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REVIEW

Mapping the Impact of Telenursing on Quality and Healthcare Savings: A Scoping Review

Mapeo del impacto de la teleenfermería en la calidad y el ahorro en atención médica: una revisión exploratoria

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ABSTRACT

Introduction: telenursing, a component of telehealth, combines information technology with nursing practice to provide care from a distance. Closing healthcare access disparities is becoming more urgent, particularly in rural and disadvantaged areas. The growing incidence of long-term health conditions and the ageing population have resulted in an increased requirement for healthcare systems to provide effective, patient-centred care. Ongoing patient care and empowerment are delivered through the remote services of telenursing, which include monitoring, educational support, and consultation
Method: this scoping review was conducted in full compliance with the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews) guidelines. The search strategy entailed using relevant keywords related to telenursing on major electronic databases including PubMed, ScienceDirect, Scopus, and ProQuest.
Results: in total, nine articles were included in this review. Research reveals that telenursing represents a highly effective technological strategy for assisting nurses in meeting patient requirements, especially during the COVID-19 pandemic, through the provision of remote healthcare services. Consistently reported research indicates that telenursing is a cost-reducing strategy which also contributes to better clinical outcomes.
Conclusions: telenursing in promoting both patient independence and healthcare saving

Keywords: Telenursing; E-Health; Healthcare Saving.

RESUMEN

Introducción: la teleenfermería, un componente de la telesalud, combina las tecnologías de la información con la práctica enfermera para brindar atención a distancia. Reducir las disparidades en el acceso a la atención médica es cada vez más urgente, especialmente en zonas rurales y desfavorecidas. La creciente incidencia de enfermedades crónicas y el envejecimiento de la población han incrementado la necesidad de que los sistemas de salud brinden una atención eficaz y centrada en el paciente. La atención continua y el empoderamiento del paciente se brindan a través de los servicios remotos de teleenfermería, que incluyen monitoreo, apoyo educativo y consulta.

Método: este estudio utilizó un enfoque de revisión exploratoria, basado en el marco PRISMA-ScR (Extensión de Elementos de Informe Preferidos para Revisiones Sistemáticas y Metaanálisis para Revisiones Exploratorias). La estrategia de búsqueda consistió en el uso de palabras clave relevantes relacionadas con la teleenfermería en las principales bases de datos electrónicas, como PubMed, ScienceDirect, Scopus y ProQuest.
Resultados: se incluyeron nueve artículos en esta revisión. Las investigaciones revelan que la teleenfermería representa una estrategia tecnológica altamente efectiva para ayudar al personal de enfermería a satisfacer las necesidades de los pacientes, especialmente durante la pandemia de COVID-19, mediante la prestación de servicios de atención médica a distancia. Diversas investigaciones indican que la teleenfermería es una estrategia de reducción de costos que también contribuye a mejores resultados clínicos.
Conclusiones: la teleenfermería promueve la independencia del paciente y el ahorro en la atención médica.

Palabras clave: Teleenfermería; Salud electrónica; Ahorro en la Atención Médica.

INTRODUCTION

Advances in healthcare are fueling ongoing developments in the field of nursing science, which is adapting to changing patient requirements and healthcare patterns. Progress in nursing capabilities, scientific understanding, and the adoption of evidence-based methods within healthcare environments are driving this transformation, Melnyk and O'verholt.[1,2,3] The adoption of healthcare technologies has become significantly more prevalent, allowing nurses to deliver care in a more streamlined and accurate way. Digital tools, such as telehealth platforms, electronic health records, and remote monitoring systems, not only make communication and data management more efficient, but also improve the quality and accessibility of nursing care in various care environments.[4,5,6] A rapidly developing advancement in nursing care is telenursing, an innovation that utilizes technology to facilitate nurses providing care from a distance via electronic communication. Telenursing enables the remote transmission of health information and offers assistance with non-face-to-face nursing care, especially in areas with limited access to healthcare or where populations are spread across a wide geographic region.[7,8,9] Nursing science is constantly evolving in response to shifting societal trends and advancements in healthcare infrastructure, requiring periodic updates to address the advancing requirements of patients and the increasing intricacy of patient care.[10]

This progress is characterized by ongoing enhancements in professional training, the expansion of nursing expertise and the incorporation of evidence-based practices in both hospital and community environments.[11,12] Integration of healthcare technology is now a key factor in expanding the responsibilities of nurses across various locations simultaneously. Technologically-enabled innovations, which combine mobile applications and telehealth platforms, are easily accessible, user-friendly, and have shown a positive impact on care quality, patient safety, and the efficiency of nursing staff.[13,14,15]

Telenursing, as an innovative, technology-driven care model, has emerged as a promising solution to improve healthcare delivery. It not only enhances patient autonomy by enabling remote self-management but also minimizes the need for hospital visits and long waiting times for treatment.[16,17]

Previous studies have extensively explored nurses' competencies and perceptions regarding the use of telenursing. However, there remains a critical gap in the international literature regarding patients' own perspectives on the perceived benefits and usability of telenursing interventions. Most existing research has prioritized provider or system-level outcomes, leaving the voice of patients underrepresented. This scoping review addresses this gap by specifically highlighting and mapping how patients perceive telenursing's impact on their care experiences, independence, and perceived healthcare value. By foregrounding the patient viewpoint, this review informs strategies to optimize the adoption and implementation of telenursing that are both effective and person-centered. The central review question guiding this work is: "What are the benefits of telenursing in ensuring effective and high-quality healthcare services while promoting healthcare cost savings from the patient's perspective. Aimed this study this scoping review is to identify and catalog the current research on the effect of telenursing in increasing to reducing healthcare expenses and efficient and quality health services, by highlighting the major themes, methods, and results presented in previously published studies.

METHOD

The method employed in this study follows a framework of five steps,[18] inclusion criteria in research is open access article, english and Indonesia languange, published in a peer-reviewed journal and publications between 2014 and 2024. Exclusion criteria including review article and abstract only article and There were no exclusion criteria based on geographical locations. further refined by Peters, Godfrey:[19]

Step 1: What are the benefits of telenursing in ensuring effective and high-quality healthcare services while promoting healthcare cost savings?

Step 2: Data was retrieved from databases such as PubMed, Scopus, ScienceDirect, and ProQuest. The search strategy employed specific keywords and Boolean operators to ensure comprehensive retrieval of relevant literature. The exact search terms included: ("telenursing" OR "tele-nursing") AND ("telehealth" OR "digital health") AND ("healthcare saving" OR "cost-effectiveness" OR "economic impact") AND ("quality of care" OR "service efficiency"). Research questions were developed using the Population, Concept, and Context (PCC) framework.[20] (Table 1). The reference sources were systematically organised within EndNote using imported data. The study adhered to the PRISMA Extension for Scoping Reviews reporting guidelines (PRISMA-ScR), incorporating a flow diagram to illustrate the selection process used in the study.[21]

Table 1. The population, Concept, and Context (PCC)

Population	Concept	Context
Advanced nursing professionals, including advanced practice nurses and nursing practitioners, possess exceptional skills with use telehealth include telenursing	E-Health, Digital Technology, Telenursing, electronic health records, machine learning.	Language: English, Indonesia Time: 2014-2024 Open acces article
*PCC: Population, Concept, and Context		

Although this review focuses on international literature, studies published in the Indonesian language were included to ensure representation of regional evidence, particularly from Southeast Asia where telenursing is emerging but remains underreported in global databases. Including Indonesian-language articles broadens the contextual relevance of the review and captures valuable data that may otherwise be overlooked due to language barriers.

Step 3: Study Selection

Authors individually examined the titles and abstracts of the chosen studies and transferred them into the EndNote software. When there were disputes, a third author served as a mediator to settle the disagreements.

Step 4: Data Mapping

This step entailed generating charts that encompassed both broad and detailed information about the evaluated literature and supplementary recommended references.[18] Data were mapped based on the authors' names, year publication, country, objectives, methods, sample size, and a summary of the main findings.

Step 5: Organizing, Summarizing, and Reporting Data

Data were organized, interpreted, and reported in alignment with the framework.[22] The results are presented in Table 2, providing a structured overview of the findings.

RESULTS AND DISCUSSION

General Characteristics of the Included Articles

We identified articles from four databases: PubMed, Science Direct, Scopus, and ProQuest, spanning the years 2014–2024. The articles originated from several countries, including the Thailand (n = 1), the UK (n = 2), Denmark (n = 1), Australia (n = 2), Brazil (n = 2), and Spain (n = 1). These are presented in the PRISMA Chart below (figure 1).

Healthcare Quality

Quality and healthcare savings are indicators of good and high-quality service.[7,32] Telenursing is a part of telehealth that can efficiently provide long-distance services without reducing quality and saving time and care costs. This technology was actually widely used during COVID-19.[33,34] Telenursing after COVID-19 is not much different in its implementation, but it is more focused on controlling patients remotely by providing education and care consultations.[35] Santana, Pereira[28] For example, it was found that telenursing improves patient health and post-operative recovery more effectively than face-to-face. This research is also supported by Lashkari, Borhani[36] on the application of telenursing to control glycemic body mass index (BMI) in diabetes patients, proved that the patient's metabolic index increased with telenursing.

da Silva Schulz, Santana[29] Confirms the effectiveness of telenursing in identifying factors that can increase post-operative risk and assisting nurses in providing appropriate interventions to prevent delayed recovery. The findings of this systematic review study support this research Raphael, Waterworth and Gott[37] explicitly mentioned that telephone-based telenursing can improve patient health indicators. Navarro-Martínez, Martinez-Millana and Traver[30] Revealed that telenursing requires digital literacy and training to maximize service and quality.

Table 2. Summary table

Author	Methods	Country	Title of Paper	Aim	Sample	Result
Ling, Searles[23]	Costing analysis	Australia	Cost analysis of an integrated aged care program for residential aged care facilities	To compare annual costs of an intervention for acutely unwell older residents in residential age care facilities (RACFs) with usual care.	N/A	Our analysis found that approximately 981 individuals annually avoided emergency department presentations due to ACE. The ACE treatment resulted in savings of approximately A$921 214 compared to standard care.
Voraraksa, Ongiem[24]	N/A	Thailand	Telemedicine and telenursing: Revolutionizing remote healthcare delivery	Examines the various telecommunication technologies essential to telemedicine, encompassing video conferencing, remote monitoring equipment, and mobile health software.	N/A	This approach has a positive effect on accessibility, convenience for patients, lowering costs, reaching out to those who are not well served, and better monitoring and managing long-term health issues.
Dixon, Hollinghurst[25]	RCT	UK	Cost-effectiveness of telehealth for patients with raised cardiovascular disease risk: evidence from the Healthline randomized controlled trial	To investigate the cost-effectiveness of telehealth interventions for primary care patients at increased risk of cardiovascular disease (CVD).	641 participants	Evidence suggests telehealth interventions via Healthline are likely cost-effective if the cost threshold is £20,000 per QALY.
Dixon, Hollinghurst[26]	RCT	UK	Cost-effectiveness of telehealth for patients with depression: evidence from the Healthlines randomised controlled trial	To evaluate the cost-effectiveness of Healthlines telehealth interventions for patients with depression.	609 participants	The intervention is unlikely to be cost-effective under current circumstances.
Witt Udsen, Lilholt[27]	RCT	Denmark	Cost-effectiveness of telehealthcare to patients with chronic obstructive pulmonary disease: results from the Danish 'TeleCare North' cluster-randomised trial	The objective is to examine whether a telehealthcare solution, when combined with standard treatment, is more cost-effective than standard treatment alone.	578 patients were randomised to telehealthcare and 647 to usual care.	Does the incremental cost-effectiveness ratio fall below the UK's threshold values of €21,068 per quality-adjusted life-year?
Santana, Pereira[28]	Quasy-Eksperimen	Brazil	Effectiveness of a telephone follow-up nursing intervention in postsurgical patients	compare the effectiveness of telephone versus conventional follow-up in postsurgical older adult patients.	43 patients with two group	In this study, telemonitoring was utilized to offer postoperative guidance for elderly individuals following discharge, ultimately leading to enhanced health outcomes and more effective postsurgical recovery compared to conventional in-person follow-up care.
da Silva Schulz, Santana[29]	RCT	Brazil	Telephonic nursing intervention for laparoscopic cholecystectomy and hernia repair: A randomized controlled study	To assess the feasibility of implementing a lifestyle-integrated functional exercise program and delivering interventions using digital technology (eLiFE).	22 participants	The experimental group showed significant outcomes, demonstrating the effectiveness of telephonic nursing interventions for these surgical patients.

Navarro-Martínez, Martinez-Millana and Traver[30]	Qualitative	Spain	Use of tele-nursing in primary care: A qualitative study on its negative and positive aspects	analyze the opinions of nursing professionals on the current limitations and future potential of digital tools in healthcare.	68 nurses	28 descriptive codes were obtained and subsequently categorized into positive and negative aspects include Benefits for the health system
Green, Newton[31]	RCT	AUS	Prostate Cancer Survivorship Essentials for men with prostate cancer on androgen deprivation therapy: protocol for a randomised controlled trial of a tele-based nurse-led survivorship care intervention (PCEssentials Hormone Therapy Study)	To evaluate the implementation of PC Essentials and its outcomes, including cost-effectiveness compared to standard care, acceptability, adoption, and sustainability.	236 orang	Cost-utility analysis provided critical economic evaluation data. Remote interventions were highly acceptable for geographically dispersed and vulnerable populations.

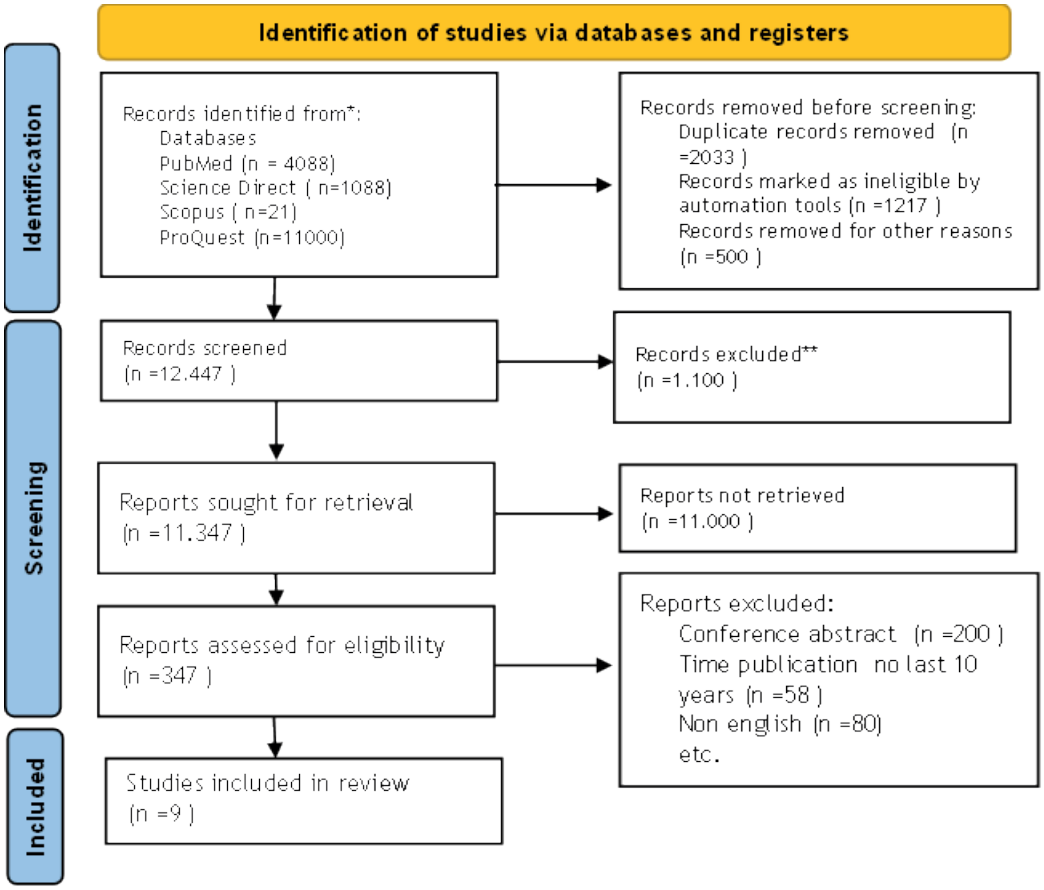

Figure 1. PRISMA Flow Chart

Healthcare saving

Ling, Searles[23] Considered that telephone-based telenursing compared with usual care could reduce the annual costs of elderly patients visiting the emergency department. This research is also supported by Sunner, Giles[38] who conducted a study in emergency rooms and found that telephone-based Partnerships in Aged-Care Emergency services using Interactive Telehealth (PACE-IT) conducted by nurses was proven to reduce financing costs. Vorараksa, Ongiem[24] his research also mentioned that changes in care technology, such as telenursing, have had an impact on patient comfort and reduced care costs. This situation is undoubtedly a form of transformation of nursing services in responding to rapid global developments.. Dixon, Hollinghurst[26] Explaining the effectiveness of health line-based telenursing in reducing costs and expenses, this study was also clarified by Witt Udsen, Lilholt[27] which applied telenursing to patients with chronic obstructive pulmonary disease and after 12 months was controlled through RCT design. This study found that telenursing was very effective in reducing the cost of care. RCT studies were also conducted by Green, Newton[31] In patients with prostate cancer, in terms of effectiveness and costs explicitly incurred for PCEssentials hormone therapy, telenursing proved to be the most effective.

Telenursing services are expected to act as a solution for lowering healthcare expenses while enhancing patient clinical results.[39] Telenursing typically involves setting up healthcare equipment or medical devices in patients' homes to track physiological readings, with doctors and nurses able to carry out this task. Furthermore, technologies like telephones and video conferencing can be leveraged.[40,41]

CONCLUSIONS

This scoping review investigated telenursing as a connection between nurses and patients, providing improved accessibility, greater time efficiency, and lower costs without sacrificing care quality. The generalizability of the findings should be viewed with caution because they are based on only nine studies, which may not provide a comprehensive representation of telenursing's global application. Publication bias and language restrictions may have also impacted the thoroughness of the evidence included. Significantly, existing research is characterised by a scarcity of robust data regarding the long-term cost-effectiveness of telenursing across a variety of populations, especially in low- and middle-income countries. Despite patients being the key to the success of remote healthcare, patient-reported outcomes and satisfaction metrics have yet to be thoroughly examined.Research going forward should focus on comprehensive, long-term studies that assess the long-term viability and cost-effectiveness of telenursing in various healthcare systems and among diverse demographic

populations. Greater emphasis should be placed on investigating patient-centered outcomes, including perceived benefit, ease of use, and quality of interaction, to provide more informed policy and practice decisions.

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CONFLICT OF INTEREST

None.

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