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RESEARCH ARTICLE (ORIGINAL)

Nurses' Attitudes and Behaviors Toward Informal Caregiver Training Scale: A Psychometric Study

Escala de Atitudes e Comportamentos dos Enfermeiros na Capacitação do Cuidador Informal: Estudo das Propriedades Psicométricas

Escala de Actitudes y Comportamientos de los Enfermeros en la Capacitación del Cuidador Informal: Estudio de las Propiedades Psicométricas

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Abstract
Background: As key agents in promoting safe care transitions, nurses occupy a central role in the training of informal caregivers.
Objective: To evaluate the psychometric properties of the "Nurses' Attitudes and Behaviors Toward Informal Caregiver Training" scale.
Methodology: A psychometric study was conducted using exploratory factor analysis of the "Nurses' Attitudes and Behaviors Toward Informal Caregiver Training" scale, applied to a non-probability sample of 117 nurses from a local health unit in central Portugal.
Results: Factor analysis identified three factors within each subscale "Attitudes" and "Behaviors". The overall Cronbach's alpha for the "Attitudes" subscale indicated good internal consistency (0.828), although the second and third factors presented lower values (0.686 and 0.542, respectively). The "Behaviors" subscale demonstrated good reliability overall.
Conclusion: Despite satisfactory overall reliability, these results should be interpreted within the context of an instrument under development and in its initial application. Further research with larger and more diverse samples is recommended to strengthen the psychometric robustness of the scale.

Keywords: caregivers; nurses; behavior rating scale; psychometrics

Resumo
Enquadramento: Os enfermeiros, como agentes promotores de transições seguras, ocupam um lugar privilegiado na capacitação do cuidador informal.
Objetivo: Avaliar as propriedades psicométricas da escala de "Atitudes e Comportamentos dos Enfermeiros Face à Capacitação do Cuidador Informal".
Metodologia: Estudo psicométrico, análise fatorial exploratória da escala de atitudes e comportamentos dos enfermeiros face à capacitação do cuidador informal, aplicada a uma amostra não probabilística de 117 enfermeiros de uma unidade local de saúde da região centro de Portugal.
Resultados: A análise fatorial permitiu extrair três fatores de cada uma das subescalas - subescala "Atitudes" e subescala "Comportamentos". Embora o Alfa de Cronbach global da subescala "Atitudes" tenha sido bom (0,828), os fatores dois e três desta subescala apresentaram valores inferiores (0,686 e 0,542, respetivamente). A subescala "Comportamentos" revela uma boa confiabilidade.
Conclusão: Apesar da confiabilidade global satisfatória das subescalas, estes resultados devem ser interpretados no contexto de um instrumento em desenvolvimento e na sua primeira utilização. São necessários estudos adicionais, com diferentes amostras, para consolidar a robustez psicométrica da escala.

Palavras-chave: cuidadores informais; enfermeiros; psicometria; escala de avaliação comportamental

Resumen
Marco contextual: Los enfermeros, como agentes promotores de transiciones seguras, ocupan un lugar privilegiado en la capacitación del cuidador informal.
Objetivo: Evaluar las propiedades psicométricas de la escala de "Actitudes y Comportamientos de los Enfermeros Frente a la Capacitación del Cuidador Informal".
Metodología: Estudio psicométrico con análisis factorial exploratorio de la escala de actitudes y comportamientos de los enfermeros frente a la capacitación del cuidador informal, aplicado a una muestra no probabilística de 117 enfermeros de una unidad local de salud de la región centro de Portugal.
Resultados: El análisis factorial permitió extraer tres factores de cada una de las subescalas - la subescala "Actitudes" y la subescala "Comportamientos". Aunque el alfa de Cronbach global de la subescala "Actitudes" fue bueno (0,828), los factores dos y tres de esta subescala presentaron valores inferiores (0,686 y 0,542, respectivamente). La subescala "Comportamientos" revela una buena fiabilidad.
Conclusión: A pesar de la fiabilidad global satisfactoria de las subescalas, estos resultados deben interpretarse en el contexto de un instrumento en desarrollo y en su primera utilización. Se necesitan estudios adicionales, con diferentes muestras, para consolidar la solidez psicométrica de la escala.

Palabras clave: cuidadores informales; enfermeros; psicometría; escala de evaluación conductual

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Introduction

One of the strategic objectives of the World Health Organization's Patient Safety Action Plan is to "engage and empower patients and families to support the journey to safer health care," which involves "information and education for patients and families" (World Health Organization, 2021, p. 13).

Family members and informal caregivers play a key role in providing care to individuals with chronic illnesses or other health needs outside of formal institutional healthcare settings. This importance has grown and become increasingly visible in recent decades due to the growing complexity of chronic conditions and the increasing number of people living with them for longer periods of time.

According to Statistics Portugal data from 2022, Portugal had the third highest proportion of individuals with chronic diseases or long-term health problems among the 27 countries of the European Union, behind only Finland and Estonia. Additionally, more than a third of the population aged 16 or older (33.4%) reported being limited in their ability to perform normal activities due to health problems. Of these individuals, 7.6% reported severe limitations in performing at least one of these activities (Lima, 2024).

Eurocarers, a European network of informal caregiver associations from various countries, estimates that there were around 58 million informal caregivers in Europe in 2022. Due to the increase in average life expectancy and the anticipated rise in chronic diseases, this number is expected to grow (Eurocarers, 2023).

Considerable progress has been made in recent years with the creation and promotion of policies that highlight the role of informal caregivers. However, most health policies still focus too much on illness and patients, relegating informal caregivers and their needs to a secondary position. Consequently, much remains to be done in the area of healthcare provision.

In this sense, the objective of this study is to evaluate the psychometric properties of "Nurses' Attitudes and Behaviors Toward Informal Caregiver Training" scale.

Background

As promoters of safe transitions and members of multidisciplinary teams, nurses play a key role in supporting and training informal caregivers.

However, nurses' perceptions of what constitutes effective training do not always align with the perspectives expressed by caregivers themselves (Marques, 2015).

In their study, Ferraz et al. (2025) emphasize the need to develop and implement structured training programs for informal caregivers that can be integrated into daily clinical nursing practice (p. 10). However, designing an effective training program that promotes continuous improvement in clinical practice and ensures a successful return home will be difficult without in-depth knowledge of the factors that compromise training.

The complexity of the training process and the relevance of the nursing care provided to informal caregivers often go overlooked, yet these factors make the role of nurses extremely challenging. This becomes even more evident when there are changes in family dynamics, which are often underestimated by nurses but can have harmful consequences for everyone involved (Nunes et al., 2022).

In their study, Nunes et al. (2022) highlight that avoidance occurs not only on the part of the caregiver-to-be but also on the part of the nurse responsible for their training. It is essential to further explore the factors underlying nurses' avoidance, as discussed by the cited authors. For example, Shibily et al. (2021) examined the perceptions of nurses and nursing students regarding family involvement in care and found that 61.1% viewed the presence of family members as a source of stress, while simultaneously 66,6% of participants recognizing it as a motivating factor to provide higher-quality care.

Recognizing this complexity, research has been conducted in this area, identifying intrinsic and extrinsic factors that influence the process.

Vidinha et al. (2024), for example, addressed factors influencing nurses' attitudes and behaviors that impact the training process, including nurses' conceptual knowledge, relational skills, assumptions about trained caregivers, a focus on results rather than the training process, the devaluation of this care area by management, and the organization of healthcare teams.

In this context, it is important to systematize the training process for informal caregivers. Effective communication, proactive leadership, and coordination of care teams are fundamental to ensuring continuity and quality of care, improving health outcomes, and reducing caregiver burden.

Recognizing the difficulties inherent in training informal caregivers, based on available evidence and expert experience, we intend to develop a tool to assess nurses' perceptions of such training with the objective of understanding the factors that influence nurse-led caregiver training.

Research question

What are the psychometric properties of the "Nurses' Attitudes and Behaviors Toward Informal Caregiver Training" scale?

Methodology

A psychometric study was conducted with cross-sectional data collected from a non-probability sample of nurses at a local health unit in central Portugal.

Data were collected using an online questionnaire sent via Microsoft® Forms® to institutional email addresses, and 117 responses were obtained between July and October 2024.

The institution's Ethics Committee approved the study (ProcNo. OBS.SF.116-2022).

The "Nurses' Attitudes and Behaviors Toward Informal Caregiver Training" scale was developed based on data

from a qualitative study. The results of this study were published by Vidinha et al. (2024) and Ferraz et al. (2025). In their study, the authors explored the intrinsic and extrinsic factors leading nurses to avoid training informal caregivers and strategies to minimize this phenomenon. Based on the aforementioned study's qualitative data, the authors developed a 56-item questionnaire. An expert panel consisting of three specialist nurses from a central hospital, two nursing school professors, and a long-term care nurse evaluated this initial set. These experts were selected based on their experience in training informal caregivers in clinical practice and their academic and professional knowledge and training in this area.

Fifteen days before the first face-to-face session, the questionnaire containing 56 potential items was sent to each expert. They were asked to consider the relevance, clarity, and comprehensiveness of each item in relation to their perception of informal caregiver training.

The first session was held in a roundtable format and moderated by the principal investigator. Three other researchers took notes on the suggestions that emerged during the session. During the session, each item was discussed in detail.

Based on feedback from the first session, the items were revised. To formalize the content validity assessment, a second panel was held remotely. At this stage, the experts reevaluated the revised items and reached a consensus on the instrument's content. The consensus criterion was collaborative discussion and subsequent agreement on the revised content. This process yielded two Likert-type subscales: the "Attitudes" subscale and the "Behaviors" subscale.

Eleven nurses from various inpatient medical and surgical services at the institution were contacted in advance to participate in the pre-test. They agreed to participate and to ask any questions or make any suggestions that arose while completing the questionnaire. The time required to complete the data collection instrument ranged from 12 to 15 minutes. Since there were no questions or suggestions regarding the content or completion of the questionnaire, it was applied at the institutional level.

Population and sample

This study aimed to assess nurses' perceptions of their behaviors and attitudes toward informal caregiver training. Therefore, the recruitment universe consisted of all nurses working in a local health unit in central Portugal. After obtaining consent, the self-completion questionnaire was sent to all nurses at the institution, and 117 valid responses were received.

Of those nurses, approximately 82% were women with a mean age of 45.8 years (*SD* = 9.6), an average of 22.9 years of nursing experience (*SD* = 9.5), and an average of 13.3 years of service at their current workplace (*SD* = 9.1). Approximately 68.4% worked in inpatient services. In terms of professional category, 53% were nurses, and 40.2% were specialist nurses.

Statistical analyses were performed using IBM SPSS Statistics software, version 20.0.

While there is no consensus on the appropriate sample size for psychometric studies, the minimum size required for factor analysis depends on the number of variables/items analyzed. Generally, there should be at least five times more observations than the variables/items analyzed (Matos & Rodrigues, 2019). Considering that the subscales were analyzed independently (the "Attitudes" subscale comprised 14 items and the "Behaviors" subscale comprised 20 items), 117 observations were sufficient for exploratory factor analysis (EFA).

For the analysis of internal consistency, the following Cronbach's alpha values were used as references: > 0.9, excellent; 0.8–0.9, good; 0.7–0.8, acceptable; 0.6–0.7, questionable; 0.5–0.6, poor; < 0.5, unacceptable (Maroco, 2007).

Results

The construct validity was assessed through EFA, which identifies the underlying dimensions of nurses' perceived attitudes and behaviors toward informal caregiver training. The factors extracted by the analysis were interpreted and labeled according to the central themes represented by the items within each factor. For example, the first factor emerging from the "Attitudes" subscale was labeled "Presence of Caregivers" because it encompassed items reflecting nurses' perceptions of the impact of caregivers' presence on the training process.

The "Attitudes" subscale comprises 14 items, each rated on a five-point Likert scale ranging from *strongly disagree* to *strongly agree* (Table 1).

Table 1

Initial items of the "Attitudes" subscale

A1. Os enfermeiros detêm conhecimentos conceptuais específicos para a capacitação do cuidador informal.
A2. Os enfermeiros consideram a capacitação do cuidador informal um processo difícil.
A3. Os enfermeiros consideram que ao cuidador informal não devem ser ensinados cuidados que possam ser de enfermagem.
A4. Os enfermeiros tendem a protelar os ensinos ao cuidador informal para a véspera e/ou dia da alta.
A5. Os enfermeiros consideram prioritário o cuidado ao doente em detrimento da capacitação do cuidador informal.
A6. Mesmo sem perguntar, os enfermeiros percebem quando é que um cuidador informal não quer assumir o papel.
A7. Nos doentes que já eram dependentes antes do internamento, os enfermeiros tendem a pressupor que o cuidador informal já está capacitado.
A8. Os enfermeiros sentem-se avaliados aquando da presença dos cuidadores informais.
A9. Os enfermeiros sentem-se stressados pela presença dos cuidadores informais.
A10. Os enfermeiros sentem-se desconfortáveis ao prestar cuidados na presença do cuidador informal.
A11. Os enfermeiros sentem segurança na prestação de cuidados com a presença dos cuidadores informais.
A12. Os enfermeiros sentem-se úteis quando envolvem os cuidadores informais.
A13. A capacitação do cuidador informal não é uma atividade prioritária para os enfermeiros.
A14. É difícil para os enfermeiros transmitirem o seu conhecimento de modo acessível ao cuidador informal.

The assumptions for conducting an EFA with Varimax orthogonal rotation were assessed using a dataset comprising 14 items measuring nurses' attitudes toward informal caregiver training.

Inspection of the initial anti-image matrix indicated that item A6 should be excluded because its measure of sampling adequacy (MSA) was below 0.5. Analysis of the communalities (h^2) of the remaining 13 items revealed that variables A1, A12, and A13 also obtained MSA values below 0.5 and, therefore, should be excluded. The anti-image covariance matrix for the remaining 10 items is presented in Table 2. Data suitability for factor analysis was assessed using the Kaiser-Meyer-Olkin (KMO) test, which yielded a value of 0.827, indicating a very good sample adequacy, and also the Bartlett's test of sphericity ($\chi^2(45) = 433.386$, $p < 0.001$), which allowed creating an identity matrix, thereby confirming sufficient correlations among variables to proceed with factor analysis.

Table 2

Anti-image covariance matrix of the "Attitudes" subscale after excluding items

	A2	A3	A4	A5	A7	A8	A9	A10	A11	A14
A2	0.706a	-0.174	-0.006	-0.023	0.134	0.023	-0.193	0.154	-0.126	-0.266
A3	-0.174	0.841a	0.045	-0.099	-0.047	0.012	0.030	-0.084	0.016	-0.096
A4	-0.006	0.045	0.835a	-0.347	-0.171	-0.046	0.031	-0.048	-0.049	-0.155
A5	-0,023	-0.099	-0.347	0.825a	-0.194	0.045	-0.166	0.050	-0.091	0.065
A7	0.134	-0.047	-0.171	-0.194	0.884a	0.059	-0.083	-0.076	-0.047	-0.025
A8	0.023	0.012	-0.046	0.045	0.059	0.909a	-0.335	-0.074	-0.111	-0.034
A9	-0.193	0.030	0.031	-0.166	-0.083	-0.335	0.777a	-0.674	0.064	-0.054
A10	0.154	-0.084	-0.048	0.050	-0.076	-0.074	-0.674	0.780a	-0.339	-0.115
A11	-0.126	0.016	-0.049	-0.091	-0.047	-0.111	0.064	-0.339	0.897a	-0.024
A14	-0.266	-0.096	-0.155	0.065	-0.025	-0.034	-0.054	-0.115	-0.024	0.886a

Note. a = Measures of Sampling Adequacy (MSA).

The decision regarding the number of factors to be retained was based on both Kaiser's criterion (eigenvalues > 1) and the graphical inspection of the scree plot, which displays the rate of change in eigenvalues across successive factors. These criteria indicated the retention of three factors, accounting for 64.2% of the total variance after Varimax rotation.

Table 3 presents the factor loading matrix following orthogonal rotation, which clearly demonstrates item saturation, with four items loading on Component 1

(presence of caregivers), three items on Component 2 (priority given to caregiver training), and three items on Component 3 (complexity of the caregiver training process). All communalities were above 0.50, indicating that each variable shared a substantial proportion of variance with its respective factor.

Table 3

Factor loading matrix of the "Attitudes" subscale after Varimax rotation

		1	2	3
Presence of caregivers	A10	0.850		
	A9	0.843		
	A8	0.820		
	A11	0.684		
Priority given to caregiver training	A5		0.772	
	A4		0.743	
	A7		0.722	
Complexity of the caregiver training process	A2			0.778
	A3			0.703
	A14	0.419		0.560

Note. Extraction Method = Principal Component Analysis. Rotation Method = Varimax with Kaiser Normalization.

The internal consistency of the subscales and factors was evaluated using Cronbach's alpha. The 10-item "Attitudes" subscale and the "Presence of caregivers" factor demonstrated good internal consistency (Table 4), with alpha values of 0.828 and 0.871, respectively. The "Priority given to caregiver training" factor obtained an acceptable alpha value of 0.686, whereas the "Complexity of the caregiver training process" factor obtained a low alpha value of 0.542. These findings indicate problems with the internal consistency of the factors.

Table 4

Analysis of the internal consistency of the "Attitudes" subscale factors, including corrected total-item correlation, Cronbach's alpha if the item is deleted, and overall Cronbach's alpha for the 10 items (n = 117)

Item	Mean	Standard deviation	Corrected total-item correlation	Cronbach's alpha if the item is deleted	Cronbach's alpha by factor
A8	3.00	1.106	0.659	0.863	
A9	3.41	1.052	0.821	0.793	0.871
A10	3.46	0.996	0.833	0.790	
A11	3.50	0.925	0.601	0.879	
A4	2.93	1.187	0.513	0.574	
A5	2.62	1.041	0.539	0.544	0.686
A7	2.75	1.106	0.449	0.652	
A2	2.39	0.991	0.395	0.376	
A3	3.65	1.061	0.288	0.538	0.542
A14	3.35	1.101	0.378	0.395	

Note. *n* = 117; 10 items; Overall Cronbach's alpha = 0.828

The "Behaviors" subscale comprises 20 items, each rated on a five-point Likert scale ranging from "never observed" to "always observed" (Table 5).

Table 5

Initial items (20) of the "Behaviors" subscale

C1. Os enfermeiros mostram vontade de capacitar os cuidadores informais.
C2. Os enfermeiros identificam o cuidador informal quando necessário.
C3. O cuidador informal é identificado tão precocemente quanto necessário.
C4. Os enfermeiros avaliam o potencial do cuidador informal para assumir esse papel de forma sistemática.
C5. O cuidador informal começa a ser envolvido nos cuidados tão precocemente quanto necessário.
C6. Os enfermeiros planeiam com o cuidador informal o melhor horário para o processo de capacitação.
C7. O cuidador informal é alvo de atenção dos enfermeiros de modo sistemático.
C8. A capacitação do cuidador informal é integrada pelos enfermeiros no planeamento de cuidados.
C9. Os enfermeiros atribuem intencionalmente tempo para concretizar a capacitação dos cuidadores informais.
C10. Os enfermeiros evidenciam habilidades relacionais na interação com os cuidadores informais.
C11. Os enfermeiros evitam a interação com o cuidador informal.
C12. Os enfermeiros facilitam a presença do cuidador informal junto do doente.
C13. Os enfermeiros avaliam sistematicamente a capacitação do cuidador informal.
C14. A documentação da capacitação do cuidador informal é realizada de forma a garantir a continuidade do processo.
C15. A documentação da capacitação do cuidador informal traduz as suas necessidades específicas.
C16. Os enfermeiros quando passam o turno identificam o cuidador informal.
C17. Durante a passagem de turno as especificidades do processo de capacitação do cuidador informal são referenciadas pelos enfermeiros.
C18. Na passagem de turno, os enfermeiros transmitem as dificuldades que sentiram na capacitação dos cuidadores informais.
C19. Quando há assunção prévia do papel do cuidador informal, os enfermeiros avaliam os recursos da comunidade que este utiliza.
C20. Os enfermeiros capacitam o cuidador informal independentemente da sua identidade étnica ou cultural.

As with the "Attitudes" subscale, the assumptions for conducting an EFA with Varimax orthogonal rotation were assessed using a dataset of 20 items measuring nurses' behaviors toward informal caregiver training, collected from a sample of 117 nurses.

Examination of the communalities (h^2) for the initial 20 items indicated that items C11, C12, C15, C19, and C20 should be excluded, as their values were below the 0.50 threshold. The anti-image correlation matrix of the remaining 15 items is presented in Table 6.

Data suitability for factor analysis was assessed by the KMO test, which yielded a value of 0.913, indicating excellent sample adequacy, and the Bartlett's test of sphericity ($\chi^2(91) = 1056.360$; $p < 0.001$), which allowed creating an identity matrix, thereby confirming sufficient intercorrelations among variables to proceed with factor analysis.

Table 6

Anti-image covariance matrix of the "Behaviors" subscale after excluding items

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C13	C14	C16	C17	C18
C1	0.910a	-0.296	-0.059	-0.115	-0.187	0.083	-0.112	-0.146	0.072	-0.306	0.059	0.188	-0.134	0.063	-0.102
C2	-0.296	0.922a	-0.316	-0.023	0.020	0.011	-0.040	0.081	-0.058	-0.032	0.052	-0.057	-0.014	-0.061	0.043
C3	-0.059	-0.316	0.887a	-0.010	-0.425	0.011	0.029	-0.043	0.149	0.050	-0.158	0.073	-0.147	0.123	-0.165
C4	-0.115	-0.023	-0.010	0.949a	-0.050	-0.041	-0.034	0.071	-0.062	-0.157	-0.360	0.055	0.016	-0.003	-0.152
C5	-0.187	0.020	-0.425	-0.050	0.909a	0.054	-0.247	-0.062	-0.169	0.002	0.074	-0.191	0.185	-0.106	0.092
C6	0.083	0.011	0.011	-0.041	0.054	0.918a	-0.314	-0.030	-0.091	-0.164	0.129	-0.290	0.106	-0.308	0.011
C7	-0.112	-0.040	0.029	-0.034	-0.247	-0.314	0.926a	-0.219	-0.071	-0.088	-0.311	0.068	-0.164	0.197	-0.115
C8	-0.146	0.081	-0.043	0.071	-0.062	-0.030	-0.219	0.949a	-0.247	0.037	-0.199	0.013	0.082	-0.181	0.025
C9	0.072	-0.058	0.149	-0.062	-0.169	-0.091	-0.071	-0.247	0.948a	-0.078	-0.077	-0.113	-0.026	-0.103	0.126
C10	-0.306	-0.032	0.050	-0.157	0.002	-0.164	-0.088	0.037	-0.078	0.926a	-0.001	-0.051	0.215	-0.130	0.054
C13	0.059	0.052	-0.158	-0.360	0.074	0.129	-0.311	-0.199	-0.077	-0.001	0.915a	-0.262	-0.055	-0.042	0.094
C14	0.188	-0.057	0.073	0.055	-0.191	-0.290	0.068	0.013	-0.113	-0.051	-0.262	0.897a	-0.197	0.151	-0.187
C16	-0.134	-0.014	-0.147	0.016	0.185	0.106	-0.164	0.082	-0.026	0.215	-0.055	-0.197	0.876a	-0.510	0.004
C17	0.063	-0.061	0.123	-0.003	-0.106	-0.308	0.197	-0.181	-0.103	-0.130	-0.042	0.151	-0.510	0.845a	-0.539
C18	-0.102	0.043	-0.165	-0.152	0.092	0.011	-0.115	0.025	0.126	0.054	0.094	-0.187	0.004	-0.539	0.897a

Note. a. *Measures of Sampling Adequacy (MSA)*

The number of factors with eigenvalues greater than 1 was determined using the principal component analysis extraction method. This analysis indicated the retention of three factors, which together accounted for 69.6% of the total variance after Varimax rotation with Kaiser normalization.

Table 7 presents the factor loading matrix after rotation, which clearly demonstrates item saturation, with eight items loading on Component 1 (Systematization of the informal caregiver care process), four items on Component 2 (Identification and involvement of the informal caregiver), and three items on Component 3 (Information related to caregiver training during shift change). All 15 analyzed items exhibited communalities greater than 0.50, indicating that each variable shared a substantial proportion of variance with its respective factor.

Table 7

Factor loading matrix of the "Behaviors" subscale after Varimax rotation with Kaiser normalization

		1	2	3
Systematization of the informal caregiver care process	C9	0.781		
	C7	0.711		
	C13	0.698		
	C8	0.696		
	C6	0.668		
	C14	0.624		
	C10	0.609		
	C4	0.574		
Identification and involvement of the informal caregiver	C2		0.781	
	C3		0.774	
	C1		0.769	
	C5		0.610	
Information related to caregiver training during shift change	C16			0.824
	C17			0.805
	C18			0.782

Note. Extraction Method = Principal Component Analysis; Rotation Method = Varimax with Kaiser Normalization.

The overall internal consistency of the 15-item "Behaviors" subscale was excellent, with a Cronbach's alpha of 0.939 (Table 8). The extracted factors also demonstrated good to very good reliability: Systematization of the informal caregiver care process (α = 0.911), Identification and involvement of the informal caregiver (α = 0.848), and Information related to caregiver training during shift change (α = 0.888). These results indicate strong internal consistency, supporting the reliability of the subscale for initial use.

Table 8

Internal consistency analysis of "Behaviors" subscale factors, including corrected total-item correlation, Cronbach's alpha if the item is deleted, and overall Cronbach's alpha for the 15 items (n = 117)

Item	Mean	Standard deviation	Corrected total-item correlation	Cronbach's alpha if the item is deleted	Cronbach's alpha by factor
C9	3.35	1.061	0.706	0.901	
C7	3.42	0.940	0.826	0.889	
C13	3.38	0.888	0.775	0.894	
C8	3.53	0.943	0.749	0.896	0.911
C6	3.81	0.991	0.722	0.898	
C14	3.36	0.885	0.636	0.905	
C10	3.90	0.724	0.600	0.908	
C4	3.69	0.835	0.688	0.901	
C2	4.23	0.700	0.637	0.823	
C3	3.75	0.819	0.724	0.783	0.848
C1	3.76	0.784	0.689	0.799	
C5	3.25	0.964	0.698	0.802	
C16	3.81	0.955	0.731	0.885	
C17	3.56	0.995	0.852	0.778	0.888
C18	3.62	0.999	0.767	0.855	

Note. *n* =117; 15 items; Overall Cronbach's alpha = 0.939.

Discussion

At the time of this study, no instruments were identified in the literature capable of assessing nurses' attitudes and behaviors toward informal caregiver training. This limitation underscores the relevance of this study, while also precluding direct comparisons or validation against existing research.

Findings from Dixe and Querido (2020) indicate that informal caregivers often do not receive sufficient information to provide quality care for dependent family members while managing their own workload. The study further emphasizes the importance of investing in the training of informal caregivers. These results highlight the need for continued investigation into the factors influencing informal caregiver training, in order to develop strategies that enhance nursing practice in this area.

Regarding potential strategies, Ferraz et al. (2025) contend that promoting informal caregiver training requires systematizing the process, organizing nursing care, providing caregivers with role-specific training, developing communication skills to manage complexity, emphasizing specialist nurse guidance for generalist nurses, fostering leadership, and ensuring coordination within primary healthcare teams.

Vidinha et al. (2024) identify a set of factors, both intrinsic and extrinsic to nurses, that influence informal caregiver training. However, the authors acknowledge that the full extent of this phenomenon remains unknown and highlight the need for the development of instruments to measure it.

In this context and building on the findings of a qualitative study conducted with nurses aimed at exploring avoidance behaviors related to informal caregiver training, the "Nurses' Attitudes and Behaviors Toward Informal Caregiver Training" scale was developed. The content of this scale was validated by a panel of experts in two phases. It should be noted that a more comprehensive pre-test could have allowed for further refinement of the scale's content; the absence of such a step represents a limitation in the scale development process.

This study addresses this gap by enabling the identification and redefinition of items that compromise factor reliability and exhibit lower internal consistency indices, thereby improving the psychometric quality of the instrument.

Regarding the "Attitudes" subscale, which demonstrated good overall internal consistency (α = 0.828), factor extraction identified three components: (1) Presence of caregivers, (2) Priority given to caregiver training, and (3) Complexity of the caregiver training process. While the first factor exhibited good internal consistency, the alpha values for factors 2 and 3 indicate lower reliability. It is anticipated that these values may improve with refinement of the item content and the inclusion of a larger sample.

The "Behaviors" subscale, in its 15-item version, demonstrated excellent internal consistency (α = 0.939). The

three extracted factors were named as follows: (1) Systematization of the informal caregiver care process, (2) Identification and involvement of the informal caregiver, and (3) Information related to caregiver training during shift changes.
Regarding study limitations, the use of a non-probability sample may restrict the generalizability of the psychometric properties to other samples or contexts. Nevertheless, future efforts will focus on further instrument refinement, including clarifying items and exploring additional psychometric properties. Subsequent studies are planned with larger samples and, preferably, probability sampling to enhance the generalizability of the findings.

Conclusion

Increasing life expectancy, demographic aging, and the consequent rise in chronic disease prevalence have amplified the importance of informal caregivers. In addition to the growing demand for caregivers, the complexity of care provision and the adoption of new technologies have made the training process increasingly challenging. Within this context, nurses play a critical role in training informal caregivers. As the professionals best positioned to perform these functions, nurses face a persistent gap between the potential of informal caregivers and the support provided during the training process.
The relevance of this study is underscored by the absence of instruments in the literature capable of comprehensively and accurately assessing the factors underlying nurses' limitations in informal caregiver training. This gap highlighted the need to develop a tool that could identify constraints impeding caregiver training. Consequently, the "Nurses' Attitudes and Behaviors toward Informal Caregiver Training" scale was developed, culminating in the factor analysis and psychometric evaluation presented in this study.
This study identified three factors within the "Attitudes" subscale, underscoring the need for further refinement of certain items and the inclusion of a larger sample to enhance reliability. In contrast, the extraction of three factors from the "Behaviors" subscale demonstrated excellent internal consistency in the sample analyzed.
A deeper understanding of nurses' attitudes and behaviors is expected to support the development of more effective and targeted training programs for informal caregivers. Moreover, the instrument developed in this study provides a means to evaluate the effectiveness of such programs.
Despite the limitations previously acknowledged, future studies should focus on advancing knowledge in this field of care, refining the data collection instrument, and extending research to other healthcare contexts.

Author contributions

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References

Dixe, M. D., & Querido, A. I. (2020). Informal caregiver of dependent person in self-care: Burden-related factors. *Revista de Enfermagem Referencia*, *5*(3), e20013. https://doi.org/10.12707/RV20013

Eurocarers. (2023). *About carers.* https://eurocarers.org/about-carers/

Ferraz, L., Gonçalves, M., Ferreira, A. J., Vidinha, T., & Marques, A. (2025). Estratégias promotoras da capacitação do cuidador informal: Estudo qualitativo. *Revista de Investigação & Inovação em Saúde*, *8*(1), 1–12. https://doi.org/https://doi.org/10.37914/riis.v8i1.417

Lima, F. (2024). *Estatísticas da saúde: 2022*. https://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_publicacoes&PUBLICACOESpub_boui=439489924&PUBLICACOESmodo=2

Maroco, J. (2007). *Análise estatistica com utilização do SPSS* (3ª ed.). Sílabo.

Marques, C. (2015). *Capacitar para o cuidado: Percepção do cuidador informal da pessoa com acidente vascular cerebral* [Dissertação de mestrado, Escola Superior de Enfermagem de Coimbra]. Repositório Cientifico da Escola Superior de Enfermagem de Coimbra. http://web.esenfc.pt/?url=bFbBCN7T

Matos, D., & Rodrigues, E. (2019). *Análise fatorial*. http://repositorio.enap.gov.br/handle/1/4790

Nunes, M. C., Gonçalves, M. A., Vidinha, T. S., Santos, E. J., & Núcleo de Investigação em Enfermagem. (2022). El juicio clínico de las enfermeras sobre el empoderamiento del cuidador. *Index de Enfermería*, *31*(3), 1–5. https://doi.org/10.58807/indexenferm20225152

Vidinha, T., Ferreira, A. J., Gonçalves, M., Ferraz, L., & Marques, A. (2024). Nurses' avoidance of the caregiver empowerment process: Perspectives on conditioning factors. *Millenium: Journal of Education, Technologies, and Health*, *2*(23), 1-8. https://doi.org/https://doi.org/10.29352/mill0223.33593

World Health Organization. (2021). *Global patien safety action plan 2021-2030: Towards eliminating avoidable harm in health care.* https://www.who.int/teams/integrated-health-services/patient-safety/policy/global-patient-safety-action-plan

Shibily, F. M., Aljohani, N. S., Aljefri, Y. M., Almutairi, A. S., Almutairi, W. Z., Alhallafi, M. A., Alsharif, F., Almutairi, W., & Badr, H. (2021). The perceptions of nurses and nursing students regarding family involvement in the care of hospitalized adult patients. *Nursing Reports*, *11*(1), 133–142. https://doi.org/10.3390/nursrep11010013