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What Kind of Technology Devices Can be Used to Improve Agronursing Practice?: A Scoping Review

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ABSTRACT

Background: Agronursing plays an important role in improving health services in rural area. Currently, health services in rural area face various challenges. Technology devices can help nurse to provide community-based health services in this area. This article aims to explore the existing literature related to the use of technology in nursing practice to answer three main questions: (1) what technology devices are commonly used to provide community-based health services, (2) what are the advantages and disadvantages of each devices (3) what are the benefits of these devices in agnonursing practice. **Methods:** The author conducted an article search using three databases, namely science direct, pubmed, and proquest using "Technology Device AND Nursing Practice" and "Robotic Device AND Nursing Practice" as the keywords. The inclusion criteria for the articles were (1) research articles from Randomized controlled trial and quasi experiment, (2) published between 2020-2025, (3) Published in English while the exclusion criteria was research conducted in hospital setting. **Results:** The author analyzed 28 articles that met the inclusion and exclusion criteria. The Author found that commonly used devices are monitoring system, robotic devices, mobile app, virtual reality, artificial intelligence, and web-based health intervention. However, these devices have their own advantages and disadvantages that can be considered when applying them in agronursing practice. **Conclusions:** Digital health technologies can enhance nursing services in agrarian communities. Tailoring these tools to rural needs is vital. Further research is needed to compare which type of device is most effective and efficient in improving agronursing practice.

KEYWORDS
Agronursing, Technology, Community-based nursing service, Rural area

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1. BACKGROUND

Indonesia is a country with most of its territory being rural areas (Asghari et al., 2024). However, currently, people lives in rural areas still have difficulty in accessing and using health services. Although 48% of Indonesians live in rural areas, only 5% of health care facilities are located there. This causes a high gap in the availability of health services in rural and urban areas which contributes to high levels of morbidity and mortality in rural areas (Anggraini, 2023).

Agronursing is an approach to nursing care that combines nursing science with an understanding of agricultural conditions and rural life (Susanto et al., 2025). Agronursing can be defined as nursing care given in the agricultural scope. Agronursing focuses on clients as individuals, families, groups, and communities (Kurniyawan, 2018). Agronursing provides holistic nursing services that include biopsycho-socioculturalspiritual comprehensively, from promotive, preventive, curative, to rehabilitative (Kurniyawan, 2018).

Agronursing has a strategic role in improving the health of the community of workers in the agricultural sector, since most of rural area residence work in agricultural field. Agronursing combines nursing science and knowledge of the agricultural sector to provide a better approach in dealing with health problems experienced by rural communities. Agronursing can prevent and improve the health of people living in rural areas using community nursing and family nursing approaches (Susanto et al., 2025).

The implementation of agronursing in both rural and remote areas faces various challenges, including limited medical personnel, geographical constraints and minimal awareness of occupational health in agricultural communities (Susanto et al., 2025). In fact, the agricultural sector is the sector that is most at risk of experiencing health problems and work accidents (Khode et al., 2024). To face these challenges, various strategies have been developed to overcome these obstacles, including by utilizing technology. Integration of technology into agronursing practices allows for a more contextual approach to addressing the various health challenges faced by farmers and agricultural workers (Susanto et al., 2025).

Recently, technological developments are occurring rapidly. Various technologies can be accessed very easily anytime, anywhere, and by anyone. With the development of existing technology, we can obtain and disseminate various kinds of information widely in a very short time (Andika et al., 2020).

Technological development also give impact on people living in rural area. For generations, people in rural areas have experienced limited access to resources, geographic isolation, and reliance on traditional socio-economic systems that have led to disparities with urban areas. These disparities have led to disparities in income, health care, education, and overall quality of life. However, recent

technological advances, especially in mobile phones, satellite internet, and digital farming equipment, are gradually bridging these gaps and enabling people living in rural areas to connect with the wider world. Mobile internet, for example, has become a gateway to essential resources, allowing rural residents to access telemedicine, online banking, and distance learning in ways that were previously unimaginable (Nnanna & Abubakar, 2025).

The development of science and technology has an impact on people's lives. The development of science and technology drives changes in all aspects of people's lives, including in the health sector. Information and communication technology is starting to be widely used in health sector to help improve the quality of health services (Andika et al., 2020).

Some of the technologies commonly used in healthcare include the Internet of Things (IoT), machine learning (ML), Artificial intelligence (AI), blockchain, edge computing, and wearable devices. IoT devices allows for real-time monitoring and data collection, leading to more accurate diagnoses and personalized treatment plans. Machine learning algorithms can analyze vast amounts of data to predict disease outbreaks, optimize treatment protocols, and improve patient outcomes. Artificial intelligence aids in automating administrative tasks, enabling healthcare providers to focus more on patient care. Blockchain technology ensures secure and transparent patient data management, addressing concerns about data breaches and privacy. Edge computing reduces latency by processing data closer to the source, facilitating faster decision-making in critical healthcare scenarios. Meanwhile wearable devices are explored for their potential applications in diagnostics, treatment, and patient monitoring (Sinha, 2024).

The integration of technology into healthcare is triggering a revolution in healthcare. Some of the benefits brought by information technology in the healthcare sector include increasing accountability, improving patient health at both the individual and community levels, increasing efficiency in healthcare delivery and reducing costs (Jen et al., 2023). Despite its benefits, the use of technology in the healthcare sector also brought various challenges. Some of these challenges include ethical concerns regarding patient privacy, legal implications of data security, and technical hurdles related to

interoperability and implementation (Sinha, 2024).

Technological advances are also driving the transformation of community nursing, as an integral part of the health care system that emphasizes prevention, health promotion, and disease management at the community level, including in rural communities (agronursing). Technological advances enable nurses to develop more effective disease prevention programs, design health promotion campaigns that are tailored to local needs, and allocate resources more efficiently. The use of telehealth is particularly beneficial for communities living in rural area that have limited access to health care facilities. Telehealth can overcome geographic and logistical barriers, saving time and money for patients and health care providers. It allows nurses to reach more patients, including those who may not be able to come to the clinic regularly, and improves continuity and quality of care (Subiyanto et al., 2024).

Agronursing can be defined as an approach to nursing care that combines nursing science with an understanding of agricultural conditions and rural life. Rural communities are an important part of Indonesia, considering that most of Indonesia is rural. However, people in rural area face various limitations, one of which is limited access to health services. This limitation is influenced by the vast geographical area, the difficulty of accessing health care facilities, and the lack of availability of health care facilities and personnel. One solution to overcome this problem is to integrate technology into health services. Therefore, the author would like to review published articles related to the use of technology devices in health services.

Although numerous studies have highlighted the role of technology in enhancing healthcare services, its application within the context of agronursing remains limited. Most research has focused on urban healthcare settings, while the unique characteristics of agrarian communities (living in remote areas, shaped by agricultural lifestyles, and exposed to occupation-specific health risks) have received little attention. Therefore, a research gap exists regarding how health technologies can be adapted to address the distinct needs of geographically dispersed agrarian populations facing barriers to healthcare access, which is the primary contribution this review seeks to fill.

2. METHODS

Review questions that arise from the background including (1) what technology devices are commonly used to provide community-based health services, (2) what are the advantages and disadvantages of each devices, and (3) what are the benefits of these devices in agronursing practice. To identify the focus and context of the review, PCC (population/ participants, concept, and context) can be used. Population/ participants in this scoping review are adults or elderly people. The concept in this scoping review is technology devices that can be used in health services. The Context of this article is people living in the community or nursing home who are not hospitalized.

The searching strategy used by the author is the author identifies the keywords that will be used in the article search. In this case, the author uses the Boolean Operators "AND" and "OR" to facilitate the search for articles. The keywords used are "Technology Device AND Nursing Practice" and "Robotic Device AND Nursing Practice". The second step of the search is carried out on the sciencedirect, pubmed, and google scholar databases using all the keywords that have been identified. The last step is to identify articles which full text can be accessed. The article will then be checked and included in the review (if relevant to the review topic). The author selects articles based on article type. In this scoping review, the author only uses articles that come from the results of randomized controlled trials (RCT) and quasi-experiments. Furthermore, the author uses a reference manager (Mendeley) to facilitate article management. The author removes duplicate articles and identifies articles that meet the inclusion and exclusion criteria. The inclusion criteria for this scoping review are (1) articles in English, (2) research articles that used RCT and quasi-experiment design, (3) open access or there are full text articles that can be accessed, (4) publications between 2020-2025. While the exclusion criteria are articles from research conducted in hospital settings. The abstract screening was done by categorizing if the content of article are meeting the inclusion and exclusion criteria. As example if the article is a result of research conducted in hospital setting then the article is removed from this review. Finally, there are 28 articles that meet the criteria of this review. PRISMA Flow Diagram used in this article can be seen below (Figure 1).

Protocol Registration and Ethics

Protocol registration is not required for a scoping review. Since the review is based on data that is already publicly accessible, there is no need for formal ethical review approval.

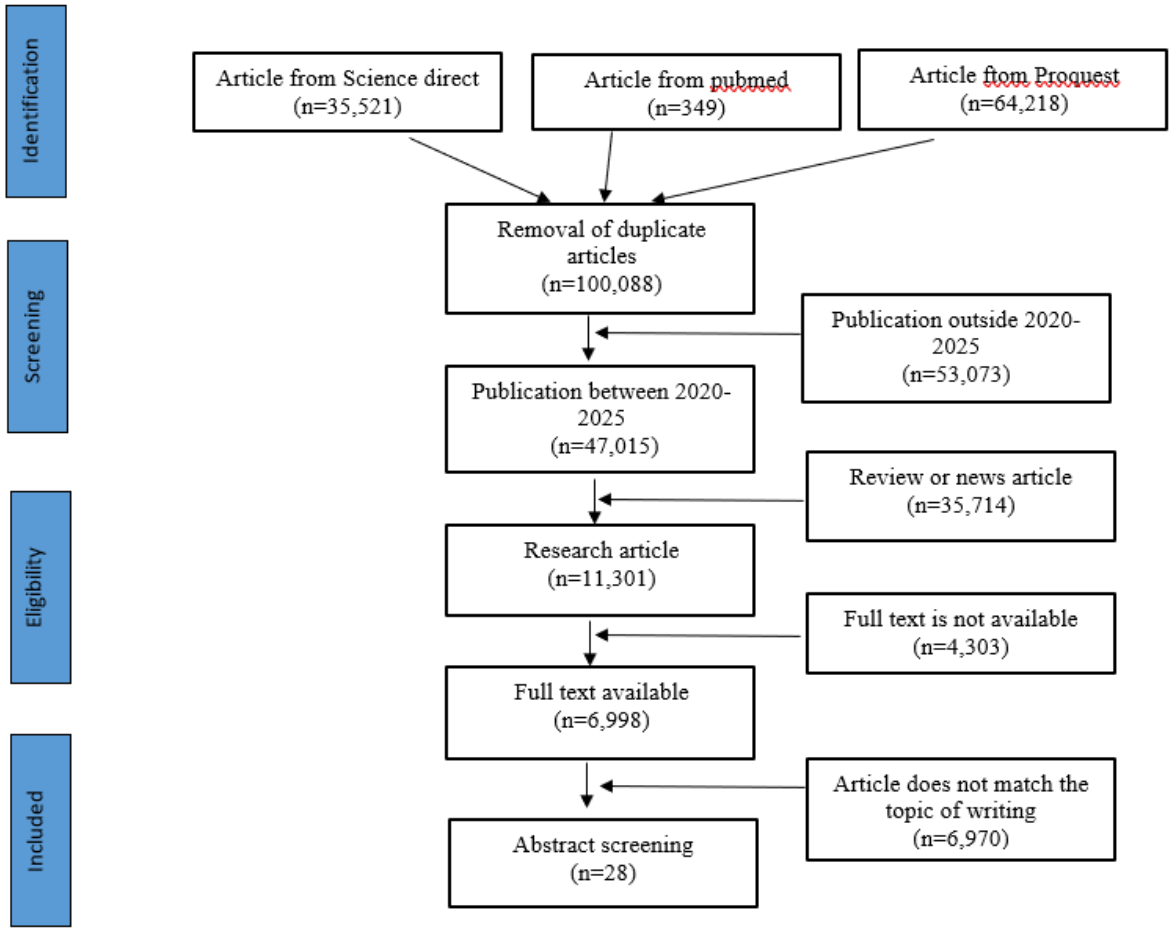

Figure 1. PRISMA Flow Diagram

3. Results

Table 1. Article Extraction

No	Title	Author & Year	Research Objectives	Method	Result
1.	Effects of Monitoring Frailty Through a Mobile/Web-Based Application and a Sensor Kit to Prevent Functional Decline in Frail and Prefrail Older Adults: FACET (Frailty Care and Well Function) Pilot Randomized Controlled Trial	(Valdés-Aragonés et al., 2024)	To evaluate whether monitoring frailty using a mobile/web-based application combined with a sensor kit can prevent functional decline in frail and prefrail older adults.	Randomized clinical trial	The FACET technological ecosystem helps in the early identification of changes in the functional status of prefrail and frail older adults

No	Title	Author & Year	Research Objectives	Method	Result
2.	Effects on sleep from group activity with a robotic seal for nursing home residents with dementia: a cluster randomized controlled trial	(Joranson et al., 2021)	To examine the effect of group activities involving a robotic seal on the sleep patterns of nursing home residents with dementia.	A cluster randomized controlled trial	Social stimulation through engaging group activity could contribute to improved sleep in people with dementia
3.	Implementing Affordable Socially Assistive Pet Robots in Care Homes Before and During the COVID-19 Pandemic: Stratified Cluster Randomized Controlled Trial and Mixed Methods Study	(Bradwell et al., 2022)	To assess the effectiveness, feasibility, and user experience of affordable socially assistive pet robots in care homes before and during the COVID-19 pandemic.	Stratified Cluster Randomized Controlled Trial and Mixed Methods Study	Affordable robot pets hold potential for improving the well-being of care home residents and people with dementia, including reducing neuropsychiatric symptoms and occupational disruptiveness
4.	Recovery after ischemic stroke: Effects of FuekFone home-based program on upper limb and cognitive function	(Kumkwan et al., 2024)	To investigate the impact of the FuekFone home-based rehabilitation program on upper limb function and cognitive recovery in patients after ischemic stroke.	A single group pre- and post-test design	Patients can perform corresponding exercises through the games according to their conditions under the guidance of medical staff
5.	The effect of a social robot intervention on sleep and motor activity of people living with dementia and chronic pain: A pilot randomized controlled trial	(Pu et al., 2021)	To evaluate the effects of social robot interventions on sleep quality and motor activity in individuals living with dementia and chronic pain	Pilot randomized controlled trial	social robot can improve sleep patterns but the effect of social robot on motor activity needs further research
6.	The impact of everyday AI-based smart speaker use on the well-being of older adults living alone	(Park & Kim, 2022)	To explore how daily use of AI-based smart speakers influences well-being, social connectedness, and quality of life among older adults living alone.	single-group longitudinal study	AI-based smart speaker use was associated with decreased depression and loneliness
7.	Usability and Utility of a Mobile App to Deliver Health-Related Content to an Older Adult Population: Pilot	(Lemos et al., 2024)	To assess the usability, acceptability, and utility of a mobile application delivering health-	Quasi experiment	The DigiAdherence mobile app was useful and highly accepted by older adults, who developed more confidence regarding

No	Title	Author & Year	Research Objectives	Method	Result
	Noncontrolled Quasi-Experimental Study		related content to older adult populations		health-related knowledge
8.	A Mobile App–Based Intervention Program for Nonprofessional Caregivers to Promote Positive Mental Health: Randomized Controlled Trial	(Ferré-Grau et al., 2021)	To evaluate the effectiveness of a mobile app-based intervention in enhancing positive mental health and coping among nonprofessional caregivers	Randomized controlled trials	Mobile phone app–based intervention programs may be useful tools for increasing nonprofessional caregivers' well-being
9.	A Smartphone App Self-Management Program for Chronic Obstructive Pulmonary Disease: Randomized Controlled Trial of Clinical Outcomes	(Glynn et al., 2025)	To determine the clinical outcomes of a smartphone app self-management program for patients with chronic obstructive pulmonary disease	Randomized controlled trials	smartphone app self-management program had a positive effect on clinical health outcomes for participants with COPD
10.	A Smartphone-Based Model of Care to Support Patients With Cardiac Disease Transitioning From Hospital to the Community (TeleClinical Care): Pilot Randomized Controlled Trial	(Indraratna et al., 2022)	To examine whether a smartphone-based model of care supports patients with cardiac disease transitioning from hospital to the community	Pilot Randomized controlled trials	The incidence of 30-day readmissions was similar in intervention and control group, however, long-term benefits were demonstrated, including fewer readmissions over 6 months, improved medication adherence, and improved cardiac rehabilitation completion in intervention group.
11.	A Web-Based Resilience-Enhancing Program to Improve Resilience, Physical Activity, and Well-being in Geriatric Population: Randomized Controlled Trial	(Wu et al., 2024)	To test the effectiveness of a web-based program designed to enhance resilience, physical activity, and well-being in geriatric populations	Randomized controlled trials	a web-based resilience-enhancing program is appropriate, acceptable, feasible, and engaging for community-dwelling older adults
12	Clinical Efficacy of Virtual Reality Cave Automatic Virtual Environments (CAVE) for Chronic Musculoskeletal Pain in Older Adults: A	(Lo et al., 2025)	To investigate the clinical efficacy of immersive virtual reality environments in managing chronic musculoskeletal pain among older adults	Randomized controlled trials	VR assisted taichi is superior to non-VR tai chi for chronic musculoskeletal pain.

No	Title	Author & Year	Research Objectives	Method	Result
	Randomized Controlled Trial				
13.	Combination of 3-Dimensional Virtual Reality and Hands-On Aromatherapy in Improving Institutionalized Older Adults' Psychological Health: Quasi-Experimental Study	(Cheng et al., 2020)	To evaluate the effects of combining 3D virtual reality and hands-on aromatherapy on the psychological health of institutionalized older adults	Quasi experiment	Combination of 3D virtual reality and hands-on aromatherapy in improving older adults' psychological health
14.	Effect of virtual-reality-based education program for managing behavioral and psychological symptoms of dementia A randomized controlled trial	(Song et al., 2024)	To determine the effectiveness of a virtual-reality-based education program in managing behavioral and psychological symptoms of dementia	Randomized controlled trials	This program, offers a valuable learning experience for those new to the care of people with dementia
15.	Effects of a Combination of Three-Dimensional Virtual Reality and Hands-on Horticultural Therapy on Institutionalized Older Adults' Physical and Mental Health: Quasi-Experimental Design	(Lin et al., 2020)	To examine the effects of combining 3D virtual reality and horticultural therapy on physical and mental health among institutionalized older adults.	Quasi experiment	This study verified the beneficial effects of a combination of 3D virtual reality and hands-on horticultural therapy on older adults' health.
16.	Effects of an mHealth Brisk Walking Intervention on Increasing Physical Activity in Older People with Cognitive Frailty: Pilot Randomized Controlled Trial	(Kwan et al., 2020)	To investigate whether a mobile health–based brisk walking program increases physical activity among older adults with cognitive frailty	Pilot Randomized controlled trials	mHealth intervention is feasible for implementation in older people with cognitive impairment and is effective at enhancing compliance with the brisk walking training program
17.	Effects of Virtual Reality Motor-Cognitive Training for Older People with Cognitive Frailty: Multicentered Randomized Controlled Trial	(Kwan et al., 2024)	To evaluate the effectiveness of virtual reality motor-cognitive training programs on cognitive and functional outcomes	Randomized controlled trials	VRMCT is effective in promoting cognitive functions and reducing physical frailty and is well tolerated and accepted by older people with cognitive frailty

No	Title	Author & Year	Research Objectives	Method	Result
			in older people with cognitive frailty.		
18.	Efficacy of a Mobile Health–Based Behavioral Treatment for Lifestyle Modification in Type 2 Diabetes Self-Management: Greenhabit Randomized Controlled Trial	(Ruiz-Leon et al., 2025)	To assess the efficacy of a mobile health–based behavioral intervention in supporting lifestyle modification and self-management of type 2 diabetes.	Randomized controlled trials	mHealth app (Greenhabit) showed beneficial effects on T2D outcomes and reduced the burden of cardiovascular risk factors.
19.	eMPower: An online Mind-body wellness Program for adults living with chronic health conditions: A three-armed randomized controlled trial protocol	(Johnson et al., 2024)	To evaluate the feasibility and effectiveness of a mind-body online wellness program for adults living with chronic health conditions.	Randomized controlled trials	Online health intervention have impact on patients health condition
20.	mHealth-Based Diabetes Prevention Program for Chinese Mothers With Abdominal Obesity: Randomized Controlled Trial	(Huang et al., 2025)	To determine the effectiveness of a mobile health diabetes prevention program in reducing risk factors among Chinese mothers with abdominal obesity.	Randomized controlled trials	This app can help chinese mothers with abdominal obesity to manage diabetes risk
21.	Mobile App–Based Lifestyle Coaching Intervention for Patients With Nonalcoholic Fatty Liver Disease: Randomized Controlled Trial	(Kwon et al., 2024	To assess the effects of a mobile app–based lifestyle coaching intervention on clinical and lifestyle outcomes in patients with nonalcoholic fatty liver disease.	Randomized controlled trials	Nonpharmacological interventions using a mobile app may be effective in improving the physiological and psychological health outcomes of patients with NAFLD
22.	Psychosocial effects of a humanoid robot on informal caregivers of people with dementia: A randomised controlled trial with nested interviews	(Zuschnegg et al., 2025)	To explore the psychosocial impact of humanoid robot interventions on informal caregivers of people with dementia.	Randomized controlled trials	Caregivers reported usefulness of Coach Pepper on being assistive in six components of human needs: 'learning ability', 'recreational activities', 'contact with others', 'mobility/body

No	Title	Author & Year	Research Objectives	Method	Result
					posture', 'communication' and 'avoiding danger'. However, they recommended further improvement in all fourteen components of human needs.
23.	Remote Patient Monitoring and Digital Therapeutics Enhancing the Continuum of Care in Heart Failure: Nonrandomized Pilot Study	(Marier-Tétrault et al., 2024)	To investigate the role of remote patient monitoring and digital therapeutics in improving care continuity and outcomes among patients with heart failure	Pre post study	This study demonstrated the feasibility of implementing our digital solution, within the specific context of HF
24.	The Effect of Using a Remote Patient Management Platform in Optimizing Guideline-Directed Medical Therapy in Heart Failure Patients	(Brahmbhatt et al., 2024)	To evaluate the effectiveness of a remote patient management platform in optimizing guideline-directed medical therapy for patients with heart failure.		This technology was effective, safe, feasible, and increased the proportion of patients achieving target doses, in a shorter period of time with no excess adverse events compared with UC
25.	The Effectiveness of a Traditional Chinese Medicine–Based Mobile Health App for Individuals With Prediabetes: Randomized Controlled Trial	(Chung et al., 2023)	To assess the clinical effectiveness of a mobile health application based on traditional Chinese medicine for individuals with prediabetes	Randomized controlled trials	TCM based mobile app can help improving HRQol in prediabetic patient
26.	The Effectiveness of a Web-Based Application for a Balanced Diet and Healthy Weight Among Indonesian Pregnant Women: Randomized Controlled Trial	(Koeryaman et al., 2023)	To determine whether a web-based application can promote balanced diet and healthy weight management among pregnant women in Indonesia.	Randomized controlled trials	Recording food intake using the application was significantly effective in improving the dietary diversity consumed, improving adequate energy and nutrient intake, and producing healthy maternal weight during pregnancy.
27.	The effects of web-based animation-supported progressive	(İşcan Ayyildiz & Bingöl, 2024)	To examine the effects of web-based animation-supported	Randomized controlled trials	Progressive Relaxation Exercises applied with the animation-supported web-based

No	Title	Author & Year	Research Objectives	Method	Result
	relaxation exercises applied to individuals with epilepsy on fatigue and sleep quality: A randomized controlled study		progressive relaxation exercises on fatigue and sleep quality in individuals with epilepsy.		mobile intervention technique reduce the fatigue levels of individuals and increase sleep quality
28.	Virtual Simulation Education Using Multiuser Virtual Environments and Standardized Patients for Child Healthcare in the Community Setting: A Multisite Pilot Study	(Shin et al., 2023)	To evaluate the effectiveness of virtual simulation education using multiuser virtual environments and standardized patients for child healthcare in community settings.	Pre post design with mixed method approach	Virtual simulations using multiuser virtual environments and standardized patients can effectively prepare nursing students for primary healthcare and children's health promotion in the community

4. DISCUSSION

Recently, the rapid development of information and communication technology had an impact on all aspects of human life. Health services are one of the aspects affected by technological developments. Today, more and more technologies are being created to improve the quality of health services.

Technological developments are also felt by people in rural areas. Rural communities in Indonesia are already familiar with the use of technology such as smartphones and the internet. Generally, rural communities use the internet to access social media, play video games or access other entertainment media. The government in rural areas has also begun to actively use the internet to update information about their villages such as problems in the village or promote tourism sites and handicrafts produced by the village community. In addition, some people also use the internet to access the latest information and for education purpose (Ohta et al., 2020). This shows that technology such as smartphones and the internet are already widely known by people in rural areas.

Information technology is starting to be widely utilized by the farming community, most of whom live in rural areas. One of the uses of information technology is to disseminate information related to crop production. Currently, farming communities are starting to hold a lot of extension services by utilizing this information technology. This extension can increase farmers' knowledge so that they can increase productivity which can then

improve the quality of life of the farmers concerned (Pandey et al., 2018).

The use of technology in the field of health services can provide various benefits. In the context of community nursing services, the use of technology can help community nurses to carry out prevention, health promotion and disease management at the community level. Digital platforms make it easier for community nurses to access up to date health information and facilitate coordination and communication with other health teams. In addition, technology also allows nurses to monitor patient conditions in real time so that they can make more appropriate clinical decisions (Subiyanto et al., 2024). Technology devices that can be used to improve nursing practice especially in community setting including monitoring system, robotic devices, mobile app, virtual reality, artificial intelligence, and web-based health intervention

One of technology devices can be used in improving nursing practice is monitoring system called FACET monitoring system, a home monitoring system to prevent prefrail and frail older adults to experience functional decline by early detection of functional change and give alert so intervention can be done early to prevent potential adverse event that caused disability and dependency. This system has both advantages and disadvantages. This system can integrate information acquired through novel technologies with comprehensive geriatric assessments, aiming to enhance the evaluation and intervention processes for frailty. But This system should be supported by various technology devices including mobile phone, The home monitoring kit consists of a gait-speed sensor, lower limbs power sensor, and wireless commercial weight scale, and web interface (Valdés-Aragonés et al., 2024). This monitoring system is less suitable for use in agricultural workers because usually agricultural workers still have good physical and cognitive functions. Beside, due to its complexity, It can be hard to provide this monitoring kit in the rural area especially in farming area where electrical supply usually are very limited.

Another technology device can be used to improve health service is robotic device. Robotic device is an automated device that can be programmed to do specific task according of its types. In healthcare settings. robotic device usually classified into three categories, namely functional robots, service assistant, and social colleagues. Functional robots is a robot that programmed functional task such

as assisting surgery, dispensing medication, or cleaning. Service assistant robot is a robot that programmed to perform complex task without constant supervision. Meanwhile social colleague robot is a robot that programmed to provide healthcare services such as entertainment purposes, stimulate physical activity and minimalize loneliness and isolation especially in older people (Adeyemo et al., 2025).

Some of the benefits nurses can get by using robotic devices are robot can help nurse save energy and time during their practice. This also reducing nurse workload and resulting in improved quality of care, and reduce human error. Robot can also help nurse collect patients date better. In other hand using robotic device can give disadvantages such as high acquisition and maintenance cost, increased risk of patient safety, privacy and medicolegal ethical issues, limiting physical and social interactions thereby weakening the nurse-patient relationship (Adeyemo et al., 2025).

Robotic devices have been proven to be useful for overcoming sleep disorders. Agricultural workers are a group that is vulnerable to sleep problems. This can be related to the workload of farmers including uncertain working hours, usually more than 8 hours per day. In addition, agricultural workers also generally have other jobs besides farming which can increase the risk of burnout and sleep disorders.

Beside monitoring system and robotic device, mobile application can be used to improve health service. Mobile application can be defined as a computer program of software that can be accessed via mobile electronic devices and smartphone (Ryan et al., 2024). This technology devices made some of health services accessible anytime and anywhere including in rural area (Nezamdoust et al., 2022). Data shows that smartphone users in Indonesia are growing rapidly, according in rural area (Heimerl et al., 2015). This means that mobile-application based health interventions are accessible to everyone, both those living in urban and rural areas.

The use of mobile application in healthcare (mHealth) give possibilities to optimize health systems, improving care and promoting health, and reducing health disparities. Patient can assess their health-related information through mHealth. mHealth also can give benefit in health education, improve patients' compliance with treatment, and help them manage their own health. Besides the benefit mentioned above mHealth also can cause major problem including the need for more closely

tailored designs, the cost of these apps, the validity of the information delivered, and security and privacy issues (Vo et al., 2019).

Mobile application can be used to disseminate health related knowledge in agricultural workers. Agricultural workers knowledge regarding health problem is still needs to be improved. Agricultural workers are at risk of experiencing various health problems, especially those related to exposure to hazardous materials such as pesticides and other chemicals (Wongta et al., 2024). Education with topics related to health can be done using a mobile app to prevent agricultural workers from experiencing these problems,

The next technology device that can be used to improve health services is virtual reality. Virtual reality is a technology that uses device to stimulate a reality in which the user is immersed in a virtual environment (Kouijzer et al., 2023). Nowadays virtual reality has a become a popular technology that can be used in any aspects in everyday life including healthcare practice. The example of application of VR in healthcare including for treating chronic pain, managing behavioral and psychological symptoms, and motor cognitive training (Kouijzer et al., 2023; Lo et al., 2025; Shin et al., 2023; Song et al., 2024).

Optimally designed VR can give users the feeling that they are physically inside this simulated space, thus providing a dynamic and immersive experience. VR can create an artificial environment through sensory trickery called 'immersion'. Immersion gives the sensation that the user is involved in an alternative world The effectiveness of virtual reality training on knowledge, skills and attitudes of health care professionals and students in assessing and treating mental health disorders. Barriers in implementing VR in healthcare including financial costs. technical issues, lack of client safety and privacy, and lack of knowledge about how to use VR (Kouijzer et al., 2023).

In the context of agronursing, virtual reality can be utilized to address health problems experienced by agricultural workers. One of the common health problems experienced by agricultural workers is chronic pain. agricultural workers do a lot of activities such as kneeling, carrying heavy loads, and repetitive motion that may increase the risk for chronic musculoskeletal pain (Xiao et al., 2013). Interventions using virtuality have been shown to reduce the scale of musculoskeletal pain

Another technology device can be used to improve health service is artificial

intelligence. Artificial intelligence is one of the fastest growing technologies today. AI is a field of computer science that aims to create machines that can perform tasks that require human intelligence. The rapid development of AI technology provides opportunities for its application in clinical practice, which has the potential to revolutionize healthcare (Alowais et al., 2023).

The use of AI in healthcare can provide significant benefits to improving the quality of healthcare services that will have an impact on improving client health. Predictive analytics using AI can improve the accuracy, efficiency, and cost-effectiveness of disease diagnosis and clinical laboratory testing. In addition, AI can assist in population health management and guideline setting, provide accurate and real-time information, and optimize treatment options (Alowais et al., 2023).

The use of AI in healthcare also has several drawbacks such as the lack of quality medical data, resulting in inaccurate results. In addition, issues of privacy, availability, and data security also arise along with the use of AI in healthcare. Therefore, an in-depth analysis is needed to determine relevant clinical metrics and choose the right methodology before integrating AI in healthcare. Strict monitoring is also needed to avoid bias or fabrication of data generated by AI (Alowais et al., 2023).

AI technology can be used to address mental health issues such as depression and loneliness. Agricultural workers, In addition to physical health problems, are also at risk of mental health problems. Agricultural workers face issues such as long hours of demanding physical labor, income uncertainty, and social isolation. Agricultural workers must also contend with unpredictable weather patterns, volatile market conditions, and shifting agricultural policies, all of which contribute to elevated stress levels (Garner et al., 2025). This high level of stress can contribute to another health problem such as depression.

the last technology device that can be used to improve health services is web-based intervention. Web-based intervention can be defined as health intervention to promote behavior change which delivered via web browser over the internet. This kind of intervention can be formed as educational programs, disease management program, and web-based group exercise program. Web-based intervention can be accessed on different technological tools such as computers, tablets, or cell phone. So, this means web- based intervention can

be accessed anytime and anywhere including in rural area that supported by internet connection (Lavoie & Dubé, 2021).

Web-based intervention has several advantages and limitations. Web based intervention offers several advantages that may overcome some of the limitation of face toface approach especially in health promotion such as anonymity, 24/7 availability, reduced costs to hold face to face meeting, high scalability, and a low access threshold. these can promote early intervention for various health problem (Heber et al., 2017) In other hand implementing web-based intervention encounter several limitations such as financial problem, privacy/confidentiality issue, no access to technology such as smartphone or computer, digital overload, lack of access to internet connection, and sharing phone with family members (Kodish et al., 2023).

Web-based online interventions can be utilized to improve the health and well-being of agricultural workers. Agricultural workers are the occupation with a high risk of occupational accidents and health problems. Agricultural workers are at high risk of substance abuse, which is generally caused by inadequate protective measures. This can lead to agricultural workers experiencing decreased health and well-being (Khode et al., 2024).

This review acknowledges a key methodological limitation in that only randomized controlled trials and quasi-experimental studies were included, while non-experimental research such as qualitative studies, case reports, and mixed-methods designs were excluded. As a result, the analysis may lack valuable insights into user experience, acceptability, and implementation challenges of digital health technologies in agronursing practice. These dimensions are critical for understanding how technologies function in real-world rural and agrarian settings, where cultural, logistical, and resource-related factors strongly influence adoption and sustainability.

5. CONCLUSION

Nurses can utilize technologies to assist in providing nursing services especially in rural area to overcome limitations found in these areas. Some of technology devices can be used to improve agronursing practice including robotic devices, mobile app, virtual reality, artificial intelligence, and web-based health intervention. However, these devices have its own advantages and limitations. Further research is needed to compare

which type of device is most effective and efficient in improving agronursing practice. This review not only analyzes articles from studies that used random sampling. In fact, most of the articles analyzed in this review used convenience sampling. This can introduce bias into the review.

CONFLICT OF INTEREST

The author declares no conflict of interest.

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DATA AVAILABILITY

Supplemental data will be provided upon request.

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