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REVIEW ARTICLE

A systematic review of using telenursing health education among families who have patients with physical impairments

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Abstract

Many families care for patients with impaired physical mobility independently at home; stable patients or with special considerations are usually allowed to go home by the hospital and continue treatment at home. The telenursing application is one of the interventions that can be implemented to help increase the knowledge and skills of families caring for patients at home. This study aimed to determine the implementation model of telenursing educational applications for families caring for patients with impaired physical mobility at home. This research is a literature study using the PRISMA approach. A systematic review using PICO. The database searches used were Google Scholar, PubMed, Crossref, ScienceDirect, and Wiley Online Library with the keywords telenursing OR telehealth OR mobile application AND physical immobility OR physical mobility impairment OR physical mobility disruption AND therapy AND the family caregiver. From the six research articles reviewed, it was found that the telenursing application is an implementation that can be applied to increase the knowledge and skills of families caring for sick family members at home. Interventions include education and training in audio, video, text, film, and consultation. The media used is WhatsApp, websites, telephones, and other cellular telecommunication-based applications. Telenursing applications are the best solution to help families caring for patients with impaired physical mobility at home.

Keywords: Telenursing; physical impairments; health education; family caregiver; telenursing

Introduction

The phenomenon that occurs today is that many families have to care for patients at home independently. Because the pandemic is still ongoing and apart from that, economic difficulties are also the cause. Inpatients who are stable or with special considerations are usually allowed to go home by the hospital and continue treatment at home. The term mobility is associated with physical movement, including simple gross motor movements, more complex fine motor movements, and related coordination (Crawford & Harris, 2018). Impaired physical mobility is caused by: stiff joints, limited movement, slow action time, unsteadiness when walking, poor body balance, circulatory disorders, vision problems, hearing problems, and disturbances in touch (Airiska, Winarni & Ratnasari, 2020). Family caregivers provide informal, unpaid assistance to family members who need physical or emotional help (Irma & Febri, 2018). As we know, several family tasks include maintaining and caring for the condition of family members so that they remain in optimal and productive conditions, maintaining and improving mental status, anticipating social and economic changes, and motivating and facilitating spiritual needs. The family plays a role in determining the care needed by the patient in the hospital.

The nurse's success in the hospital is in vain if it is not continued at home, which results in the patient having to be treated again (relapse). The family's participation from the beginning of treatment in the hospital can increase the ability of the family to care for patients at home so that patients do not have relapses or can be prevented. Telemedicine and telehealth are terms used to describe providing healthcare services remotely to patients through technology (Howard & Kaufman, 2018). In general, telemedicine and telenursing are urgently needed because of the pandemic and because it creates new opportunities for remote care services (Smolinska et al., 2021). With advances in technology, of course, nursing services are demanded that are easy, fast, and inexpensive; that's why telenursing is

the solution. Telenursing is a mobile telecommunications-based application that assists families in caring for sick and hospitalized family members with physical mobility disorders. This application is expected to be able to increase family knowledge and skills when doing care at home. The aim is to discover the implementation model of telenursing educational applications for families caring for patients with impaired physical mobility at home.

Method

There has been much research on telenursing, but no one has compiled whether telenursing practices provide better outcomes in patient recovery. The results of this systematic review can undoubtedly be used to strengthen clinical evidence regarding the implementation of telenursing in Indonesia. The article design used is a systematic review regarding the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA). PRISMA is a tool and guide used to evaluate a systematic review (Zhang et al., 2020). The PRISMA checklist is included as a complementary document (**Figure 1**). The search process begins with formulating a PICO, which is used to direct the author in searching for articles. PICO is an acronym for P (patient, population, problem), I (intervention, prognostic factor, exposure), C (comparison, control), and O (outcome) (Roever, 2018). The PICO formulation in this systematic review is P = family who cares for their family members; I = telenursing; C = control group as comparison; O = model of implementing telenursing educational applications in families who care for family members with physical mobility barriers at home.

Article inclusion criteria were published or published from 2018 – 2022 and given easy access (open access journals); the articles used were original full-text research articles with telenursing or telehealth or mobile application interventions. Exclusion criteria were articles with topical issues not related to the application of telenursing education to increase families' knowledge and skill levels about caring for patients with impaired physical mobility at home, articles based on literature review/systematic review/meta-analysis, and not full text. A database search in this systematic review was conducted in October 2022. The databases used included Google Scholar, PubMed, Crossref, ScienceDirect, and Wiley Online Library. To get specific articles according to the theme using keywords (keywords). Keywords that make it easy for every article reader to find out the essence of the paper quickly. The keywords used by the author in searching for articles are telenursing OR telehealth OR mobile application AND physical immobility OR physical mobility impairment OR physical mobility disturbance AND therapy AND the family caregiver. After finding various articles, 19.932 were screened for titles, and 34 were obtained. The report did not discuss the telenursing/telehealth model with impaired physical mobility at home, and it was not full text; then, the complete text article was assessed for eligibility (n=21). Articles that are irrelevant to the inclusion and exclusion criteria were excluded. Articles were selected with inclusion and exclusion criteria (n = 6). This results in a comprehensive series of articles on the chosen topic.

The selected articles are assessed critically, assessing a research methodology (**Figure 1**). The instrument used is the CASP JBI 2020 questionnaire (Critical Appraisal Skills Program 2020). The research focused on assessing the quality of the methodology and possible biases in design, behavior, and analysis (Singh, 2013). This questionnaire contains different question items for each research design. Randomized control trials are considered the highest level of evidence for establishing a causal relationship in clinical research. The list of questions for research with a randomized controlled trial (RCT) design has 13 questions (Zabor, Kaizer & Hobbs, 2020). Non-randomized control trial design is a group of methods collectively known as non-randomized studies; a list of questions for non-randomized studies, such as quasi-experiments, contains nine questions (Sedgwick, 2018). Each question must be answered yes/no/unclear and does not apply. The answer "yes" gets a value of 1, and the other answers get a value of 0, then the results are divided by the total number of questions and multiplied by 100%. Good quality if the score is 100-80%, sufficient quality is 79-50%, and less rate <50%.

Results

This study conducted a review study on six articles on the effect of implementing telenursing/telehealth in patients who experience impaired physical mobility who are treated at home or outside the hospital. The article does not directly mention impaired physical mobility, but papers are selected in cases that result in or are related to impaired physical mobility. The first article (McDermott et al., 2018) used the Randomized Clinical Trial study design intending to determine whether a home-based exercise intervention consisting of wearable activity monitors and telephone coaching improves walking ability over nine months in patients with the peripheral arterial disease (PAD).

Researchers (McDermott et al., 2018) Among 200 randomized participants (mean age [SD] age, 70.2 [10.4] years; 105 [52.5%] female), 182 (91)% completed nine months of follow-up.

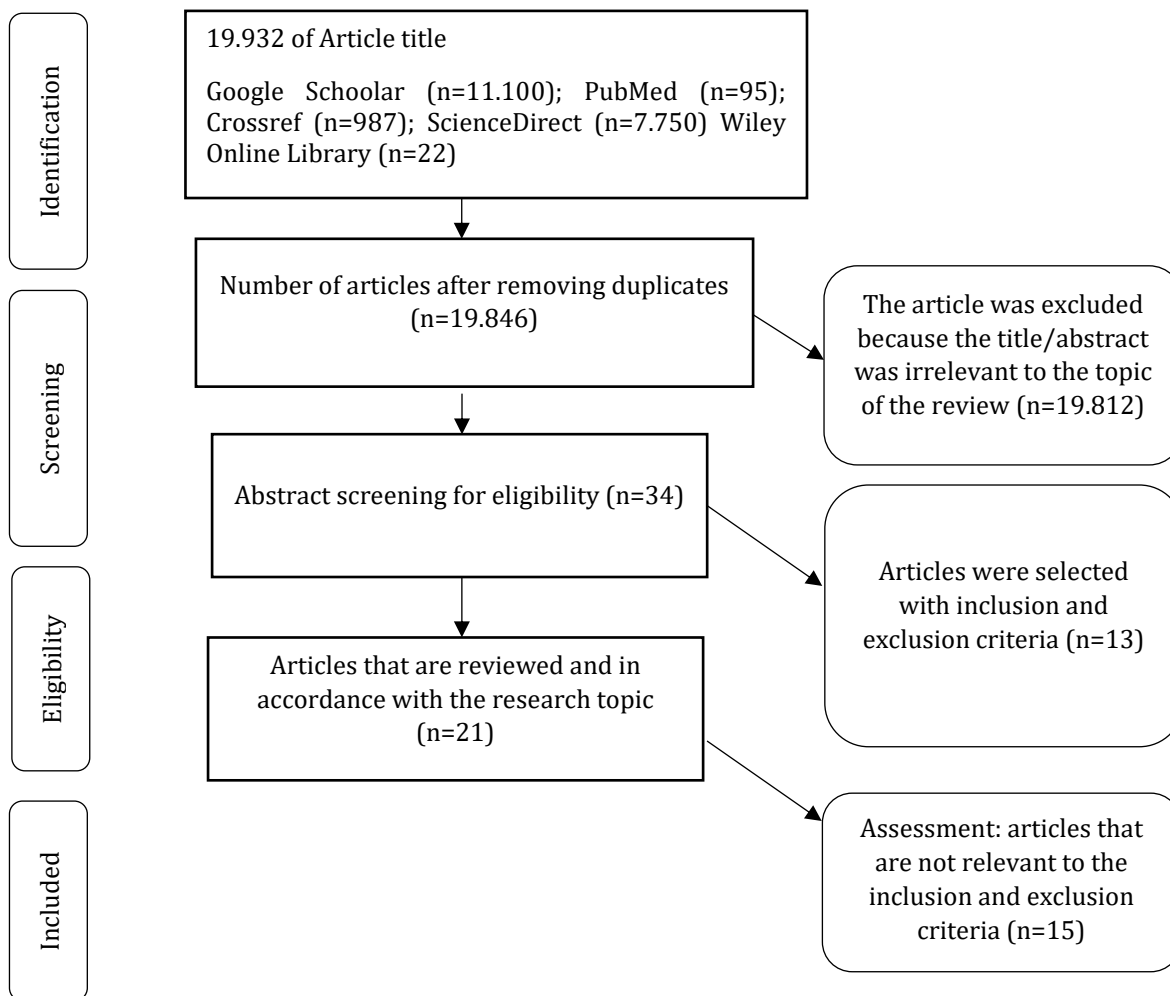


Figure 1. Article selection process

The mean baseline change from baseline to 9 months follow-up in 6-minute walking distance was 5.5 meters in the intervention group vs. 14.4 meters in the usual care group (8.9 meters difference; 95% CI, 26.0 to 8.2 meters; L=31). Exercise intervention worsened the PROMIS pain score; the mean change from baseline to 9 months was 0.7 in the intervention group vs. -2.8 in the usual care group (difference, 3.5; 95% CI, 1.3 to 5, 8P=0.002). There were no significant differences between groups in WIQ scores, SF-36 physical functioning scores, PROMIS mobility, or satisfaction with social role scores. A home-based exercise intervention consisting of wearable activity monitors and telephone coaching versus usual care did not improve walking performance at nine months follow-up. The second article (Liang et al., 2021) used the study design of A Randomized Controlled Trial to evaluate the effectiveness of an integrated nurse-led tele-homecare program for patients with multiple chronic illnesses and a high risk of pre-hospital admission—determination of the number of samples using the randomized method technique. A study (Liang et al., 2021) for the primary outcome evaluation found that the tele-homecare program significantly reduced mortality and ED visits.

In contrast, no significant effect on readmission was observed. For the secondary outcome evaluation, the patient's quality of life improved significantly. The nurse-led tele-homecare program involves remote monitoring and surveillance 24 hours a day. In this study, the system detects physical changes earlier and provides management at the right time and place. Thus, reducing visits to the ER and death besides can improve the quality of life of patients.

The effectiveness of this nurse-led tele-homecare program strengthens the care of patients with various chronic illnesses. Third article (Rezaei et al., 2019) used a clinical trial research design with pre-post design on three groups which aimed to compare the effect of telenursing and face-to-face training on the quality of life of burns. In research (Rezaei et al., 2019), there was a statistically significant difference between the three groups concerning training methods after the intervention ($p < 0.001$). In addition, the post hoc test showed no significant difference between the telenursing and face-to-face groups ($p = 0.244$). In line with previous research on the comparison of the effects of face-to-face training and educational booklets, there was no significant difference between the two interventions (Taheri, Alamdari & Afrasiabi, 2021). The conclusion is that educational methods in telenursing and face-to-face training are effective and improve the quality of life for burn patients. Still, the face-to-face and telenursing training interventions show significant differences. The fourth article (Hosseini et al., 2022) used the Randomized Clinical Trial research design to know the effect of telenursing on the burden of care on caregivers and the rate of complications in acute brain stroke patients discharged from the nerve ward. In research (Hosseini et al., 2022), after the intervention, the average value of caregiving burden in the control and counseling groups was respectively $35.22 + 17.215$ dan $8.00 + 7.556$ ($p < 0.001$). The counseling group experienced fewer urinary problems ($p < 0.001$ and ($p = 0.011$). This study shows that telenursing reduces the burden of care on caregivers and reduces urinary tract infections and falls in acute stroke patients. Fifth article (Fallah et al., 2022) This study uses a Quasi-Experimental design in a before and after format.

The study aimed to determine the effect of telemedicine on caregiver care burden and quality of life of patients undergoing resection of bladder tumors through a tube (TURBT). In research (Fallah et al., 2022), the mean quality score rating after the intervention was higher than before the intervention, and the difference between the mean quality of life score was significant ($p < 0.05$) before and after the remote nursing intervention. There is also a considerable difference between the burden of care before and after the intervention ($p < 0.05$) so that patients' average quality of life reaches 11.08-13.61, and the moderate pressure of care burden goes 2.27-3.78 after the intervention. Sixth article (Ardalan et al., 2022) The research design used was a randomized controlled clinical trial. This study aimed to determine the effect of education and telephone follow-up on the burden of caring for family caregivers in elderly stroke patients. In research (Ardalan et al., 2022) before the intervention, there was no significant difference between the two groups in the amount of care burden ($26.20 + 11.08$ for the intervention group and $28.70 + 11.63$ for the control group) ($p = 0.333$); however, after the intervention, the intervention group's care burden ($18.28 + 10.07$) and control group ($29.80 + 11.76$) showed a significant difference ($p < 0.001$). The results showed that 12 weeks of education and telephone follow-up significantly reduced the caregiver's family care burden ($p < 0.001$).

Discussion

Impaired physical mobility is defined by the North American Nursing Diagnosis Association (NANDA) as a condition in which an individual experience or is at risk of experiencing limitations in physical movement. Impaired physical mobility is caused by: stiff joints, limited movement, slow action time, unsteadiness when walking, poor body balance, circulatory disorders, vision problems, hearing problems, and disturbances in touch (Airiska, Winarni, and Ratnasari, 2020). This condition makes the patient highly dependent on the family in fulfilling health and daily activities. Families are expected to be able to care for family members who experience impaired physical mobility at home. For families to care for their homes correctly, they need to be equipped with the skills and knowledge about caring for their family members. One of the nursing interventions that can be used to increase family knowledge and skills as home care providers are to use telenursing educational applications. Telenursing focuses on minimizing the face-to-face method in providing care needs services, especially during a pandemic, for health service providers both as workers in hospitals and the community are expected to be able to utilize telehealth as the leading choice in carrying out nursing interventions (Raafi, Saryono and Sari, 2021).

Based on synthesizing six intervention articles on education, two papers, training 1 article, education and training three pieces. Education and training in audio, video, text, film, and consulting. The media used consisted of 2 articles on telephone, 1 article on WhatsApp and phone, 1 article on WhatsApp and website, 1 article on Instagram and telephone, and 1 article on phone and website. Based on a literature study of 6 journal articles that evaluated the effectiveness of the intervention/implementation of telenursing education applications with randomized control trials and quasi-experimental designs, it was found that the performance of telenursing education was proven to be able to provide significant changes following the objectives of each study (Mcdermott et al. 2018; Liang et al. 2021; Rezaei et al. 2019; Hosseini et al. 2022; Fallah et al. 2022; Ardarlan et al. 2022). Based on the results of the synthesis of the characteristics of the six articles, it was found that the research design methods used included randomized control trials and quasi-experimental designs. This is because it pays attention to the level of evidence-based research, namely

the group in research studies such as the level from lowest to highest as follows cross-sectional, cohort study, case-control, quasi-experiment design, randomized control trial/clinical trial, systematic review, meta-analysis. Each type of study has its characteristics and advantages; the higher the level of study, the better the research. In addition, the determination of the number of samples also affects the quality of the article; the more the number of selections involved, the more accurate and better the research will be.

The synthesis results regarding the types, techniques, methods, media, and intervention time stated that the model for the implementation of telenursing education differed between the articles reviewed. The review results also found no significant difference before the intervention between the control group and the intervention group. In general, applying the eight types of interventions effectively increased the knowledge and skills of research subjects. In the articles reviewed, different measurement instruments were used, including the Impairment Questionnaire (WIQ); physical function score Medical Outcomes Study Short Form 36 (SF-36); behavioral scale (C-MABS); the Chinese version of the EuroQol (EQ) scale (C-EQ5D-5L); visual analog scale EQ (EQ-VAS); Burn Specific Health Scale-Brief (BSHS-B); CBIs; Barthel's index; and Zarit Burden Interview (ZBI). The instrument that is widely used to obtain demographic information and quality of life is the 36SF questionnaire. The reviewed studies provide significant findings about several models of implementing telenursing educational applications for families/caregivers and patients cared for at home.

The findings of telenursing for mobility impairments are essential because there are increasing numbers of cases of impaired physical mobility; there are connecting media available between parts of the world that can bridge physical mobility problems and legally begin to be facilitated from a legal aspect. Naturally, this will enhance the development of nursing in the future. Applications in nursing practice are increasingly developing; what used to be just homecare is now expanding into telenursing, a combination of remote monitoring, home care, and patient visits to the hospital if needed. The variety of these three things will improve patient care outcomes. Implementing this intervention can improve the quality of nursing care carried out by families/caregivers caring for patients/family members who are sick at home. In implementing the telenursing educational application, the nurse giving care (expert nurse) must continuously be monitored so that developments are constantly monitored, precise, and not dangerous for the patient and family/caregivers. The limitation of the synthesis review in this report is that the author only makes synthesis review articles in a systematic form. Review and meta-analysis have not been carried out, and research articles are limited to randomized controlled trials, quasi-experimental methods, and year of publication 2018-2022.

Conclusion

The results of a literature study on the six articles above regarding the implementation of telenursing educational applications in families caring for patients with impaired physical mobility at home, the interventions provided were very varied. At least six different interventions were obtained from the six articles reviewed. Interventions to increase family knowledge and skills to care for families with impaired physical mobility at home can include education and training in audio, video, text, film, and consultation. Media is used through WhatsApp, websites, telephones, and other applications based on mobile telecommunications. The interventions from these six articles are highly dependent on application technology devices, participants must adapt to technology, and the costs incurred are not small. The six research articles reviewed found that the telenursing application is an implementation that can be applied to increase family knowledge and skills. They were caring for sick family members at home. Telenursing applications are the best solution to help families caring for patients with impaired physical mobility at home. Nurses must constantly innovate in developing science and technology, especially telenursing-based educational application models, to help families and patients independently maintain and improve their health.

Author's declaration

The authors made substantial contributions to the conception and design of the study and took responsibility for data analysis, interpretation, and discussion of results. For manuscript preparation, all the authors read and approved the final version of the paper.

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Availability of data and materials

All data are available from the authors.

Competing interests

The authors declare no competing interest.

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