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The Telehealth Effectiveness in Home Care Services: A Systematic Review

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ABSTRACT
Telehealth is a technology-based system that facilitates remote health management. This study aimed to examine the telehealth's effectiveness in home care services. The Systematic literature was carried out on the last five years of research from 5 indexed electronic databases. This study used PICOS framework as a guideline in finding articles. The RCT examined the telehealth's effect in home care services. The methodological quality used JBI critical appraisal checklist. The study's major findings showed that Telehealth in home care services is quite effective both in providing services, increasing the competence of nurses, and making it easier for patients to do it from home. Telehealth interventions are effective and feasible for use in home care patients who have chronic disease, and provides satisfaction in providing services to both patients and nurses.

Keywords: Telehealth, Telemedicine, Telenursing, Home Care, Home Health Care

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BACKGROUND

The purpose of health development is to increase awareness, desire, willingness, and ability to live healthy to realize the highest degree of health. Indonesia is a vast archipelago, so travelling from one region to another takes a long time. This shows that access factors cause the high disparity of health services in Indonesia. This situation causes public awareness of health to become weak. The 2015 Ministry of Health speech regarding RPJMN telemedicine shows that nearly 50% hospitals are located in Java, while only 1-2% hospitals are located in Maluku and Papua (Istifada, Sukihananto and Laagu, 2018).

Currently, telemedicine in Indonesia has not been applied to home care services between nurses and patients. The concept of telemedicine in Indonesia is still limited to the doctor and patient consultation services. Telemedicine home care service is one of the solutions to overcome health visits. A survey (2004) conducted by a home care institution shows that patients who use telemedicine services will no longer be hospitalized. The Indonesian government seeks to use telemedicine technology to reduce gaps in access to medical services. The government's initial target in implementing telemedicine is currently focused on telemedicine service providers throughout Indonesia, and the percentage in 2016 was 6% (Kementerian Kesehatan, 2020)

According to WHO, telehealth is the delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies, for the exchange of valid information for the diagnosis, treatment, and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers, in all the interests of advancing the health of individuals and their communities (WHO, 2010). The broad definition of telecommunications includes several modes of transmission, such as video, mobile applications and secure messaging. WHO found several branches of telemedicine including: telenursing, teleradiology, teledermatology, telepatology and telepsicology. Telehealth has broad access, and can make health services more comfortable for patients, especially in areas far from access to health services, those with little children and those with mobility limitations.

Many studies have been conducted on telehealth user systems, one of which is the research titled "Telehealth Remote Monitoring Systematic Review: Structured Self-monitoring of Blood Glucose and Impact on A1C" conducted by Deborah A. Greenwood, Heather M. Young, and Charlene C. Quinn.

Home care is a part of continuous and comprehensive health services provided to individuals and families in their homes that aim to improve, maintain or restore health or maximize independence and minimize the impact of the disease. Home care is a form of service that can be promotive, preventive, curative and rehabilitative. The service providers who have competence and authority could only provide the service.

METHODS

This study used preparation of a systematic review on the Telehealth in Home care service's effectiveness and a systematic protocol. The protocol includes the rationale and purpose of the review, the eligibility criteria, the sources of information, the search strategy, the study selection and the data collection process, the data items and results searched for, the methods for assessing the risk of bias for individual studies, and the synthesis data (Shamseer *et al.*, 2015).

The literature search was carried out using an electronic database that is used in finding highly reputable articles is Scopus, Pubmed, Sage, Science Direct, ProQuest, with output limits for the last 5 years, from 2016 to 2020, full-text articles, and in English. The search

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strategy used the Scopus database, then developed with Medical Subject Heading (MeSH) and combined and identified using Boolean Logic/operators on other databases with the keyword "Telehealth" OR "Telenursing" OR "Telemedicine" AND "Home Care" OR Home Health Care".

Inclusion and exclusion criteria

Table 1. Inclusion and exclusion criteria

PICOT Framework	Inclusion Criteria
Participants	Patients who use home care services
Intervention	Health services using Telehealth
Comparison Intervention	Intervention Face to face service
Outcomes	Measured effectiveness on quality of life
Time	2016 - 2020
Study design	Randomized controlled trial
Language	English
Article Types	Original research studies with full-text available

As a guide in finding articles using the PICOT Framework (table 1), the study design used only a randomized controlled trial and involved patients with home care services, because the review was focused on exploring the effects of telehealth used on the patients quality life who needed health services Because they had certain limitations to come to the hospital.

Study selection

By the protocol guidelines on PRISMA, the electronic databases drawn good studies (Shamseer *et al.*, 2015). The articles taken and collected then selected through a systematic stage, including by removing duplicate articles, both titles and abstracts. The articles from selected studies from the screening process will be reviewed by three independent reviewers.

Risk of bias

The risk of bias in this systematic review is carried out by determining data extraction, which includes the similarity of the research objectives and the resulting outcomes, the similarity of the study design using RCT and an assessment of the quality of the studies to be reviewed later. The methodological quality of the randomized controlled trials used JBI critical appraisal checklist for RCT. 13 items assessed bias.

Data extraction

The data extraction in this study were designed to guide information from records according to research objectives. Data extracted in each of the studies included: year, language, population, study design, study objectives, methods and interventions, instruments used and time of follow-up and the outcome of each study. Furthermore, the data to be

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extracted is in the results section, namely: year, intervention, analysis method, results and conclusions.

Data synthesis

Data synthesis was carried out qualitatively by three independent reviewers with discussion to analyze the selected study. All interventions aimed at improving the quality of life status of home care patients with telehealth used interventions are reported in this systematic review.

RESULT

Study selection

The search for articles/literature is carried out in the following stages, as shown in the PRISMA Flowchart diagram. From 1,872 searches excluded, 1635 based on the limit to from the last 5 years, the method used had to be a randomized trial (RCT), used English so that 363 articles were obtained. From the feasibility test of the full text of the articles, there are only 30 articles, and 9 research articles were reviewed.

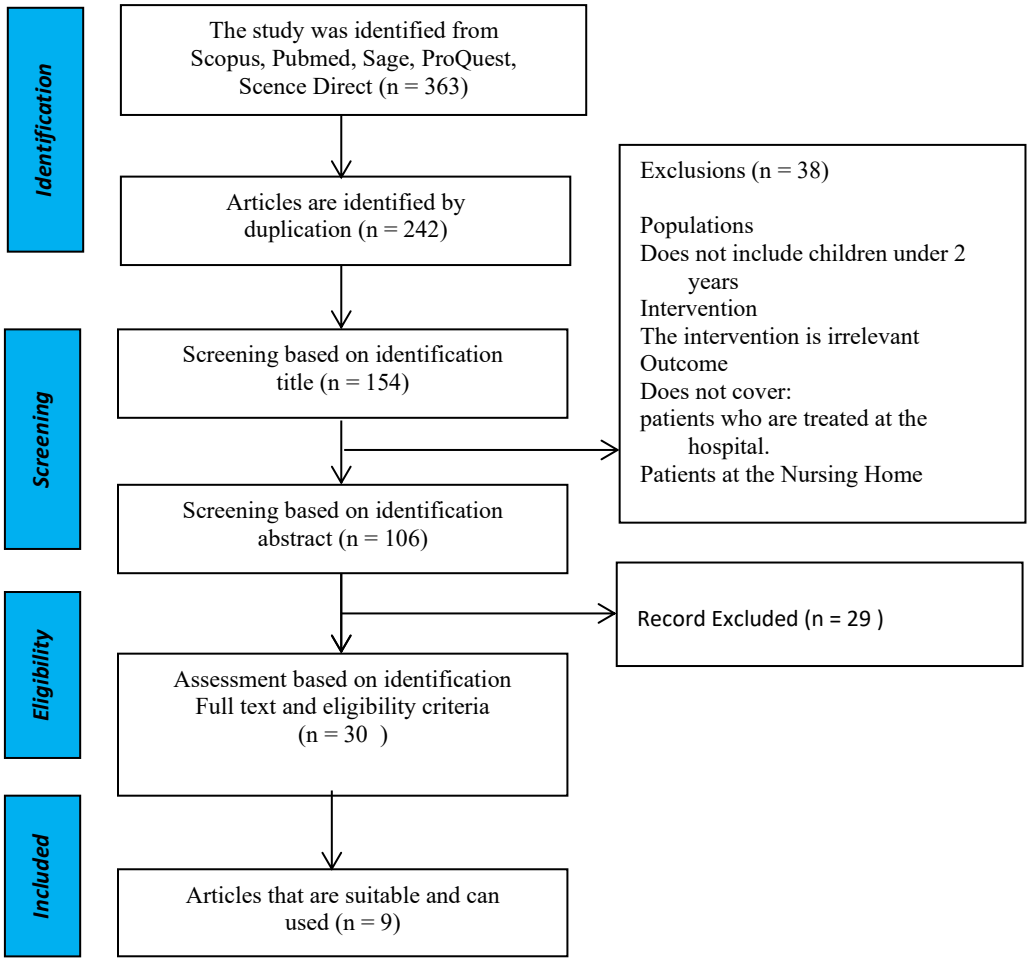

Figure 1. Study selection flow chart

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Risk of Bias

Table 2. Summary of risk of bias from 9 articles taken in this systematic review using the JBI critical appraisal checklist for randomized controlled trials (Joanna Briggs, 2017).

Author and Year	Critical Apprisal Cecklist													Result
	1	2	3	4	5	6	7	8	9	10	11	12	13	
Ding H et al., 2019	√	√	√	√	√	√	√	√	√	√	√	√	√	13
Jansons et al., 2019	√	√	√	√	√	√	√	√	√	√	√	√	√	13
Renee et al., 2019	√	√	√	√	√	√	√	√	√	√	-	√	√	12
Mizukawa et al., 2019	√	√	√	√	√	-	√	√	√	√	√	√	√	12
Andija et al., 2018	√	√	√	√	√	√	√	√	√	√	√	√	√	13
Oliver et al., 2018	√	√	√	√	-	√	√	-	√	√	√	√	√	11
Wendy et al., 2017	√	√	√	√	√	√	√	√	√	√	√	√	√	13
Noelia et al., 2016	√	√	√	√	√	√	√	√	√	√	√	√	√	13
Giordano et al., 2016	√	√	√	√	√	√	√	√	√	√	-	√	√	12

Study characteristics

The overview of the nine articles reviewed is summarized in terms of the characteristics associated with telehealth intervention in home care patients to improve the life's quality. Regarding the intervention given, instruments, follow-up and results were presented in nine articles using RCT. The studies conducted on the nine articles above were found in several countries, including Australia, Japan, China, and the United States. The interventions given in each study also varied, including Health Education, Symptom monitoring and electronic COPD action plans (Ding *et al.*, 2019), gym-based and home-based exercises (Jansons *et al.*, 2017), individual home exercise programs with strength and health care assistance (Giordano *et al.*, 2016), and APRN-delivered telephone care coordination and received the care coordination intervention using telephone and interactive video (Looman *et al.*, 2018). The nine studies aimed to evaluate the telehealth effectiveness for a given intervention with various parameters.

Table 3. Results of the review of articles

Author	Outcome
Ding H et al., 2019	This study intregrates explicitly the innovative mHealth system with clinical COPD services and evaluates this approach via RCT. The evaluation presents a unique opportunity to improve COPD care in communities through mHealth innovations.
Jansons et al., 2019	There was a significant difference between study groups in the main outcome (visual analogue EQ-5D scale, 0 to 100) over the 12-month intervention period, with an estimate (adjusted regression coefficient) of an effect difference of 0 (95% CI 5 to 4). . The gym group showed slightly fewer depressive symptoms over the 12 months compared to the

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	homegroup (average difference of 0.8 points on a 21-point scale, 95% CI 0.1 to 1.6)
Pekmezaris et al., 2019	These findings suggest that TSM is ineffective in reducing utilization or improving the quality of life for patients with heart failure. Further research is needed to determine whether TSM can be effective for populations facing health care access problems.
Looman et al., 2017	There was no significant effect of the Telehealthcare intervention on the child's HRQL (Health-Related Quality of Life) or family impact after 24 months. Care coordination interventions for CMC may need to incorporate family system interventions for optimal outcomes in various quality of life domains.
Andrija et al., 2018	This modelling study shows that (Home Telemonitoring) HTM and (Nurse Telephone Support) NTS are viable solutions to support patients with chronic heart failure. NTS is cost-effective compared to (Usual Care) UC with a WTP of € 9000/QALY or higher. Like NTS, HTM improved patient survival in all NYHA (New York Heart Association) classes and was cost-effective compared to UC with a WTP of € 14,000 / QALY or higher.
Mizukawa et al., 2019	It was feasible for us to perform CM for patients with heart failure using a telemonitoring system in a community care setting. When we compared the means, with the reference UC group, patients in the CM group experienced a more significant reduction in re-entry rates and a greater improvement in QOL. As the hospital admission rate for HF aggravation continues to increase in Japan, HF management programs are on the rise urgent. To prevent re-admission to the hospital, nurses need to assess patients to determine if they can manage heart failure with self-management education or whether they need additional support from nurses using a monitoring system. The correct allocation of services reduces the risk of re-admission to the hospital and eliminates unnecessary costs for telemonitoring devices and medical personnel.
Oliver et al., 2018	Compared with the non-intervention group, TM as an adjunct to usual care over a 6 months improved quality of life, as assessed by the 15D questionnaire, in patients with severe COPD, whereas no difference between groups was observed in CAT scores.
Noelia et al., 2016	The results showed that telehealth interventions were just as effective in increasing QOL scores in patients undergoing cancer treatment as direct UC. Further learning should be carried out with different telehealth modalities to determine their appropriate and effective interventions to improve the QOL of cancer patients undergoing treatment.

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Giordano et al., 2016	Most of the studies conducted on community-dwelling patients did not specifically address older adults with cognitive impairment. Elderly adults with cognitive problems are among the most vulnerable sectors of our society with obvious mental, social and physical weaknesses. They are more likely to experience falls. Therefore, it is important to identify evidence-based interventions to reduce the risk of falls and related injuries in people with cognitive impairments.

DISCUSSION

Telehealth is an alternative method of providing health care to people who need to travel long distances to get routine health care. Telehealth uses information technology and telecommunications technology to support remote care related to clinical health, patients, and health education (Grustam *et al.*, 2018). Technologies include video conferencing, the internet, store-and-forward imaging, streaming media, and wireless communications

Quality of Life

The results show that telehealth interventions are effective in increasing QoL scores in patients undergoing direct regular treatment (Noelia et al., 2016). Further research should be carried out on various telehealth modalities to determine more appropriate and effective use of telehealth in interventions to improve the life's quality of cancer patients undergoing treatment.

Studies in patients with heart failure using telemonitoring systems in community care management. When comparing the mean, with the patient group under normal care as a reference, patients in the telehealth intervention group experienced a greater decrease in re-hospitalization and a greater increase in QoL (Pekmezaris *et al.*, 2019). Patients need to be identified for those who need telemonitoring and collaborative care. This is done to prevent re-hospitalization (Mizukawa *et al.*, 2019). Nurses need to assess patients to determine whether they can manage heart failure with self-management or need additional support from nurses using a monitoring system (Ding H et al., 2019). An appropriate alternative to telehealth services reduces the risk of re-admission to the hospital and eliminates unnecessary costs (Mizukawa et al., 2019).

In another study for patients with COPD, compared to the non-intervention group, TM to usual care over 6 months improved QoL, as assessed by the 15D questionnaire, in patients with severe COPD, whereas no difference between groups was observed in CAT scores (Ding H et al., 2019).

Additional results

In several studies reviewed, some have research results that not only assess the life's quality against the interventions that have been given, but report other results, namely on cost savings and satisfaction that focus on consumers (nurse, patient, caregiver, family (Mizukawa et al., 2019). Several studies suggest that telehealth is cost-effective. One study found that 91% of studies show tele homecare to be cost-effective, because it reduces the cost of using hospitals, transportation costs and other patient needs. Telehealth can also reduce travel time and waiting time for re-admission in the hospital (Mizukawa et al., 2019). Another study found telehealth for home care for patients with chronic conditions is very cost-effective (Giordano et al., 2016).

There are reports of increased self-efficacy in managing one's condition through telehealth, enjoyment of telehealth experiences, positive attitudes in receiving nursing care

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via telehealth and mutual agreement that patient care needs are met (Giordano et al., 2016). There is consistent evidence that telehealth has an overall positive impact on patient and nurse satisfaction (Oliver et al., 2018). Consumer-focused satisfaction includes adherence to patient-centered care, empathy for health care providers and patient relationships with quality of care, support for home care health service providers, emotional support, professionalism and cultural competence of health service providers (Grustam *et al.*, 2018).

CONCLUSION

Telehealth is effective to be used as a means of communication and administration in providing nursing care for home care patients. Telehealth provides many successes and conveniences, among others; improve quality of life, reduce costs incurred for the cost of going to the hospital, save time and be used whenever needed, and satisfaction for those who use it. In addition, nurses can easily provide education related to patient and family knowledge about post-hospitalization care efficiently. The success of the treatment will make the patient's quality of life better and be satisfaction for both patients and nurses. Telehealth is deemed necessary to be implemented and developed to provide effective professional nursing care services and technological developments. The recommendation for further research is to analyze the effectiveness of Telehealth in combination with outpatient services during the Covid-19 pandemic.

CONFLICT OF INTEREST

There are no conflicts of interest to declare.

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