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RESEARCH ARTICLE (ORIGINAL)

Telenursing as a Follow-Up Strategy for Patients with Traumatic Wounds: A Comparative Study

Teleconsulta de Enfermagem como Estratégia de Follow-up em Utentes com Ferida Traumática: Estudo Comparativo

La Teleconsulta de Enfermería como Estrategia de Seguimiento en Usuarios con Heridas Traumáticas: Estudio Comparativo

Cátia de Sousa Rosa [1, 2]
https://orcid.org/0009-0002-9006-9150

Luís Filipe Pereira Todo Bom [1, 2, 3, 4]
https://orcid.org/0000-0001-6739-8648

Cristina Raquel Batista Costeira [1, 3, 5]
https://orcid.org/0000-0002-4648-355X

[1] Polytechnic Institute of Leiria, Health School of Leiria, Leiria, Portugal

[2] São Francisco Hospital, Sanfil Medicina, Leiria, Portugal

[3] Polytechnic Institute of Leiria, Health School of Leiria, Center for Innovative Care and Health Technology (CiTechCare), Leiria, Portugal

[4] University of Évora, Comprehensive Health Research Centre (CHRC), Évora, Portugal

[5] Nursing School of the University of Coimbra, Health Sciences Research Unit: Nursing (UICISA: E), Coimbra, Portugal

Corresponding author
Cátia Sousa Rosa
E-mail: catiasousarosa@gmail.com

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Abstract

Background: Follow-up telenursing is recommended as an effective strategy for reducing hospital admissions and associated costs. A telenursing service was implemented in an outpatient clinic to monitor patients with traumatic wounds.

Objective: To compare satisfaction and healthcare utilization among patients with traumatic wounds who received follow-up telenursing and those who did not.

Methodology: A descriptive-comparative study was conducted. The experimental group (n = 33) received follow-up telenursing in addition to conventional care, while the control group (n = 35) received conventional care only. The study was conducted between May and July 2022, with data collected via questionnaire and analyzed using SPSS® software. Ethical standards were observed.

Results: Males predominated in both groups, with a mean age of 40 years. The experimental group reported higher satisfaction with nursing care and lower use of in-person services ($p \leq 0.05$).

Conclusion: Telenursing contributed to health improvements, supporting its potential as an effective tool for monitoring patients with traumatic wounds.

Keywords: telenursing; wounds and injuries; patient satisfaction; nursing care

Resumo

Enquadramento: A teleconsulta de follow-up é recomendada como estratégia eficaz para reduzir episódios hospitalares e custos associados. Num serviço de ambulatório foi implementada uma teleconsulta de enfermagem destinada ao acompanhamento de utentes com ferida traumática.

Objetivo: Comparar a satisfação e o consumo de cuidados de saúde entre utentes com ferida traumática, com e sem teleconsulta.

Metodologia: Realizou-se um estudo descritivo-comparativo, no qual o grupo experimental (n = 33) recebeu teleconsulta de follow-up para além dos cuidados convencionais, enquanto o grupo controlo (n = 35) recebeu apenas cuidados convencionais. O estudo decorreu entre maio e julho de 2022, com recolha de dados através de questionário e análise efetuada no software SPSS®. Cumpridos pressupostos éticos.

Resultados: Em ambos os grupos, o sexo masculino foi predominante e as médias de idade situaram-se nos 40 anos. O grupo experimental evidenciou maior satisfação com os cuidados de enfermagem e menor recurso a atendimentos presenciais ($p \leq 0,05$).

Conclusão: A teleconsulta promoveu ganhos em saúde, reforçando o seu potencial como ferramenta útil no acompanhamento destes utentes.

Palavras-chave: telenfermagem; feridas e lesões; satisfação do paciente; cuidados de enfermagem

Resumen

Marco contextual: La teleconsulta de seguimiento se recomienda como estrategia eficaz para reducir los episodios hospitalarios y los costes asociados. En un servicio ambulatorio se implementó una teleconsulta de enfermería destinada al seguimiento de usuarios con heridas traumáticas.

Objetivo: Comparar la satisfacción y el consumo de cuidados sanitarios entre usuarios con heridas traumáticas, con y sin teleconsulta.

Metodología: Se realizó un estudio descriptivo-comparativo, en el que el grupo experimental (n = 33) recibió una teleconsulta de seguimiento, además de la atención convencional, mientras que el grupo de control (n = 35) recibió solo cuidados convencionales. El estudio se llevó a cabo entre mayo y julio de 2022, con la recopilación de datos mediante un cuestionario y el análisis realizado con el software SPSS®. Se cumplieron los requisitos éticos.

Resultados: En ambos grupos, predominó el sexo masculino y la media de edad se situó en los 40 años. El grupo experimental mostró una mayor satisfacción con los cuidados de enfermería y un menor recurso a las consultas presenciales ($p \leq 0,05$).

Conclusión: La teleconsulta ha promovido mejoras en la salud, lo que refuerza su potencial como herramienta útil para el seguimiento de estos pacientes.

Palabras clave: teleenfermería; heridas y lesiones; satisfacción del paciente; cuidados de enfermería

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Introduction

Telenursing has become an increasingly popular strategy for ensuring continuity of healthcare, particularly for follow-up care after hospital discharge. According to the Portuguese Nursing Profession Regulatory Body's Nursing Council, telenursing is an essential resource for maintaining continuity of care and proximity to citizens (Ordem dos Enfermeiros, 2021). However, its implementation requires careful consideration of the limitations inherent to digital interactions, while upholding key principles such as the professional–patient relationship, trust, patient autonomy, and confidentiality of information (Ordem dos Enfermeiros, 2020).

The primary objectives of follow-up telenursing are to reduce the need for in-person visits to healthcare services, clarify doubts, and minimize postoperative complications (Direção-Geral da Saúde, 2022). Despite its recognized benefits for clinical safety, challenges remain in professional training and technological infrastructure (Sebastià & Martínez, 2024).

However, the literature is not entirely unanimous. Some studies suggest that conventional education and face-to-face follow-up programs may be sufficient in certain clinical contexts, with teleconsultation serving as a complementary rather than essential intervention for improving health outcomes (Jensen et al., 2011). For example, in post-radical prostatectomy rehabilitation, conventional home self-care education adequately supported patient recovery, while telenursing was perceived as a functional adjunct to conventional treatment without a significant impact on recovery.

Nevertheless, a recent scoping review by Giménez et al. (2024) highlighted that telenursing is increasingly regarded as an important tool in the postoperative period. In light of these findings, and with the aim of enhancing patient care, particularly with regard to satisfaction and demand for in-person care, this study sought to compare satisfaction and healthcare utilization among patients with traumatic wounds who received follow-up telenursing versus those who did not.

Background

In the context of monitoring patients with traumatic wounds, telenursing has proven to be an effective means of monitoring and providing support. It allows nurses to address concerns, prevent complications, and reinforce essential self-care guidelines (Fagan, 2021; Ordem dos Enfermeiros, 2021).

Recent studies also highlight telenursing as a strategy that improves treatment adherence, reduces neglect of personal care, and decreases avoidable hospital visits (Carvalho, 2021; Shuen et al., 2018). It positively impacts patient satisfaction with health services (Blanco et al., 2020; Direção-Geral da Saúde, 2022; McVey, 2023; Tan & Lang, 2014; Woods et al., 2019). Telenursing provides a comfortable environment for patients and allows for personalized follow-up (Fagan, 2021), significantly reducing emergency department visits within 30 days of discharge (Record et al., 2015).

This study was developed as part of a continuous quality improvement project at an outpatient service in a private hospital in central Portugal. The project involved designing and implementing a follow-up telenursing service for adult patients with traumatic wounds. This intervention was motivated by an analysis of anonymized data provided by the institution's Management Control Department. Between June 1, 2020, and May 31, 2021, 431 patients were admitted to the outpatient service with traumatic wounds requiring surgical treatment. Most injuries resulted from workplace accidents and predominantly affected the upper limbs, specifically the hands. The data revealed that the primary cause of urgent visits prior to the normally scheduled follow-up between the 8th and 15th day was doubts arising at home that resulted in complications in wound healing management. In some cases, wound sites were in poor condition for effective healing due to factors such Strike-through present, external contamination, macerated edges, and/or edema. In response to these findings, the team developed a telenursing service tailored to meet these needs. The Portuguese Operating Room Nurses Association (Associação dos Enfermeiros de Sala de Operações Portugueses, 2012) emphasizes the importance of structured follow-up, recommending post-surgical assessments within 24 hours after discharge, which can be conducted via telenursing. Conversely, the Portuguese Association of Outpatient Surgery (Associação Portuguesa de Cirurgia de Ambulatório, 2014) extends the follow-up period to 48 hours after the procedure.

Research question

What is the impact of follow-up telenursing on patient satisfaction and healthcare utilization among patients with traumatic wounds, compared to conventional care?

Methodology

This is a descriptive, comparative study with a quantitative approach, using non-probability convenience sampling. Two groups were formed. The control group consisted of 35 patients with injuries who received conventional nursing care until discharge. The experimental group consisted of 33 patients with injuries who received conventional care and follow-up telenursing provided by the service's nurses. Conventional nursing care included planned surgical wound treatments with the patient or, when necessary, with a family member responsible for transportation. Care continued from the day of the accident until suture removal, which was scheduled based on healing progress, typically between the 8th and 15th day post-injury. Inclusion criteria were: patients over 18 years of age; victims of accidents (work-related, road-related, sports-related, home-related, or other) resulting in traumatic injuries requiring surgical treatment between May 19, 2022, and July 19, 2022; ability to communi-

cate verbally; ability to use a cell phone or landline; and consent to participate. The experimental group consisted of all patients with traumatic wounds requiring surgical treatment who were admitted to the institution on odd-numbered days from May to July. The control group included patients admitted on even-numbered days until a minimum of 30 individuals per group was reached. Exclusion criteria were hearing or verbal impairments that compromised telephone communication and cognitive changes preventing patients from answering nurses' questions via phone. Cognitive status was assessed using the Mini-Mental State Examination.

Data were collected using a self-administered questionnaire developed by the researchers and validated by five medical-surgical nurses with over 10 years of experience and five non-health professional patients who evaluated the instrument for relevance and clarity. Content validity was calculated using Cohen's Kappa ($\kappa = 0.92$), indicating almost perfect agreement. Internal consistency was analyzed using Cronbach's alpha ($\alpha = 0.84$), interpreted cautiously due to the small sample size. The questionnaire was informed by literature and institutional satisfaction assessment protocols and comprised two sections. The first section consisted of 11 sociodemographic questions (e.g., age [years]; sex [female, male]) and clinical questions (e.g., date and type of accident [personal, work-related, school-related, sports-related, road-related, or other]; anatomical wound location [head/face/neck, arm/forearm, hand, thoracic region, abdominal region, lumbar region, thigh/leg, foot, or other]; whether the patient received a follow-up phone call from the nurse [yes, no], whether the patient considers it important to receive a follow-up phone call from the nurse [yes, no]; number of in-person consultations scheduled since the day of the accident [number]; whether the service was used on days not scheduled for treatment [yes, no] and why [increased pain, old dressing, convenience, or other]; date of suture removal and whether further treatment will be required after suture removal [yes, no]. The second section included eight questions relating to satisfaction with nursing care provided [e.g., availability of the nursing team; nurse's responsiveness to the patient's needs; explanation of procedures; number of visits made to the nursing team; patient reception; knowledge about necessary care demonstrated by the nurse; nurse-patient relationship; and overall satisfaction], with responses scored on a1−5 Likert scale: 1 − not applicable/no opinion, 2 − dissatisfied, 3 − neither satisfied nor dissatisfied, 4 − satisfied, 5 − very satisfied. Informed consent was obtained on the day of the accident. Participants were provided with an alphanumeric code in a sealed envelope and requested to fill it in to code the questionnaire to ensure patient anonymity. This ensured that participants could withdraw from the study at any time, thus guaranteeing their right to self-determination. The questionnaire was administered at a single point in time: the day of suture removal. Data were analyzed using the IBM SPSS® Statistics version 28.0. Descriptive statistics included means, medians, absolute and relative frequencies, and standard deviations. Inferential statistics were also applied: normality was assumed for samples larger than 30 based on the Central Limit Theorem; homogeneity of variances was verified using Levene's test; Student's *t*-test was used for comparisons between two independent groups; Fisher's exact test and chi-square test were applied to assess group equivalence and compare distributions of categorical variables. A significance level of 5% ($p < .05$) was adopted. The study was approved by the Ethics Committee (Opinion No. CE/.../26/2022) and was conducted in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines (Elm et al., 2008).

Results

Table 1 presents the characteristics of the two study groups. In the experimental group ($n = 33$), 84.8% of participants were male, with a mean age of 41.21 (±10.02) years (range: 23–62 years). In the control group ($n = 35$), 85.7% were male, with a mean age of 40.69 (±13.65) years (range: 22–64 years). The groups were equivalent in terms of sex ($\chi^2 = 0.010$; $p = .920$) and age ($t = 0.180$; $p = .857$).

Regarding perceptions of telenursing, 90.9% of participants in the experimental group considered nursing follow-up via telephone important. In contrast, only 54.3% of the control group acknowledged its relevance, while 45.7% did not perceive its usefulness. This difference between groups was statistically significant (Fisher's exact test, $p = .001$), indicating that participants who did not receive telenursing tended to consider it less important. In both groups, accidents predominantly occurred in the workplace, and traumatic wounds most frequently affected the hand.

Reasons for seeking care included increased pain, old dressing, personal convenience (e.g., clarification of doubts or proximity to the institution), and other factors.

Table 1

Sociodemographic Characteristics of the Sample and Perceptions of Teleconsultation

Variable		Experimental Group (*n* = 33)					Control Group (*n* = 35)					Test
		M	*Md*	*SD*	*Min*	*Max*	*M*	*Md*	*SD*	*Min*	*Max*	
Age		41.21	41.00	10.0	23.00	62.00	40.69	39.00	13.65	22.00	64.00	*t = 0.180* *p* = 0.857
			n		**%**			***n***		**%**		
Sex	Female		5		15.2			5		14.3		χ^2 = 0.010 *p* = 0.920
	Male		28		84.8			30		85.7		
Site	Head/face/neck		4		12.1			5		14.3		---
	Arm/forearm		5		15.2			4		11.4		
	Hand		16		48.5			22		62.9		
	Thigh/leg		7		21.2			4		11.4		
	Foot		1		3			-		-		
Reasons for seeking urgent care	Increased pain		-		-			1		25		---
	Personal convenience		1		50			1		25		
	Old dressing		1		50			-		-		
	Another reason		-		-			2		50		
Location of the accident	Home		1		3			2		5.7		---
	Workplace		32		97			33		94.3		
Do you consider telephone follow-up important?	Yes		30		90.9			19		54.3		Fisher's Exact Test *p* = 0.001
	No		3		9.1			16		45.7		

Note. n = Sample size; % = Percentage, *M* = Mean; *Md* = Median; *SD* = Standard deviation; *Min* = Minimum value; *Max* = Maximum value; *t* = Statistical test; *p* = Significance level.

To assess statistically significant differences between the control group and the experimental group regarding satisfaction with nursing care (Table 2), Student's *t*-test was applied, which revealed a statistically significant difference between the two groups ($t = 2.71$; $p = .009$). Participants in the experimental group reported higher satisfaction levels (M = 39.09; SD = 2.27; 95% CI [38.23–39.95]) compared to those in the control group (M = 37.20; SD = 3.58; 95% CI [35.98–38.42]). Regarding healthcare utilization, the control group made more frequent use of in-person nursing services at the institution where the study was conducted (M = 2.26; SD = 0.98; 95% CI [1.92–2.60]) than the experimental group (M = 1.79; SD = 0.78; 95% CI [1.52–2.06]).

Table 2

Comparison of Differences Between Study Groups

	Experimental Group		Control Group	
	M	***SD***	***M***	***SD***
Satisfaction with nursing care (8-40)	39.09	2.27	37.20	3.58
Tests		Levene's test	Z = 12.41; *p* = .001	
		Student's *t*-test	*t* = 2.71; *p* = .009	
	M	***SD***	***M***	***SD***
No. of treatments	1.79	0.78	2.26	0.98
Tests		Levene's test	**Z** = 0.19; *p* = .66	
		Student's *t*-test	*t* = -2.18; *p* = .03	

Note. M = Mean; *SD* = Standard deviation; *t* = Test value; *Z* = Test value; *p* = Significance value.

Discussion

This study aimed to compare satisfaction and healthcare utilization among surgical patients with traumatic wounds, divided into two groups: those who received follow-up telenursing and those who did not. Most participants in both groups were victims of workplace accidents and were predominantly male. These findings are consistent with data from the Portuguese Authority for Working Conditions (Autoridade para as Condições do Trabalho, 2023), which reported that 84.6% of workplace accidents in Portugal involved male workers.

With regard to age, participants in both groups presented similar characteristics, with a mean age of approximately 40 years. These findings are comparable to those reported by Watanabe et al. (2015), who identified a predominance of young adults aged 18–40 (47.5%) with a mean age of 47 years. This profile may be related to the fact that men in this age group are more frequently employed in occupations associated with higher exposure to external risk factors (Watanabe et al., 2015).

A higher proportion of participants in the experimental group (90.9%) highlighted the importance of telephone follow-up compared to those in the control group (54.3%). This difference may be explained by the lack of access to follow-up telenursing in the control group, which may have limited their awareness of its benefits and importance. These results are in line with those of Hodgins et al. (2008), in which more than 80% of participants in the intervention group considered follow-up telenursing useful or extremely useful. Additionally, Miller et al. (2012) found that 71.5% of participants (n = 97) preferred telephone follow-up over face-to-face consultations. Telephone-based support from healthcare professionals may enhance patients' sense of support and security while avoiding the costs of unnecessary face-to-face visits.

The results showed that, from the day of the accident to suture removal, participants in the experimental group had fewer in-person treatment visits (1.79 ± 0.78) than those in the control group (2.26 ± 0.98). These findings suggest that individuals in the control group sought healthcare services more frequently at unscheduled times and required additional interventions until suture removal. Characteristics common to modern healthcare users, such as convenience, proximity, trust, and transparency of health services (Keckley & Coughlin, 2012), may be effectively addressed through teleconsultation.

Participants in the experimental group demonstrated higher satisfaction scores with nursing care (39.09 ± 2.27) than the control group (37.20 ± 3.58).

These findings are consistent with previous studies reporting several patient benefits in implementing telenursing after discharge, including increased satisfaction with healthcare (Blanco et al., 2020; Shuen et al., 2018; Tan and Lang, 2014; and Woods et al., 2019). In contrast, Fagan (2021) did not observe statistically significant results regarding satisfaction with the implementation of telenursing after emergency department discharge. Nevertheless, the author emphasized the clinical relevance of the findings, noting increased satisfaction levels after the introduction of follow-up telenursing.

It is important to note that, although 47.5% of participants in the control group did not consider follow-up telenursing to be important, satisfaction scores in both groups were close to the maximum score on all items of the satisfaction scale (total score = 40). This finding indicates that participants were satisfied with the nursing care provided by the institution.

When comparing unplanned urgent healthcare utilization, the control group demonstrated greater use of in-person healthcare services (n = 4). These results are aligned with those reported by Record et al. (2015), who found that follow-up telenursing reduced healthcare service use within the month following discharge. Similarly, Shuen et al. (2018) observed that patients who received telenursing after discharge were less likely to use emergency services or contact their attending physician compared with those who received conventional discharge instructions.

One limitation of this study is the use of convenience sampling, which may have introduced selection bias because the participants included may not adequately represent the target population. This sampling method may have resulted in the overrepresentation of specific participant profiles, thereby limiting the generalizability of the findings. Additionally, using self-report instruments may have introduced measurement bias due to response subjectivity or social desirability. The small sample size and the absence of a formal sample size calculation further restrict the extrapolation of results and constitute additional methodological limitations. For follow-up telenursing to be implemented sustainably in other healthcare settings, investment in technological infrastructure is essential to adequately support healthcare professionals and establish clear clinical protocols. These measures will ensure data confidentiality and allow for the monitoring of indicators such as care quality, patient satisfaction, and cost-effectiveness over time.

Future research should include a detailed analysis of the reasons for the recurrence of unplanned visits to healthcare services to better tailor care to patients' needs. Future studies should be conducted using interviews with injured patients and their families. Larger samples from both private and public Portuguese healthcare institutions using randomized designs and incorporating cost-effectiveness analyses are recommended to enhance the generalizability of the results. It is also important to explore healthcare professionals' experiences with telenursing and perceptions of its impact on care quality.

Conclusion

The implementation of telenursing for monitoring patients with traumatic wounds demonstrated positive effects on patients, including increased satisfaction with nursing care and a reduced need for in-person healthcare services. These outcomes translated into both personal and economic benefits for patients and the healthcare institution. Telenursing has proven to be an effective strategy for improving care quality and should be con-

sidered a practice worthy of sustained implementation and further investment.

Thesis/Dissertation

This article is derived from the dissertation entitled "*Implementação de teleconsulta de enfermagem em sinistrados com ferida traumática: estudo comparativo", submitted to the Health School from* Polytechnic University of *Leiria in 2022.*

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