MINH
MALAHAYATI INTERNATIONAL JOURNAL OF NURSING AND HEALTH SCIENCE
ISSN 2620-9152 (Print)
ISSN 2621-4083 (Online)
DOI: 10.33024
Nomor: 79/E/KPT/2023

ARTICLE INFORMATION
Received: July, 23, 2025
Revised: November, 28, 2025
Available online: November, 29, 2025
at : https://e-jurnal.iphorr.com/index.php/minh

Utilization of virtual and digital technologies in reducing psychological problems in the elderly with chronic illness: A systematic review

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Abstract

Background: Globally the prevalence of chronic diseases continues to increase every year. In 2021, it is estimated that around 43 million people will die from chronic diseases, with 73% of them being prevalent in low-income or developing countries.
Purpose: To conduct an analysis related to the use of virtual and digital technology in reducing psychological problems in the elderly with chronic diseases.
Method: This paper is a review of the literature related to the topic of the use of virtual and digital technology in the elderly with chronic diseases on its effect on psychological problems. The analysis begins with a literature search across several databases, including PubMed, Google Scholar, Sage Journals, ProQuest, ScienceDirect, and SpringerLink. The article search was conducted using the PICO form (P = Elderly with chronic diseases; (2) Intervention = Utilization of virtual technology, utilization of digital technology; (3) Outcomes = Reducing psychological problems, elderly rehabilitation). The author identified 33 articles for analysis and filtered them, resulting in 5 articles that employed the Randomized Controlled Trial (RCT) research method. Furthermore, the author conducted an analysis using a critical appraisal form, namely the CASP (Critical Appraisal Skill Program) form.
Results: The virtual technologies can minimise depression, anxiety, and increase self-efficacy in elderly people with chronic disease. The digital application technologies give a psychological impact based on the features and the basic purpose of making that application.
Conclusion: Virtual and digital technologies have an impact on the psychological well-being of the elderly, based on the features that these technologies provide for them.

Keywords: Chronic Illness, Elderly, Psychological Well-Being, Technology.

INTRODUCTION

The elderly are an age group prone to disease due to an increase in age and a decrease in organ function in the body. One of the conditions that can be caused by an increase in age in the elderly is suffering from chronic diseases. Globally, the prevalence of chronic diseases continues to increase every year. In 2021, it is estimated that around 43 million people will die from chronic diseases, with 73% of them being prevalent in low-income or developing countries (World Health Organization, 2024).

WHO (2024) also states that several chronic diseases are commonly experienced and result in death, such as cardiovascular disease (19 million), cancer (10 million), chronic respiratory disease (4 million), and diabetes mellitus as many as 2 million residents (World Health Organization, 2024). Diseases that are often experienced by the elderly in Indonesia are diseases of the cardiovascular system. This study found data that out of 2,873 elderly individuals aged more than 70 years suffered from

DOI: https://doi.org/10.33024/minh.v8i9.1268

hypertension disease around 20%. The increase in the number of people with chronic diseases will affect the prevalence of elderly people who undergo hospitalisation in hospitals (Madyaningrum, 2023).

The incidence of chronic diseases in the elderly can be caused by several factors. The main factor in the occurrence of these diseases is the biological ageing process in the body's organs. The acceleration of the ageing process that occurs in the elderly is also caused by several factors, such as activity patterns, nutrition, and social, economic, and environmental influences on the elderly. Ageing factors that affect the incidence of chronic diseases can also be influenced by genetics and the presence of other comorbid diseases that trigger the occurrence of chronic diseases in the elderly (Xin, Xu, Dou, Jacques, Umbella, Fan, & Hill, 2025).

Chronic diseases not only cause physical disorders in the elderly, but can also have a psychological impact. The elderly tend to experience loneliness, anxiety, depression, and social isolation. Some of these conditions can worsen the overall health condition of the elderly, such as a decrease in the quality of life in the elderly. The psychological condition of the elderly is an important issue, but is often overlooked. Neglected psychological conditions can also lead to a decrease in endurance and worsen the elderly's health recovery process. Health workers in health services often ignore these psychological aspects, so that many elderly people experience worsening due to psychological problems (Xin et al., 2025).

One method that can be done conventionally to improve the psychological well-being of the elderly is the activity and social involvement of the elderly in the surrounding environment. The provision of this therapy not only increases the positive emotions of the elderly but also maintains cognitive function and improves the mood of the elderly. This method can also minimize serious conditions in the elderly (O'G'Li, 2024). Some severe chronic disease conditions, involving social activities in the elderly, is not possible due to the faster fatigue and decreased functional abilities. Therefore, there is a need for technological innovation that can be provided to improve or maintain the psychological condition of the elderly.

Virtual technology is currently present in dealing with several problems that occur in all aspects of the scientific field, especially health and nursing (Saab, Landers, Murphy, O'Mahony, Cooke, O'Driscoll, & Hegarty, 2022). Recent research has also shown that there is effectiveness in using virtual technology on a person's emotional state. The technology is modified with therapeutic therapies that have shown their effectiveness in improving psychological conditions, especially in the elderly. Some digital platforms that have been built in virtual reality include virtual social spaces, such as social activities. Virtual social activity interventions show results that are not much different when compared to conventional methods. This intervention showed an increase in wider social interaction, improved cognitive status and improved psychological well-being of the elderly (Eckardt, 2025).

Digital or smartphone-based technologies have also been found to reduce anxiety and depression in the elderly. Studies that have been conducted have shown that *mindfulness* therapy and digital or *smartphone-based* social activities have a positive impact on improving or maintaining the psychological well-being *of* the elderly (Yu, Foss, Segall, Block, Risser, Razzak, & Rodgers-Melnick, 2025). Although this technological innovation has proven to have a positive impact, it has several challenges and barriers to its use in the elderly. Limited access, low cost, ability to use, and the need for assistance are challenges and obstacles in its use in the elderly. Optimal preparation is needed by researchers and health workers to see the success of using the technology provided against the expected results (Zhou, Zhai, Qi, Jin, Xiao, Li, & Yan, 2025).

Based on some of these conditions, the author considers that there are positive and negative impacts caused by the use of technology in improving the psychology of the elderly, especially in people with chronic diseases. The purpose of this paper is to conduct an analysis related to the use of virtual and digital technology in reducing psychological problems in the elderly with chronic diseases. The author will also provide an overview of the positives and negatives of previous research in terms of effectiveness, challenges, and opportunities in developing this intervention both in hospitals and other health services.

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RESEARCH METHOD

The author compiled this systematic review to analyze several articles related to the utilization of virtual technology on the psychological problems of elderly people with chronic diseases. This method is considered important because the results obtained from this method become more comprehensive related to the topic that the author and readers want to study. The author conducted a systematic review starting with identifying relevant articles related to the use of virtual and digital technology in dealing with the psychological problems of elderly people with chronic diseases. The authors searched using the keywords that had been compiled, and filtered articles according to the inclusion criteria or what the writing team expected. The inclusion criteria are adjusted to the PICO method (Patient/Problem, Intervention, Comparison, and Outcomes), including (1) P = Elderly people with chronic diseases; (2) Intervention = Utilization of virtual technology, utilization of digital technology; (3) Outcomes = Reducing psychological problems (depression, anxiety, etc.).

The screening process was conducted according to the PRISMA flowchart in Figure 1. The writing team searched and found 8,173 articles that matched the expected keywords. The researcher then conducted an initial screening by obtaining 33 articles that matched the desired title and abstract. The articles were then read in their entirety, and 19 articles proceeded to the review stage, and 10 articles that met the criteria for obtaining relevant and detailed information. The authors then removed some of the approved articles and selected those that were suitable for a systematic review. There were several reasons for the exclusion of 5 articles, including incomplete research results, statistical methods that did not meet the research objectives, not focusing on older people with chronic diseases, and not clearly including the effects of interventions on psychological problems.

The reviewed articles were in English and consisted of articles that included complete results and were published between 2020 - 2025. The authors used a combined search strategy according to the PICO method and keywords appearing in Medical Subject Headings (MeSH). The keywords used were ("virtual" OR "technology" OR "augmented" OR "extended" OR "reality") AND ("hypertension" OR "diabetes" OR "stroke" OR "arthritis" OR "rheumatism" OR "kidney" OR "cancer" OR "chronic illness") AND ("elderly" OR "older adults") AND ("psychological" OR "psychology" OR "depression" OR "anxiety" OR "mental"). The team conducted article searches using several databases, namely PubMed, ProQuest, Google Scholar, Sage Journal, Science Direct, and Springer Link.

The authors also assessed the risk of bias in articles that were reviewed and met the criteria. The assessment used a validated form, namely the *Critical Appraisal Skills Program* (CASP), by the *Randomized Controlled Trial* approach. The CASP form consists of 4 main components containing 11 question items that are used as a reference for researchers in assessing the minimal risk of research bias in the articles reviewed. Some of the questions asked in the review form include the accuracy of the results and their compatibility with the title and objectives of the study, the randomization method, the statistical methods used, and the impact given to the expected population locally.

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RESEARCH RESULTS

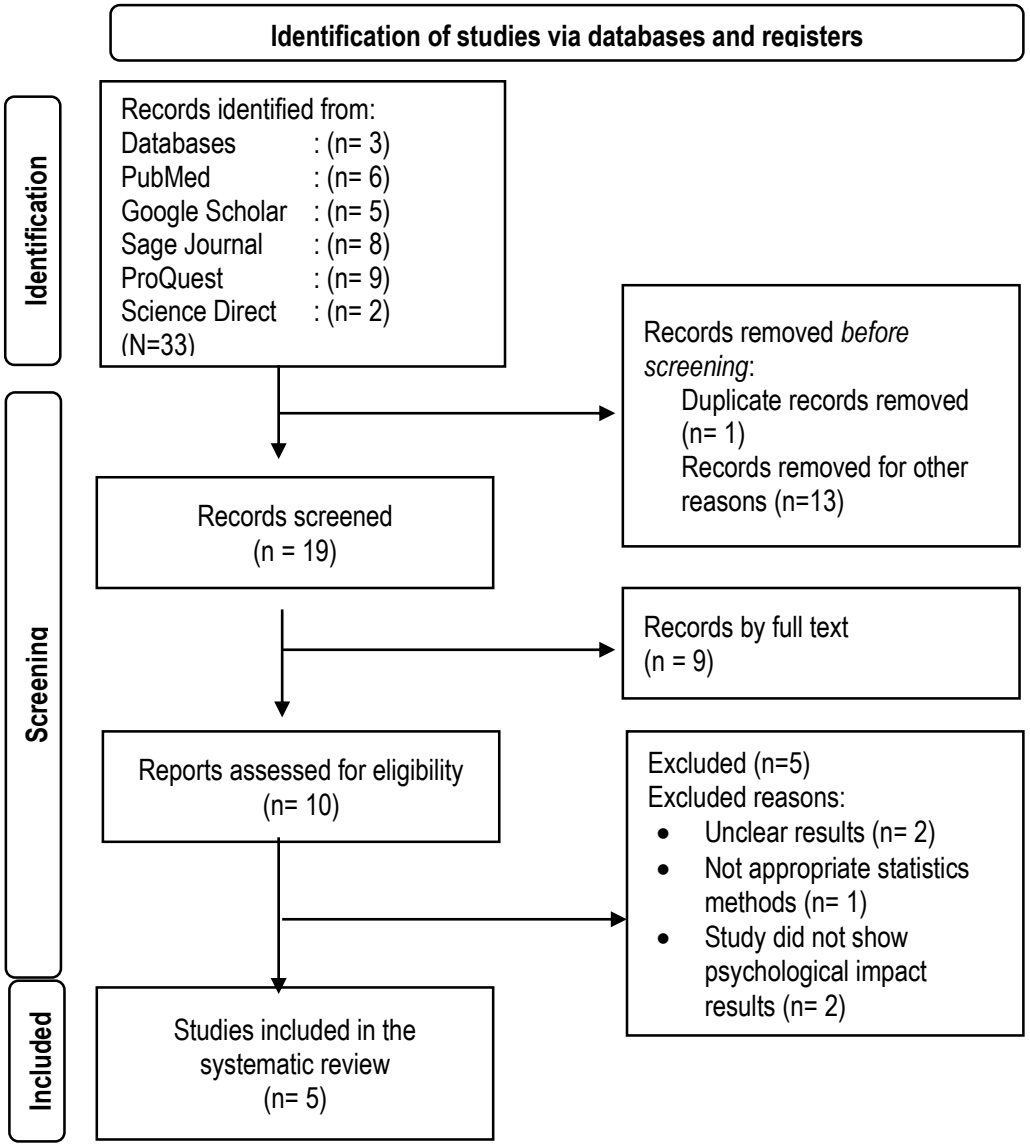


Figure Flow Prism Diagram

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Table Summary of the Review Articles

(Author, Year) (Country)	Purpose	Method	Results
(Kiper et al., 2022) (Italy)	To investigated the effectiveness of immersive VR therapy on both functional activity and depressive symptoms in stroke survivors.	We conducted a single blind, randomized controlled trial comparing VR therapy with Schultz's Autogenic Training (SAT). Patients randomized to the VR group received treatment in an immersive VR therapeutic garden with elements of psychotherapy and physical activity of the upper extremities, whereas patients in the control group received SAT.	We assessed 60 patients and randomly assigned to the VR or control group. The VR group showed a significant reduction in depressive symptoms ($\eta p2 = 0.13$, $p < 0.01$) compared to SAT. The applied VR therapy significantly increased the sense of self-efficacy and the level of acceptance of the illness; however, this effect was similar to that obtained with the standard intervention. We did not observe statistically significant changes in the functional parameters of post-stroke patients.
(Niki et al., 2021) (Japan)	To examine the efficacy and safety of reminiscence using immersive virtual reality (iVR reminiscence) focusing on anxiety that often appears with cognitive decline. The secondary objective is to reveal the preference for VR image types for reminiscence: live-action (LA) or computer graphics (CG).	This was a pilot, open-label, and randomized crossover study which was conducted on January 2020 at a single nursing home. The subjects were randomly divided into two groups (A or B) in equal numbers, and they alternately viewed two types of VR images (LA and CG) themed on the mid- to late Showa era (A.D. 1955–1980) in Japan. In group A, the CG images were viewed first, and then the LA images were viewed (CG→ LA). In group B, the images were viewed in the opposite order (LA→ CG). Before VR viewing, subjects responded to Mini-Mental State Examination (MMSE) Japanese version and State-Trait Anxiety Inventory (STAI) Japanese version.	This study suggests that iVR reminiscence can reduce anxiety in the oldest-old without causing serious side effects. Furthermore, the impacts might be better with LA images.

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(Author, Year) (Country)	Purpose	Method	Results
(Gustafson Sr et al., 2024) (USA)	To tested the effectiveness of an ElderTree intervention designed specifically for older patients with multiple chronic conditions to determine whether combining it with primary care improved socioemotional and physical outcomes.	In a nonblinded randomized controlled trial, 346 participants recruited from primary care clinics were assigned 1:1 to the ElderTree intervention or an attention control and were followed for 12 months. All participants were aged 65 years or older and had electronic health record diagnoses of at least three of 11 chronic conditions.	Multiple chronic conditions showed signs of improving socioemotional outcomes but no impact on physical outcomes. This may reflect the choice of chronic conditions for inclusion, which need not have impinged on patients' physical quality of life
(Zhu et al., 2025) (China)	To evaluate the impact of a CV–graded exercise intervention application over a 6-week period on clinical outcomes in patients with KOA.	A randomized controlled trial was conducted with 60 participants aged 60-80 years, recruited through community administrators between July 2023 and September 2023. Participants were randomly assigned to one of two groups is the graded exercise application group (n=32) and the exercise education brochure group (n=28).	The findings suggest that the CV-based graded exercise intervention application effectively improves physical function and self-efficacy among patients with KOA . This digital tool demonstrates the potential to enhance the quality and personalization of exercise rehabilitation compared to traditional methods.
(Mazurek et al., 2023) (Polish)	To determine the efficacy of VR therapy in mitigating symptoms of depression, anxiety, and stress among older adults following arthroplasty surgery and to comprehend the influence of psychological improvement on changes in functional outcomes.	Utilizing a parallel-group randomized controlled trial design, the study involved 68 osteoarthritis patients who had recently undergone either total hip or knee arthroplasty. Subjects were split into two groups. The experimental group underwent eight VR therapy sessions during their rehabilitation, while the control group was given standard care.	The findings emphasize the promising role of VR therapy as a beneficial addition to the rehabilitation process for older adults' post-hip and knee arthroplasty. The integration of psychological interventions in standard rehabilitation practices appears valuable, but further studies are needed to ascertain the long-term advantages of such an approach.

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DISCUSSION

The analysis conducted by the author on this topic will summarize some of the results found on the effectiveness of using virtual and digital technology in reducing the psychological problems of ischemic stroke patients (Zhang, Fu, Lu, Zhang, Huang, Yang, & Li, 2021). The successful use of virtual reality (VR) in rehabilitation programs depends on the patient's condition, both physical and mental conditions. This study analyzed the possibility of successful use of VR in each age category of ischemic stroke patients. The results obtained show that age does not affect the possibility of an ischemic stroke patient using VR as a medium in rehabilitation (Matys-Popielska, Popielski, & Sibilska-Mroziewicz, 2024).

Conducted an analysis related to the feasibility, acceptance, and effectiveness of using virtual technology in the elderly undergoing rehabilitation. The results of the analysis conducted show that there are positive effects provided by the use of VR in the elderly, but the results shown are inconsistent, and the number of trials conducted is still low (Dore, Gaudreault, Everard, Ayena, Abboud, Robitaille, & Batcho, 2023). Interventions using virtual technology, such as immersive virtual reality, do not cause serious effects for the elderly, such as nausea. Modifications to the use of VR need to be made to prevent serious effects for the elderly, such as gentle movements when used by the elderly. This study also analyzed the anxiety of the elderly towards their disease conditions. Measurements were taken after the elderly used virtual technology. The measurement results using STAI show that the intervention provided can relieve the anxiety experienced by the elderly towards the disease. This condition is because VR applications combine positive memories and content realism that can create pleasant experiences and provide security for the elderly (Niki, Yahara, Inagaki, Takahashi, Watanabe, Okuda, & Ito, 2021).

Psychological treatment of the elderly is very important, especially for the elderly with chronic diseases. In the elderly who experience stroke and other vascular problems, psychological treatment will reduce the risk of death in the elderly and psychological severity, such as depression, anxiety, and stress. The use of modern VR technology is very useful for improving the quality of rehabilitation and treatment programs (Szczepańska-Gieracha, Jóźwik, Cieślik, Mazurek, & Gajda, 2021). The application of VR immersive therapy in elderly stroke patients undergoing rehabilitation. The results showed that there were changes in depression levels at each period and differences in each group ($p < 0.01$) (Kiper, Przysiężna, Cieślik, Broniec-Siekaniec, Kucińska, Szczygieł, & Szczepańska-Gieracha, 2022). The decrease in depression levels can be attributed to the interest of the elderly in using VR, and the immersive atmosphere provided can calm the elderly, so that the elderly indirectly have positive emotions when using immersive VR, which has an impact on the motivation of the elderly in participating in the rehabilitation program (Dore et al., 2023).

The benefits of using VR technology and its impact on the elderly, especially on psychological problems of the elderly (Kupczik, Farrelly, & Wilson, 2022). VR technology in the elderly, based on this study, has a good impact on the psychology of the elderly, such as a decrease in depression levels ($p<0.001$), a decrease in stress perception ($p<0.001$), and an increase in self-efficacy ($p>0.001$). This study does not explain how immersive VR can have a great influence on the psychological problems of the elderly. However, the study mentioned that older adults with higher self-efficacy tend to experience less anxiety and depression. This condition is because the elderly are perceived to be able to overcome the obstacles that arise in the conditions they experience (Mazurek, Cieślik, Wrzeciono, Gajda, & Szczepańska-Gieracha, 2023).

Research on the elderly with osteoarthritis uses digital applications by providing opportunities for the elderly to monitor improvements in health conditions, carry out independent rehabilitation, so that these researchers assess depression and self-efficacy in response to the disease in the elderly. The results obtained also show that digital applications given to the elderly can increase self-efficacy in the elderly ($p = 0.003$). This condition is because the digital application provided is a health monitoring tool that provides information to users about their health conditions (Kim, Choi, Song, Yoon, Kim, & Sohn, 2021). The monitoring feature provides an opportunity for users to observe health improvements. Elderly people who get this

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opportunity will be more confident to be able to maintain their health conditions, although they still have to be given guidance in carrying out the rehabilitation process. Unfortunately, this digital application did not change the level of depression in the elderly (Zhu, Zhao, Wu, Zhu, Wang, & Han, 2025).

Digital applications by providing health information combined with the usual treatment. The study mentioned that there was no major influence on the socioemotional conditions of the elderly (psychological well-being, loneliness, and coping mechanisms after being given the intervention. However, the digital technology provided by researchers to the elderly can influence the elderly's closeness to their closest people (Schroeder, Dodds Georgiou, Gewald, & Siette, 2023). This condition is due to the duration of using digital applications in the elderly, which can affect the condition of the psychological well-being of the elderly. The longer the use of digital applications, the more accustomed the elderly are to the results and use of applications, so that psychological conditions tend to be stable, and there is no change. However, the closeness with the closest people and fellow elderly will be closer due to the frequency of using the application quite often (Gustafson Sr, Mares, Johnston, Vjorn, Curtin, Landucci, & Shah, 2024).

Based on the analysis conducted by the author on several articles reviewed, the author can conclude that the use of VR can have a positive effect on the level of depression towards the disease, especially when measured through a special instrument for measuring the level of elderly depression (GDS). In the measurement of anxiety, the dominant result of 3 articles assessing the effectiveness of VR obtained two articles that mention that VR immersive applications can influence changes in the level of anxiety of the elderly towards disease conditions. Measurement of self-efficacy in the elderly has different results, where in the use of VR in ischemic stroke patients, the elderly do not show any changes in self-efficacy and experience differences in the elderly who experience Osteoarthritis. The author assumes that this condition is due to differences in the disease system owned and the effects that arise functionally in the elderly from the disease condition.

The author's analysis of the use of digital technology obtained several results. The author concludes that the use of digital technology does not necessarily improve the psychological health of the elderly. This condition depends on the duration of the use of digital applications in the elderly and the features provided to them elderly. Digital applications cannot provide psychological changes for the elderly, but can increase the closeness of the elderly with the closest people and fellow users of the application (Gustafson at al., 2024). There is a change in depression levels and an increase in self-efficacy in the elderly. This condition is due to the monitoring feature that can provide information to the elderly regarding their health conditions (Zhu et al., 2025).

Psychological conditions are important in the physiological and functional improvement of the elderly. The depression, anxiety, and self-efficacy are indirectly a major determinant in the success of the elderly undergoing rehabilitation programs. The elderly who can manage their emotions well will adhere to the treatment schedule and can achieve rehabilitation goals. This reason can certainly be a consideration for health care providers to pay attention not only to the physiological health conditions of the elderly. Psychological conditions are also a determining factor of how the elderly and caregivers continue to follow the rehabilitation activities that have been scheduled (Zhu et al., 2025).

The application of virtual and digital technology in health services, the author feels that technology can be applied to health services. Unfortunately, to start the technology implementation intervention, stakeholders need to prepare several things, such as the establishment of applications, the availability of tools, and the ability of health workers to apply the technology that will be used. This is certainly a big consideration, besides the results obtained from using the application will improve the quality of service. Stakeholders need to conduct simulations, further research and satisfaction surveys on the application of virtual and digital technology in elderly rehabilitation, both from the elderly, caregivers or families, and health workers. The existence of satisfaction surveys and the readiness of health workers will increase the readiness of stakeholders in implementing the use of digital and virtual applications in health services for the elderly with chronic diseases.

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CONCLUSION

The author can conclude that the use of virtual technology can affect changing the level of depression, anxiety, and self-efficacy of elderly people with chronic diseases. A good psychological condition will affect the process of successful rehabilitation of the elderly. In the use of digital technology, the effect of successful use of the application depends on the features provided and the duration of use of the application features; the more frequently used, the psychological problems are not seen, and emotions tend to be stable. The authors assume that when healthcare providers want to implement virtual and digital technology, they need to think about the expected goals, so they know what features are suitable for users, especially the elderly.

LIMITATION

This article has several limitations in analyzing articles related to the use of technology on psychological problems in elderly people with chronic diseases. Researchers found it difficult to find articles related to the results that focus on the psychology of the elderly. This condition is because there are still many studies that analyze the impact on the physiological and functional abilities of the elderly. The author in this case feels that other researchers must conduct further research related to the application of therapy using virtual and digital technology during the rehabilitation process.

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