REVISTA DE ENFERMAGEM REFERÊNCIA
homepage: https://rr.esenfc.pt/rr/
ISSNe: 2182.2883

RESEARCH ARTICLE (ORIGINAL)

Development of a nursing-sensitive quality indicators profile in ambulatory surgery

Elaboração de perfil de indicadores de qualidade sensíveis às intervenções de enfermagem em cirurgia de ambulatório

Elaboración de perfiles de indicadores de calidad sensibles a las intervenciones de enfermería en cirugía ambulatorial

Joana Pinto [1]
https://orcid.org/0000-0003-1095-0088

Luís Sá [1]
https://orcid.org/0000-0001-9687-413X

António Amaral [2]
https://orcid.org/0000-0001-9386-207X

João Amado [1]
https://orcid.org/0000-0002-5330-779X

[1] Universidade Católica Portuguesa, Faculty of Health Sciences and Nursing, Center for Interdisciplinary Research in Health, Porto, Portugal

[2] Nursing School of Coimbra, Coimbra, Portugal

Autor de correspondência
Joana Pinto
E-mail: joanaraqp@esenfc.pt

Recebido: 16.05.23
Aceite: 31.10.23

Abstract

Background: Ambulatory surgery has increased significantly in recent years. Literature is scarce regarding the quality of care in this setting, particularly regarding nursing-sensitive quality indicators.
Objective: To develop a nursing-sensitive quality indicators profile in ambulatory surgery.
Methodology: The modified e-Delphi methodology was used to find consensus on the best indicators. Online questionnaires were used in two rounds.
Results: A panel of 27 experts evaluated 58 nursing-sensitive quality indicators in ambulatory surgery, including structure, process, and outcome indicators. Forty-five indicators were validated.
Conclusion: This study highlights nurses' role in perioperative care and may support the development of tools to assess the quality of nursing care in ambulatory surgery.

Keywords: perioperative nursing; nursing care; quality indicators, health care; Delphi technique

Resumo

Enquadramento: A cirurgia de ambulatório tem sofrido um forte crescimento nos últimos anos. Existe pouca literatura relativamente à qualidade dos cuidados neste contexto e menos ainda sobre os indicadores de qualidade sensíveis às intervenções do enfermeiro.
Objetivo: Elaborar um perfil de indicadores de qualidade sensíveis às intervenções de enfermagem em cirurgia de ambulatório.
Metodologia: Para encontrar o consenso sobre os melhores indicadores, utilizou-se a metodologia de e-Delphi modificada através de questionários online, em duas rondas.
Resultados: Um painel de 27 peritos avaliou 58 indicadores de qualidade sensíveis às intervenções de enfermagem em cirurgia de ambulatório, divididos pelas dimensões de estrutura, processo e resultado. Foram validados 45 indicadores.
Conclusão: Este estudo evidencia o papel do enfermeiro neste contexto de prestação de cuidados perioperatórios e poderá subsidiar a construção de ferramentas para avaliar a qualidade dos cuidados de enfermagem em cirurgia de ambulatório.

Palavras-chave: enfermagem perioperatória; cuidados de enfermagem; indicadores de qualidade em assistência à saúde; técnica Delfos

Resumen

Marco contextual: La cirugía ambulatoria ha experimentado un fuerte crecimiento en los últimos años. Existe poca literatura relativa a la calidad de los cuidados en este contexto y aún menos sobre indicadores de calidad sensibles a las intervenciones del enfermero.
Objetivo: elaborar un perfil de indicadores de calidad sensibles a las intervenciones de enfermería en cirugía ambulatoria.
Metodología: Para llegar a un consenso, se utilizó la metodología e-Delphi modificada mediante cuestionarios en línea, en dos rondas.
Resultados: Un panel de 27 expertos evaluó 58 indicadores de calidad sensibles a las intervenciones de enfermería en cirugía ambulatoria, divididos por las dimensiones estructura, proceso y resultado. Se validaron 45 indicadores.
Conclusión: Este estudio evidencia el papel de los enfermeros en este contexto de la prestación de cuidados perioperatorios y puede apoyar el desarrollo de herramientas para evaluar la calidad de los cuidados de enfermería en cirugía ambulatoria.

Palabras clave: enfermería perioperatoria; atención de enfermería; indicadores de calidad de la atención de salud; técnica Delfos

How to cite this article: Pinto, J., Sá, l., Amaral, A., & Amado, J. (2024). Development of a nursing-sensitive quality indicators profile in ambulatory surgery. *Revista de Enfermagem Referência*, *6*(3, Supl. 1), e31223. https://doi.org/10.12707/RVI23.63.31223

Introduction

Ambulatory surgery (AS) has revolutionized perioperative care in the 21st century. There has been a significant increase in AS worldwide, with increasingly complex surgical and anesthetic procedures being performed in this setting (Nunes et al., 2018).
There are several reasons for the growing success of AS, namely the evolution of anesthetic techniques, the emergence of new drugs, and the development of minimally invasive surgery. Another reason is the fact that AS is designed to be more patient-centered, enabling shorter hospital stays, being highly effective at an organizational level, having several economic advantages, and resulting in fewer postoperative complications and healthcare-associated infections (Organisation for Economic Co-operation and Development, 2021; Pinto et al., 2020).
Despite the advantages associated with AS, little is known about the quality of care provided in this context or nursing-sensitive quality indicators (NSQIs).
Understanding how nurses influence the quality of care provided in AS is crucial for designing management and leadership strategies to improve nursing care for perioperative patients.
This study sought consensus among experts to create a NSQIs profile in AS.

Background

NSQIs serve as the foundation for monitoring the quality of nursing care. They can be important for benchmarking and assist in providing evidence of the cost-effectiveness of nursing care and planning quality improvement projects. These indicators are based on the field of discipline and practice, for which there is empirical evidence linking nursing interventions to patient outcomes. In other words, NSQIs are the criteria for changes in a person's health status that nursing care can directly influence (Afaneh et al., 2021).
NSQIs have some essential attributes. Firstly, these indicators measure the quality of at least one of the domains of Donabedian's framework – that is, the resources needed to establish a nursing system (structure), the nursing interventions (process), and the effect of nursing interventions (outcome). On the other hand, NSQIs are linked to at least one of the six aims domains for quality in healthcare described by the US Institute of Medicine in 2001: safety, effectiveness, patient-centeredness, timeliness, efficiency, and equitability. Finally, they are applicable to all stakeholders, such as nurses, patients, family members, and hospital administration (Afaneh et al., 2021).
NSQIs aim to measure aspects of nursing practice that are clearly identified as goals for quality.
It should be emphasized that nurses deliver around 90% of all healthcare services (David, 2012). Nurses play a key role in AS as they are present throughout the patient's perioperative period (Pinto et al., 2020). Evaluating the quality of care is essential, and the contribution of nursing care should be considered in management decision-making (Aiken et al., 2002).
Despite the considerable influence of nursing interventions on the quality of healthcare, measuring the quality of nursing care and its effects on patient outcomes and the healthcare system remains challenging (Afaneh et al., 2021). Measuring outcomes is the foundation for evidence-based practice and monitoring the quality of care.
It is essential to acknowledge the multidisciplinary nature of healthcare, emphasizing that health outcomes reflect the contributions of the several team members rather than the contribution of a single discipline within that team (Doran & Pringle, 2011). It is difficult to identify indicators that only reflect the contribution of nursing. Although the indicators may not be exclusive to nursing, they can reflect nursing's unique contributions to quality.
To avoid a proportional increase in perioperative morbidity due to the growing volume of AS, quality monitoring systems should be implemented and analyzed.
Monitoring quality in AS should be an effective concern for planning health policies, which is a dynamic process aimed to assess outcomes and contribute to the growth of AS.
In Portugal, the indicators of the Health Regulatory Authority are currently in use. The literature shows that although these indicators are aligned with the indicators used in AS worldwide, they do not assess the outcomes of care because they are process indicators (Nunes et al., 2018).
In the quality standards of specialized care in Medical-Surgical Nursing for perioperative patients, the Portuguese nursing regulator (Ordem dos Enfermeiros, OE) states that those statements should serve as a reference in the definition of indicators that reflect the contribution to health gains sensitive to perioperative nursing care (Ordem dos Enfermeiros, 2017).
The correct definition, monitoring, and interpretation of NSQIs in AS will increase the quality of care provided in this setting.

Research question

Which are the NSQIs in AS?

Methodology

This study used the Delphi methodology and followed the steps and recommendations described by Beiderbeck et al. (2021) and Borel et al. (2021). The Delphi technique is a scientific method to organize and manage discussions among a group of experts to generate insights on topics where there is no consensus or limited knowledge (Beiderbeck et al., 2021). It aims to encourage anonymous communication between individuals with expertise in a given topic, seeking their opinion in an interactive and structured way to achieve a consensual position (Borel et al., 2021).
This study used the modified e-Delphi technique. The preparatory phase included a literature review (Pinto et

al., 2022) and a focus group to discuss and validate the first questionnaire used in this study, thus justifying the designation as a modified technique. This study consisted of two online rounds due to their ease of use, time-saving benefits, and ability to organize and process the data while ensuring participant anonymity (Nasa et al., 2021).
The sampling criteria were determined based on the methodological proposals of Keeney et al. (2010) and Borel et al. (2021), which recommend creating panels of experts with different levels of expertise. This composition ensures a broader range of opinions (collective wisdom). Preference should be given to individuals with knowledge and practical experience in the subject under study. It is not imperative for all experts to have different academic qualifications. The inclusion of individuals with different points of view on the quality of care enriches the results of the study (Boulkedid et al., 2011). This panel of experts was heterogeneous in terms of profession and length of service. It initially consisted of physicians, nurses (nurse director, nurse coordinators, nurse specialists, and general nurses), nursing professors, hospital managers, and the director of the Health Regulatory Authority department. These experts were selected using purposive sampling.
There is no consensus in the literature on the number of experts to include on the panel. However, the consulted authors recommend a panel of 10 to 30 experts (Beiderbeck et al., 2021; Borel et al., 2021; Nasa et al., 2021; Keeney et al., 2010). For this study, a panel of 27 experts was selected and invited to participate in both rounds via email.
A version of the questionnaire was developed for Round 1 based on the preparatory work. The questionnaire consisted of three sections: 1) Informed consent to participate in the study; 2) Sociodemographic characterization of participants; and 3) NSQIs in AS. Section 3 included free-text fields for the experts to leave comments, opinions, and/or suggestions. A 5-point Likert scale was used, where 1 = *Not at all sensitive*; 2 = *Slightly sensitive*; 3 = *Moderately sensitive*; 4 = *Sensitive*, and 5 = *Very sensitive*.
The preparatory phase took place from November 2021 to May 2022, starting with the conceptualization and definition of the objectives to be achieved with the Delphi panel. This study used the Nursing Role Effectiveness Model framework and the Delphi technique (data collection via electronic means and sequentially, i.e., in several rounds). A literature review was conducted to map the quality indicators used in AS (Pinto et al., 2022). Subsequently, semi-structured interviews were conducted with five experts. The panel selected for these initial interviews aimed to be representative of the professionals involved in an elective AS. The interviews were analyzed, and the main findings were summarized to complement the results of the literature review and help formulate the questions for Round 1.
The second phase of this study ran from April 2022 to December 2022, involving the Delphi technique and the analysis of data from each round. The questionnaire was developed using the Qualtrics software. The experts were invited to participate in the study by email with a link to the questionnaire, which was valid for four weeks. After this period, the data were analyzed both qualitatively and quantitatively.
The content in the experts' comments in free-text fields were analyzed, and categories were created to identify contributions to this study (Bardin, 2014).
Quantitative data were analyzed using IBM SPSS Statistics software, version 28.0. The mean, median, standard deviation, coefficient of variation (CV), content validity index (CVI), and percentage of 1 and 2 answers were calculated for each of the items. The CV determines the stability of the responses to each item and is calculated by dividing the standard deviation by the mean (Gracht, 2012). This measure is reported as a percentage, where consensus exists when there is low dispersion in the results (low dispersion if CV ≤ 15%, medium dispersion if CV 15%-30%, and high dispersion if CV ≥ 30%). The CVI measures the percentage of agreement for each item and was calculated by calculating the number of items that scored '3', '4', and '5' and dividing by the total number of responses. It was also reported as a percentage. Consensus was defined as CVI ≥ 80%.
If any of the experts expressed doubts or lack of understanding about an item, the item would move on to the next round, regardless of its statistical analysis. Table 1 shows the consensus criteria to include or exclude items.

Table 1

Consensus criteria

	Consensus criteria
Consensus to include an item (cumulative criteria)	✓ 80% of answers ≥3 (CVI x 100 ≥ 80%) ✓ Median ≥ 3; ✓ None of the experts expressed doubts or lack of understanding about the item.
Consensus to exclude an item (non-cumulative criteria)	✓ 80% of answers ≤ 2; ✓ Median ≤ 2.
No consensus	The items that did not fit previous classifications.

Note. CVI = Content Validity Index.

Two analyses were conducted: one using data from the panel of experts and another using data from the subgroup of nurses. The results of these analyses were then compared. Whenever a high dispersion of results was

observed, the two groups were compared to determine whether to include the item, proceed to Round 2, or exclude the item (Gracht, 2012).
The results of Round 1 were analyzed and compiled into a report to provide feedback to the experts. The second questionnaire resulted from the deletion of the items that obtained consensus regarding their inclusion or exclusion and the maintenance of items that did not obtain consensus and that raised doubts among the experts. The free-text field at the end of each section of the questionnaire was kept. The report of Round 1 and the link to the second questionnaire were sent to the same group of experts. The questionnaire was available for four weeks. The results of Round 2 were analyzed in the same way as described for Round 1. The research team discussed the indicators that did not reach consensus to determine whether to include them in the indicator profile. This decision was based on the literature search and statistical analysis conducted. The panel was informed of the results of Round 2.
After the research protocol had been designed and reviewed by the research team, it was presented to the Ethics Committee for Health of the Universidade Católica Portuguesa, which issued a favorable opinion.
All participants were provided with the informed consent form on the first page of the questionnaire. They were required to read and accept the form before proceeding with the questionnaire.

Results

Seventeen experts participated in Round 1 (response rate of 62.9%), with a mean age of 46.53 years and a mean length of professional experience of 22.88 years. Twenty-experts participated in Round 2 (response rate of 81.4%), with a mean age of 47.18 years and a mean length of professional experience of 23.27 years.
With regard to their profession, the majority of participants in both rounds were nurses (n = 11 in Round 1 and n = 17 in Round 2), five of the participants in Round 1 and four in Round 2 were physicians, and one participant in each round was a manager.
In Round 1, seven participants held a bachelor's degree, six a master's degree, and four a doctoral degree. In Round 2, half of the participants held a bachelor's degree, eight a master's degree, and three a doctoral degree. Table 2 shows the experts' socio-professional characteristics.
Data were collected about professionals working at the following institutions: Leiria Hospital Center, Coimbra Hospital and University Center, Porto Hospital and University Center, Central Lisbon Hospital and University Center, Arcebispo João Crisóstomo Hospital, Hospital da Luz Coimbra, Senhora da Oliveira Hospital, Health Regulatory Authority, and Nursing School of Coimbra.
In Round 2, 72.7% of the experts had participated in Round 1 (n = 16).

Table 2

Socio-professional characteristics of the experts

Variables	Round 1	Round 2
Age (mean)	46.53	47.18
Length of professional experience (mean)	22.88	23.27
Profession		
Nurse (%)	64.7	77.3
Manager (%)	5.9	4.5
Physician (%)	29.5	18.2
Education level		
Doctoral degree (%)	23.5	13.6
Master's degree (%)	35.3	36.4
Bachelor's degree (%)	41.2	50.00

The literature review identified 42 quality indicators in AS, which were reviewed and grouped into structure, process, and outcome indicators according to Donabedian's model (1992). After analyzing the initial interviews with experts and research team meetings, it became clear that some indicators needed clarification. As a result, 58 indicators were analyzed.
In Round 1, the expert panel and the nurses did not reach a consensus on the following indicators: "Existence of protocols about the clinical information provided to patients and relatives", "Rate of postoperative hypertension", "Rate of surgical site infection", and "Staff satisfaction". As a result, these indicators were carried over to Round 2. In Round 1 report, clarifications were provided for three items ("Personnel skill-mix", "Favorable practice environments", and "Rate of preoperative nursing visits"), which were moved to Round 2. A consensus was reached regarding the inclusion or exclusion of 35 indicators, with 23 indicators advancing to Round 2.
In Round 2, the structure indicator "Influenza vaccination compliance among healthcare personnel" did not reach consensus among the expert panel. The process indicator "Supply of medication at discharge" also did not reach

a consensus among the experts, as well as the following outcome indicators: "Rate of postoperative hematoma", "Rate of postoperative ischemia", "Rate of postoperative hypertension", "Rate of postoperative hypoxemia", and "Waiting times after admission to the ambulatory surgery center". The research team analyzed each indicator and the experts' answers individually to determine which ones to include in the indicators' Based on the two rounds and the analysis conducted by the research team, a profile of 45 NSQIs in AS was established.

Tables 3 and 4 show the analysis carried out in Round 1 and 2, respectively.

Table 3

Results of the quantitative analysis of Round 1

Indicator	Mean	Median	Standard deviation	CV (%)	CVI (%)	1 or 2 answers (%)	Decision
Structure indicators							
Existence of protocols about the clinical information provided to patients and relatives	4.00	4.00	1.118	27.951	82.35	17.6	Include
Influenza vaccination compliance among healthcare personnel	2.71	3.00	1.359	50.206	52.94	47.1	No consensus
Existence of a standardized health records platform	4.18	5.00	1.131	27.083	94.12	5.9	Include
Existence of occupational safety guidelines	4.12	4.00	1.166	28.325	88.24	11.8	Include
Personnel skill mix	3.82	4.00	1.074	28.101	76.47	11.8	No consensus
Existence of a quality manual	4.12	4.00	0.993	24.106	94.12	5.3	Include
Favorable practice environments	4.29	5.00	0.920	21.414	94.12	5.3	No consensus
Process indicators							
Number of preoperative delays and incidents	3.71	3.00	1.312	35.395	76.471	23.5	No consensus
Supply of medication at discharge	3.12	3.00	1.219	39.091	70.588	23.4	No consensus
Education and guidance at discharge	4.82	5.00	0.529	10.959	100.000	0	Include
Postoperative evaluation 24 hours after discharge	4.35	5.00	1.057	24.287	94.118	5.3	Include
Rate of same-day cancellations	2.94	2.00	1.435	48.785	41.176	58.5	Not include
Patient selection for administration of nausea and vomiting prophylaxis	2.76	3.00	1.251	45.266	52.941	47.1	No consensus
Selection of nausea and vomiting prophylaxis	2.65	2.00	1.320	49.870	17.647	52.9	Not include
Regular evaluation of pain intensity in ambulatory surgery	4.71	5.00	0.849	18.039	94.118	5.9	Include
Moderate to maximum pain in patients undergoing ambulatory surgery	3.94	5.00	1.197	30.382	88.235	11.8	Include
Surgical site hair removal	3.18	3.00	1.185	37.308	76.471	23.5	No consensus
Compliance with occupational safety guidelines	3.82	3.00	1.074	28.101	94.118	5.9	Include
Rate of preoperative nursing visits	4.47	5.00	1.007	22.532	94.118	5.9	No consensus
Appropriate use of the Surgical Safety Checklist	4.24	4.00	1.091	25.769	94.118	5.9	Include
Incidence of safety events	4.18	5.00	1.015	24.293	100.000	0	Include
Reporting of safety events	4.18	5.00	1.185	28.375	88.235	11.8	Include
Incidence of medication errors	4.35	5.00	1.057	24.287	94.118	5.9	Include
Rate of patients administered prophylactic intravenous antibiotic therapy on time	3.88	5.00	1.364	35.131	82.353	17.6	Include
Outcome indicators							
Rate of postoperative bleeding	2.88	2.00	1.453	50.350	35.294	64.7	Not include
Rate of postoperative hematoma	3.06	3.00	1.197	39.220	58.824	41.2	No consensus

Rate of wound dehiscence	2.82	2.00	1.380	48.940	47.059	52.9	Not include
Rate of postoperative ischemia	3.12	3.00	1.576	50.640	58.824	41.2	No consensus
Rate of postoperative hypertension	2.53	2.00	1.375	54.150	41.176	58.8	Not include
Rate of postoperative hypoxemia	2.76	3.00	1.480	53.620	52.941	47.1	No consensus
Rate of Toxic Anterior Segment Syndrome	2.41	2.00	1.004	41.490	47.059	52.9	Not include
Rate of thromboembolic events	3.53	3.00	1.375	38.810	76.471	23.5	No consensus
Rate of surgical site infection	3.88	5.00	1.269	32.730	82.353	17.6	Include
30-day morbidity rate	2.82	3.00	1.237	43.970	58.824	41.2	No consensus
30-day mortality rate	2.71	2.00	1.263	46.490	47.059	52.9	Not include
Number of unplanned returns to the operating room	3.00	2.00	1.620	54.000	47.059	52.9	Not include
Rate of unplanned hospital readmissions	3.29	3.00	1.611	48.940	64.706	35.3	No consensus
Number of hospital transfers	2.76	2.00	1.393	50.360	41.176	58.8	Not include
Number of same-day admissions with a length of stay of at least 24 hours	3.12	3.00	1.364	43.590	58.824	41.2	No consensus
Number of unplanned overnight stays	3.18	3.00	1.334	41.820	64.706	35.3	No consensus
Patient experience in the ambulatory surgery center	3.82	5.00	1.380	36.130	82.353	17.6	Include
Incidence of burns	3.82	3.00	1.185	31.150	88.235	11.9	Include
Incidence of falls	4.12	5.00	1.111	26.940	94.118	5.9	Include
Incidence of injuries related to surgical positioning	3.94	3.00	1.029	26.140	100.000	0	Include
Incidence of wrong site surgery	4.53	5.00	0.874	19.210	100.000	0	Include
Incidence of wrong side surgery	4.41	5.00	0.939	21.320	100.000	0	Include
Incidence of wrong patient surgery	4.29	5.00	0.985	23.080	100.000	0	Include
Incidence of wrong procedure surgery	4.12	5.00	1.111	26.940	94.118	5.9	Include
Incidence of wrong implant surgery	4.18	5.00	1.185	28.470	88.235	0	Include
Urinary retention rate	3.29	3.00	1.213	36.780	70.588	29.4	No consensus
Number of visits to the Emergency Department within 30 days of surgery	2.47	2.00	1.179	47.770	41.176	58.8	Not include
Number of visits to the Health Center within 30 days of surgery	2.59	2.00	1.37	52.90	47.059	52.9	Not include
Number of unplanned visits to the surgical specialty clinics within 30 days of surgery	2.47	2.00	1.18	47.77	41.176	58.8	Not include
Staff satisfaction	3.76	5.00	1.48	39.36	82.353	17.6	Include
Waiting times after admission to the ambulatory surgery center	3.12	3.00	1.41	45.19	64.706	35.3	No consensus
Number of days until the patient resumes their activities of daily living following surgery	3.24	3.00	1.30	40.12	70.588	29.4	No consensus
Maintenance of normothermia	3.88	3.00	1.11	28.61	94.118	5.9	Include
Health-related quality of life	3.65	3.00	1.22	33.42	82.353	17.6	Include

Table 4

Results of the quantitative analysis of Round 2

Indicator	Mean	Median	Standard deviation	CV (%)	CVI (%)	1 or 2 answers (%)	Decision
Structure indicators							
Existence of protocols about the clinical information provided to patients and relatives	4.55	5	0.858	18.873	95.455	4.5	Include
Influenza vaccination compliance among healthcare personnel	2.68	3	1.323	49.343	54.545	45.5	No consensus
Personnel skill mix	4.55	4.5	0.800	17.610	100	0	Include
Favorable practice environments	4.36	5	0.727	16.654	100	0	Include
Process indicators							
Number of preoperative delays and incidents	4.23	4.5	0.973	23.007	90.909	9.1	Include
Supply of medication at discharge	3.64	4	1.329	36.547	77.273	22.7	No consensus
Patient selection for administration of nausea and vomiting prophylaxis	3.55	4	1.184	33.404	81.818	18.2	Include
Surgical site hair removal	4.05	4	0.722	17.853	100	0	Include
Rate of preoperative nursing visits	4.77	5	0.612	12.821	100	0	Include
Outcome indicators							
Rate of postoperative hematoma	3.32	3	1.211	36.482	72.727	27.3	No consensus
Rate of postoperative ischemia	3.36	3	1.217	36.174	72.727	27.3	No consensus
Rate of postoperative hypertension	3.09	3	1.269	41.056	59.091	40.9	No consensus
Rate of postoperative hypoxemia	3.50	3.5	1.185	33.864	72.727	27.3	No consensus
Rate of thromboembolic events	3.73	4	1.077	28.898	86.364	13.6	Include
Rate of surgical site infection	4.36	4.5	0.790	18.094	95.455	4.5	Include
30-day morbidity rate	3.86	4	0.990	25.629	86.364	13.6	Include
Rate of unplanned hospital readmissions	3.95	4	1.133	28.649	86.364	13.6	Include
Number of same-day admissions with a length of stay of at least 24 hours	3.77	4	1.152	30.532	81.818	18.2	Include
Number of unplanned overnight stays	3.68	4	1.211	32.878	81.818	18.2	Include
Urinary retention rate	3.95	4	0.999	25.260	90.909	9.1	Include
Staff satisfaction	4.41	5	0.734	16.651	100	0	Include
Waiting times after admission to the ambulatory surgery center	3.50	4	1.225	34.993	68.182	31.8	No consensus
Number of days until the patient resumes their activities of daily living following surgery	3.91	4	1.019	26.075	90.909	9.1	Include

Discussion

The use of the Delphi technique in this study made it possible to develop a profile of NSQIs in AS.

Until now, only the knowledge regarding which quality indicators are used in this type of surgery had been mapped (Pinto et al., 2022). This study shows which of these indicators are sensitive to nursing interventions.

Fifty-eight indicators were initially presented to the experts, distributed across the three dimensions of Donabedian's (1992) model. In Round 1, there was consensus to include or exclude 35 items and three items required clarification. In Round 2, the experts evaluated 23 indicators. The research team analyzed the indicators for which there was no consensus to decide whether to include or exclude them from the profile.

In Round 1, experts reported a lack of understanding of the structure indicators "Personnel skill-mix" and "Favorable practice environments". The report sent to the experts with the results of Round 1 included clarifications regarding the indicators that raised doubts, revealing ambiguity or lack of understanding of the items.

Skill mix refers to the number of nurses, their academic preparation, and their professional experience in a given clinical setting. It indicates that there is an appropriate number of nurses with different levels of education, skills, and experience across the continuum of care to ensure that patient needs are met (Kushemererwa et al., 2020). The term *practice environments* refers to the organizational characteristics that either facilitate or limit professional nursing practice, including the type of relationship nurses establish with managers and physicians, as well as their position within the hospital hierarchy (Lake, 2002). Practice environments can be assessed using the Portuguese version of the Practice Environment Scale of the Nursing Work Index (Amaral et al., 2012). In Round 2, both indicators met the criteria to be included in the indicators' profile.

Consensus was not reached in any of the rounds for the indicator 'Influenza vaccination compliance among healthcare personnel'. The statistics for this indicator were analyzed, comparing the results of the panel of experts and the results of the nurses belonging to the panel alone. The indicator did not meet the criteria for inclusion or exclusion and was subsequently removed from the indicators' profile by the research team.

Regarding process indicators, the indicator "Supply of medication at discharge" did not meet the consensus criteria in any of the rounds or among the nurses' subgroup in any of the rounds. Although this quality indicator is one of the indicators defined by the Health Regulatory Authority (Entidade Reguladora da Saúde, 2022) used in Portugal the research team understood that the supply of medication was more of a bureaucratic issue than a nurse intervention. The nurse's autonomous intervention goes beyond providing medication and "education and guidance on discharge". It involves reconciling medication and empowering the patient and/or caregiver to manage their therapeutic regimen after the AS. Therefore, the research team suggests including medication reconciliation as a quality (process) indicator sensitive to nursing interventions in AS. This will transform the criteria described in Standard No. 018/2016 of the Directorate-General for Health into metrics for evaluation. Although the criteria for consensus were met in Round 2 of the Delphi technique, the research team decided not to include this indicator. The team felt that its assessment was dichotomous (*yes*/*no*) and redundant with the process indicator "Appropriate use of the Surgical Safety Checklist", as it was already included there. On the other hand, there was no stability in the panel's responses to this indicator, which refers to an interdependent nursing intervention.

Finally, regarding the outcome indicators, the indicators "Rate of postoperative hematoma", "Rate of postoperative ischemia", "Rate of postoperative hypertension", and "Rate of postoperative hypoxemia" did not meet the criteria for inclusion or exclusion from the indicators" profile, with overlapping results between the expert panel and the nurses' subgroup. This leaves us to reflect on autonomous nursing interventions to mitigate these possible postoperative complications and their visibility to those involved in the AS and to the nurses themselves. The Quality Standards for Specialized Care in Medical-Surgical Nursing, specifically in the area of Nursing care for Perioperative Patients, recommend that nurses take a proactive professional approach to prevent complications, manage complex therapeutic protocols throughout the perioperative period, and implement appropriate monitoring and intervention mechanisms (Ordem dos Enfermeiros, 2017). states that monitoring signs and symptoms, analyzing outcomes, and intervening with specialized knowledge, scientific evidence, and professional experience are part of the Specific Competences of the Nurse Specialist in Medical-Surgical Nursing - Nursing care for Perioperative Patients. Thus, the research team concluded that postoperative complications are influenced by the autonomous interventions of nurses and recommended that these indicators be included in the profile.

The quality indicator "Waiting times after admission to the ambulatory surgery center" is valid and useful and has been cited multiple times in the literature (Brökelmann & Bäcker, 2010; Lemos et al., 2009; Williams et al., 2003). However, it was not considered a NSQI in this study. The panel of experts and nurses' subgroup did not reach a consensus on this indicator in any of the rounds. The high percentage of 1 and 2 answers, as well as CVs of over 30%, revealed a high dispersion of answers. Therefore, this indicator was removed from the indicators' profile.

There are limitations to this study. Firstly, a non-randomized sample was used. Although the panel of experts was heterogeneous, none of them had personal experience in a perioperative situation. Therefore, only the perspective of formal participants throughout the AS process was considered.

Furthermore, data analysis and interpretation were based on criteria defined by the research team, since there is no clear definition in the literature on the consensus criteria, the size and characteristics of the panel of experts, or the number of rounds to be carried out. Also, some experts did not participate in both rounds, which may have impacted the achievement of consensus.

Conclusion

This study made it possible to develop a profile of NSQIs in AS. Monitoring the quality of nursing care is crucial for improving the quality of the healthcare system, and NSQIs should be a priority in daily nursing practice. A conceptual approach is needed to measure the quality of nursing care using NSQIs that are relevant in the clinical context.

To improve the quality of nursing care and make appropriate clinical, managerial, and financial decisions, it is necessary to understand the metrics used to evaluate it and address any constraints. Measuring and evaluating quality indicators in AS demonstrates a commitment to improving quality and is crucial for patient safety.

The results of this study could support the development of a measurement tool for assessing NSQIs in AS. This will increase the visibility of nursing care in this context, allowing for more efficient and higher quality patient-centered care.

Author contributions

Conceptualization: Pinto, J., Sá, l., Amaral, A.
Data curation: Pinto, J.
Formal analysis: Pinto, J., Amado, J.
Investigation: Pinto, J.
Methodology: Pinto, J., Sá, l., Amaral, A.
Project administration: Pinto, J.
Resources: Amado, J.
Software: Amado, J.
Supervision: Sá, l., Amaral, A.
Validation: Sá, l., Amaral, A.
Visualization: Sá, l., Amaral, A.
Writing – original draft: Pinto, J.
Writing – review and editing: Pinto, J.

References

Aiken, L., Clarke, S. P., Sloane, D. M., Sochalski, J., & Silber, J. H. (2002). Hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction. *Journal of American Medical Association*, *288*(16), 1987-1993. https://doi.org.10.1001/jama.288.16.1987

Afaneh, T., Abu-Moghli, F., & Ahmad, M. (2021). Nursing-sensitive indicators: A concept analysis. *Nursing Management*, *28*(3), 28-33. https://doi.org/10.7748/NM.2021.E1982

Amaral, A. F., Ferreira, P. L., & Lake, E. (2012). Validation of the practice environment scale of the nursing work index (PESNWI) for the Portuguese nurse population. *International Journal of Caring Sciences*, *5*(3), 280-288. https://internationaljournalofcaringsciences.org/docs/7.%20%20Original%20Paper.pdf

Bardin, L. (2014). *Análise de conteúdo* (4th ed.). Edições 70.

Beiderbeck, D., Frevel, N., Gracht, H. A. Von Der, Schmidt, S. L., & Schweitzer, V. M. (2021). Preparing, conducting, and analyzing Delphi surveys: Cross-disciplinary practices, new directions, and advancements. *MethodsX*, *8*, 101401. https://doi.org/10.1016/j.mex.2021.101401

Borel, M., Lopes, R., Thofhem, M., Nóbrega, M., Arreguy-Sena, C., & Brandão, M. (2021). Guideline for incorporating the Delphi method in the evaluation of nursing theories. *Revista Latino-Americana Enfermagem*, *29*, e3387. https://doi.org/10.1590/1518-8345.4157.3387

Boulkedid, R., Abdoul, H., Loustau, M., Sibony, O., & Alberti, C. (2011). Using and reporting the Delphi Method for selecting healthcare quality indicators: A systematic review. *PLoS ONE*, *6*(6), e20476. https://doi.org/10.1371/journal.pone.0020476

Brökelmann, J., & Bäcker, K. (2010). Clinical indicators for ambulatory surgery. *Ambulatory Surgery*, *16*(2), 34–37.

David, S. (2012). *Why nurses are the unsung heroes of global health*. https://www.huffpost.com/entry/international-nurses-week_b_1499802

Donabedian, A. (1992). The role of outcomes in quality assessment and assurance. *Quality Review Bulletin*, *18*(11), 356-360. https://doi.org.10.1016/s0097-5990(16)30560-7

Doran, D., & Pringle, D. (2011). Patient outcomes as accountability. In D. Doran (Ed.), *Nursing outcomes: The state of the science* (2nd ed., pp. 1-23). Jones & Bartlett Learning.

Entidade Reguladora da Saúde. (2022). *Resultados da segunda avaliação de 2021*. https://apch2.ers.pt/pages/594

Gracht, H. A. (2012). Technological forecasting & social change consensus measurement in Delphi studies review and implications for future quality assurance. *Technological Forecasting & Social Change*, *79*(8), 1525–1536. https://doi.org/10.1016/j.techfore.2012.04.013

Hitchcock, M., & Ogg, T. W. (1994). A quality assurance initiative in day case surgery: General considerations. *Ambulatory Surgery*, *2*(4), 181–192. https://doi.org/10.1016/0966-6532(94)90016-7

Keeney, S., Hasson, F., & McKenna, H. (2010). The Delphi technique in nursing and health research. *Wiley Online Library*. https://doi.org.10.1002/9781444392029

Kushemererwa, D., Davis, J., Moyo, N., Gilbert, S., & Gray, R. (2020). The association between nursing skill mix and mortality for adult medical and surgical patients: Protocol for a systematic review. *International Journal Environmental Research and Public Health*, *17*(22), 8604. https://doi.org/10.3390/ijerph17228604

Lake, E. T. (2002). Development of the Practice Environment Scale of the Nursing Work Index. *Research in Nursing and Health*, *25*(3), 176–188. https://doi.org/10.1002/nur.10032

Lemos, P., Pinto, A., Morais, G., Pereira, J., Loureiro, R., Teixeira, S., & Nunes, C. S. (2009). Patient satisfaction following day surgery. *Journal of Clinical Anesthesia*, *21*(3), 200–205. https://doi.org/10.1016/j.jclinane.2008.08.016

Nasa, P., Jain, R., & Juneja, D. (2021). Delphi methodology in healthcare research: How to decide its appropriateness. *World Journal of Methodology*, *11*(4), 116–129. https://doi.org/10.5662/wjm.v11.i4.116

Nunes, J., Gomes, R., Povo, A., & Alves, E. (2018). Quality indicators in ambulatory surgery: A literature review comparing Portuguese and international systems. *Acta Médica Portuguesa*, *31*(7-8), 425-430. https://doi.org.10.20344/amp.10416

Ordem dos Enfermeiros. (2017). *Padrões de qualidade dos cuidados especilizados em enfermagem médico-cirúrgica: Na área de enfermagem à pessoa em situação crítica: Na área de enfermagem à pessoa em situação paliativa: Na área de enfermagem à pessoa em situação perioperatória: Na área de enfermagem à pessoa em situação crónica.* https://www.ordemenfermeiros.pt/media/5681/ponto-2_padroes-qualidade-emc_rev.pdf

Organisation for Economic Co-operation and Development. (2021). *Health at a glance: Health at a glance 2021: Ambulatory surgery.* https://www.oecd-ilibrary.org/social-issues-migration-health/health-at-a-glance-2021_dd4f4919-en

Pinto, J., Matias, A., & Sarnadas , L. (2020). Avaliação da cultura de segurança do doente em cirurgia ambulatória pelos enfermeiros: Protocolo de scoping review. *Revista de Enfermagem Referência*, *5*(4), e20059. https://doi.org.10.12707/RV20059

Pinto, J., Matias, A. C., Sá, L., & Amaral, A. (2022). Quality indicators in ambulatory care surgery: A scoping review. *Nursing Economic$*, *40*(5), 215–229. http://hdl.handle.net/10400.14/39670

Regulamento n.º 429/2018 da Ordem dos enfermeiros. (2018). *Diário da República: II série*, n.º 135. https://www.ordemenfermeiros.pt/media/8420/115698537.pdf

Serviço Nacional de Saúde, & Direção-Geral da Saúde. (2016). *Norma n.º 018/2016 de 30/12/2016*. https://normas.dgs.min-saude.pt/wp-content/uploads/2019/10/reconciliacao-da-medicacao.pdf

Williams, A., Ching, M., & Loader, J. (2003). Assessing patient satisfaction with day surgery at a metropolitan public hospital. *Australian Journal of Advanced Nursing*, *21*(1), 35–41.