or other healthcare institutions, can play a role as the main driver in adopting health technology. By integrating EHR systems,

implementing telemedicine, and giving patients access to mobile health apps, health institutions can provide more accessible and efficient services for the community.

Meanwhile, the private sector, including technology companies and innovative start-ups, can play a role in developing innovative and accessible health technology solutions for the general public. By launching health apps, health monitoring devices, and telemedicine services, the private sector can contribute to improving healthcare accessibility through technological innovation. It is also important to remember that digital transformation in healthcare is not an end in itself, but a tool to achieve the ultimate goal of improving people's health and well-being. Therefore, the use of health technology needs to be integrated with a holistic approach to healthcare, including health promotion, disease prevention, coordinated care, and attention to the social and psychological aspects of health. Digital transformation in healthcare has opened the door to greater accessibility for people, especially for those who live in remote areas or have limited mobility. With various technological innovations, ranging from telemedicine to the use of AI in diagnostics, healthcare accessibility has become easier and more efficient. However, to ensure the success of this digital transformation, collaboration between the government, health institutions, the private sector, and the general public is required. Thus, digital transformation can be a powerful tool in improving the quality of healthcare services and achieving better health for the entire population.

However, despite the many benefits, the development of E-Health and digital transformation in healthcare also poses several challenges that need to be addressed. One of them is the concern for health data privacy and security. With health information being stored and transferred digitally, the risk of data privacy breaches and leakage of patients' personal information has increased. Therefore, it is important to strengthen health information security systems, ranging from data encryption to strict regulations related to the electronic management of health information. In addition, not all individuals have access or understanding of the technology needed in E-Health. The superiority of technological advancement is often not evenly distributed in various regions, so there is still a gap in accessibility for people living in rural or less developed areas. The government and relevant institutions need to work together to ensure that internet access and the necessary technological infrastructure are available in all regions, as well as educating the public on the benefits and how to use health technology. This will ensure that advancements in health technology are accessible to all levels of society. Another challenge is the cultural and behavioral changes in the community related to the acceptance of health technology. Some people may still prefer to get traditional health services by coming to a health facility in person, rather than using online health services or telemedicine. Therefore, efforts are needed to educate the public about the benefits and safety of using health technology, as well as strengthen regulations and policies that support the development of E-Health. By strengthening technological infrastructure, data security, accessibility, and supporting cultural and behavioral changes in accepting health technology, E-Health and digital transformation will continue to play a role in improving the accessibility of health services for all. With technology, we have taken a step towards more inclusive healthcare, ensuring

that every individual, regardless of geography or social background, has equal access to necessary healthcare services.

NO	NEGARA	PENYAKIT	SAMPLES AND MANY APPS USED
1	Inggris	Asma	112 samples from 1 app
2	Australia	Kardiovaskuler	486 samples from 1 app
3	Kanada	PCP ADHD (Attention Deficit Hyperactivity Disorder) Hipertensi	6,813 samples from 3 apps
4	Belanda	Alergi Antibiotik	44 samples from 1 app
5	Jerman	Vertigo	600 samples from 1 app

Table 1: E-Health and Digital Transformation and the utilization of its applications in various countries in healthcare.

Health services take many forms. The first is primary care. Primary care is the basic health service that is usually available at the first level, such as clinics, health centers, and general practitioners' practices. Primary care is the main access point for people to get initial health care. Secondary and tertiary care. Advanced health services, such as hospitals, specialist health services, and other medical facilities, provide more intensive and specialized care for more complex medical conditions. Third, mental health services. These mental health services involve treatment for mental health issues, ranging from counseling to medical intervention for conditions such as psychiatric disorders and other psychological problems. Fourth, community health services. These services focus on health efforts on a population scale, such as mass vaccination programs, health education, disease prevention campaigns, and public health surveillance.

Health care is very important. Health services play a crucial role in maintaining and improving the overall health of the community. By providing appropriate access, health services can help reduce mortality, improve quality of life, and provide protection against preventable diseases and conditions. Through a wide range of services and a comprehensive approach, healthcare aims to meet the health needs of individuals and communities. It also includes aspects of prevention, treatment, rehabilitation, and education that are essential to achieving a healthier society as a whole. The objectives of healthcare include a range of aspects that focus on maintaining, improving, and protecting the overall health of individuals or populations. Some of the objectives of health services are to encourage healthy behaviors and promote health-supportive lifestyles. This includes health education, awareness campaigns, and efforts to encourage balanced diets, regular exercise, and other healthy living habits. Secondly disease prevention efforts such as vaccinations, health screenings, and disease prevention campaigns target to reduce the risk of disease occurrence and identify medical conditions early. Third, providing appropriate and timely care. Fourth realizing the effective use of appropriate therapies, medications, and other medical interventions. Fourth Maintaining patient safety during treatment is a priority. This includes safe

medication management, preventing nosocomial infections, and maintaining high safety standards in every medical procedure. Fifth Ensure that every individual has equal access to quality healthcare, regardless of economic, geographic, or social status. Sixth Ensure that health services not only focus on acute care, but also provide long-term care for chronic conditions or diseases that require ongoing monitoring and management.

CONCLUSION

Based on the results and discussion above, it can be concluded that e-Health and digital transformation have great potential in improving the accessibility of health services. By continuing to develop and integrate technology in the healthcare sector, it can achieve the greater goal of providing more equitable and affordable healthcare to the global community. These steps can help reduce disparities in access to healthcare and improve people's overall quality of life. E-Health and digital transformation have been key drivers in improving healthcare accessibility around the world. The integration of information and communication technologies into health systems has brought about change, expanding access possibilities for individuals to get better health care. E-Health enables access to healthcare without being constrained by distance or geographical boundaries. Remote consultation allows individuals to obtain medical services without having to be physically present at the medical practice. This is especially crucial for those who live in remote areas or are hard to reach by traditional health facilities. The implementation of E-Health and digital transformation in healthcare accessibility is faced with several challenges. Such challenges related to data privacy, technology access gaps, and regulatory arrangements remain a focus in the implementation of E-Health. However, as technology continues to evolve, there are great opportunities to further improve healthcare services, especially with the integration of artificial intelligence (AI), IoT, and more advanced data analytics. Digital transformation in healthcare not only changes the way we interact with medical services, but also opens the door to more equitable and affordable healthcare for all. By continuing to innovate and address emerging challenges, E-Health has great potential to continue to expand healthcare accessibility and improve the quality of life for people globally.

REFERENCES

Ahmad, M., Amin, M. B., Hussain, S., Kang, B. H., Cheong, T., & Lee, S. (2016). Health Fog: A novel framework for health and wellness applications. *The Journal of Supercomputing*, *72*(10), 3677–3695. https://doi.org/10.1007/s11227-016-1634-x

Aliffiro Naufal, M., & Muklason, A. (2022). Pengembangan Aplikasi Healthcare Intelligence System Untuk Pemantauan Kesehatan Ibu Dan Anak: Perancangan Aplikasi Frontend. *JATISI (Jurnal Teknik Informatika Dan Sistem Informasi)*, *9*(2), 1038–1052. https://doi.org/10.35957/jatisi.v9i2.1902

Bai, Sun, Zang, Zhang, Shen, Liu, & Wei. (2019). Identification Technology of Grid Monitoring Alarm Event Based on Natural Language Processing and Deep Learning in China. *Energies*, *12*(17), 3258. https://doi.org/10.3390/en12173258

Bohr, A., & Memarzadeh, K. (2020). The rise of artificial intelligence in healthcare applications. In *Artificial Intelligence in Healthcare* (pp. 25–60). Elsevier. https://doi.org/10.1016/B978-0-12-818438-7.00002-2

Bull, F. C., Al-Ansari, S. S., Biddle, S., Borodulin, K., Buman, M. P., Cardon, G., Carty, C., Chaput, J.-P., Chastin, S., Chou, R., Dempsey, P. C., DiPietro, L., Ekelund, U., Firth, J., Friedenreich, C. M., Garcia, L., Gichu, M., Jago, R., Katzmarzyk, P. T., … Willumsen, J. F. (2020). World Health Organization 2020 guidelines on physical activity and sedentary behaviour. *British Journal of Sports Medicine*, *54*(24), 1451–1462. https://doi.org/10.1136/bjsports-2020-102955

Chen, H., Yuan, X., Pei, Z., Li, M., & Li, J. (2019). Triple-Classification of Respiratory Sounds Using Optimized S-Transform and Deep Residual Networks. *IEEE Access*, *7*, 32845–32852. https://doi.org/10.1109/ACCESS.2019.2903859

Fitriarti, E. A. (2019). URGENSI LITERASI DIGITAL DALAM MENANGKAL HOAX INFORMASI KESEHATAN DI ERA DIGITAL. *Metacommunication: Journal of Communication Studies*, *4*(2), 219. https://doi.org/10.20527/mc.v4i2.6929

Gale, N. K., Heath, G., Cameron, E., Rashid, S., & Redwood, S. (2013). Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC Medical Research Methodology*, *13*(1), 117. https://doi.org/10.1186/1471-2288-13-117

Haggerty, E. (2017). Healthcare and digital transformation. *Network Security*, *2017*(8), 7–11. https://doi.org/10.1016/S1353-4858(17)30081-8

Huda, L. N. (2007). Hubungan Status Reproduksi, Status Kesehatan, Akses Pelayanan Kesehatan dengan Komplikasi Obstetri di Banda Sakti, Lhokseumawe Tahun 2005. *Kesmas: National Public Health Journal*, *1*(6), 275. https://doi.org/10.21109/kesmas.v1i6.288

Isernia, S., Pagliari, C., Jonsdottir, J., Castiglioni, C., Gindri, P., Gramigna, C., Palumbo, G., Salza, M., Molteni, F., Baglio, F., & HEAD study group. (2019). Efficiency and Patient-Reported Outcome Measures From Clinic to Home: The Human Empowerment Aging and Disability Program for Digital-Health Rehabilitation. *Frontiers in Neurology*, *10*, 1206. https://doi.org/10.3389/fneur.2019.01206

Janz, N. K., & Becker, M. H. (1984). The Health Belief Model: A Decade Later. *Health Education Quarterly*, *11*(1), 1–47. https://doi.org/10.1177/109019818401100101

Juwaini, J. (2023). Revitalisasi Peran Filsafat sebagai Proses Transformasi Masyarakat Multikultural. *Jurnal Sosiologi Agama Indonesia (JSAI)*, *4*(1), 102–118. https://doi.org/10.22373/jsai.v4i1.2690

Lee, J., Azamfar, M., Singh, J., & Siahpour, S. (2020). Integration of digital twin and deep learning in cyber-physical systems: Towards smart manufacturing. *IET Collaborative Intelligent Manufacturing*, *2*(1), 34–36. https://doi.org/10.1049/iet-cim.2020.0009

Malik, H., Chaudhary, G., & Srivastava, S. (2022). Digital transformation through advances in artificial intelligence and machine learning. *Journal of Intelligent & Fuzzy Systems*, *42*(2), 615–622. https://doi.org/10.3233/JIFS-189787

Marques, I. C. P., & Ferreira, J. J. M. (2020). Digital transformation in the area of health: Systematic review of 45 years of evolution. *Health and Technology*, *10*(3), 575–586. https://doi.org/10.1007/s12553-019-00402-8

McKhann, G., Drachman, D., Folstein, M., Katzman, R., Price, D., & Stadlan, E. M. (1984). Clinical diagnosis of Alzheimer's disease: Report of the NINCDS-ADRDA Work Group* under the auspices of Department of Health and Human Services Task Force on Alzheimer's Disease. *Neurology*, *34*(7), 939–939. https://doi.org/10.1212/WNL.34.7.939

Mulyasari, D., Noer, R. M., Sari, N., Ermawaty, E., Triharyadi, F., Tampubolon, D., & Catherine, S. (2023). Improving Health Status in The Elderly Through Health Checks and Education at Nuriah Nursing Homes in Karimun. *Pengabdian: Jurnal Abdimas*, *1*(2), 75–81. https://doi.org/10.55849/abdimas.v1i2.183

Nantabah, Z. K., A, Z. A., & Laksono, A. D. (2019). Gambaran Akses Pelayanan Kesehatan pada Balita di Indonesia. *Buletin Penelitian Sistem Kesehatan*, *22*(1), 54–61. https://doi.org/10.22435/hsr.v22i1.439

Negro-Calduch, E., Azzopardi-Muscat, N., Krishnamurthy, R. S., & Novillo-Ortiz, D. (2021). Technological progress in electronic health record system optimization: Systematic review of systematic literature reviews. *International Journal of Medical Informatics*, *152*, 104507. https://doi.org/10.1016/j.ijmedinf.2021.104507

Preti, E., Di Mattei, V., Perego, G., Ferrari, F., Mazzetti, M., Taranto, P., Di Pierro, R., Madeddu, F., & Calati, R. (2020). The Psychological Impact of Epidemic and Pandemic Outbreaks on Healthcare Workers: Rapid Review of the Evidence. *Current Psychiatry Reports*, *22*(8), 43. https://doi.org/10.1007/s11920-020-01166-z

Qiu, H., Qiu, M., Liu, M., & Memmi, G. (2020). Secure Health Data Sharing for Medical Cyber-Physical Systems for the Healthcare 4.0. *IEEE Journal of Biomedical and Health Informatics*, *24*(9), 2499–2505. https://doi.org/10.1109/JBHI.2020.2973467

Rachmani, E., Dewi, F., Haikal, H., & Setiono, O. (2023). Pengukuran Literasi Kesehatan Digital Kader Kesehatan Desa Penadaran Menggunakan SI-Cerdik: Digital Health Literacy Competencies of Community Health Workers in Penadaran Village, Grobogan. *Indonesian Journal of Health Information Management Services*, *3*(1), 7–10. https://doi.org/10.33560/ijhims.v3i1.57

Sodhro, A., Sangaiah, A., Sodhro, G., Lohano, S., & Pirbhulal, S. (2018). An Energy-Efficient Algorithm for Wearable Electrocardiogram Signal Processing in Ubiquitous Healthcare Applications. *Sensors*, *18*(3), 923. https://doi.org/10.3390/s18030923

Till, C. (2014). Exercise as Labour: Quantified Self and the Transformation of Exercise into Labour. *Societies*, *4*(3), 446–462. https://doi.org/10.3390/soc4030446

Yassine, A., Singh, S., & Alamri, A. (2017). Mining Human Activity Patterns From Smart Home Big Data for Health Care Applications. *IEEE Access*, *5*, 13131–13141. https://doi.org/10.1109/ACCESS.2017.2719921

Yusuf, S., Amal, A. A., & Sumarmi. (2023). EKSPLORASI SIKAP PERAWAT LULUSAN BARU TERHADAP KOMPUTER DALAM PELAYANAN KESEHATAN: Exploration of the Newly Graduated Nurses' Attitude towards Computers in Healthcare. *Jurnal Ilmiah Keperawatan (Scientific Journal of Nursing)*, *9*(1), 189–195. https://doi.org/10.33023/jikep.v9i1.1454

Zeadally, S., Isaac, J. T., & Baig, Z. (2016). Security Attacks and Solutions in Electronic Health (E-health) Systems. *Journal of Medical Systems*, *40*(12), 263. https://doi.org/10.1007/s10916-016-0597-z

Zhou, X., Liang, W., Wang, K. I.-K., Wang, H., Yang, L. T., & Jin, Q. (2020). Deep-Learning-Enhanced Human Activity Recognition for Internet of Healthcare Things. *IEEE Internet of Things Journal*, *7*(7), 6429–6438. https://doi.org/10.1109/JIOT.2020.2985082