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UNFINISHED NURSING CARE

FOR THE PATIENT AT RISK AND WITH DELIRIUM

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Abstract

Background

Patients with delirium are defined in the literature as frailty patients who are more vulnerable to unfinished care due to their inability to communicate their needs. Unfinished nursing care (UNC) is used as an umbrella term, in the literature and is defined as 'a problem of time scarcity that leads nurses to implicitly ration care through the clinical prioritisation process. From this knowledge gap, a research project was built with the following objectives: a) To describe the state of the art about concepts used in the literature to describe the cognitive process underlying UNC; the conceptual models and the measurement tools available; b) To explore how nurses prioritise interventions in practice and the reasons for such choices within acute and post-acute settings for patients at risk of functional and/or cognitive decline at risk of delirium. c) To adapt the Unfinished Nursing Care Survey (UNCS) tool for the assessment of delayed or missed care among patients at risk or with delirium and to evaluate its psychometric properties in a sample of nurses.

Materials and methods

To meet objective a) a Scoping Review was conducted, b) a Q-Methodology study was conducted, (involving a systematic literature review and the Nominal Group Technique to produce the Q methodology materials). Finally, to meet objective c) a validation study was performed

Results

Prioritisation is an important activity for nurses, who have to decide which unfinished nursing tasks to prioritise. In study b) 56 nurses working in medical, geriatric and post-acute care facilities were involved. The results describe the preventive and management interventions that received the highest/lowest priority, the patterns that emerged among the nurses, and the reasons.

Conclusions

This project highlighted the importance of focusing on the way nurses prioritise, motivate and measure unfinished care to promote safe and quality care.

Keywords

Delirium; delirium/nursing; prevention, management, prioritisation, Unfinished Nursing care; reasons.

Chapter 1

The research project

In this first chapter, the rationale of the doctoral research project is outlined, the antecedent of unfinished nursing care and the instruments for measuring unfinished nursing care in patient at risk and with delirium, the underexplored areas of the literature and the research objectives.

1.1 THE GUIDING PRINCIPLE SUPPORTING THE RESEARCH

Delirium is defined as a neuropsychiatric syndrome characterised by disturbances of attention (reduced ability to direct, focus, sustain and shift attention), awareness (reduced orientation towards the environment) and an additional disturbance of cognition (e.g., deficits in memory, disorientation, language, visual-spatial ability or perception) that usually has a rapid onset and fluctuating course and represents a significant change from a previous level of functioning [1]. Delirium is by definition the result of an underlying medical disease and is not more appropriately explained by a different neurocognitive problem, whether it is established, developing, or pre-existing [2]. The clinical presentation can vary, but it typically involves psychomotor behavioral disorders, including hyper or hypoactivity, as well as impairments to sleep architecture and duration [3]. Patients with hyperactive delirium have heightened levels of agitation and [3] sympathetic activity. Confusion, hallucinations, and sometimes aggressive or uncooperative conduct are some of the symptoms they may exhibit [3].

Patients with hypoactive delirium have decreased alertness and increased somnolence. Because hypoactive delirium is frequently overlooked or confused with melancholy or exhaustion, it can be deadly [2]. In a susceptible patient, delirium is a sign of stress on the central nervous system's functionality; there is likely more than one etiology, and the pathophysiology is not well known [2]. The possible pathophysiologic origins of delirium are described by a number of theories, and each given instance of delirium most likely incorporates one or more of these ideas in a convoluted and interrelated process. The accepted multifactorial models characterise delirium as the result of a susceptible patient interacting with risk variables who are then subjected to noxious insults or precipitant factors [2]. As a result, delirium is a common acute neuropsychological disorder in hospitalised patients, especially in elderly patients internationally, who have a high prevalence of delirium in intermediate care units (39.8%) [4], internal medicine units (from 33.1% [5] to 34.2% [4]), and neurology units (30.43% [4]), while there is a low prevalence of delirium in geriatric (20-29%) and Nursing Home/Postacute Care (14%) units [3]. In Italy, nursing home (36.8%) [6], neurology (28.5%) and geriatric (24.7%) units had the highest prevalence, while internal medicine (21.4%) and rehabilitation (14.0%) units had the lowest [7].

Predisposing and precipitating factors are the two categories of delirium risk factors. Older age, dementia, functional impairments, sex, low eyesight and hearing, cardiovascular diseases, cumulative comorbidities, central nervous system disorders and mild cognitive impairment are the most frequent predisposing variables [8]. On the other hand, surgery, intraoperative blood loss/hemodynamics, postoperative complications, prolonged time to operation, anaemia, infection, fever or hypothermia, hypoxemia and pain are the main precipitating factors [8]. Many of these factors are involved in underlying mechanisms that can be influenced by healthcare-associated factors, such as

immobilisation, malnutrition, pain and/or sleep disruption [8]. From this perspective, delirium is a major problem that has an impact on both costs and short- and long-term outcomes. However, because of its subtle clinical expression, particularly its hypoactive variety, the diagnosis is frequently missed [9].

For this reason, preventing delirium through non-invasive techniques, such as nonpharmacological approaches, is a key strategy [10]. There is evidence that interventions such as protocols to address reorientation, early mobilisation, the promotion of sleep, the maintenance of adequate hydration and nutrition, the provision of vision and hearing aids, and systematic cognitive and systematic searches for pain are effective ways to prevent the incidence of delirium [11]. In fact, these strategies represent real game changers in non-ICU settings [12]. However, these valuable interventions are multicomponent and need to be conducted by a multidisciplinary team, where nurses with advanced competences are needed [13]. From this perspective, nurses can play a pivotal role in the recognition, prevention and management of delirium, as they are often the first to detect the presence of this condition [14, 15]. However, nurses report several barriers to successful delirium screening and management, such as difficulties with using delirium screening tools, an organisational culture not conducive to delirium prevention, and competing clinical priorities [16]. Regarding this latter aspect, nurses find themselves prioritising their activities in a complex and changing care environment with high workloads, where they choose which care activities to complete first with complex patients with high comorbidity [17]. The literature indicates that there is a difference between the different needs of patients, and patients at risk and with delirium are at greater risk of experiencing unfinished nursing care (UNC), which can subsequently lead to adverse events [18] and increased costs [2]. These events span a wide range of manifestations, such as middle- or long-term cognitive impairment and mortality [19, 20]. According to the "Failure to Maintain" conceptual model, which illustrates the way nurses think, patients at risk and with delirium turn out to be complex patients with more care needs, as they fail to express their needs [17]. In particular, frailty, a condition defined as a state of extreme vulnerability to sudden changes in health status induced by minimal stress events [21] , is associated with delirium [22, 23]. Frailty has recently been operationalised in a new, more comprehensive framework, the biopsychosocial model, which recommends a multidomain and multidisciplinary approach [21]. From this perspective, the involvement of the family can be very useful for both frailty [21] and delirium [24]. Nevertheless, families also show efficacy in supporting caregivers' health during delirium management [24]. Finally, this involvement can also result in a benefit for the patient, with lower perceived distress [25].

Antecedents Unfinished Nursing Care

The international and national literature has focused on a quality indicator for nursing care and patient safety: missed nursing care (MNC) [26]. MNCs are defined as those care that nurses have planned for their patients and for whatever reason are forced to delay or omit (partially or completely) [27]. In the literature, several related concepts can vary depending on the instrument used to measure the phenomenon, e.g., implicit rationing nursing care [28], care left undone, tasks left undone [29], care left undone [30], and unmet patient need [31]. Although they differ, all terms seek to describe a nursing phenomenon in which necessary or essential nursing care is omitted or left incomplete due to time [32] (Jones et al. 2019). This led to the need to include the term Unfinished Nursing Care (UNC) as a single, umbrella concept to encompass all the present literature [29, 33].

The concept was studied in terms of the model, antecedents, measurement tools and consequences.

The socioecological model is used as a strategy to promote the issue of UNC, in which the problem is seen in a complex and systematic logic, with the allocation of social resources as the antecedent and the achievement of quality as the consequence. The model has a multilevel approach (macrosystem, ecosystem, mesosystem, microsystem and nurse-related level), in which the underlying idea is that higher levels can influence nurses' behaviour to varying degrees (e.g., political choices of staff cuts, as well as reducing the ratio of nurses to persons cared for, can influence nurses' ability to deliver care) [32]. The antecedents are divided at the following levels: (a) unit level (e.g., workload, no nursing tasks, ineffective models of care); (b) nurse level (e.g., age, gender, deficiencies in training); (c) patient level (clinical instability, increased demand for patient care); and (d) nursing leadership (e.g., inadequate leadership) [34, 35]. The literature also provides evidence of what the antecedents are by providing multiple perspectives, not only from the nurse's point of view but also from the manager's [35] and patient's [36] perspectives.

In recent years, attention has been given not only to defining what the antecedents were but also to dwelling on the reasoning processes of nurses working at the bedside of patients [37]. Every day, nurses find themselves planning the care of patients with time scarcity (scarce scarcity of resources/time), which requires them to choose activities to provide care [32]. The prioritisation process involves not only a single list of interventions to be performed for the patient but also a skill based on critical thinking and clinical reasoning, e.g., the ability to analyse and evaluate situations rationally and systematically to make safe decisions [38]. The prioritisation process is an essential process that helps nurses manage care effectively and respond to patient needs in a timely manner [32]. Nurses are guided in the prioritisation process by a humanistic approach [39], accountability [40] and teamwork [39]. Decision making has been studied in several hospital [41] and nursing home [39, 42] contexts.

Nurses make decisions through clinical decision making and clinical judgement [43] and are aware that time constraints can also affect patient safety, resulting in adverse events.

Instruments

In recent years, the UNC has been measured in the literature as an indicator of quality of care. Instruments have been built on the following approaches: a) Tasks Undone (TU), b) Implicit Rationing (IR) and c) Missed Nursing Care (MNC) and aim to measure missing activities and reasons.

Specifically, the instruments they measure are the Missed Care Survey (MISSCARE), the Basal Extent of Rationing of Nursing Care (BERNCA) and the Task Undone scale (TU-7), which have acceptable psychometric properties in terms of both quality and methodology [44]. Missed care is measured in the national context with an Unfinished Nursing Care Survey instrument, which was developed considering all validated instruments in this field (MISSCARE Survey; BERNCA; Caring Behaviours Inventory) and is composed of two parts: part A, which allows the assessment of items of missed care, and part B, which investigates the reasons for UNC [45].

UNC can be evaluated in different contexts [46–48] in a multicentre manner [49] from the perspectives of patients [50], students [51, 52] and nurses [45].

The consequences of UNC are (a) for nurses, job satisfaction, burnout and intention to leave [53] and (b) for patients, outcomes in the context of patient safety (e.g., adverse risks such as the risk of falling and adverse events such as functional impairment of autonomy and falls) and the quality of nursing care (e.g., patient satisfaction) [54].

1.2 RATIONALE OF THE RESEARCH PROJECT

From these concepts, it is important to describe the most recent evidence on the prioritisation process. Understanding how nurses the prioritise process in the prevention and management of patient with delirium [55] , especially knowing the reasons for delirium prevention under difficult conditions, such as during the COVID-19 pandemic, and what the reasons behind the choices were [56]. Finally, defining tools to measure UNCSs for patients with delirium seems to be a priority because these patients have more care needs and fail to express their needs and identify possible treatments that nurses may omit or delay [57].

Overall, the critical issues that have emerged in the literature are (a) the limited description of prioritisation terms, (b) the lack of evidence of how nurses choose the prioritisation process and the reasons for these choices, and (c) the lack of instruments to measure unfinished nursing care for patients at risk and with delirium, shaping the framework of a research project that intends to provide safe strategies for patients at risk and with delirium. In summary, the underexplored areas of the literature allowed us to define the primary research question of the project and its specific research questions.

Objectives

From this knowledge gap, a research project was built with the following objectives:

a) To describe the state of the art with respect to which concepts are used in the literature to describe the cognitive process underlying MNC/UNC; the conceptual models and the measurement tools available;

b) To explore how nurses prioritise interventions in practice and the reasons for such choices within acute (Northern Italy Hospital) and post-acute (Northern Italy) settings for patients at risk of functional and/or cognitive decline at risk of delirium.

c) To adapt the Unfinished Nursing Care Survey (UNCS) tool for the assessment of delayed or missed care among patients at risk or with delirium and to evaluate its psychometric properties in a sample of nurses.

This thesis is divided into three chapters corresponding to three different objectives of the research project.

The first chapter describes the results of the literature review by means of scoping review methodology, focusing on the terms most frequently used in the literature to define the decision-making processes influencing missed nursing care and the conceptual models and measurement tools available. The results of this review have been published [58].

The second chapter reports the results of the study conducted through Q-methodology to explore the prioritisation process of interventions for patients with a risk or presence of delirium at

risk of functional and/or cognitive decline. The results of the study have been published [59, 60] and are currently being evaluated by peer-reviewed journals (Sist et al., submitted).

The third chapter describes the results of the validation study, which made it possible to adapt the Unfinished Nursing Care Survey instrument for the assessment of postponed care for patients at risk and/or in the presence of delirium and to investigate its psychometric properties. Some of the results of this study have been published [61], and others are being evaluated by a journal (Sist et al., submitted). Finally, in the discussion section, the studies were critically evaluated, and the contributions of these results to the topic, implications for practice, research and limitations are reported.

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Chapter 2

Decision Making and *missed nursing care*: Results from a scoping review

This second chapter faithfully reports the contents of the work published published in Italian and translated into English in the national journal:

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2.1 BACKGROUND

In recent years, the literature has focused on the topics of Missed Nursing Care (MNC) [1], Unfinished nursing care or Implicit rationing of nursing care defined by the Agency for Health Care Research and Quality as indicators of nursing care quality and patient safety [2]. These are those treatments that nurses have planned for their patients and for various reasons are forced to delay or omit (partially or completely) [3, 4]. At the national level, there is no unambiguous term for MNC; even at the first Italian Consensus Conference, this phenomenon was referred to as "Compromised Nursing Care" [5].

To date, the conceptual aspects [3, 6, 7], causes, and measurement instruments and outcomes of MNC have been studied. However, it is still not entirely clear what cognitive processes are involved in selecting what to do or omit and how priorities are set when resources/time are scarce. One of the determinants in the choice are the following: if immediate and visible (e.g., a fall of the patient), the intervention is delivered; otherwise, it is more likely to be postponed [8]. A lack of human and material resources and communication difficulties are also important [9]. Nurses also make decisions based on individual factors (e.g., priorities set by what is known or considered important) [10], context (what is considered important or rewarding), and system (what assumes value to society). However, how nurses make decisions is an underexplored area of study [11]. For this reason, the aim of this review is to describe the state of knowledge with respect to (a) the terms used today to describe the decision-making mechanisms that explain MNC, (b) the factors involved, and (c) the measurement tools available.

2.2 MATERIAL & METHODS

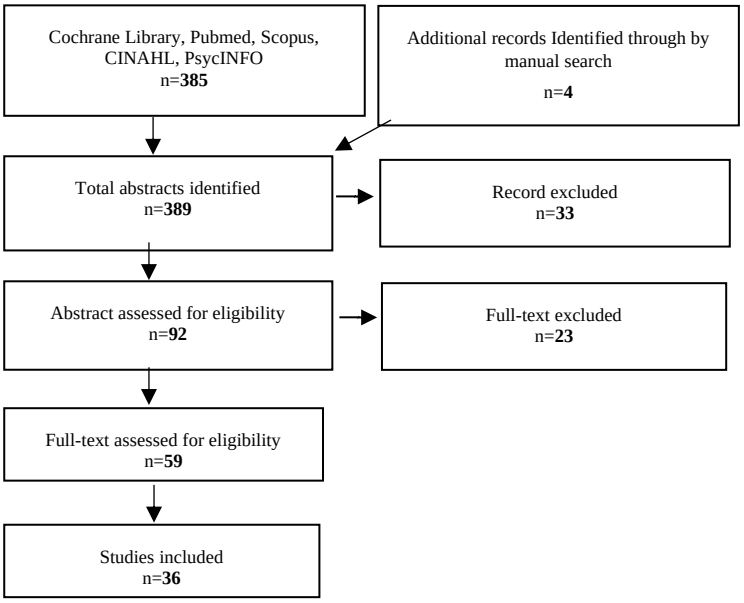
This scoping review was conducted using Arksey and O'Malley's [12] methodological framework, which involves the following steps: (a) identification of the research question, (b) identification, (c) selection, and (d) collection, synthesis and reporting of studies. The following research question was defined: 'What terms are used today to describe nurses' decision-making in the context of MNC, and what factors influence these decisions? What are the most documented decision-making models and instruments that measure the quality of these cognitive processes?

The literature search was conducted from March-August 2020 by consulting the Cochrane Library, PubMed, Scopus, Cumulative Index to Nursing and Allied Health Literature (CINAHL) and PsycINFO databases. A manual reference search of the included articles and a scan through the

Google Scholar databases were performed. The keywords ‘priority setting’, ‘prioritisation’, ‘nurse prioritisation’, ‘clinical prioritisation’, ‘clinical decision making’, ‘time scarcity’, ‘rationing of nursing care’, ‘implicit rationing’, ‘nursing care rationing’, ‘missed care’, and ‘unfinished nursing care’ and the MesH terms ‘decision making’ and ‘clinical decision making’ were used.

The following were included: (a) all primary and secondary studies relevant to the research question for which the abstract was available; (b) articles published within the last 10 years to find current sources; (c) instrument validation studies; and (d) studies written in English. A total of 385 results were identified in addition to four found by manual search; therefore, 92 abstracts were evaluated, and 36 studies were selected after reading the full texts (Figure 1).

Figure 1. Flow chart of the literature search process.



The following information was extracted from the selected studies and summarised: (a) authors, (b) year of publication, (c) country/context of study, (d) objective(s), (e) methods, (f) instruments, and (g) main results. Terms used to describe MNC-related decision-making mechanisms, their meaning, factors influencing decision-making, and measurement tools were identified.

2.3 RESULTS

Studies and main characteristics Thirty-six studies emerged, 22 of which were primary and 14 of which were secondary (Table 1). Among the primary studies, most used a qualitative design, eight used a quantitative approach [13–20], and one used a mixed-method design [21]. Among the qualitative studies are two *concept analyses* referring to the concepts of *clinical decision making* [22] and *clinical judgement* in nursing [23].

Most of these studies were conducted in Nordic countries [18, 20, 24–28], America [17, 29, 30] and acute hospitals [13–18, 20, 24, 25, 30–32].

Qualitative studies have described priority setting [24, 26, 27, 32], prioritisation, and activity hierarchy [25, 28, 30], implicit nursing care rationing [29], and bedside nursing rationing [16, 33] in terms of their ability to influence MNCs [34] and accountability [35]. In three quantitative papers, instruments measuring Decision Making [18, 20] and Critical Thinking [19] were validated. Other quantitative studies have measured nurses' prioritisation process [14, 15, 21], implicit nursing care

rationing process [13, 16, 33], decision making [17], and nursing activities subject to time shortages [15].

Seven narrative and as many systematic reviews emerged among the secondary sources, summarising the literature on the models and theoretical frameworks of priority setting [36, 37], time scarcity [38], prioritisation in nursing [39, 40], decision making in nursing [35, 41–43], clinical intuition [44], rationing care [45, 46], ethical aspects [47] and tools [48].

Table 1 Terms used to indicate the decision-making process for choosing interventions, study designs and instruments.

Terms and similar terms		Author/Authors Year/Nation	Setting	Study Design	Tools
Decision Making	Clinical Decision Making	Bjørk et al., 2011 [18] Norway	Hospital	Qualitative Transversal	Nursing Decision Making Instrument
	Bedside Clinical Decision Making	Marino et al., 2020 [41]		Narrative review	
	Decision Making In Nursing Practice	Johansen et al., 2016 [22]		Qualitative Concept Analysis	
		Lauri et al., 2002 [20] Finland	Territory, Intensive care unit	Quantitative Validation	Clinical Decision Making in Nursing Instrument
		Nibbelink et al., 2018 [42]		Systematic review	
		Krishnan, 2018 [35]		Review	
	Decision Making Process In Nursing Practice	Abdelhadi et al., 2020 [34] Israel	Hospital University	Qualitative Grounded Theory	Semistructured interview Focus groups
	Decision Making In Emergency Department	Rubio-Navarro et al., 2020 [31] UK	Emergency Department	Qualitative Ethnography	Observation Semistructured interview
	Clinical Intuition Decision Making	Melin-Johansson et al., 2017 [44]		Integrative Review	
	Emotional In Clinical Decision Making	Kozlowski et al., 2017 [43]		Systematic review	
	Clinical Judgment In Nursing	Manetti, 2019 [23]		Qualitative Concept Analysis	
	Critical Thinking	Hassan et al., 2007 [19] Lebanon	Private University	Qualitative Validation	Watson Glaser Critical Thinking
		Lee et al., 2017 [48]		Integrative Review	
	Critical Thinking Skills	Wahl et al., 2013 [17] USA	Intensive care unit	Quantitative Before/after intervention	25 items (Problem Recognition, Clinical Decision Making, Prioritisation, Clinical Implementation, Reflection)
Priority Setting	Priority Criteria	Arvidsson et al., 2010 [27] Sweden	Primary Care	Qualitative Grounded Theory	Focus groups
	Priority Setting In Health Care	Barasa et al., 2015 [36]		Systematic review	
		Hendry &Walker, 2004 [37]		Narrative Review	
	Priority Setting In Nursing	Suhonen et al., 2018 [47]		Systematic review	
	Priority Setting In Homes	Tønnessen et al., 2011 [26] Norway	Primary Care	Qualitative Phenomenology hermeneutics	Survey Interview
	Severity	Barra et al., 2020 [24] Norway and Sweden	National Health Service	Qualitative Briefing History	Survey
Prioritisation of clinical care	Priorities Of Nurse And Nursing	Chan et al., 2013 [32] Hong Kong	Hospital, Primary Care	Qualitative Narrative Investigation	Interview
	Nurse Prioritisation	Cho et al., 2020 [15] South Korea	Hospital Surgery and Medicines	Qualitative Transversal	Nurse-to-patient ratio; Missed Nursing Care Survey; Patient Safety Grade Quality; Nurse Job Satisfaction

		Patterson et al., 2011 [30] USA	Indiana University: Intensive care unit, medicine, surgery, post acute	Qualitative Grounded Theory	Interview with audio recording Observation
		Lake et al., 2009 [40]		Review	
	Prioritasation Of Care	Ludlow et al., 2020 [21] Australia	Nursing Home	Quantitative Qualitative Q-methodology	Survey Demographic Semistructured interview
		Skirbekk et al., 2017 [25] Norway	Hospital: medicine	Qualitative Grounded Theory	Observation Interview, Focus group
	Prioritatisation To Unfinished Nursing Care	Palese et al., 2020 [14] Italy	Hospital University: Surgery	Quantitative Q- methodology	35 Nursing activities derived from: Tasks Undone survey, Based Extent of Raining of Nursing Care Instrument, MISSCARE survey
	Clinical Prioritisation	Slettebø et al., 2010 [28] Norway	Primary Care	Qualitative Grounded Theory	Interview
	Prioritising Patient Priority Complex Patient	Skirbekk et al., 2017 [25] Norway	Hospital. Medicine	Qualitative Grounded Theory	Observation Interview Focus group
		Grant et al., 2013 [39]		Review	
	Nursing prioritisation of patient needs	Lake et al., 2009 [40]		Review	
	Priorities in the delivery care	Papastavrou et al., 2014 [16] Cyprus	Hospital	Qualitative Grounded Theory	Focus groups Semistructured interview
Implicit Rationing	Implicit Nursing Care Rationing	Friganovic et al., 2020 [13] Croatia	Hospital University: Intensive care unit , Surgery	Quantitative Cross-sectional	Perceived Implicit Rationing of Nursing Care Questionnaire
	Implicit Rationing Of Nursing Care	Papastavrou et al., 2014 [16] Cyprus	Hospital Surgery and Medicines	Quantitative Descrittivo	Patient Satisfaction Scale; Basel Extend of Rationing of Nursing Care; Revised Professional Practice Environment
	Implicit Rationing Of Care	Potter, 2021 [29] USA	Università	Qualitative Pilot Study	Interview
	Rationing Of Bedside Nursing Care	Papastavrou et al., 2014 [33] Cyprus	Hospital	Qualitative Grounded Theory	Focus groups Semistructured interview
	Rationing In Health System	Keliddar et al., 2017 [46]		Critical Review	
	Rationing Of Care	Mandal et al., 2020 [45]		Systematic review	
Time scarcity	Time scarcity	Jones, 2016 [38]		Review	
		Cho et al., 2020 [15] Corea del Sud	Hospital Surgery and Medicines	Qualitative Transversal	Nurse-to-patient ratio; Missed Nursing Care Survey; Patient Safety Grade Quality; Nurse Job Satisfaction
		Patterson et al., 2011 [30] USA	Indiana University: Intensive care unit, medicine, surgery, post acute	Qualitativo Grounded Theory	Interview with audio recording Observation
	Working collegially and opportunistic communication with patients	Chan et al., 2013 [32] Hong Kong	Hospital Primary Care	Qualitativo Narrative Investigation	Interview

The terms and factors influencing decisions

Prioritising one or the other intervention means activating a decision-making process. The broader concept of decision making has declined among nurses in terms of decision making in nursing practice [22, 42], which expresses the process of decision making [15] of a clinical nature [18, 35] at the patient's bedside [41] and has the fundamental aim of pursuing patient safety [22]. Decision-making is influenced by intuition [44], emotions [43], analytical skills, experience, knowledge,

critical thinking [22] and clinical judgement [23]). The latter includes critical thinking and clinical reasoning that allow nurses to formulate a decision based on objective and subjective data integrated with each other [23]).

Within the broad concept of decision-making, four terms appear to be emphasised (Table 1) to indicate the pathway of choice of nursing intervention to be granted, postponed or omitted: (a*) Priority setting*; (b) *Prioritisation of clinical care*; (c) *Implicit rationing*; (d) *Time scarcity.*

The term *Priority* is derived from the verb 'prioritise', which means establishing an order for dealing with a set of tasks according to their importance [28, 37, 47]. The term "priority setting in health care" refers to a choice based on a formal or informal ranking process that takes into account the specific characteristics of the context [27], the use of available resources and, according to the severity of the condition, the principle of equity and human dignity while also considering social and individual consequences, such as mortality risk [24]. Alongside the term "priority setting", the term "priority criteria" has also appeared over time and includes the key criteria for deciding on a priority according to patient severity, benefit and cost-effectiveness of the intervention. In primary care, other dimensions are considered to define priority criteria: the patient's or caregiver's point of view and timing (immediate or deferable need) [26, 27]. The levels of priority setting identified to date through available studies are macro, national health policy, meso, individual institution-hospital and micro, at the patient's bedside [36, 47].

The term *prioritisation of clinical care* implies establishing an order in the patient's needs,40 in the nursing care to be planned [32], or delivered [21, 25, 33], in which the nurse [15, 30] decides which care to leave unfinished (*prioritisation unfinished nursing care*) [14]. The care to be prioritised may depend on the patient's clinic, the activities of daily living, the relationship with the patient, or all of these elements, in a holistic view [21]. In complex patients (*priorities for complex patients*), priorities depend not only on the clinical point of view but also on the patient and his or her family and are subject to continuous redefinition [39]. Deciding on a priority depends on the situation and perceived role responsibilities [21]. The main factors are experience, competence and decision-making ability; the patient's condition (severity, age), availability of resources, organisation of the facility, philosophy and models of care; and the nurse–patient relationship [28, 37, 38]. Tacit knowledge that guides judgement and ongoing assessment of complex situations also plays an important role [16, 33, 38, 40], as do ethical principles [25]. A hierarchy of nursing activities has been documented according to which (a) imminent clinical concerns are addressed first, (b) activities with high uncertainty content are addressed, (c) reporting is addressed, (e) documentation is addressed, (f) concluding with tidying up the environment and restocking is reached, and (h) personal breaks and social interactions are addressed [30]. In concrete terms, the activities that receive the highest priority are targeted assessment, medication administration, patient education [15], and phone call handling [14]. The activities with the lowest priority are meal preparation, attending interdisciplinary conferences [15], patient and oral hygiene [14, 15, 45], and emotional and educational needs [45] across settings.

The terms *implicit rationing of nursing care and care rationing* denote the process by which nurses decide to postpone or not postpone necessary nursing activities [15]. The term *rationing* in its Latin meaning, i.e., 'limiting use' [46], indicates the implicit rationing process that leads to deciding what care to complete and what to leave unfinished [38]. The process is influenced by many factors: the philosophy of care, certain variables (experience, training and skills-knowledge, ethics and

professionalism), the work environment (resources/skills, interdisciplinary collaboration, autonomy and responsibility) and organisational aspects (budget, policy priorities, resource allocation, management structure, culture and climate) [29]. Other factors are lack of resources (personnel, material, time or expertise) and high workload [13]. However, knowledge (e.g., Maslow's hierarchy of needs), whether a result can be obtained immediately, costs and time requirements also play a role in rationing care [38].

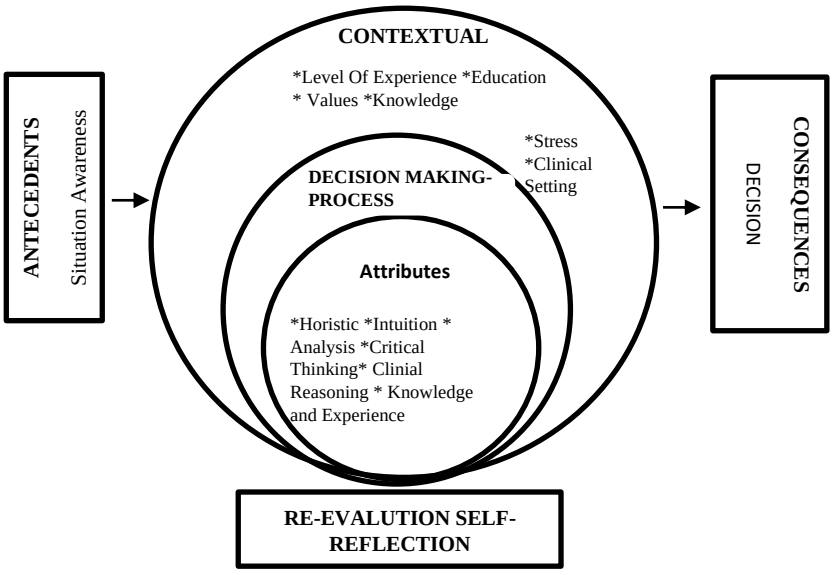
Finally, *time scarcity* is defined as the scarcity of time in the workplace [32], a common occurrence in care settings: when caregivers perceive time scarcity, they are forced to choose what to deliver or leave out [38]. One strategy for coping with the time scarcity phenomenon [32] is teamwork, where mutual help ensures a greater ability to respond to needs; the involvement of patients and/or their family members can also compensate for time scarcity [32].

Decision-making helps to make the best decisions, and prioritisation defines the order of interventions, rationing of care results in MNCs [15], reduced quality of care [26], patient dissatisfaction, and increased risk of mortality and adverse events [16, 33, 45]. This also results in greater dissatisfaction among nurses [15, 45].

Decision-making models. There are four models documented to date that help to understand the complexity of decision-making processes: the decision-making model [22], Hammond's Cognitive Continuum Theory [18], the systemic-positivist and intuitive-humanistic model [35], and Tanner's clinical judgment model [41].

In the former model, the decision is stimulated by situational awareness (Figure 2) [22]. The context, with its values, characteristics, pressure exerted on the decision, and training received, influences decision-making processes from the outside. An individual's abilities, such as critical thinking, knowledge, clinical experience, and intuition, are the factors that influence the quality of decision-making. As a corollary, critical reflection on one's own decision-making processes improves one's ability to perceive the situation and to make effective decisions.

Figure 2: Decision-making model [22]



In the second model, which is based on Hammon's cognitive continuum theory [18], the decision is a function that intersects the activities to be performed and the cognitive processes. The continuum oscillates

(a) from the analytical to the intuitive, i.e., from the detailed process of data collection and decision-making to one that instead proceeds by intuition on the basis of experience;

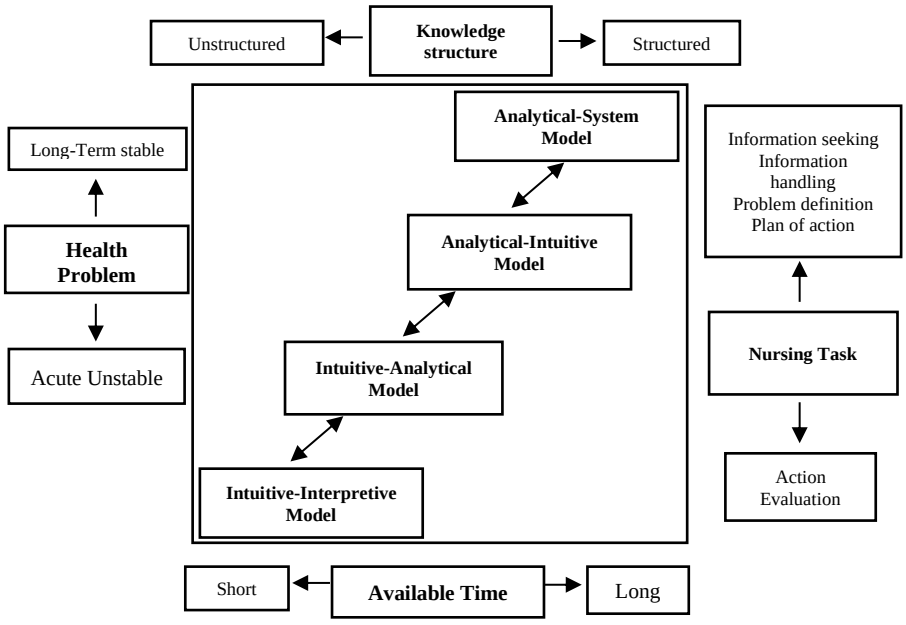
(b) from structured tasks (e.g., the placement of a bladder catheter) to unstructured tasks (e.g., the relationship with the person with dementia).

Patient health problems, the available knowledge structure, the time available (short- or long-term decisions) and nursing activities influence the decision-making process. Decision-making processes for an undefined activity (e.g., the relationship with the aggressive patient) are based on an intuitive-interpretive model, whereas a structured activity (e.g., the placement of a bladder catheter) is based on the analytical-systematic model (Figure 3). Decision-making processes, therefore, do not always occur in the same way.

In the third and fourth models, we entered the specific field of nursing. The systematic-positivist model describes *decision making* as a process based on theoretical knowledge with which data are analysed and a diagnosis is formed: this model could reflect the decision-making process of a student who uses knowledge learned in theory to selectively gather data about the patient and thus arrive at a diagnosis. The intuitive-humanistic model is known in nursing through the work of Patricia Benner: nurses develop their skills along a continuum from beginner to advanced and competent beginner to expert, which correspond to different decision-making modes [35]. The expert nurse makes decisions based not only on intuition and tacit knowledge but also on data (*cues*) that are not always perceptible to the novice.

Finally, Tanner's clinical judgement model (*clinical judgement*) is based on the competence of clinical judgement through which nurses observe, interpret and process the decision followed by reflection. The model emphasises nurses' role, training, context and relationship between nurses and patients [41].

Figure 3: Decision Making Model According to the Hammond Cognitive Continuum Theory [18].



Measurement tools

The following tools emerged from the review:

- **Watson–Glaser Thinking Appraisal (W-GCTA)** [19, 20, 48] is one of the main instruments for assessing cognitive skills in professionals, as it measures critical thinking: it describes how nurses mature their decisions in nursing practice. It consists of 56 items that assess five dimensions: inference (how the deductive or inductive process is carried out), hypothesis recognition, deductive reasoning, interpretation and evaluation. The instrument can be used in different contexts, and measurements can be made through self-assessment: nurses can complete the questionnaire several times to explore the evolution of their critical thinking skills over time based on experience and training [20, 48]. The scores, formulated according to the individual dimensions, correspond to a percentage score (0-100%) based on the correctness of the answers. The WGCTA is distinguished by its long history of development and use in different countries and contexts. Two English language versions of this instrument were born: one version for the United States (1980) and one for the United Kingdom (1991), which has also been validated in other countries [19, 48]; it has been used prevalently in nursing education to explore how enhanced critical thinking skills influence academic performance.

- The **Nursing Decision Making Instrument** [18, 48] is a 24-item version of the W-GCTA. The instrument is self-completed by the nurse by imagining a patient present in their own context, assigning each statement a Likert scale frequency score from 1 (almost never) to 5 (often). Low scores (24) correspond to analytical-systematic decision-making, and high scores (120) correspond to intuitive-interpretive decision-making. The reduced version of the instrument has not been validated and has been translated into English and Norwegian [18, 48].

- **Critical Thinking Skills** [17, 48], an instrument developed by the Nurse Executive Board of The Advisory Board Company in New York that was validated in 2010 to assess nurses' critical thinking skills. The dimensions assessed cover the skills of critical thinking, problem recognition, clinical decision-making, priority setting, clinical implementation and reflection. The instrument is self-completed by the nurse and the clinical nurse manager at the same time, both assigning each statement (e.g., prioritising urgent patients) a Likert scale score from 1 (strongly disagree) to 6 points (strongly agree). The instrument is filled out a second time by the clinical nurse manager while observing the nurse's skills during a simulation. The results of the assessment are shared with the practitioner and read in individual dimensions; the highest possible score for each statement is 6, with a maximum of 150, indicating high critical thinking skills. The instrument has been validated in critical care settings, including in Spanish [17].

2.4 DISCUSSION

Understanding how nurses decide has always been a topic of great interest in the literature [49] dealing with nursing decision-making from both theoretical and practical points of view and has become increasingly important with the progressive legitimisation of nurses' autonomy, a topic introduced in Italy at the end of the 1980s [50]. With the growing evidence on MNCs, from an initial phase in which the focus was on overall decision-making processes, i.e., the ability to choose between two or more alternatives [22], researchers have shifted their attention to specific elements of the

decision-making process pertaining to how priorities are assigned, how care is rationed and how time scarcity is managed. The available literature is extensive and predominantly qualitative in nature given the complexity of implicit and unseen cognitive processes. The terms used to date of priority setting, prioritisation of clinical care, and implicit rationing within the more general term of decision making appear to be used interchangeably [37], generating at times a confused picture on which clarity should be developed.

Between prioritisation and rationing

Decision-making should have the primary goal of pursuing patient safety [22]. By prioritising and rationing care through an implicit cognitive process [51], patients' risk can increase: in both processes, decisions are made about what to do first and what to do next. However, the terms have different meanings: with prioritisation, a preferential sequence for care activities is established with the result of delaying less meaningful activities, while implicit rationing consists of postponing selected activities leaving care unfinished [38]. However, while from a conceptual point of view, this subtle distinction has its relevance, in practice, deciding on a priority does not mean that postponed activities are then actually performed, so deciding on priorities can also generate MNC. Precisely to prevent postponed activities from being unconsciously rationed, decision aids, such as '*reminders*' systems (Early Warning Systems), can be used to promote the early identification of deterioration by supporting nurses' decision-making and reducing MNC [52]. Sharing with the patient and family the 'things to do later' can also prevent the loss of important elements. Several factors influence one or the other process, with some elements in common, for example, the relevance of the patient's condition, context, philosophies, care models, and training. Time scarcity can generate both prioritisation [37, 38] and rationing [32]. However, in addition to more cognitive dimensions (how nurses make decisions) and contingent factors (e.g., patient situation), nurses also prioritise or ration based on context values. The principles that permeate the broader context and reflect health policy and institutional-hospital decisions with respect to, for example, the value of nursing, primary care, the elderly population, and so on, exert an important influence on bedside choices [36, 47]. Supporting clinical nurses in prioritising and rationalising without affecting patient safety is complex. The use of guidelines, supervision and the sharing of difficult decisions can facilitate this process. Doing so much decision-making, as a critical choice between two or more priorities and the rationing of unnecessary activities, appears to be an important strategy not only in basic and continuing education but also in organisational settings.

The available theoretical models

To date, they are of little help in understanding the processes that lead to MNCs because they focus more on reasoning and judgement skills in decision-making [18, 35, 41]. Only the decision-making model according to Hammond's cognitive continuum theory17 considers the variable of time, while no model considers the scarcity of resources, a common problem in more recent years. However, across the board, there is a tendency to consider the systematic approach (based on the progressive processing of the information gathered) as opposed to the intuitive approach: Benner has always attributed these modes as prevailing at different professional stages, such as novice and expert. In reality, they seem to be used flexibly in relation to tasks and recipients on a kind of continuum. Training future generations in this flexibility can be an important strategy for understanding the complexity of decision-making, the different risks of a systematic approach, and the different risks based on intuition, in accordance with the needs of the context.

Instruments

Decision-making is currently measured with self-report instruments that investigate some specific aspects of decision-making skills, such as critical thinking skills [19, 20, 48]. Methodologically, these instruments are compiled by imagining a hypothetical patient or situation and therefore do not capture decision-making in a real context. Such instruments help to understand the quality of certain decision-making processes but do not measure the tendency to prioritise and/or ration care, thus suggesting an interesting area of study.

Limitations

This review has several limitations: we included only the last ten years and surveyed the available literature without critically evaluating the included studies; furthermore, we combined quantitative and qualitative studies to map the documented terms, models and instruments. Furthermore, we did not use a theoretical framework in the analysis and synthesised the information as it emerged according to its similarity.

2.5 CONCLUSIONS

Nursing research has always wondered about the nature and characteristics of decision-making processes: to date, the literature describes general decision-making approaches emphasising certain elements of the process without, however, being able to explain why nurses lose care. Prioritising and rationing are two similar processes related to time (or resource) scarcity. However, while the former orders and optimises the sequence of activities or problems to be addressed, the latter rationalises them by generating MNCs. The theoretical models describing decision-making processes to date are of little use in understanding the decision-making processes that lead to MNCs; consequently, evaluation tools are also of limited use. The tendency to think of expert practice as based on intuitive processes should be reviewed: decisions may be based on different approaches, according to the type of activity, the time available, and the type, knowledge and condition of the patient. Decisions are influenced by internal and external factors, among which it is important to consider the relevance of the business and political context in which one works, which influences the prioritisation and rationing of care.

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Chapter 3

Applicability of recommended interventions in the literature and priorities in prevention and management

3.1 - Applicability of the interventions recommended for patients at risk or with delirium in medical and post-acute settings: a systematic review and a Nominal Group Technique study

This 3.1 faithfully reports the contents of the work published in English in the international journal:

Sist L, Ugenti N V, Donati G, Cedioli S, Mansutti I, Zanetti E, Macchiarulo M, Messina R, Rucci P, & Palese A. (2022). Applicability of the interventions recommended for patients at risk or with delirium in medical and post-acute settings: a systematic review and a Nominal Group Technique study. Aging clinical and experimental research, 34(8), 1781–1791. https://doi.org/10.1007/s40520-022-02127-7

3.1.1 BACKGROUND

Delirium is a neuropsychiatric syndrome characterised by disturbance in attention (reduced ability to direct, focus, sustain and shift attention), awareness (reduced orientation to the environment) and an additional disturbance in cognition (e.g., memory deficit, disorientation, language, visuospatial ability, or perception) which usually has a rapid onset and a fluctuating course [1]. Delirium occurs in all settings reaching a prevalence of 20.1% at admission and 19.2% in the following days of hospitalisation [2]. In Italy, Nursing Homes (36.8%) [3], Neurology (28.5%), and Geriatric (24.7%) [4] units have been reported at the highest prevalence, whereas Internal Medicine (21.4%) and Rehabilitation (14.0%) [4] units at the lowest. At the international level, Intermediate care (39.8%) [5], Internal Medicine (33.1% [6] to 34.2% [5]) and Neurology units (30.43%) [5], have been reported at the highest prevalence, whereas Geriatric (20-29%) [7], Nursing Home/Post-acute Care (14%) [7] units at the lowest. These variations in incidence of delirium are due to several factors as (1) the risk to under-recognise the episodes [8], given that only 46% of patients' manifest delirium with psychomotor agitation [2], and (2) the various instruments used to detect its occurrence as well as their different capacity to accurately detect Delirium episodes.

Predisposing (present on hospital admission) and precipitating factors of delirium (occurring during admission) [7] have been documented to date: among the first, risk factors have been reported in the patient's baseline vulnerability, including advanced age and dementia, whereas precipitating factors have been recognised in those

precipitating delirium, as for example, a single dose of sleep induction medication [7], pain, dehydration, and setting changes [9].

Patients at risk or with delirium, are at greater risk of short and long-term functional [10] and/or cognitive [11] decline, as well as in decreased capacity to communicate their needs [12]. Moreover, patients with delirium are at increased risk of falls [13], increased risk of long hospitalisations and readmissions [5], discharges in nursing homes [5,14] and mortality [14]. According to its relevance, delirium is considered as an indicator of patient safety and of service quality provided in hospitals and in other facilities [7] requiring appropriate preventive and treatment interventions [7], with non-pharmacological, pharmacological and communication strategies [9].

To date several recommendations have been provided on prevention of delirium during hospitalisation such as reorientation, keeping patients occupied with significant activities, avoiding psychoactive medications, ensuring early mobilisation, sleep, hydration and nutrition, and providing vision and hearing adaptations [7,15]. On the side of treatments, pharmacological and non-pharmacological interventions have been recommended considering the individual clinical condition, his/her care needs and the involvement of family members [7,9]. However, no recommendations have been developed to date regarding the standards of care that should be offered to medical and post-acute settings where patients are at risk of delirium [7]; moreover, there is a need to assess the applicability of such interventions in daily care where several barriers might be present and other guidelines are required to be implemented especially in medical and post-acute settings given the clinical complexity of the patients admitted. To the best of our knowledge, only two studies have investigated to date the degree of intervention's implementation and applicability in daily care: firstly, a multicomponent, non-pharmacological intervention integrated into routine practice have been documented as effective in reducing the delirium among hospitalised older patients as implemented without additional resources in a public healthcare system [15]; more recently, a systematic review was performed regarding the Hospital Elder Life Program as an evidence-based approach targeting delirium risk factors widely disseminated. In addition to other outcomes, there adherence and the adaptations required to the programme in its daily implementation were assessed, as well as the barriers and issues in its sustainability [16]. In fact, together with the resources [15] there is a need to consider the barriers [16] as well as the challenges, insights, and the degree of acceptance of health care professionals to change the practice and to maintain such practice over time should be considered [17]. In this context, we designed and performed a systematic review to identify interventions recommended to prevent and manage delirium in elderly people in medical and post-acute settings; then, we designed and conducted a consensus process on such interventions to discover their applicability in daily care according to healthcare professionals' perspectives

3.1.2 MATERIALS & METHODS

Study Aims

The aim of this research exercise study was to emerge the applicability of the interventions documented to date in the daily care of patients at risk or with delirium in medical and post-acute settings. The specific aims were (a) to summarise interventions documented in the literature for patients at risk or with delirium cared for in medical and post-acute settings, and (b) to identify those interventions judged applicable in daily practice.

Study designs

The study consists of three main phases: in phase 1 a systematic review was conducted to identify interventions; in phase 2 the Nominal Group Technique was used to approach consensus of experts on the interventions previously selected; the, in Phase 3, the synthesis of the consensus process was provided and the validity of the final list of applicable interventions was assessed. The entire study process was performed in 2021.

Phase 1 - Systematic Review of Literature

In the phase 1, a systematic review was designed and conducted in accordance with the Centre for Reviews and Dissemination criteria and methodology [18] to identify and list all interventions documented in the nursing care of patients at risk or with delirium in medical and post-acute settings.

The literature search was conducted from January-February 2021, consulting the following databases: Cochrane Library, PubMed, Scopus, Cumulative Index to Nursing and Allied Health Literature, Psychological Information Database, and the Joanna Briggs Institute. The following keywords were used “nursing management”, “nursing intervention” and the MesH terms “delirium”, “delirium/nursing”, “delirium/prevention and control”, “activities of daily living”, “nursing care” and “patient care management” (Supplementary Tab. 1). There were included (a) all primary and secondary studies with title an abstract relevant to the research question; (b) published in the last 10 years, to find current literature [8]; (c) including medical and post-acute non-intensive care unit settings; (d) regarding patients aged over 65 years; and (e) written in English or in Italian languages.

Two independent researchers (GD, LS) reviewed the titles and abstracts of studies identified according to the inclusion criteria. In case of disagreement, a third reviewer (NVU) was consulted. Then, researchers independently summarised all included studies by extracting the following data: author(s), country/setting(s), aims, study design, population investigated, and interventions documented as relevant’.

Studies included were independently assessed by the two researchers (NVU and LS) using different tools according to their study design, namely: (a) for quantitative results, the Standard Quality Assessment Criteria was used to evaluate primary studies [19]; (b) for systematic reviews, the Critical Appraisal Skills Programme [20] was used;

and (c) for guidelines, the Appraisal of Guidelines for Research & Evaluation (AGREE II) [21] was adopted. A third author (GD) was consulted when divergent evaluations emerged.

Phase 2 - Nominal Group Technique

In phase 2, the list of previously interventions identified was here evaluated and discussed by a group of health care professionals (HCPs) using the Nominal Group Technique [22,23]. The technique involves four key stages: (a) silent generation followed by round-robin (as strategies allowing all members to contribute), (b) clarification of the interventions emerged from the literature, (c) voting (ranking each intervention), and (d) discussion [22,23]. The Nominal Group was composed of experts selected with a purposeful sample according to the following criteria:

(a) experts in the field due to their academic (e.g., evidence of investigation in the field; teaching experiences, advanced education in the field) and practice experience (working in medical and post-acute settings),

(b) recognized as leaders in the field (e.g., appointed by the medical and/or nursing directors of their units as a reference point regarding delirium), and

(c) willing to participate.

Three clinical nurses were identified, one geriatrician and two experienced nurse facilitators aged between 29 and 57 years, with more than five years of experience, advanced educated (master, doctorate levels) with the expected clinical, research, educational and managerial responsibilities.

Experts were invited by the Principal Investigator by e-mail and after their acceptance, they received the instructions and the list of interventions, divided in macro-areas according to the literature [9]. All of those contacted accepted the invitation. Then, after 20 days, contact for clarification with each was held, and the consensus meeting was designed. The meeting lasted around two hours; it was delivered through zoom platform and organised around the following steps: (a) aims and methodology presentation; (b) intervention clarification, and vote [22,23] by also including criteria used in attributing the scores, comments, and new interventions via wooclap platform; and (c) discussion. To allow each expert to vote independently, the wooclap platform was used: each participant was invited to indicate the applicability of each intervention in daily practice using a four-point Likert scale from 1 (the intervention is totally inapplicable) to 4 (totally applicable). They were invited to consider all forms of delirium, hyperkinetic, hypokinetic, and mixed. Participants were allowed to write comments and to add new interventions, if required. The meeting was completed with a peer discussion. Thus, quantitative data was collected in an Excel spreadsheet and a descriptive statistical analysis was performed, using the statistical program Jasp 0.14.1.0; qualitative data (comments) was summarised.

Phase 3 – Synthesis and validation

Researchers re-read all interventions with the intent of reducing redundancies and increasing the clarity of the list; moreover, (a) comments collected verbally during the meeting, (b) comments written during the voting, (c) new interventions indicated by experts, and (d) underlined criteria used by them while scoring the applicability, were all considered and grouped in categories by an inductive process [24]. Thus, the overall findings (list of interventions, scores attributed, underline criteria, comments and new interventions suggested) were then resubmitted to the Nominal Group Members to perform the member checking [25] by asking further consensus and the final validation. The findings were confirmed by the Nominal Group Members.

Ethical consideration

The study was approved by the Bioethical Committee of the University of Bologna, Italy (Register N.0109186, 2021).

3.1.3 RESULTS

Phase 1 - Study selection and main characteristics

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow chart [26] (Fig. 1) shows the selection of the relevant studies.

As reported in the Supplementary Table 2, among the 12 studies included seven were quantitative [27-33], three systematic reviews [34-36], one systematic review and meta-analysis [37] and one clinical guideline [38]. Of the seven studies, there was a randomized clinical trial (pilot study) [27], a pilot testing [28], a pre/post design as part of a mixed-methods study [29], a comparative [30], cross-sectional prospective [31], a case-control study [32] and a quasi-experimental pre/post design [33].

Studies were conducted in hospital(s) [27,29,30,32,33], in long-term care units at an academic urban nursing home bed [28], in nursing homes and in post-acute long-term care [31]. Regarding the countries, these were conducted in Spain [27,31,32]; in the United States [28,33], in the United Kingdom [38] and in Switzerland [29,30]. In the Criteria Checklist for assessing the quality of quantitative studies, all reached a score > 78.5% out of 100% [19]; in the Critical appraisal Skills Programme Systematic Review [20] the score achieved was ≥9 out of 10, while (c) in the AGREE II [21] evaluation, the score was 96.4 out 100% (Supplementary Tab. 2).

Phase 1 - Interventions as reported in the literature

The statements identified were firstly analysed to eliminate duplications; the final list of 96 statements were identified (Supplementary Tab. 3) and categorised in four areas as prevention, non-pharmacological, communication, and pharmacological management intervention [9,38].

Preventive interventions were defined as all those regarding the identification of patients at risk of delirium [9,38] in the first 24 hours after admission [31,32,38], based mainly on the assessment of the risk (general and specific risk factors) such as age, clinical conditions [35], cognitive impairments, changes in behaviour (cognitive function, perception, physical function, and social behaviour); also, through the use of tools such as the Confusion Assessment Method (CAM) [30,35], the Assessment test for delirium & cognitive impairment (4AT) [35] and the Mini-Mental State Examination scales (MMSE) [36].

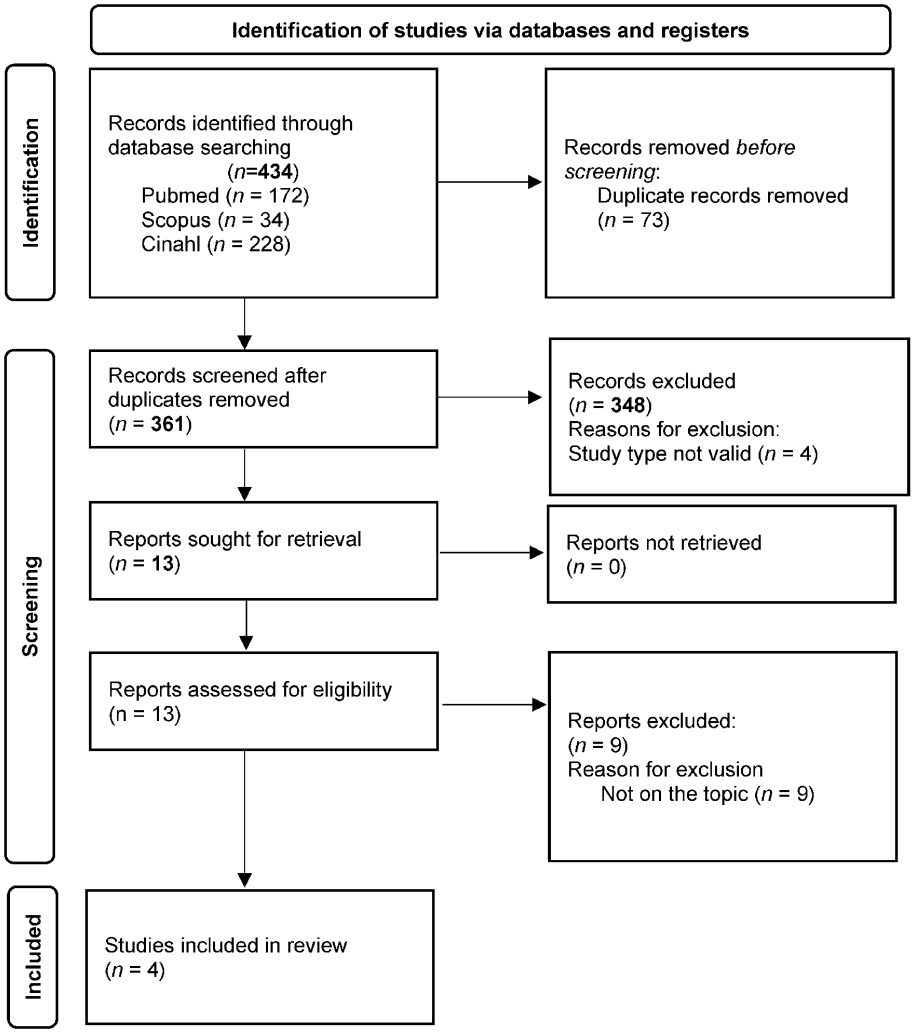
The non-pharmacological interventions included all care oriented to the needs of the patients such as: early mobilisation [27,29,35,36,38], physical activity [29,35,38] and sleep promotion [27,35,38], adequate nutrition [27,28,35] and hydration [28,36,38]; intestinal and urinary elimination promotion [27,38], pain control [27,38], the provision of visual and hearing aids [27,35,36,38]; space and time reorientation [33,35,36,38], and minimising invasiveness (bladder catheterisation [27,35,38], nasogastric tube, intravenous access [38]).

Communication interventions were defined as all those promoting communication with the patient and his/her caregiver and/or family relative(s). Examples emerged are: communicating in a clear manner, by calling the patient with his/her name; using both verbal [27-29,38] and non-verbal language [27] and offering techniques and cognitive stimulation (reminiscence) [36,38]. Regarding the family members, examples emerged regarded their active involvement in the care [27,38], their education and information about the state of the illness and its management [27,38] and relaxation techniques [33].

The pharmacological interventions included the treatment of the delirium episodes or its causes as for example pain [29,35,36,38], infections management [30,32,35,38], administration of specific medications such as haloperidol medications [35,37,38], avoiding other medication (antipsychotics) [37,38], management of their adverse effects [29,37,38] and interactions [36,37].

At the overall level, interventions that emerged can be multi-professional [29,38], multi-intervention [28,29,37] such as care bundles [36], that should be tailored according to individual needs and setting [35]. Moreover, the application of the interventions might also require volunteers [36] or the use of specific tools such as reminders to ensure their application to prevent missed care [36].

Figure 1. Flowchart of studies screening process (PRISMA guidelines [26]).



PRISMA: Preferred Reporting Items for Systematic reviews and Meta-Analyses; CINAHL: Cumulative Index to Nursing and Allied Health Literature; PsycINFO: Psychological Information Database

Phase 2 - Interventions applicability as rated by the Nominal Group Technique

Experts used the following criteria to rank the applicability of the interventions: (a) the required nursing expertise to apply each intervention, that should be general therefore possessed by all nurses working in medical or post-acute settings, (b) the work environment aspects, defined as the patient's hospital unit characteristics, their potentialities, and limitations and (c) the time required by each intervention considering high workloads.

As reported in Supplementary Table 4, from the list of 96 interventions, 51 reported an average score ≥ 3.5 thus near to totally applicable in medical and post-acute

settings. Interventions with a mean score of 4 were: encouraging the person to drink; detecting issues in intestinal elimination (diarrhea and constipation); encouraging the person to walk; assessing oxygen saturation; placing hearing and vision aids; assessing pain with verbal expressions or using scales (PAINAD: Pain Assessment IN Advanced Dementia); avoiding excessive noises; advising the caregiver and family to bring personal items; communicating with the person ("where I am, who I am, what is my role"); communicating clearly and simply; communicating face-to-face during conversation; managing ongoing infections; and managing pain.

The interventions that received the lowest score of 1.5, thus suggesting from totally, to inapplicable, were: massaging the person (Supplementary Table 4) or offering pet-therapy, relaxation techniques, creating an environment with contrasting colours and furniture, reading books/stories aloud.

Phase 3 – Synthesis and validation

From the agreed list of 51 interventions, researchers re-read the results and comments of the experts and identified the final list of interventions by using the following strategies:

(a) removing non-specific nursing interventions (n=2);

(b) adding one intervention proposed by the Nominal Group during comments in the wooclap platform and discussion (facilitating communication with family members and/or caregivers by phone or video call);

(c) grouping by content and averaging other interventions (n=16) (e.g., carrying out multi-professional interventions and working in teamwork for patient management and performing multiple interventions together; changed to working in teamwork, carrying out multi-professional interventions, performing multiple interventions together), and

(d) making the educational interventions explicit to the family and/or caregiver by content and instrument (e.g., educating the family and/or caregiver. Contents: risk factors and signs and symptoms of delirium, and changes in the person. Tools: information leaflets).

The final list of 34 interventions was shared with the Members of the Nominal Group who provided consent and added: (a) the intervention of removing the urinary catheter as soon as conditions permit to encourage spontaneous urination and/or avoid urinary catheterisation, and (b) the intervention of preventing restraint (physical, pharmacological, environmental, and psychological or relational restraint). The final list agreed by the Nominal Group Members resulted in 35 applicable interventions (Table 1).

Table 1. Intervention for patients at risk or with presence of delirium applicable in medical and post-acute settings in daily practice.

Macro-areas	Interventions
Prevention	(1) Assessing predisposing and precipitating risk factors of delirium (for hyper- or hypokinetic or mixed delirium) within the first 24 hours and reassessing at each change (hours or days)
	(2) Assessing the changes in the vigilance, attention, cognitive and behavioural status within the first 24 hours and demonstration of a marked change or fluctuating course in attention, comprehension or other cognitive-behavioural functions; Reassessing at each change (hours or days) (e.g., with 4 AT scale)
	(3) Continuous monitoring mental (e.g., orientation, short- and long-term memory, calculation, attention and concentration, object naming, command execution, writing, orientation in space and time, abstract reasoning, judgement) and physical state (e.g., Barthel Scale)
	(4) Monitoring the vital parameters (heart rate, blood pressure, oxygen saturation)
	(5) Preventing infection (assessment, testing, medication administration)
	(6) Preventing restraints (physical, pharmacological, environmental and psychological or relational restraints)
Non-pharmacological management	(7) Assessing the integrity, functioning and placing hearing, sight and dental aids
	(8) Motivating to take an oral nutritional and water intake according to their metabolic needs (avoiding caffeine and heavy meals in the evening)
	(9) Encouraging the person to drink
	(10) Detecting issues in intestinal elimination (diarrhoea and constipation)
	(11) Detecting issues in urinary elimination (presence of bladder globus)
	(12) Removing urinary catheter as soon as conditions permit and/or avoiding urinary catheterisation to encourage spontaneous urination
	(13) Assessing sleep activity and patterns
	(14) Encouraging sleep by avoiding night-time procedures
	(15) Encouraging the person to walk and providing walking aids (appropriate and accessible)
	(16) Getting the person out of bed every day
	(17) Assessing pain with verbal and non-verbal expression or using scales (e.g., PAINAID)
	(18) Minimising the effects of the hospital environment such as noises (doorbell, alarms, pumps, monitors) and lights (avoiding direct light and using soft lights)
	(19) Providing a clock, calendar and signs in the room (where they are and in which city)
	(20) Encouraging the presence of personal items (photos, bedspreads)
	(21) Ensuring a safe environment (e.g reducing bed height)
	(22) Minimising the number of people in the room and placing the person in the single room (Delirium Room)
	(23) Minimising room and ward changes
	(24) Working in teamwork, carrying out multi-professional interventions, performing multiple interventions together
	(25) Tailoring interventions according to the person's needs and the setting, trying to maintain a daily routine for the person
Communication	(26) Communicating with the person (calling him/her by name, explaining where I am, who I am, what my role is, what activities are taking place)
	(27) Communicating with verbal and non-verbal language in a clear, simple way and position oneself in front of the person
	(28) Encouraging the presence of the family and/or caregiver on a daily basis and sharing the experience of delirium with the caregiver
	(29) Educating the family and/or caregiver. Contents: Risk factors and signs and symptoms of delirium, and changes in the person. Tools: Information leaflets
	(30) Educating the family and/or caregivers. Contents: Re-orientation interventions for the person. Risk factors and signs and symptoms of delirium, and changes of the person Tools: Information leaflets
	(31) Facilitating communications with family members and/or caregivers by phone or video call
Pharmacological	(32) Evaluating therapy (number, dosage, pharmaceutical form of medications)

management	together with the doctor
	(33) Controlling and managing medication interactions
	(34) Administering and monitoring the effects of administered medication (e.g., haloperidol)
	(35) Treating pain (administration of medication and non-pharmacological treatments)

PAINAD: Pain Assessment IN Advanced Dementia; 4AT: Assessment test for delirium & cognitive impairment.

3.1.4 DISCUSSION

Methodological discussion

We performed a systematic review to summarise the evidence available in the field and to identify that considered applicable interventions according to experts' judgement. Nurses should be supported in easy identification of feasible interventions, given that available guidelines are focused on different sub-groups of patients [39,40]; moreover, considering the higher number of interventions identified to date, assessing their applicability might support health care facilities in developing local protocols, decision-making supports, and tools capable of addressing the daily practice. In medical and post-acute units, the skill-mix [41] is mainly composed of nursing aides, with limited education, thus at need to be addressed in ensuring good standards of care. Moreover, the complexity of the patients' needs, in addition to the high turnover of expert nurses [42] might challenge the quality of care. In this context, an applicable operative list of interventions may improve the care quality, standardise the interventions documented in the clinical records and provide the basis for future research regarding those interventions that were or were not systematically applied, with the intent to also measure their pragmatic effectiveness. In addition, our study in the context of those already performed [15,16], is also a research exercise aimed at identifying applicable evidence as well as factors involved in such the evaluation of such applicability.

Studies included in this review were diverse in terms of designs, participants (ages and settings), outcomes and methods of delirium diagnosis. Therefore, the interventions derived from heterogenous studies reflecting the complexity of this research field and its attempts to promote complex intervention approach [15,16,43]. Critical appraisal of the included studies showed that they were all high quality thus suggesting both efforts performed by researchers in this field [19-21] and the level of the evidence produced to date.

Overall, six out of 12 studies investigated preventive interventions [30-32,35,36,38], 11 non-pharmacological management [27-29,31-38], seven communication interventions [27-29,33,35,36,38], and other seven pharmacological management interventions [27,29,30,32,35-38]. Therefore, the different areas of possible interventions, from preventive to those regarding the management of the delirium episodes, seems to be well covered by the available literature.

Findings' discussion

The experts ranked the applicability of 35 out of 96 interventions: six are preventive; 19 non-pharmacological; six communication and four pharmacological. No other studies have documented similar research exercises and the critical situation in terms of workloads of nursing care, in medical and post-acute units documented in Italy [44,45] may have influenced the findings. There are four main implications of these findings: (a) in performing research and addressing recommendations, their applicability should be discussed with the clinicians in early stages; (b) moreover, discussing the applicability and identifying the core interventions, might prevent the moral distress of clinicians who are exposed to higher expectations of interventions to be performed than the care required with really limited time; (c) starting to consider what is really feasible in the approaches of care, may help in setting the expected minimum standards of the daily practice: additional interventions may be offered according to the improvements of work environment conditions and resources; (d) and last but not least , identifying inapplicable interventions may trigger a further discussion regarding the improvements needed in daily care: for example, reading aloud to the person (e.g., books, stories) was considered not applicable by our experts and involving volunteers and/or relatives by educating them, might increase the feasibility of such interventions [46].

Overall, applicable interventions seem to address a structured approach from prevention to management as outlined in the Scottish Intercollegiate Guidelines Network [47]. Specifically, preventive interventions judged as applicable are aimed to recognise predisposing and precipitating factors of delirium, for example, assessing these factors within the first 24 hours and reassessing at each change (hours or days). Although the applicability is focused on early recognition of risk factors and changes [48], nurses identified a few applicable interventions out of the initial prevention of infections and restraints, and this may suggest their attitude to manage instead of preventing delirium.

Experts considered several (n= 19) non-pharmacological interventions out of 51 as applicable and these may be considered both as preventive and as an actual intervention to manage delirium (e.g., encouraging the person to drink; detecting changes in bowel elimination; placing hearing and vision aids). The applicable interventions emphasise a multicomponent and a multi-professional approach integrated with each other are required and a strong collaboration among professionals in pooling their knowledge and expertise [49] is suggested. Notably, experts judged not applicable interventions requiring structural changes of the hospital (e.g., providing a spacious environment for mobilisation and placing the person in the delirium room) as well as those requiring organisational interventions (e.g., using reminders to remember interventions) [46]. These findings suggest that recommendations required an integrated managerial and clinical role, to make the work environments facilitating and supporting the implementation of evidence [50].

Some applicable communication interventions (n=.6) out of 26 were considered in line with the literature that stressed communication as an important aspect [47] threatened by the lack of knowledge of the patient history [51]: in this context, the contribution of family members is important to improve outcomes [52]. However, to address the restrictions related to the pandemic – where the family visitors are strictly limited, experts suggest a new intervention (phone or video calls) as an alternative method of communication [53]. No evidence regarding the effectiveness of such intervention in the context of delirium is available suggesting an interesting area of further investigation.

A limited number of pharmacological interventions (n=4) have been considered applicable out of 12, for example administering and monitoring the effects of medication (e.g., haloperidol). The applicable interventions emphasise the role of the nurses [48] in evaluating, controlling, managing, and monitoring the medication administration to early identify and prevent possible side effects [54].

Limitations of the study

The study has several limitations. In the systematic review, we combined primary and secondary sources to identify interventions. Moreover, given the main intent of our study which was a research exercise, the interventions were not weighted in their degree of evidence and were not ranked according to the hierarchy of evidence established by their study designs. However, the members of the Nominal Group were informed on the underline studies of each recommendation with tables (e.g., Supplementary Table 2 and 3).

We adopted a simple score to evaluate the applicability; moreover, a limited number of experts were involved in the Nominal Group Technique [22], given the limitations imposed by the pandemic. However, the available literature suggests that the experts involved may be sufficient [22,23], given their experience in the field.

Furthermore, researchers performed the systematic review as the first phase to allow the following phases and the entire process required several months. In the following months, two Systematic Reviews have been published [43,49] on non-pharmacological nursing interventions for the prevention and treatment of delirium. Given that the Nominal Group was already established and conducted, no changes in the list of interventions were provided. However, we assessed the main interventions as reported in the new reviews which were similar those included in the list subjected to the applicability assessment of the experts except for interventions for simulated family presence using pre-recorded video messages [49].

As a final remark, we performed the study during 2021 when the effect of the pandemic might have further reduced the resources devoted to nursing care, thus influencing the applicability as expressed by the members of the Nominal Group Members.

3.1.5 CONCLUSIONS

We performed a systematic review of the existing literature on recommended interventions for patients at risk or with delirium in medical and post-acute settings and identified those applicable according to experts. A total of 96 interventions were from the literature, 35 interventions were finally judged as applicable. Applicability, in daily practice, has been evaluated according to the nurses' required expertise, the environmental features and the time required to perform each intervention in the context of high workloads. The applicable interventions that emerged may orient the nursing care towards patients at risk or with delirium, with multiple needs, in a multi-professional perspective, with a structured approach through preventive, non-pharmacological, communication and pharmacological interventions. Moreover, the list of interventions contextualised in the Italian medical and post-acute settings, may function as an operative guide to improve the quality care.

3.1.6 SUPPLEMENTARY MATERIALS

Supplementary Table 1. Keywords and searching information strategy.

Databases	Key words used
Pubmed	(("Delirium"[Mesh]) AND ("Activities of Daily Living"[Mesh])) AND ("Nursing Care"[Mesh]) ((("Delirium"[Mesh]) AND "Delirium/prevention and control"[Mesh]) AND ("Delirium/nursing"[Mesh]) AND ((2000:2021[pdat]) AND (all adult [Filter]))) NOT ("Intensive Care Units"[Mesh]) Limits Adult 19 + years From 2000 to 2021 ("Delirium/nursing"[Mesh]) AND "Patient Care Management"[Mesh] Limits 10 (("Delirium"[Mesh]) AND ("Nursing Care"[Mesh])) NOT ("Intensive Care Units"[Mesh]) Limits Adult: 19 + years from 2000 to 2021
CINAHL	"Delirium" AND "nursing interventions" NOT "intensive care unit" Limits 10 "Delirium" AND "nurse management" NOT ("intensive care unit" OR "ICU" or "critical care") "Delirium" AND "Nursing care" NOT ("intensive care unit" OR "ICU" OR "critical care" OR "critical care unit") Limits 10 Age 65+
PsycINFO	"Delirium" AND "Nursing intervention" NOT ("intensive care unit" OR "ICU" OR "critical care" OR "critical care unit") TI Delirium" AND "Nursing care" NOT ("intensive care unit" OR "ICU" OR "critical care" OR "critical care unit") Limits 10 "Delirium" AND "Nursing management" NOT ("intensive care unit" OR "ICU" OR "critical care" OR "critical care unit")
Cochrane Library	"Delirium"
JBI	"Delirium" AND "Nursing intervention"
JBI	"Delirium" AND "Nursing care"
JBI	"Delirium" AND "Nursing management"
Scopus	(TITLE (delirium) AND TITLE (nursing AND interventions) Publication year > 2009
Scopus	(TITLE (delirium) AND TITLE (nursing AND management)

CINAHL: Cumulative Index to Nursing and Allied Health Literature; JBI: Joanna Briggs Institute; ICU: intensive care unit; PsycINFO: Psychological Information Database.

Supplementary Table 2. Evaluation of the methodological quality of the studies included

Authors **Country** **Setting**	**Aims** **Study design** **Population**	**Quality Score Criteria Checklist for assessing the quality of quantitative studies [19]** %
Avendaño-Céspedes et al. [27] Albacete (Spain) Acute Geriatric Units Complejo Hospitalario Universitario	To analyse if a preventive multicomponent non-pharmacologic nurse-led intervention reduces the incidence, duration, and severity of delirium in hospitalised older adults in an AGU Parallel-group double-blind randomized clinical trial (pilot study) The study enrolled 50 patients hospitalised in AGU > 65 years: 21 in the intervention group and 29 in the control group	78.5 out of 100
Boockvar et al. [28] United States Residents on long-term care units at an -bed academic urban nursing home	To determine the feasibility of an innovative approach to reduce delirium and improve outcomes of acute illness in long-term nursing home residents. Pilot testing 143 long-term care nursing home residents	90 out of 100
Hasemann et al. [29] Switzerland Medical wards of an acute care university hospital in urban	To compare the course of delirium in terms of severity and duration of delirium episodes associated with administration of a complex delirium intervention (DemDel) Pre/post design as part of a mixed-methods study 130 patients with cognitive impairment (treatment as usual group) 138 patients (intervention group)	85 out of 100
Hasemann et al. [30] Switzerland Wards of a medical department a tertiary university hospital	To report findings about delirium detection when ward nurses screened for delirium in patients with cognitive impairment using the DOSS in comparison to the CAM Comparative study 138 patients	100 out of 100
Sepúlveda et al. [31] Tarragone province (Spain) Nursing Homes (NH) and other post-acute Long-Term Care (LTC)	To evaluate the association of different clinical aspects of patients from Nursing Home with delirium Cross-sectional, prospective study 131 patients	100 out of 100
Solà-Miravete et al. [32] Tortosa, Spain Various surgical and medical specialist fields at southern Catalonia's leading (Verge de la Cinta Hospital)	To evaluate the usefulness of comprehensive nursing assessment as a strategy for determining the risk of delirium in older in-patients from a model of care needs based on variables easily measured by nurses Case-control study 454 patients	95.4 out of 100
Rosenbloom et al. [33] Boston (United States) Acute care academic medical centres	To examine the effect of the NFCPM on knowledge of delirium, attitudes toward partnership, and satisfaction with The Nurse/Family Caregiver Partnership for Delirium Prevention A quasi-experimental pretest-posttest design 28 patients, 28 family caregivers, and 28 staff nurses	95.4 out of 100

		Critical appraisal Skills Programme Systematic Review [20]
Siddiqi et al. [37]	To assess the effectiveness of interventions for preventing delirium in hospitalised non- ICU patients Systematic Reviews and Meta-Analysis 39 trials that recruited 16082 participants	9/10=Yes 1/10= Can't Tell
Yakimicki et al. [34]	To evaluate the effectiveness of animal-assisted activities Systematic Review A total of 32 studies with a total of 1087 patients were represented in the studies	10/10=Yes
Oh et al. [35]	To summarize the current state of the art in diagnosis and treatment of delirium and to highlight critical areas for future research to advance the field Systematic Review 127 articles with a total of 11616 patients were represented in the treatment studies.	10/10=Yes
Thomas et al. [36]	To synthesise the best available evidence on multi-component non-pharmacological interventions for the prevention of delirium in hospitalised non-intensive care older adult patients Systematic Review 127 articles with a total of 5054 patients were represented in the studies.	9/10=Yes 1/10= Can't Tell
		AGREE II Score [21]%
National Institute for Health and Care Excellence [38]	To provide diagnosis and treatment of delirium and over in hospital and in long-term residential care or in a nursing home Clinical Guidelines In people aged 18 years over in hospital and in long-term residential care or in a nursing home	96.4 out of 100

AGREE: Appraisal of Guidelines for Research & Evaluation; AGU: Acute Geriatric Units; BPSD: Behavioural and psychological symptoms of dementia; CAM: Confusion Assessment Method; DemDel: Intervention protocol (interprofessional education; screening for cognitive impairment, interprofessional planning, interprofessional delirium prevention and treatment, screening for delirium, delirium symptom manager); DOSS: Delirium Observation Screening Scale; ICU: Intensive Care Unit; NFCPM: The Nurse/Family Caregiver Partnership for Delirium Prevention.

Supplementary Table 3. Preventive and management interventions for patients at risk or with delirium according to the literature.

Topics	Nursing interventions	Author(s)
Prevention	Assessing the risk factors within the first 24 hours and reassessing to each change	Sepúlveda et al. [31]
	Assessing signs and symptoms of delirium within the first 24 hours and reassessing to each change	Solà-Miravete et al. [32] National Institute for Health and Care Excellence [38]
	Assessing the mental confusion (acute onset or fluctuating course of the mental status, inattention, disorganized thought, altered level of consciousness) using the CAM scale	Hasemann et al. [30] Oh et al. [35]
	Assessing delirium and cognitive deficit (vigilance, acute onset or fluctuating course of the mental status, attention, age, date, space-time orientation) using the 4AT scale	Oh et al. [35]
	Monitoring the vital parameters (heart rate, blood pressure)	
	Continuous monitoring mental (e.g., orientation, short- and long-term memory, calculation, attention and concentration, object naming, command execution, writing, orientation in space and time, abstract reasoning, judgement) and physical state (e.g., Barthel Scale)	
	Assessing the mental state (cognitive impairment, difficulty in attention, in orientation and in memorization) using the MMSE scale	Thomas et al. [36]
Non-pharmacological management	Providing nutritional supplements	Avendaño-Céspedes et al. [27]
	Evaluating the hydration of mucous membrane	
	Detecting issues in intestinal elimination (diarrhoea and constipation)	
	Detecting issues in urinary elimination (presence of bladder globus)	
	Recording intake and output (fluid balance)	Avendaño-Céspedes et al. [27] National Institute for Health and Care Excellence [38]
	Avoiding urinary catheterisation	Avendaño-Céspedes et al. [27] National Institute for Health and Care Excellence [38]
	Removing urinary catheter as soon as possible	Avendaño-Céspedes et al. [27] Oh et al. [35] National Institute for Health and Care Excellence [38]
	Keeping noises to a minimum during night shifts	Avendaño-Céspedes et al. [27] Oh et al. [35]; National Institute for Health and Care Excellence [38]
	Assessing sleep activity and patterns	Avendaño-Céspedes et al. [27] Oh et al. [35]
	Getting the person out of bed every day	Avendaño-Céspedes et al. [27] Thomas et al. [36]
	Not using restraints	Avendaño-Céspedes et al. [27]

	National Institute for Health and Care Excellence [38]
Assessing oxygen saturation	Avendaño-Céspedes et al. [27] Hasemann et al. [29] Solà-Miravete et al. [32] Oh et al. [35] National Institute for Health and Care Excellence [38]
Placing hearing and sight aids	Avendaño-Céspedes et al. [27] Thomas et al. [36] Oh et al. [35] National Institute for Health and Care Excellence [38]
Assessing pain with verbal expressions or using scales (PAINAD)	Avendaño-Céspedes et al. [27] National Institute for Health and Care Excellence [38]
Lighting the room by avoiding direct light and using soft lights	Avendaño-Céspedes et al. [27] Thomas et al. [36]; National Institute for Health and Care Excellence [38]
Offering a yogurt or a nutritional support 15 minutes before or after a meal	Boockvar et al. [28]
Offering a hot drink before sleep	
Playing music	
Performing physical activity	
Encouraging the person to drink	Boockvar et al. [28] Thomas et al. [36] National Institute for Health and Care Excellence [38]
Performing multiple interventions together	Boockvar et al. [28] Hasemann et al. [29] Siddiqi et al. [37]
Motivating to take an oral nutritional and water intake according to their metabolic needs	Hasemann et al. [29] Oh et al. [35] National Institute for Health and Care Excellence [38]
Encouraging active mobilisation	Hasemann et al. [29] Oh et al. [35] National Institute for Health and Care Excellence [38]
Carrying out multi-professional interventions	Hasemann et al. [29] National Institute for Health and Care Excellence [38]
Offering relaxation techniques	Rosenbloom et al. [33]
Providing a clock, calendar and signs in the room (where they are and in which city)	Rosenbloom et al. [33] Thomas et al. [36] Oh et al. [35]
Working in teamwork for patient management	Sepúlveda et al. [31]
Providing walking aids (appropriate and accessible)	Oh et al. [35]

		National Institute for Health and Care Excellence [38]
	Encouraging sleep by avoiding night-time procedures	Oh et al. [35] National Institute for Health and Care Excellence [38]
	Avoiding caffeine and heavy meals in the evening	Oh et al. [35]
	Tailoring interventions according to the person's needs and the setting	
	Placing the person in the delirium room	
	Using pet-therapy	Yakimicki et al. [34]
	Agreeing on the presence of volunteers	Thomas et al. [36]
	Carrying out geriatric consultations	
	Creating an environment with contrasting furniture and colours	
	Using care bundles and reminders to remember interventions	
	Minimising the effects of the hospital environment (doorbell, alarms, lights, pumps, monitors, window presence)	
	Eliminating unnecessary stimuli	
	Encouraging the presence of personal items (photos, bedspreads)	
	Providing a spacious environment for mobilisation	
	Ensuring a safe environment	
	Minimising the number of people in the room	
	Ensuring a single multi-professional team for the whole patient care pathway	Thomas et al. [36] National Institute for Health and Care Excellence [38]
	Encouraging the person to walk	Thomas et al. [36] National Institute for Health and Care Excellence [38]
	Avoiding excessive noise(s)	National Institute for Health and Care Excellence [38]
	Customizing therapeutic regimen according to the person's needs and to the setting	
	Massaging the person	
	Minimising room and ward changes	
	Removing causes of sensory problems (e.g., earwax)	
	Securing dentures	
Communication	Collaborating with family and caregiver to evaluate possible changes in the person	Avendaño-Céspedes et al. [27] National Institute for Health and Care Excellence [38]
	Communicating with the person (explaining where I am, who I am, what is my role)	
	Communicating to the family or caregiver about delirium as a temporary situation	
	Educating the caregiver and the family to re-orientate the person	

	Involving family, friends and caregivers in the management of activities	
	Educating the carer and the family to recognise the risk factors and causes of delirium and to report them to the staff	Avendaño-Céspedes et al. [27] National Institute for Health and Care Excellence [38]
	Supporting the educational process with the use of tools such as information leaflets to relatives and caregivers	Avendaño-Céspedes et al. [27]
	Offering relaxation techniques for family and caregiver	Rosenbloom et al. [33]
	Sharing the experience of delirium with the caregiver	
	Offering techniques and cognitive stimulation (reminiscence)	Thomas et al. [36] National Institute for Health and Care Excellence [38]
	Communicating with non-verbal language	Avendaño-Céspedes et al. [27]
	Communicating in a clear and simple way	Hasemann et al. [29] Thomas et al. [36] National Institute for Health and Care Excellence [38]
	Getting the patient to repeat the day, month, year and place	Boockvar et al. [28]
	Getting the person to tell about the past using personal photographs	
	Reading aloud to the person (e.g., books, stories)	
	Collecting information about the person's history (past behaviour)	Thomas et al. [35] Oh et al. [35]
	Advising the carer and the family to bring personal items	Thomas et al. [36]
	Communicating with the person about the activities that are going to be done	
	Calling the person by name	
	Communicating face-to-face during the conversation	
	Giving feedback to the person about his/her competences and self-esteem	
	Encouraging the presence of family and caregivers on a daily basis	Thomas et al. [36] National Institute for Health and Care Excellence [38]
	Advising the caregiver and the relatives to be present on a continuous basis	National Institute for Health and Care Excellence [38]
	Informing the caregiver and the relatives regarding the presence of support groups	
	Checking that the information given has been understood	
	Reassuring the person	
Pharmacological management	Avoiding psychotropic medication	Avendaño-Céspedes et al. [27] Siddiqi et al. [37]
	Managing infections (acquired or already present)	Hasemann et al. [30] Solà-Miravete et al. [32] Oh et al. [35] National Institute for Health

	and Care Excellence [38]
Managing pain	Hasemann et al. [29] Thomas et al. [36] Oh et al. [35] National Institute for Health and Care Excellence [38]
Monitoring the effects of administered medication	Hasemann et al. [29] Siddiqi et al. [37] National Institute for Health and Care Excellence [38]
Administering therapy for the resolution of sign and symptoms' causes (e.g., pain, hypoxia).	Hasemann et al. [29] National Institute for Health and Care Excellence [38]
Administering haloperidol	Siddiqi et al. [37] Oh et al. [35] National Institute for Health and Care Excellence [38]
Administering of atypical antipsychotics	Siddiqi et al. [37] National Institute for Health and Care Excellence [38]
Administering melatonin or its agonist	Siddiqi et al. [37]
Controlling and managing medication interactions	Siddiqi et al. [37] Thomas et al. [36]
Evaluating therapy (number, dosage, pharmaceutical form of medications)	Thomas et al. [36] Oh et al. [35] National Institute for Health and Care Excellence [38]
Reducing polypharmacotherapy	Thomas et al. [36] Oh et al. [35]
Performing ECG before and after the administration of haloperidol	National Institute for Health and Care Excellence [38]

CAM: Confusion Assessment Method; ECG: electrocardiogram; MMSE: Mini-Mental State Examination scales; PAINAD: Pain Assessment IN Advanced Dementia; 4AT: Assessment test for delirium & cognitive impairment.

Supplementary Table 4. Interventions applicability according to the scores given by the Nominal Group.

Interventions	Mean*	SD
(13) Encouraging the person to drink	4	0
(16) Detecting issues in intestinal elimination (diarrhoea and constipation)	4	0
(26) Encouraging the person to walk	4	0
(32) Assessing oxygen saturation	4	0
(34) Placing hearing and sight aids	4	0
(35) Assessing pain with verbal expressions or using scales (PAINAD)	4	0
(41) Avoiding excessive noise(s)	4	0
(67) Advising the carer and the family to bring personal items	4	0
(73) Communicating with the person (explaining where I am, who I am, what is my role)	4	0
(77) Communicating in a clear and simple way	4	0
(79) Communicating face-to-face during the conversation	4	0
(95) Managing infections (acquired or already present)	4	0
(96) Managing pain	4	0
(1) Assessing signs and symptoms of delirium within the first 24 hours and reassessing to each change	3.75	0.5
(3) Assessing delirium and cognitive deficit (vigilance, acute onset or fluctuating course of the mental status, attention, age, date, space-time orientation) using the 4AT scale	3.75	0.5
(7) Continuous monitoring mental (e.g., orientation, short- and long-term memory, calculation, attention and concentration, object naming, command execution, writing, orientation in space and time, abstract reasoning, judgement) and physical state (e.g., Barthel Scale)	3.75	0.5
(17) Detecting issues in urinary elimination (presence of bladder globus)	3.75	0.5
(18) Avoiding urinary catheterisation	3.75	0.5
(21) Keeping noises to a minimum during night shifts	3.75	0.5
(29) Getting the person out of bed every day	3.75	0.5
(42) Minimising the effects of the hospital environment (doorbell, alarms, lights, pumps, monitors, window presence)	3.75	0.5
(62) Collaborating with family and caregiver to evaluate possible changes in the person	3.75	0.5
(76) Communicating with non-verbal language	3.75	0.5
(83) Communicating with the person about the activities that are going to be done	3.75	0.5
(85) Evaluating the medications given (number, dosage, pharmaceutical form of medications)	3.75	0.5
(86) Reducing polypharmacotherapy	3.75	0.5
(87) Controlling and managing medication interactions	3.75	0.5
(88) Monitoring the effects of administered medication	3.75	0.5
(2) Assessing the risk factors of delirium within the first 24 hours and reassessing to each change	3.5	0.6
(6) Monitoring the vital parameters (heart rate, blood pressure)	3.5	0.6
(8) Securing dentures	3.5	0.6
(12) Avoiding caffeine and heavy meals in the evening	3.5	0.6
(19) Removing urinary catheter as soon as possible	3.5	1
(20) Encouraging sleep by avoiding night-time procedures	3.5	0.6

(23) Assessing sleep activity and patterns	3.5	0.6
(27) Providing walking aids (appropriate and accessible)	3.5	0.6
(40) Providing a clock, calendar and signs in the room (where they are and in which city)	3.5	0.6
(44) Encouraging the presence of personal items (photos, bedspreads)	3.5	0.6
(46) Ensuring a safe environment	3.5	0.6
(47) Minimising the number of people in the room	3.5	0.6
(52) Minimising room and ward changes	3.5	0.6
(53) Carrying out multi-professional interventions	3.5	0.6
(55) Performing multiple interventions together	3.5	0.6
(56) Tailoring interventions according to the person's needs and the setting	3.5	0.6
(64) Educating the caregiver and the family to re-orientate the person	3.5	1
(65) Supporting the educational process with the use of tools such as information leaflets to relatives and caregivers	3.5	1
(70) Checking that the information given has been understood	3.5	0.6
(72) Sharing the experience of delirium with the caregiver	3.5	0.6
(78) Calling the person by name	3.5	1
(89) Administering medications to treat sign and symptoms' causes (e.g., pain, hypoxia)	3.5	0.6
(91) Avoiding psychotropic medication	3.5	0.6
(11) Motivating to take an oral nutritional and water intake according to their metabolic needs	3.25	0.9
(43) Eliminating unnecessary stimuli	3.25	0.9
(51) Working in teamwork for patient management	3.25	0.5
(54) Carrying out geriatric consultations	3.25	0.9
(60) Encouraging the presence of family and caregivers on a daily basis	3.25	0.9
(61) Communicating to the family or caregiver about delirium as a temporary situation	3.25	1
(63) Educating the carer and the family to recognise the risk factors and causes of delirium and to report them to the staff	3.25	0.9
(66) Collecting information about the person's history (past behaviour)	3.25	0.9
(84) Reassuring the person	3.25	0.5
(15) Evaluating the hydration of mucous membrane	3	0
(28) Encouraging active mobilisation	3	1.4
(33) Removing causes of sensory problems (e.g., earwax)	3	0.8
(39) Lighting the room by avoiding direct light and using soft lights	3	0.8
(45) Providing a spacious environment for mobilisation	3	1.4
(59) Involving family, friends and caregivers in the management of activities	3	0.8
(68) Advising the caregiver and the relatives to be present on a continuous basis	3	1.4
(69) Informing the caregiver and the relatives regarding the presence of support groups	3	1.1
(9) Providing nutritional supplements	2.75	1.2
(24) Offering a hot drink before sleep	2.75	0.9
(25) Playing music	2.75	0.5
(30) Avoiding restraints	2.75	0.5
(50) Ensuring a single multi-professional team for the whole patient care pathway	2.75	0.5

(57) Using care bundles and reminders to prevent missed interventions	2.75	0.5
(93) Administering of atypical antipsychotics	2.75	0.5
(94) Performing ECG before and after the administration of haloperidol	2.75	0.5
(4) Assessing the mental confusion (acute onset or fluctuating course of the mental status, inattention, disorganized thought, altered level of consciousness) using the CAM scale	2.5	1
(14) Recording intake and output (fluid balance)	2.5	1
(22) Customizing therapeutic regimen according to the person's needs and to the setting	2.5	0.6
(49) Placing the person in the delirium room	2.5	0.6
(58) Agreeing on the presence of volunteers	2.5	1.2
(80) Getting the patient to repeat the day, month, year and place	2.5	1
(90) Administering melatonin or its agonist	2.5	1
(92) Administering haloperidol	2.5	1
(10) Offering a yogurt or a nutritional support 15 minutes before or after a meal	2.25	0.9
(71) Offering relaxation techniques	2.25	1.5
(74) Offering techniques and cognitive stimulation (reminiscence)	2.25	0.9
(75) Giving feedback to the person about his/her competences and self-esteem	2.25	0.9
(81) Getting the person to tell about the past using personal photographs	2.25	0.9
(31) Performing/encouraging physical activities	2	1.4
(36) Using pet-therapy	2	1.1
(37) Offering relaxation techniques for family and caregiver	2	1.1
(48) Creating an environment with contrasting furniture and colours	2	0.8
(82) Reading aloud to the person (e.g., books, stories)	2	0.8
(5) Assessing the mental state (cognitive impairment, difficulty in attention, in orientation and in memorization) using the MMSE scale	1.5	0.6
(38) Massaging the person in order to promote relax	1.5	1

*Score 1, totally inapplicable; 2, inapplicable; 3, applicable, 4 totally applicable)

CAM: Confusion Assessment Method; ECG: electrocardiogram; MMSE: Mini-Mental State Examination scales; PAINAD: Pain Assessment IN Advanced Dementia; SD: Standard deviation; 4AT: Assessment test for delirium & cognitive impairment

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3.2 Nurses prioritization processes to prevent delirium in patients at risk: findings from a Q-Methodology study

The 3.2 faithfully reports the contents of the work published in English in the international journal:

Sist L, Pezzolati M, Ugenti NV, Cedioli S, Messina R, Chiappinotto S, Rucci P, & Palese A. (2024). Nurses prioritization processes to prevent delirium in patients at risk: Findings from a Q-Methodology study. Geriatric nursing (New York, N.Y.), 58, 59–68. Advance online publication. https://doi.org/10.1016/j.gerinurse.2024.05.002

3.2.1 BACKGROUND

Over the last decade, the literature has focused on clinical decision-making as the complex ability to choose between two or more alternatives to pursue patients' outcomes and safety [1] Alongside the decision of what is the best, health care professionals are called to decide priorities by ordering the interventions needed in the time available [2]. Deciding priorities requires a classification of the problems and concerns into those requiring immediate actions and responses and into those that can be delayed given their inferior urgency and/or importance [3]. According to the evidence available, the patient's assessment, the medication administration [4] and answering phone calls [5] are ranked as priorities in acute settings; on the other side, attending multi-professional meetings [4] and providing patient's oral care and hygiene [5] are ranked as the lowest priorities.

The prioritisation process is based on different factors: the clinical judgment [6-8] influenced by the conditions of the patient [9] and his/her urgent needs [5,7,10] may address priorities in acute care. The time available [10] and the perception of time scarcity [11] may shape the priorities chosen. In addition, the context [12] and its underlying philosophies and caring models [12-14] as well as the resources available [14,15] may contribute. Furthermore, the influence of the relatives, that of the unit leader16 and the teamwork [5,16] may influence the prioritization. More recently, factors at the individual level, such as the education (e.g., in a specific field), the experience (with specific patients), personal values and beliefs of each individual professional [l,13,17,18] have also been documented as important. Therefore, the prioritisation process implies both explicit [10] factors related to the patient and the context/environment and implicit individual factors [17,19] that impose a sequence of the care activities, with some ultimately provided first and others at risk of being delayed or missed [1].

Mostly of the studies available have assessed the prioritisation process towards actual problems (e.g., [20,21]); differently, to our best knowledge, no studies have been conducted in the field of prevention when a potential problem should be prevented with specific activities. Moreover, no studies have been conducted among patients at risk of delirium [22] who are at increased need of care and unable to express their needs [23] The delirium is characterised by disturbances in the attention (reduced ability to direct, focus, sustain and shift attention), awareness (reduced orientation to the environment) and cognition (e.g., memory deficit, disorientation, language, visuospatial ability, or perception) with a rapid onset and a fluctuating course [24]. Episodes of delirium have been documented as significantly worsening the clinical outcomes among patients, as well as to generate negative impact on relatives, health care professionals and services [25, 26].

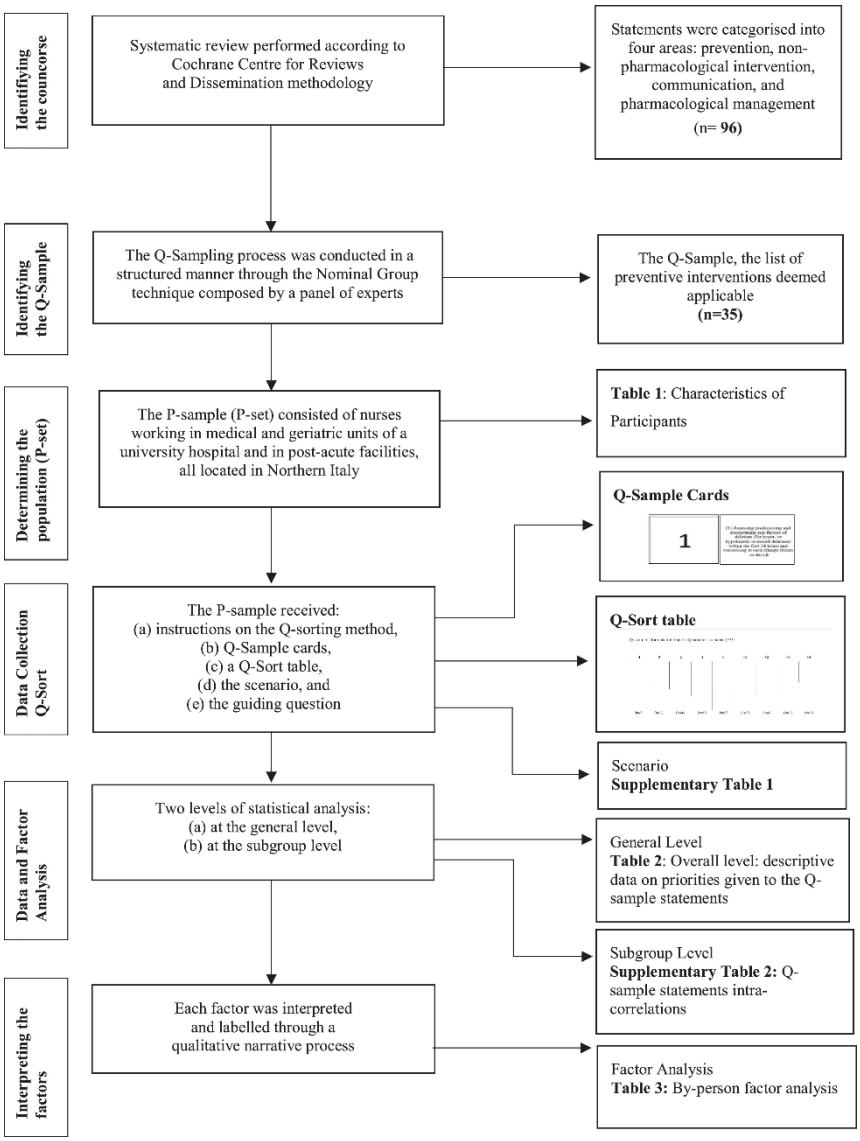
Several calls for action have been promoted to prevent delirium, especially in hospital settings, by implementing specific recommendations [27]. In this field, nurses have been recognised as important in the identification of patients at risk of delirium [28] and in the delirium prevention [29] However, to our best knowledge no studies have been conducted on how nurses prioritise interventions among patients at risk of delirium. Expanding the knowledge regarding their prioritisation patterns may inform decisions regarding how to increase the quality of care in this field, given that it is still recognised as suboptimal [28] Therefore, the main intent of this study was to describe how nurses prioritise preventive interventions in their daily practice for patients at risk of delirium.

3.2.2 MATERIAL & METHODS

Study Aims

The aims of the study were to (a) explore how nurses prioritise interventions to prevent delirium among patients identified at risk and (b) to describe the underlying prioritisation process according to nurses' individual characteristics.

Figura 1. Flow chart del processo di ricerca bibliografica.



Study Design

A Q-methodology was used [30,31] due to its capacity to in-depth investigate the prioritisation processes [20] and to contribute to the description of complex phenomena by starting from subjectivity and reaching an objective result [31, 32]. According to the Q-methodology, the research process follows specific steps: (a) identifying the concourse, (b) the Q-sample, and (c) the population (P-set); (d) collecting data using the Q-sort table; (e) entering the data and performing the factor analysis; and (f) interpreting the factors identified [31,32], as summarised in Fig. 1.

Identifying the concourse

The preliminary list of recommended interventions for patients at risk of delirium in medical and post-acute settings was identified through a systematic review [32] performed according to the Centre for Reviews and Dissemination methodology [33]. The search was conducted in January and February 2021 by two independent reviewers (NVU, LS) and a third researcher in case of disagreement(s) (MP), accessing the Cochrane Library, PubMed, Scopus, Cumulative Index to Nursing and Allied Health Literature, Psychological Information Database, and Joanna Briggs Institute databases. We included all primary and secondary studies with an abstract relevant to the research aim, published within the last 10 years, comprising medical and post-acute non-intensive care unit settings, involving patients over 65 years of age, and written in English or Italian. Seven of the included studies were quantitative [34-39] three were systematic reviews [40-42] one systematic review and meta-analysis [43] and one a clinical guideline [44]. A list of 96 statements emerged.

Identifying the Q-sample

The Q-sampling process was conducted by involving a Nominal group technique of experts [45,46] to identify the applicable preventive interventions for delirium [47] in daily practice. Experts with more than five years of experience and with clinical, research, educational, and managerial background and responsibilities were involved [47]. The following steps were performed: (a) silent identification and generation of the experts' group by a researcher (LS), after which the experts were invited to participate in a consensus meeting, accepting the invitation by e-mail; (b) round-robin, where all experts were provided with the list of interventions to prepare them to offer their contribution in the meeting; (c) clarification of the interventions that emerged from the literature; (d) voting by using a four-point Likert scale from 1 (totally inapplicable) to 4 (totally applicable) in the Wooclap platform; and (e) discussion [45,46]. The overall results were subjected to member checking [48] with a panel of experts who reworded one intervention and added one additional intervention. The Q-sample resulted in a list of 35 preventive measures [49].

Establishing the population (P-set)

The P-sample (P-set) consisted of nurses working in the medical and geriatric units of an academic hospital and in post-acute units all located in Northern Italy. Nurses were included who (a) were able to understand and communicate in Italian; (b) had at least six months of experience in the unit [15,17]; (c) had previous experience in the medical-geriatric field [7]; (d) were working full-time; and (f) were willing to participate in the study. Nurses with managerial responsibilities were excluded [5]. To reach an adequate P-set of approximately 40 nurses, at least three or four nurses per unit were invited to participate [30].

Collecting data through a Q-sort table

The P-sample was invited to participate by sending them the research protocol. All agreed to participate. Then, they received the (a) instructions on the Q-sorting method; (b) the Q-sample cards as the list of interventions: the cards reported a number randomly assigned to the intervention on the front and the description of the intervention on the back; (c) the Q-sort table with spaces configurating a distribution: on the left the lowest priority (-4) and on the right the highest priorities (+4) 31,50 (Fig. 1); (d) the scenario (Supplementary Table 1); and (e) the guiding question. The guiding question was aimed at facilitating the decision process as follows: 'By reading the scenario, in what order do you decide to provide the preventive interventions for this patient? Please order the cards containing the interventions within the Q-sort table, from the highest priority (+4) to the lowest priority (-4).'

Participants were involved in an online meeting that lasted approximately two hours. The sessions were audio-video recorded and conducted by two researchers. One led the process (LS), while the second played a supportive role (MP) by taking notes (e.g., non-verbal behaviour, interruptions), according to the methodology [27].

The online meeting followed the Q-methodology: (a) the aims and the methods were first presented; (b) the scenario was read aloud by one participant on a voluntary basis and the guiding question by the researcher; (c) clarifications were provided regarding the scenario and the listed interventions according to the needs of participants; (d) the prioritisation process began: participants reordered the Q-sample statements in the Q-sort, and the process took place for each participant individually in the previously received paper material [32]. Participants were facilitated in deciding the prioritisation with specific prompts [51,52]: 'Please organise the 35 Q-sample interventions according to the scenario given, into three piles: 14 at high priority, seven at neutral priority, and 14 at low priority'; 'Please select the Q-sample interventions from the high priority, neutral priority, and low priority stacks and reorder them in a consecutive sequence within the Q-sort table'; 'Please provide reasons for each choice by indicating notes'. At the end, all participants were asked to take a picture of the Q-sort table filled in with the prioritised interventions.

During the meeting, the researcher used several techniques to facilitate participants, such as suggesting to read the interventions again when not prioritised, to read the guiding question again, or to ask questions [52]. They were also allowed to modify the decisions along the process. During the prioritisation process of the interventions within the Q-sample, researchers turned off the cameras to leave participants free; however, they remained available for questions or clarifications. No interpretive advice was given, while the importance of their interpretation in context was emphasised. Researchers asked the participants to summarise the reasons both during the prioritisation process and at the end of the Q-sort [52]. At the end of the meeting, participants were asked to report the socio-demographic (e.g., age, gender) and some professional data (e.g., nursing education, experience, number of patients cared for, degree of appropriateness of the nursing resources available and degree of satisfaction) according to the available literature [7,10] and using a form filled in via the Wooclap platform.

Analysing the data

Participants sent the picture of the Q-table via the WhatsApp platform. The researchers transferred the data into an Excel matrix. The collected data (Q-sets and Q-sorts) were analysed using the qfactor procedure of Stata 15.1 (StataCorp LLC, College Station, TX 77845, USA). Two levels of statistical analysis were performed [30,32].

(a)Overall level: The preventive interventions were described according to the priority given by all participants involved as the common viewpoint; averages, standard deviation (SD), and 95% confidence intervals (CIs) were calculated considering the priorities assigned to each Q (-4 to +4). Moreover, to discover correlations, if any, in the priority assigned to each, the correlation coefficients between Q-sort were calculated using the Spearman rho test. The strength of the relationship was checked according to Cohen's criteria (small rho = 0.10 to 0.29; medium rho = 0.30 to 0.49; large rho = 0.50 to 1.00) [53].

(b)Subgroup level: By-person factor analysis was performed to establish the factor (or factors) describing the correlations between the study's participants that are represented by Q-sorts in the Q-methodology. This method calculated correlation coefficients between Q-sorts to identify commonalities between participants' similar types of Q-sorts that significantly correlated with each other to form a group, known as a subgroup factor [32]. The by-person factor analysis was performed through the oblique rotation technique (Oblim), which produced results of the extracted factors, eigenvalues of the correlation matrix, uniqueness, and commonalities of the Q-sorts. The percentage eigenvalues of the explained variance, composite reliability, and standard errors were used to determine the factors.

Interpreting factors

The factors that emerged were interpreted and labelled in a process called storytelling that was conducted by three researchers (LS, NVU, SC3) [32]. Specifically, the three researchers (LS, NVU, SC3) worked first independently and then as a team to label and interpret each viewpoint, using the following sources of information: (a) the list of statements that generated the high- or low-priority Q-sample; (b) the factorial matrix (these are tables generated through Stata's qfactor procedure 15.1), where the specific interventions for that factor were appended to each factor; (c) the list of reasons expressed by each nurse during the data collection while expressing the priorities (available from authors); and (d) the researcher's notes collected during the data collection process [52,54].

Ethical consideration

The research project was approved by the Bioethical Committee of the University of Bologna (Register N.0109186, 5 May 2021).

3.2.3 RESULTS

Population (P-set)

A total of 56 nurses participated, with an average age of 31.6 years (CI 95%=29.6–33.6). Most of them were female (39; 69.6%) and educated at the bachelor level (53; 94.6%); only a quarter reported to have attended post-graduate education (14; 25%) and specific continuing courses on delirium (15; 26.8%). Participants were working in medical (31; 55.4%), geriatric (15; 26.8%), and post-acute/intermediate (10; 17.8%) units, where they spent the most time of their professional experience (38; 67.9%). They reported an average of 4.5 years of professional experience (CI 95%=2.7–6.2), mostly as shift nurses (52; 92.9%) in a full-time position. In the last months, they accumulated an average of 19.8 hours (CI 95%=14.2–25.3) of overtime work.

The human resources in the unit as perceived by participants were adequate half of the time (27; 48.2%), and for 10 nurses (17.9%) they were adequate from never to 25% of the time. In the last shift, participants were responsible for an average of 16.8 patients (CI 95%=15.2–18.4) and managed

on average 3.1 newly admitted (CI 95%=2.6–3.6) and 2.3 discharged (CI 95%= 1.8–2.8) patients. The satisfaction in the nursing role in the unit was on average 3.7 out of 5 (very satisfied) (CI 95%=3.5–3.8), whereas the satisfaction with being a nurse was on average 4.5 (CI 95%= 4.3–4.7) and the satisfaction regarding the teamwork was 3.8 (CI=3.5–4.0) (Table 1).

Table 1. Characteristics of participants.

Variables	**Nurses** **N (%)** **56 (100)**
Age, CI (95%)	31.6 (29.6–33.6)
Females	39 (69.6)
Undergraduate education	
Bachelor's degree in nursing	53 (94.6)
Post-graduate education	
Master's degree	14 (25)
Continuing education course(s) on delirium	15 (26.8)
Work setting	
Internal medicine	31 (55.4)
Geriatrics	15 (26.8)
Post-acute-intermediate care	10 (17.8)
In the current unit	
I spent the most time of my professional experience	38 (67.9)
Years of experience, CI (95%)	4.5 (2.7–6.2)
Time work profile as shift worker	52 (92.9)
Number of working hours per week, CI (95%)	36.6 (36.1–37.2)
Overtime hours in the last 3 months, CI (95%)	19.8 (14.2–25.3)
Adequacy of the nursing resources	
100% of time	2 (3.6)
75% of time	17 (30.4)
50% of time	27 (48.2)
25% of time	8 (14.3)
0% of time	2 (3.6)
Number of patients in charge in the last shift, CI (95%)	16.8 (15.2–18.4)
Number of newly admitted patients in the last shift, CI (95%)	3.1 (2.6–3.6)
Number of discharged patients in the last shift, CI (95%)	2.3 (1.8–2.8)
Satisfaction in the current role*, CI (95%)	3.7 (3.5–3.8)
Satisfaction with being a nurse*, CI (95%)	4.5 (4.3–4.7)
Satisfaction with the teamwork*, CI (95%)	3.8 (3.5–4.0)

*from 1, Very dissatisfied, to 5, Very satisfied. **Legend:** CI, confidence interval.

How nurses prioritise interventions to prevent delirium

The preventive intervention receiving the highest priority was 'Monitoring the vital parameters (heart rate, blood pressure, oxygen saturation)' (2.96 out of 4 as the highest priority; CI 95%: 2.57, 3.36), followed by 'Assessing the changes in the vigilance, attention, and cognitive and behavioural status within the first 24 hours and demonstration of a marked change or fluctuating course in attention, comprehension, or other cognitive-behavioural functions, reassessing at each change (hours or days) (e.g., with 4 AT scale)' (1.88; CI 95%: 1.38, 2.37) and 'Communicating with the person (calling him/her by name, explaining where I am, who I am, what my role is, what activities are taking place)' (1.86; CI 95%: 1.43, 2.28), as reported in Table 2.

The preventive intervention receiving the lowest priority was 'Educating the family and/or caregivers on the person's re-orientation interventions' (-1.86 out of -4 as the lowest priority; CI 95%:

-2.34, -1.37), followed by 'Educating the family and/or caregiver on risk factors and signs and symptoms of delirium, and changes in the person' (-1.71; CI 95%: -2.29, -1.14) (Table 2).

Among the high priorities, there are 14 preventive interventions where the average priority given ranged from 0.05 to 2.96 (out of 4 as the highest priority), while 21 ranged from -1.86 to -0.04

Table 2. Overall level: How nurses prioritise interventions to prevent delirium

Q-sample statements	Mean[#]	SD	CI 95%
(4) Monitoring the vital parameters (heart rate, blood pressure, oxygen saturation)	2.96	1.49	2.57, 3.36
(2) Assessing the changes in the vigilance, attention, and cognitive and behavioural status within the first 24 hours and demonstration of a marked change or fluctuating course in attention, comprehension, or other cognitive-behavioural functions, reassessing at each change (hours or days) (e.g., with 4 AT scale)	1.88	1.85	1.38, 2.37
(26) Communicating with the person (calling him/her by name, explaining where I am, who I am, what my role is, what activities are taking place)	1.86	1.59	1.43, 2.28
(17) Assessing pain with verbal and non-verbal expression or using scales (e.g., PAINAID)	1.77	1.63	1.33, 2.20
(27) Communicating with verbal and non-verbal language in a clear, simple way and positioning oneself in front of the person	1.71	1.81	1.23, 2.20
(3) Continuous monitoring of mental (e.g., orientation, short- and long-term memory, calculation, attention and concentration, object naming, command execution, writing, orientation in space and time, abstract reasoning, judgement) and physical state (e.g., Barthel Scale)	1.66	2.06	1.11, 2.21
(1) Assessing predisposing and precipitating risk factors for delirium (for hyper- or hypokinetic or mixed delirium) within the first 24 hours and reassessing at each change (hours or days)	1.50	2.05	0.95, 2.05
(35) Treating pain (administration of medication and non-pharmacological treatments)	1.50	1.61	1.07, 1.93
(21) Ensuring a safe environment (e.g., reducing bed height)	1.27	1.54	-0.85, 1.68
(7) Assessing the integrity, functioning, and placing of hearing, sight, and dental aids	0.52	1.86	0.02, 1.02
(6) Preventing restraints (physical, pharmacological, environmental, psychological, or relational restraints)	0.34	1.72	-0.12, 0.80
(34) Administering and monitoring the effects of administered medication (e.g., haloperidol)	0.21	2.05	-0.34, 0.76
(10) Detecting issues in intestinal elimination (diarrhoea and constipation)	0.14	1.61	-0.29, 0.57
(8) Motivating to take oral nutrition and water according to their metabolic needs (avoiding caffeine and heavy meals in the evening)	0.05	1.74	-0.41, 0.52
(18) Minimising the effects of the hospital environment such as noises (doorbell, alarms, pumps, monitors) and lights (avoiding direct light and using soft lights)	-0.04	1.74	-0.50, 0.43
(11) Detecting issues in urinary elimination (presence of bladder globus)	-0.04	2.10	-0.04, -0.60
(24) Working in teamwork, carrying out multi-professional interventions, performing multiple interventions together	-0.05	1.63	-0.49, 0.38
(25) Tailoring interventions according to the person's needs and the setting, trying to maintain a daily routine for the person	-0.14	1.76	-0.61, 0.33
(5) Preventing infection (assessment, testing, medication administration)	-0.30	1.88	-0.81, 0.20
(33) Controlling and managing medication interactions	-0.32	1.85	-0.82, 0.17
(28) Encouraging the presence of the family and/or caregiver on a daily basis and sharing the experience of delirium with the caregiver	-0.36	2.13	-0.93, 0.21
(13) Assessing sleep activity and patterns	-0.41	1.36	-0.77, 0.05
(14) Encouraging sleep by avoiding night time procedures	-0.41	1.51	-0.82, 0.01
(9) Encouraging the person to drink	-0.79	1.60	-1.22, -0.36

(22) Minimising the number of people in the room and placing the person in a single room (delirium room)	-0.86	1.87	-1.36, -0.36
(32) Evaluating therapy (number, dosage, pharmaceutical form of medications) together with the doctor	-0.96	1.77	-1.44, -0.49
(31) Facilitating communications with family members and/or caregivers by phone or video call	-0.98	1.83	-1.47, -0.49
(12) Removing urinary catheter as soon as conditions permit and/or avoiding urinary catheterisation to encourage spontaneous urination	-1.07	1.75	-1.54, 0.60
(16) Getting the person out of bed every day	-1.18	1.38	-1.55, -0.81
(15) Encouraging the person to walk and providing walking aids (appropriate and accessible)	-1.27	1.62	-1.70, -0.83
(23) Minimising room and ward changes	-1.48	1.52	-1.89, -1.07
(19) Providing a clock, calendar, and signs in the room (where they are and in which city)	-1.54	1.76	-2.01, -1.06
(20) Encouraging the presence of personal items (photos, bedspreads)	-1.61	1.80	-2.09, -1.13
(29) Educating the family and/or caregiver. Contents: risk factors and signs and symptoms of delirium, and changes in the person. Tools: information leaflets	-1.71	2.14	-2.29, -1.14
(30) Educating the family and/or caregivers. Contents: re-orientation interventions for the person. Tools: information leaflets	-1.86	1.80	-2.34, -1.37

[#]From + 4 as the highest priority to – 4 as the lowest priority. **Legend:** CI, confidence interval; PAINAD, Pain Assessment IN Advanced Dementia; SD, standard deviation; 4 AT, assessment test for delirium and cognitive impairment.

(out of -4 as the lowest priority), thus ranked as low priority. Moreover, while the priorities given in some interventions were clearly different (e.g., average 2.96 out of 4 in 'Monitoring the vital parameters (heart rate, blood pressure, oxygen saturation)' and 1.88 out of 4 in 'Assessing the changes in the vigilance, attention, and cognitive and behavioural status within the first 24 hours and demonstration of a marked change or fluctuating course in attention, comprehension, or other cognitive-behavioural functions, reassessing at each change (hours or days) (e.g., with 4 AT scale)'), in others the differences were limited or absent (e.g., 'Treating pain' [1.50 out of 4] and 'Assessing predisposing and precipitating risk factors for delirium (for hyper- or hypokinetic or mixed delirium) within the first 24 hours and reassessing at each change (hours or days)' [1.50 out of 4]) (Table 2).

To explore relationships, if any, in the priorities given, correlations were assessed: only two interventions, namely 'Monitoring of vital parameters (heart rate, blood pressure, oxygen saturation)' and 'Preventing restraints (physical, pharmacological, environmental, psychological, or relational),' reported no significant correlations. Among the remaining, there emerged both positive and negative correlations. According to Cohen's criteria (small rho = 0.10 to 0.29; medium rho = 0.30 to 0.49; large rho = 0.50 to 1.00) [53], five strong positive correlations were detected, as follows:

- 'Educating the family and/or caregivers on re-orientation interventions for the person with information leaflets' with 'Educating the family and/or caregiver on risk factors, signs, and symptoms of delirium and changes in the person with information leaflets' (Rho=0.852, $p < 0.01$);
- 'Providing a clock, a calendar, and signs in the room (where they are and in which city)' with 'Encouraging the presence of personal items (photos, bedspreads)' (Rho=0.539, $p < 0.01$);

- ‘Evaluating the therapy (number, dosage, pharmacological forms of medications) together with the doctor’ and ‘Controlling and managing medication interactions’ (Rho= 0.534, $p < 0.01$);
- ‘Assessing predisposing and precipitating risk factors of delirium (for hyper- or hypokinetic or mixed delirium) within the first 24 hours and reassessing at each change (hours or days)’ and ‘Assessing the changes in the vigilance, attention, cognitive and behavioural status within the first 24 hours and demonstration of a marked change or fluctuating course in attention, comprehension or other cognitive-behavioural functions; Reassessing at each change (hours or days) (e.g., with 4 AT scale)’ (Rho= 0.529, $p < 0.01$);
- ‘Encouraging the person to walk and providing walking aides (appropriate and accessible)’ with ‘Getting the person out of the bed every day’ (Rho=0.521, $p < 0.01$).

No strong negative correlations emerged (Rho < - 0.500), while the highest emerged between ‘Removing urinary catheter as soon as the conditions permit and/or avoiding catheterisation to encourage spontaneous urination’ and ‘Treating pain (drug administration and non-pharmacological treatments)’ (Rho= -0.411, $p < 0.01$) (Supplementary Table 2).

The prioritisation process according to the nurses’ individual characteristics

By-person factor analysis was performed to identify, if any, nurses with a common view on how to prioritise preventive interventions for patients at risk of delirium. The results of the by-person factor analysis suggest the existence of two prioritisation patterns which account for 44.78% of the total variances, namely ‘Clinical-oriented’ (explained variance of 36.19%), reflecting the prioritisation perspectives of 45 nurses, and ‘Patient family/caregivers-oriented’ (explained variance of 8.60%), reflecting the prioritisation perspectives of eight nurses, as shown in Table 3. The remaining three nurses did not express a common view on how to prioritise. No significant differences emerged in the by-factor analysis findings and settings (medical, geriatric, and post-acute settings) of the participant nurses (first factor p=0.59; second factor p=0.431).

Table 3. By-person factor analysis: The prioritisation process according to the nurses’ individual characteristics

Q-sample statements	Factor 1 Clinical-oriented	Factor 2 Patient/family-oriented
(1) Assessing predisposing and precipitating risk factors for delirium (for hyper- or hypokinetic or mixed delirium) within the first 24 hours and reassessing at each change (hours or days)	2	1
(2) Assessing the changes in the vigilance, attention, cognitive, and behavioural status within the first 24 hours and demonstration of a marked change or fluctuating course in attention, comprehension, or other cognitive-behavioural functions, reassessing at each change (hours or days) (e.g., with 4 AT scale)	4	2
(3) Continuous monitoring of mental (e.g., orientation, short- and long-term memory, calculation, attention and concentration, object naming, command execution, writing, orientation in space and time, abstract reasoning, judgement) and physical state (e.g., Barthel Scale)	3	3
(4) Monitoring the vital parameters (heart rate, blood pressure, oxygen saturation)	4	1
(5) Preventing infection (assessment, testing, medication administration)	0	-4
(6) Preventing restraints (physical, pharmacological, environmental, psychological, or relational restraints)	1	0
(7) Assessing the integrity, functioning, and placing of hearing, sight, and dental aids	1	1

(8) Motivating to take oral nutrition and water according to their metabolic needs (avoiding caffeine and heavy meals in the evening)	1	-1
(9) Encouraging the person to drink	-1	-1
(10) Detecting issues in intestinal elimination (diarrhoea and constipation)	1	-2
(11) Detecting issues in urinary elimination (presence of bladder globus)	0	-3
(12) Removing urinary catheter as soon as conditions permit and/or avoiding urinary catheterisation to encourage spontaneous urination	-2	-3
(13) Assessing sleep activity and patterns	0	-1
(14) Encouraging sleep by avoiding night time procedures	0	0
(15) Encouraging the person to walk and providing walking aids (appropriate and accessible)	-2	-2
(16) Getting the person out of bed every day	-2	-2
(17) Assessing pain with verbal and non-verbal expression or using scales (e.g., PAINAID)	3	1
(18) Minimising the effects of the hospital environment such as noises (doorbell, alarms, pumps, monitors) and lights (avoiding direct light and using soft lights)	-1	1
(19) Providing a clock, calendar, and signs in the room (where they are and in which city)	-3	0
(20) Encouraging the presence of personal items (photos, bedspreads)	-3	2
(21) Ensuring a safe environment (e.g., reducing bed height)	2	0
(22) Minimising the number of people in the room and placing the person in a single room (delirium room)	-1	-1
(23) Minimising room and ward changes	-3	0
(24) Working in teamwork, carrying out multi-professional interventions, performing multiple interventions together	0	-2
(25) Tailoring interventions according to the person's needs and the setting, trying to maintain a daily routine for the person	0	3
(26) Communicating with the person (calling him/her by name, explaining where I am, who I am, what my role is, what activities are taking place)	2	3
(27) Communicating with verbal and non-verbal language in a clear, simple way and positioning oneself in front of the person	3	4
(28) Encouraging the presence of the family and/or caregiver on a daily basis and sharing the experience of delirium with the caregiver	-1	4
(29) Educating the family and/or caregiver. Contents: risk factors and signs and symptoms of delirium, and changes in the person. Tools: information leaflets	-4	2
(30) Educating the family and/or caregivers. Contents: re-orientation interventions for the person. Risk factors and signs and symptoms of delirium, and changes in the person. Tools: information leaflets	-4	2
(31) Facilitating communications with family members and/or caregivers by phone or video call	-2	-1
(32) Evaluating therapy (number, dosage, pharmaceutical form of medications) together with the doctor	-1	-4
(33) Controlling and managing medication interactions	0	-3
(34) Administering and monitoring the effects of administered medication (e.g., haloperidol)	1	0
(35) Treating pain (administration of medication and non-pharmacological treatments)	2	0
Number of loading (=nurses with similar profile)	**45**	**8**
Eigenvalues	20.26	4.81
% of explained variance	**36.19**	**8.60**

Legend: CI, confidence interval; PAINAD, Pain Assessment IN Advanced Dementia; 4 AT, assessment test for delirium and cognitive impairment

3.2.4 DISCUSSION

In a context in which several concerns remain regarding how to effectively prevent delirium among patients at risk [55] we used a Q-methodology which not only emphasises what interventions

are prioritised in daily practice, but also detects the subjectivity of nurses as individuals to investigate the underlying patterns [31,32]. The intent was to highlight how nurses perform the prioritisation process within acute and post-acute settings for patients at risk of delirium by revealing the implicit process undertaken by nurses in a given scenario. Deepening the underlying mechanisms of prioritisation according to the recent studies highlighting the role of individuals - which may differ from that of the context [56] - may help in designing appropriate interventions.

A group of expert nurses was involved that was pressured by high workloads, as suggested by the number of patients cared for in the last shift and the perception of roughly half the time having adequate nursing staff available in the unit. These data are like those already documented in different studies (e.g., [57]), suggesting that our nurses were forced every day to prioritise interventions given the limited time available [58]. This may suggest that, in the given scenario for the research purposes, they applied their daily patterns of decision-making influenced by the difficult working conditions they live.

How nurses prioritise interventions to prevent delirium

At the overall level, three main findings have emerged. Firstly, nurses assign high priority to the monitoring of vital parameters; assessment and re-assessment of changes in vigilance, attention, and cognitive and behavioural status; and communication with the patient. These interventions are also suggested in the literature as able to comprehensively assess the patient's conditions and risk factors. Evidence suggests to support the nurses' assessment with mnemonics (e.g., Think Delirium) [27]; however, according to our findings, nurses give higher priority to the vital parameters that, on the one hand, may function as an instrumental activity to check the patient's status and needs (e.g., going to bed, asking their name), while, on the other, may express routine care giving more importance to some clinical aspects (e.g., blood pressure) instead of others (e.g., checking and rechecking the patient's vigilance). In addition, nurses give low priority to some interventions like family members' involvement and education, which have been reported as impacting missed nursing care, leading to delirium [59]. These findings may be related to the restrictions imposed by the COVID-19 pandemic, where family members were not allowed to participate or be involved in the care of patients; however, this may also be related to the reluctant attitude of nurses to engage and educate relatives [60,61]. Training the staff on multicomponent interventions for delirium, including early recognition and prevention, has been strongly recommended [61].

Secondly, the given priorities as ranked from + 4 (highest) to -4 (lowest) are clearly different in some interventions, while not in others. This seems to suggest that nurses proceed in their decision-making process in a sort of bundle or complex intervention approach [62], where some preventive interventions are interconnected with each other (e.g., monitoring, cognitive impairment assessment, and communication) [63], while others stand alone. For example, it is clear that the communication is performed simultaneously with other interventions, or just after contact with the patient is initiated while collecting vital signs [64].

Thirdly, only two reported no correlations, whereas the remaining preventive interventions reported both positive and negative correlations, between two and three interventions. Interestingly, 'Monitoring the vital parameters' was not correlated with any other intervention, suggesting that it may be enacted independently according to the daily routines, implying a continuous clinical assessment. Similarly, 'Preventing restraints' also reported no correlation, and this may be interpreted

as an overall approach according to the several strategies enacted in recent years to prevent the use of restraints [65]; thus, it seems to be at intervention embodied in practice, not specifically to patients at risk of delirium. Moreover, some interventions reporting large positive correlations [53] suggest interlinked roles (e.g., 'Educating the family and/or caregiver on risk factors, signs, and symptoms of delirium and changes in the person' and 'Educating the family and/or caregivers on the person's re-orientation interventions'). Consequently, when these interventions receive high or low priority, all those interlinked interventions seem to receive high or low prioritisation; thus, as in the case of family/caregiver education, all interventions related to the relatives are at risk to be missed because they are ranked as low priority.

Therefore, educational programmes should be carried out methodically to foster an increase in knowledge of delirium on the part of the family members, caregivers, and the person with delirium [61]; therefore, their low priority should be seen as an issue needing to be addressed. On the other hand, 'Assessing activity and sleep patterns' and 'Pain treatment' showed a negative correlation, suggesting an opposite direction in the prioritisation. This is a surprising finding, considering that pain may affect the sleep and daily activity patterns. This seems to confirm that in addition to rational elements (e.g., the combination of scientific knowledge and contextual factors) [7], individual patterns of each health care professional may play a role.

The prioritisation process according to the nurses' individual characteristics

The by-person factor analysis reveals two profiles, suggesting the existence of two prioritisation patterns: 'Clinical-oriented' and 'Patient family/caregivers-oriented.' The first reflects the prioritisation perspectives of 45 nurses, while the second that of eight nurses. The first group assigned high priority to monitoring vital parameters, assessment of cognitive status, communication, pain, and safe environment; the second gives high priority to the presence of family members and/or caregivers, communication, personalisation of the interventions and environment, and relatives' education. The first group of nurses reflects a clinical approach focused on altered signs, symptoms, and changes through observation and diagnostic investigations [20]; the second profile embodies a humanistic/holistic approach to care 15 that has been suggested to prevent delirium [66] and is also in line with the priorities, expectations, and wishes of patients [18].

Alongside these two prioritisation patterns representing 53 out of 56 nurses, three nurses have been not included in the subgroups, suggesting additional individual patterns that may have been shaped by the previous knowledge and experience [25], by the workloads, or the perceived condition of the patient [67] described in the scenario. The differences in the professional experience and in the education (as some with postgraduate education or continuing education courses) as well as the different adaptation processes to the culture of the context by some nurses may justify the findings emerged [10].

Consequently, in the prioritisation process, nurses work as a group, but also according to each individual pattern [68] learned during their education and experiences, as well as expressing personal values and visions. Therefore, strategies aimed at increasing attention towards preventing delirium should be targeted at the group level, 21 but also on implicit perspectives that influence prioritization [23] at the individual level. Moreover, given that the patterns that emerged are not influenced by the care setting (e.g., medical, geriatric, or post-acute care), different subgroups may be ubiquitarians [5]. The different perspectives may be considered as a potentiality given that they may influence each

other (e.g., balancing the clinical-oriented approach with that based on the family/relatives) but also may be a source of conflicts when opposite priorities are given. However, by analysing the percentage of variance (44.78%), only around half of the factors at the individual level have been discovered. Further investigations are needed to gain knowledge on the prioritisation process at the individual level.

Limitations

This study is affected by several limitations. First, the Q-sample (i.e., the list of preventive interventions) resulted from the literature and the consensus of experts [49]. Although valuable, this methodology may not have considered all possible interventions [54] and have not compared the given priorities to those recommended in the literature. Second, a realistic simulated scenario was used to trigger the nurses' prioritisation, and this may have prevented nurses from considering other variables affecting the clinical reasoning at the bedside. Third, only one clinical scenario was used: critical thinking and decision-making are complicated by the fact that nurses care for multiple patients within environments that are fast-paced and change on a minute-by-minute basis [2,16,67]. Fourth, the data collection meetings were performed online: while this was effective to save time, this may have prevented the likelihood to discuss some issues in more depth [31]. In addition, demographic and professional data has not been used to explain statistically differences in the prioritization patterns emerged given (a) the limited sample size and (b) the main intent of the study; moreover, no differences were searched across setting [9,15,17] given that all were geriatric-oriented for acute (medical and geriatric units) and long term care. However, future studies should consider investigating the contribution of some professional and setting variables (e.g., experience, units) in shaping the prioritization patterns.

The priorities emerged (Supplementary Table 3) at the overall level, from the higher to the lowest, were not compared to the recommendations available (e.g., NICE27). Overall, the research process was conducted during the pandemic period (2021–2022) when nurses were extremely pressed by difficult working conditions. Therefore, repeating the study in normal circumstances to accumulate evidence is recommended.

3.2.5 CONCLUSIONS

To our best knowledge, this is the first study based on the Q-methodology to describe how nurses prioritise preventive interventions towards patients at risk of delirium and discover prioritisation patters according to nurses' individual characteristics. Investigating priorities regarding preventive intervention may inform strategies to increase prevention for patients at risk of delirium, which has been recognised as suboptimal.

At the overall level, nurses assign high priority to both technical and relational interventions by combining them. Relatives' involvement has emerged as a low priority, which is an issue that should be addressed. When investigating the prioritisation process at the individual level, two main patterns emerged: clinical-oriented and family/caregiver-oriented.

Consequently, while at the overall level relatives' involvement is at risk to be missed in the daily care because the clinical-oriented factors prevail, some nurses at the individual level are oriented towards them. How these different perspectives affect each other in daily practice warrants further investigation, as well as additional factors at the individual and setting level, given the limited explained variance that emerged.

Coaching how to prioritise, by adopting techniques such as thinking aloud, discussing scenarios, and simulating decisions for at-risk patients, may shape priorities according to the best recommendations and the needs of the patients. Moreover, implementing teamwork strategies may prevent potential difficulties generated by different patterns of prioritisation among nurses that, on the one hand, may enrich the practice, but, on the other hand, may trigger staff conflicts and uncertainty among patients and their families.

3.2.6 SUPPLEMENTARY MATERIAL

Supplementary Table 1. Scenario

Female M. aged 84 years, presented to the Emergency Department with dyspnoea, cough and fever for three days. Concomitant diseases: Hypertension, COPD and hypercholesterolemia. Home treatment: on amlodipine, ipratropium bromide and simvastatin. In the emergency room she was given intravenous diuretics, steroids, antibiotics, oxygen and a bladder catheter were placed for fluid monitoring. Prior to admission she lived with her husband, was independent in instrumental and basic activities of daily living, drove a car and played cards. After two hours in the emergency room, she was transferred to the medical unit with the diagnosis of pneumonia. At the nurse's assessment in the medical unit the following data were noted: TC 38.8 °C, regular HR 70bpm, BP 140/68 mm Hg, RR 24 beats/min, SpO2 92% with venturi mask FIO2 28%; shallow breathing, presence of productive cough with dense, yellow sputum; no skin turgor; PAINAID 5/10; wearing glasses and hearing aid. On admission, in the morning shift, Mrs. M is unable to answer questions appropriately, shows difficulty in maintaining attention, with disorganised thinking seems to talk to herself and is difficult to understand what is being said. In addition, she does not know why she is in hospital and thinks it is 1990. The daughter is worried because she has seen her mother very confused. The following are prescribed: blood cultures, sputum cultures, oxygen therapy with venturi mask FIO2 28%; antibiotic intravenous therapy every six hours, painkiller, antihypertensive, statins, steroids and diuretics.

Legend: BP: blood pressure; COPD: *Chronic obstructive pulmonary disease*; FIO2: inhaled fraction of oxygen; HR: heart rate; RR: respiratory rate; SpO2: Oxygen saturation; PAINAD: Pain Assessment IN Advanced (1-3, mild pain; 4-6, moderate pain; 7-10, severe pain); TC: body temperature.

Supplementary Table 2. Q-sample statements intra correlations: statistically significant findings

Q-sample statement(s) **Reference statement**	**Q-sample statement(s)**	**Rho**	**Q-sample statement(s)**	**Rho**
(1) Assessing predisposing and precipitating risk factors of delirium (for hyper- or hypokinetic or mixed delirium) within the first 24 hours and reassessing at each change (hours or days)	(2) Assessing the changes in the vigilance, attention, cognitive and behavioural status within the first 24 hours and demonstration of a marked change or fluctuating course in attention, comprehension or other cognitive-behavioural functions; Reassessing at each change (hours or days) (e.g., with 4 AT scale)	0.529**	(7) Assessing the integrity, functioning and placing hearing, sight and dental aids	-0.278*
(2) Assessing the changes in the vigilance, attention, cognitive and behavioural status within the first 24 hours and demonstration of a marked change or fluctuating course in attention, comprehension or other cognitive-behavioural functions; Reassessing at each change (hours or days) (e.g., with 4 AT scale)	-	-	(29) Educating the family and/or caregiver. Contents: Risk factors and signs and symptoms of delirium, and changes in the person. Tools: Information leaflets	-0.301*
(3) Continuous monitoring mental (e.g., orientation, short- and long-term memory, calculation, attention and concentration, object naming, command execution, writing, orientation in space and time, abstract reasoning, judgement) and physical state (e.g., Barthel Scale)	(33) Controlling and managing medication interactions	0.344*	-	-
(5) Preventing infection (assessment, testing, medication administration)	(24) Working in teamwork, carrying out multi-professional interventions, performing multiple interventions together	0.430**	(18) Minimising the effects of the hospital environment such as noises (doorbell, alarms, pumps, monitors) and lights (avoiding direct light and using soft lights)	-0.401**
	(33) Controlling and managing medication interactions	0.330*	(28) Encouraging the presence of the family and/or caregiver on a daily basis and sharing the experience of delirium with the caregiver	-0.394**
	(17) Assessing pain with verbal and non-verbal expression or using scales (e.g., PAINAID)	0.315*	(30) Educating the family and/or caregivers. Contents: Re-orientation interventions for the person. Tools: Information leaflets	-0.320*
	(11) Detecting issues in urinary elimination (presence of bladder globus)	0.305*	(27) Communicating with verbal and non-verbal language in a clear, simple way and position oneself in front of the person	-0.304*
	-	-	(29) Educating the family and/or caregiver. Contents: Risk factors and signs and symptoms of delirium, and changes in the person. Tools: Information leaflets	-0.287*

	-	-	(26) Communicating with the person (calling him/her by name, explaining where I am, who I am, what my role is, what activities are taking place)	-0.275*
(7) Assessing the integrity, functioning and placing hearing, sight and dental aids	(20) Encouraging the presence of personal items (photos, bedspreads)	0.284*	(34) Administering and monitoring the effects of administered medication (e.g., haloperidol)	-0.370**
	(18) Minimising the effects of the hospital environment such as noises (doorbell, alarms, pumps, monitors) and lights (avoiding direct light and using soft lights)	0.276*	(24) Working in teamwork, carrying out multi-professional interventions, performing multiple interventions together	-0.267*
(8) Motivating to take an oral nutritional and water intake according to their metabolic needs (avoiding caffeine and heavy meals in the evening)	(9) Encouraging the person to drink	0.493**	(31) Facilitating communications with family members and/or caregivers by phone or video call	-0.320*
	-	-	(28) Encouraging the presence of the family and/or caregiver on a daily basis and sharing the experience of delirium with the caregiver	-0.294*
(9) Encouraging the person to drink	-	-	(20) Encouraging the presence of personal items (photos, bedspreads)	-0.340*
	-	-	(19) Providing a clock, calendar and signs in the room (where they are and in which city)	-0.288*
(10) Detecting issues in intestinal elimination (diarrhoea and constipation)	(11) Detecting issues in urinary elimination (presence of bladder globus)	0.336*	(26) Communicating with the person (calling him/her by name, explaining where I am, who I am, what my role is, what activities are taking place)	-0.291*
(11) Detecting issues in urinary elimination (presence of bladder globus)	(35) Treating pain (administration of medication and non-pharmacological treatments)	0.319*	(20) Encouraging the presence of personal items (photos, bedspreads)	-0.380**
	(17) Assessing pain with verbal and non-verbal expression or using scales (e.g., PAINAID)	0.294*	(19) Providing a clock, calendar and signs in the room (where they are and in which city)	-0.288*
	-	-	(23) Minimising room and ward changes	-0.272*
	-	-	(26) Communicating with the person (calling him/her by name, explaining where I am, who I am, what my role is, what activities are taking place)	-0.265*
(12) Removing urinary catheter as soon as conditions permit and/or avoiding urinary catheterisation to encourage spontaneous urination	-	-	(20) Encouraging the presence of personal items (photos, bedspreads)	-0.364**
(13) Assessing sleep activity and patterns	-	-	(35) Treating pain (administration of medication and non-pharmacological treatments)	-0.411**
	-	-	(17) Assessing pain with verbal and non-verbal expression or using scales (e.g., PAINAID)	-0.284*

(14) Encouraging sleep by avoiding night-time procedures	-	-	(24) Working in teamwork, carrying out multi-professional interventions, performing multiple interventions together	-0.290*
(15) Encouraging the person to walk and providing walking aids (appropriate and accessible)	(16) Getting the person out of bed every day	0.521**	(30) Educating the family and/or caregivers. Contents: Re-orientation interventions for the person. Tools: Information leaflets	-0.329*
	-	-	(29) Educating the family and/or caregiver. Contents: Risk factors and signs and symptoms of delirium, and changes in the person. Tools: Information leaflets	-0.323*
(16) Getting the person out of bed every day	-	-	(30) Educating the family and/or caregivers. Contents: Re-orientation interventions for the person. Tools: Information leaflets	-0.298*
(17) Assessing pain with verbal and non-verbal expression or using scales (e.g., PAINAID)	(35) Treating pain (administration of medication and non-pharmacological treatments)	0.736**	--	-
(18) Minimising the effects of the hospital environment such as noises (doorbell, alarms, pumps, monitors) and lights (avoiding direct light and using soft lights)	(22) Minimising the number of people in the room and placing the person in the single room (Delirium Room)	0.450**	(34) Administering and monitoring the effects of administered medication (e.g., haloperidol)	-0.349**
	(23) Minimising room and ward changes	0.378**	(33) Controlling and managing medication interactions	-0.310*
	(19) Providing a clock, calendar and signs in the room (where they are and in which city)	0.306*	(24) Working in teamwork, carrying out multi-professional interventions, performing multiple interventions together	-0.288*
(19) Providing a clock, calendar and signs in the room (where they are and in which city)	(20) Encouraging the presence of personal items (photos, bedspreads)	0.539**	(34) Administering and monitoring the effects of administered medication (e.g., haloperidol)	-0.286*
	(31) Facilitating communications with family members and/or caregivers by phone or video call	0.369**	(22) Minimising the number of people in the room and placing the person in the single room (Delirium Room)	-0.274*
(20) Encouraging the presence of personal items (photos, bedspreads)	-	-	(32) Evaluating therapy (number, dosage, pharmaceutical form of medications) together with the doctor	-0.395**
(21) Ensuring a safe environment (e.g reducing bed height)	-	-	(23) Minimising room and ward changes	-0.314*
(22) Minimising the number of people in the room and placing the person in the single room (Delirium Room)	(23) Minimising room and ward changes	0.292*	-	-
(25) Tailoring interventions according to the person's needs and the setting, trying to maintain a daily routine for the person	(27) Communicating with verbal and non-verbal language in a clear, simple way and position oneself in front of the person	0.266*	(32) Evaluating therapy (number, dosage, pharmaceutical form of medications) together with the doctor	-0.353**
	-	-	(35) Treating pain (administration of medication and non-pharmacological treatments)	-0.274*

(26) Communicating with the person (calling him/her by name, explaining where I am, who I am, what my role is, what activities are taking place)	(27) Communicating with verbal and non-verbal language in a clear, simple way and position oneself in front of the person	0.336*	-	-
(28) Encouraging the presence of the family and/or caregiver on a daily basis and sharing the experience of delirium with the caregiver	(30) Educating the family and/or caregivers. Contents: Re-orientation interventions for the person. Tools: Information leaflets	0.357**	(32) Evaluating therapy (number, dosage, pharmaceutical form of medications) together with the doctor	-0.322**
	(29) Educating the family and/or caregiver. Contents: Risk factors and signs and symptoms of delirium, and changes in the person. Tools: Information leaflets	0.315*	-	-
(29) Educating the family and/or caregiver. Contents: Risk factors and signs and symptoms of delirium, and changes in the person. Tools: Information leaflets	(30) Educating the family and/or caregivers. Contents: Re-orientation interventions for the person. Tools: Information leaflets	0.852**	(33) Controlling and managing medication interactions	-0.280*
	(31) Facilitating communications with family members and/or caregivers by phone or video call	0.344**	(32) Evaluating therapy (number, dosage, pharmaceutical form of medications) together with the doctor	-0.276*
(30) Educating the family and/or caregivers. Contents: Re-orientation interventions for the person. Tools: Information leaflets	-	-	(32) Evaluating therapy (number, dosage, pharmaceutical form of medications) together with the doctor	-0.403**
(32) Evaluating therapy (number, dosage, pharmaceutical form of medications) together with the doctor	(33) Controlling and managing medication interactions	0.534**	-	-

* p = < 0.05; **p = < 0.01. # No significant correlations emerged for the following Q-sample statements: (4) Monitoring the vital parameters (heart rate, blood pressure, oxygen saturation); (6) Preventing restraints (physical, pharmacological, environmental, and psychological or relational restraints). **Legend**: PAINAD: Pain Assessment IN Advanced Dementia; 4AT: Assessment test for delirium & cognitive impairment, Rho: correlation coefficient; Cohen's criteria (small rho = 0.10 to 0.29; medium Rho = 0.30 to 0.49; large Rho = 0.50 to 1.00) [50]

Supplementary Table 3. Prevention Strategies, according to the overall prioritisation given, from high to low

Q-sample statements
Monitoring the vital parameters (heart rate, blood pressure, oxygen saturation)
Assessing the changes in the vigilance, attention, and cognitive and behavioural status within the first 24 hours and demonstration of a marked change or fluctuating course in attention, comprehension, or other cognitive-behavioural functions, reassessing at each change (hours or days) (e.g., with 4 AT scale)
Communicating with the person (calling him/her by name, explaining where I am, who I am, what my role is, what activities are taking place)
Assessing pain with verbal and non-verbal expression or using scales (e.g., PAINAID)
Communicating with verbal and non-verbal language in a clear, simple way and positioning oneself in front of the person
Continuous monitoring of mental (e.g., orientation, short- and long-term memory, calculation, attention and concentration, object naming, command execution, writing, orientation in space and time, abstract reasoning, judgement) and physical state (e.g., Barthel Scale)
Assessing predisposing and precipitating risk factors for delirium (for hyper- or hypokinetic or mixed delirium) within the first 24 hours and reassessing at each change (hours or days)
Treating pain (administration of medication and non-pharmacological treatments)
Ensuring a safe environment (e.g., reducing bed height)
Assessing the integrity, functioning, and placing of hearing, sight, and dental aids
Preventing restraints (physical, pharmacological, environmental, psychological, or relational restraints)
Administering and monitoring the effects of administered medication (e.g., haloperidol)
Detecting issues in intestinal elimination (diarrhoea and constipation)
Motivating to take oral nutrition and water according to their metabolic needs (avoiding caffeine and heavy meals in the evening)
Minimising the effects of the hospital environment such as noises (doorbell, alarms, pumps, monitors) and lights (avoiding direct light and using soft lights)
Detecting issues in urinary elimination (presence of bladder globus)
Working in teamwork, carrying out multi-professional interventions, performing multiple interventions together
Tailoring interventions according to the person's needs and the setting, trying to maintain a daily routine for the person
Preventing infection (assessment, testing, medication administration)
Controlling and managing medication interactions
Encouraging the presence of the family and/or caregiver on a daily basis and sharing the experience of delirium with the caregiver
Assessing sleep activity and patterns
Encouraging sleep by avoiding night time procedures
Encouraging the person to drink
Minimising the number of people in the room and placing the person in a single room (delirium room)
Evaluating therapy (number, dosage, pharmaceutical form of medications) together with the doctor
Facilitating communications with family members and/or caregivers by phone or video call
Removing urinary catheter as soon as conditions permit and/or avoiding urinary catheterisation to encourage spontaneous urination
Getting the person out of bed every day
Encouraging the person to walk and providing walking aids (appropriate and accessible)
Minimising room and ward changes
Providing a clock, calendar, and signs in the room (where they are and in which city)
Encouraging the presence of personal items (photos, bedspreads)
Educating the family and/or caregiver. Contents: risk factors and signs and symptoms of delirium, and changes in the person. Tools: information leaflets
Educating the family and/or caregivers. Contents: re-orientation interventions for the person. Tools: information leaflets

Legend: PAINAD: Pain Assessment IN Advanced Dementia; 4AT: Assessment test for delirium & cognitive impairment.

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3.3 Prioritisation processes of nurses in the management of a patient with delirium: results of a Q-Methodology study

The 3.3 faithfully reports the contents of the work submitted in English to an international journal Research in Nursing & Health

3.3.1 BACKGROUND

Patients with delirium, which usually has a rapid onset and fluctuating course [1], are at increased need of tailored nursing care to prevent negative outcomes [2]. However, despite the interventions available specifically for hospitalised patients [3], several studies have reported that the care delivered is still poor and studies exploiting how management strategies are applied are limited, leaving this research area in need of development [4]. Patients with delirium not only may receive poor nursing care but also wrong treatments (e.g., restraints, poor fluid intake) further increasing the stimuli triggering episodes of delirium (e.g., [5]) leading to worse individual-, family- and health - care system outcomes [6, 7].

Several studies have investigated factors affecting the quality of care for patients with delirium. Among those strictly related to nursing care, which has the responsibility of providing 24/24 surveillance, and to non-pharmacological interventions, a lack of knowledge, staff attitudes [8] and staff shortages have been reported as factors affecting the quality of care [9], preventing person-centred multicomponent approaches for proper delirium management [10]. Alongside factors already documented, recent studies have reported that patients with delirium are among the most vulnerable to the prioritisation process [11]: as a consequence, whenever basic or postgraduate nursing education on required interventions is provided, the implementation of such interventions may be missed or postponed because of the low priority given in general to both patient as older [12, 13].

Nurses are required to make decisions [14] and thus to choose and apply interventions according to the evidence available. However, the decision-making process is affected by external factors (such as having knowledge regarding the evidence-based interventions), but also by internal factors at each nursing level shaping the so-called prioritisation process [15].

The prioritisation process is defined as a preferred order of care interventions, resulting in the delay of activities that are deemed to be less urgent and/or important [15]. The most highly prioritised activities are patient assessment and medication administration [16], while those ranked as low priority are strictly related to the fundamentals needs (e.g., mobilization, care hygiene [17].

The process of prioritisation is affected by explicit factors, such as: the patient's condition and the culture of the context/environment [18, 19]; the perceived lack of time [20]; the philosophies and care models adopted by the health care service [18, 21, 22]; the influence of relatives and that of the manager and teamwork [23]. All of these factors influence the whole nursing staff; however, the prioritisation process is also influenced by the education, experience, personal values and beliefs of each individual nurse [22, 24, 25]. Therefore, the decision regarding what should be delivered first or later, is shaped by the group culture and patterns – for example, in a unit, but also by the individual nurse. Discovering prioritisation patterns at the group and at the individual levels could enable

decisions on how to improve the quality of care in the field of delirium management, as it is still considered suboptimal [26]. However, to the best of our knowledge, no studies have been performed in the context of delirium management. Investigating the process of prioritisation to understand the underlying mechanisms that may influence nurses, both as a whole and as an individual, in the optimal application of the evidence-based interventions regarding delirium management was the main intent of this study.

3.3.2 MATERIAL & METHODS

Study Aims

The aims of the study were to (a) describe how clinical nurses prioritise interventions to manage episodes of delirium, and (b) explore, if any, the underlying prioritisation patterns according to the nurses' individual characteristics.

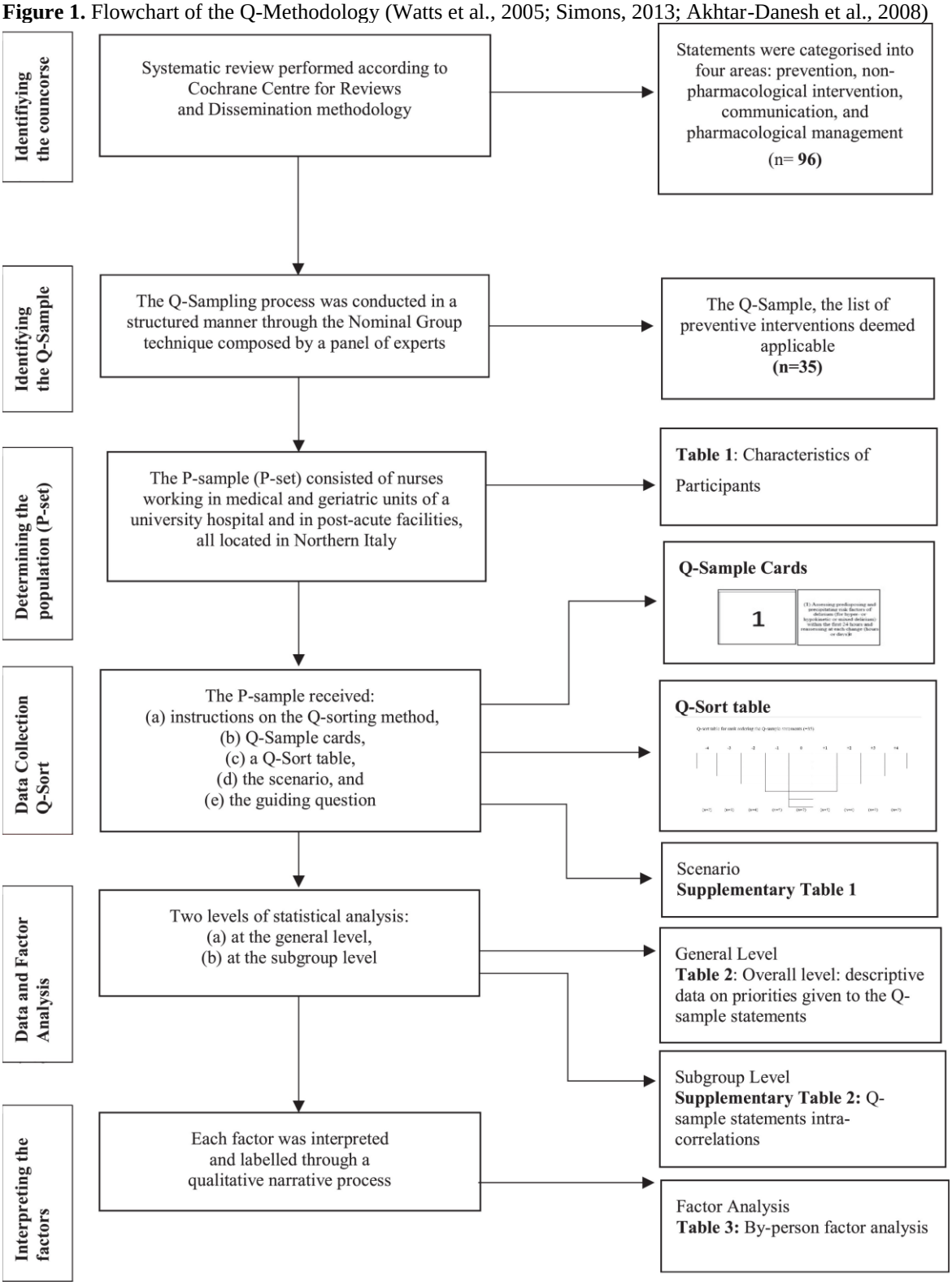
Study Design

A Q-methodology [27, 28] was applied according to its capacity to discover and describe multiple points of view, starting from a subjective [29] and reaching objective data, thus allowing the discovery and analysis of complex processes [27, 30]. Specifically, the Q-methodology steps were applied as follows: (a) identifying the concourse; (b) the Q-sample; and (c) the population (P-set); (d) collecting data using the Q-sort table; (e) entering data and analysis; and (f) interpreting the identified factors [27, 30] as summarised in Figure1.

Concourse Identification

In a preliminary fashion, the list of evidence-based interventions recommended for patients with delirium in medical and post-acute settings were identified. A systematic review was performed [30] following the Centre for Reviews and Dissemination [31] methodology. Two reviewers (NVU, LS) and a third in case of divergencies (MP) conducted the process in January and February 2021 using the Cochrane Library, PubMed, Scopus, Cumulative Index to Nursing and Allied Health Literature, Psychological Information Database and Joanna Briggs Institute databases. Included in the search were primary and secondary studies written in English or Italian, with abstract available, published in the last 10 years, and regarding (a) medical, post-acute non-intensive care settings, and (b) patients aged 65 years and over. A total of seven quantitative studies [32–38], three systematic reviews [38–40], one systematic review and meta-analysis [41] and a clinical guideline [42] were included. The two reviewers (NVU, LS) independently assessed the included studies and then summarised the relevant interventions. All duplicate interventions were eliminated, and 96 statements (concourse) [43] were obtained in the following areas: prevention; non-pharmacological interventions; communication; and pharmacological treatment [3, 44].

Figure 1. Flowchart of the Q-Methodology (Watts et al., 2005; Simons, 2013; Akhtar-Danesh et al., 2008)



Q-sample Definition

A Q-sampling process [45] was conducted to identify, from the list of recommended interventions that emerged, only those applicable in the medical and post-acute settings. For this purpose, a nominal group (NG) was used comprised of technical experts [46, 47] with > 5 years of experience, and with clinical, research, educational, managerial background/responsibilities, in accordance with the methodology [45]. After having identified and generated the NG and invited

them to participate in a consensus meeting (LS), they were involved in the following steps [46, 47]: (a) a round-robin, in which all participants were provided with the list of recommended interventions emerged from the literature to prepare them to give their input at the meeting; (b) the clarification of the interventions provided whereby all questions were addressed; (c) a vote of the intervention, using a four-point Likert scale from 1 (totally inapplicable) to 4 (totally applicable) in daily practice in the Wooclap platform; and (d) a discussion. Findings were subjected to member review [48]: one intervention was reworded, and one additional intervention added by the NG. The Q-sample produced a list of 35 interventions aimed at managing the episodes of delirium in hospitalised older patients in medical and post-acute settings [43].

Population (P-set) Identification

The P-sample (P-set) was identified among clinical nurses working in medical/geriatric units of an academic hospital and in post-acute units, all located in Northern Italy. Those (a) who were able to understand and communicate in Italian; (b) with at least six months of experience in the unit [24, 49]; (c) with previous experience in the medical-geriatric field [50]; (d) working full-time; and (f) willing to participate in the study, were included. To reach an adequate P-set of approximately 40 nurses, at least 3–4 participants per unit were invited to participate [28].

Data Collection Through a Q-sort Table

The research protocol was sent to the identified P-sample to obtain their informed consent and provide them with a full explanation of the research process. All those invited agreed to participate; they were then informed about the Q-sorting method and the Q-sample cards: the cards had a number randomly assigned to the recommended interventions identified on the front, with the description of the intervention on the back. Moreover, the configuration of the Q-sort table was explained to the participants, with the spaces on the left being [or ‘representing’?] the lowest priority (-4) and those on the right the highest (+4) [27, 51] (Figure 1). After having ensured the participants understood the process, the scenario (Figure 2) was presented and the following question was posed: ‘By reading the scenario, in what order would you decide to provide the interventions to manage the episode of delirium in this patient? Please order the cards containing the interventions within the Q-sort table, from the highest priority (+4) to the lowest priority (-4).

The data collection process was performed in a meeting that lasted around two hours and was audio-video-recorded. The meeting was led by one researcher (LS) and supported by a second (MP) who also took notes in the field (e.g., non-verbal behaviour, interruptions) as suggested by the methodology [28]. Specifically, the scenario was read aloud by one participant on a voluntary basis and the guiding question was read by the researcher; clarifications regarding the scenario and the listed interventions were provided. Then, each participant was required to order the Q-sample statements in the Q-sort individually, using paper material previously provided [30], with the following instruction [28, 52]:

Figure 2. Scenario: the context and the issue

The context

Female M. aged 84 years, presented to the Emergency Department with dyspnoea, cough and fever for three days. Concomitant diseases: Hypertension, COPD and hypercholesterolemia. Home treatment: on amlodipine, ipratropium bromide and simvastatin. In the emergency room she was given intravenous diuretics, steroids, antibiotics, oxygen and a bladder catheter were placed for fluid monitoring. Prior to admission she lived with her husband, was independent in instrumental and basic activities of daily living, drove a car and played cards. After two hours in the emergency room she was transferred to the medical unit with the diagnosis of pneumonia.

At the nurse's assessment in the medical unit the following data were noted: TC 38.8 °C, regular HR 70bpm, BP 140/68 mm Hg, RR 24 beats/min, SpO2 92% with venturi mask FIO2 28%; shallow breathing, presence of productive cough with dense, yellow sputum; no skin turgor; PAINAID 5/10; wearing glasses and hearing aid.

On admission, in the morning shift, Mrs. M is unable to answer questions appropriately, shows difficulty in maintaining attention, with disorganised thinking seems to talk to herself and is difficult to understand what is being said. In addition, she does not know why she is in hospital and thinks it is 1990. The daughter is worried because she has seen her mother very confused. The following are prescribed: blood cultures, sputum cultures, oxygen therapy with venturi mask FIO2 28%; antibiotic intravenous therapy every six hours, painkiller, antihypertensive, statins, steroids and diuretics.

Issue

At 3am, Mrs M's daughter called the night nurse because she had psychomotor agitation, had removed her PVC and was tending to get out of bed. The daughter reported that her mother had been evacuated three days previously and had refused food and drink for the last two days.

Abbreviation: COPD: *Chronic obstructive pulmonary disease;* TC: body temperature; HR: heart rate; BP: blood pressure; RR: respiratory rate; SpO2: Oxygen saturation; FIO2: inhaled fraction of oxygen; PAINAD: Pain Assessment IN Advanced Dementia; PVC peripheral venous catheter.

'Please organise the 35 Q-sample interventions according to the scenario given, into three piles: 14 at high priority, seven at neutral priority and 14 at low priority'; 'Please select the Q-sample interventions from the high priority, neutral priority and low priority stacks and reorder them in a consecutive sequence within the Q-sort table'; 'Please, give reasons for each choice by providing notes'. At the end, participants sent the picture of the Q-table via WhatsApp.

Strategies to facilitate participants were used during the meeting (e.g., rereading interventions that had not been prioritized [53]), and they were allowed to modify the decisions during the process. During this process, researchers turned off the cameras to leave participants free but remained available to answer any doubts; no interpretive suggestions were offered, whereas the importance of their free prioritisation was emphasised [53].

When the process ended, participants were asked to fill in a short form regarding some socio-demographic (e.g., age, gender) and professional (e.g., nursing education) via the Wooclap platform.

Data Analysis

First, researchers transferred the data contained in the pictures into an Excel matrix: the Q-sets and the Q-sorts were both analysed using the qfactor procedure (Stata 15.1; StataCorp LLC, College Station, TX 77845, USA). The analysis was performed [28, 30] at two levels.

(a)Overall: the priority given to all interventions by participants was described first as a common viewpoint; averages, standard deviation [SD] and 95% confidence intervals [CI] were calculated according to the priorities assigned to each Q (-4 to +4). Moreover, with the intent of exploring correlations, if any, coefficients between Q-sort were calculated (Spearman rho test) and

checked according to Cohen's criteria (small rho = 0.10 to 0.29; medium rho = 0.30 to 0.49; large rho = 0.50 to 1.00) [54].

(b)Subgroup level: By-person factor analysis was conducted to establish the factor (or factors) describing the underlying patterns of prioritisation. Specifically, correlation coefficients between Q-sorts have been calculated to identify commonalities to discover similar types of Q-sorts that significantly correlated with each other to form a group, known as a subgroup factor [30]. The by-person factor analysis was performed through the oblique rotation technique (Oblim), resulting in factors, eigenvalues of the correlation matrix, uniqueness, and commonalities of the Q-sorts. The percentage eigenvalues of the explained variance, composite reliability and standard errors were used to determine the factors.

Factors Interpretation

Three researchers (LS, NVU, SC3) were involved in interpreting and labelling the factors [30]; they approached the data first independently and then as a team. They analysed in depth the list of statements as grouped in the factor analysis; they deepened their commonalities and differences and then named them as suggested by the literature [53, 55]. The label was compared, and the final approval of the definition was given by the entire team (see authors).

Ethical Consideration

The research project was approved by the Bioethical Committee of the University of Bologna (Register N.0109186, 5 May 2021).

3.3.3 RESULTS

Population (set p)

A total of 56 clinical nurses (31.6 years on average, Table 1) participated; the majority were female (39; 69.6%) and educated at university level (53; 94.6%) with some trained in the specific field of delirium (15; 26.8%). At the time of participating in the study, they were working in medical (31; 55.4%), geriatric (15; 26.8%) and post-acute/intermediate care (10; 17.8%) where they spent most of their clinical experience (Table 2) as shift nurses (52; 92.9%) working, on average, 36.6 hours.

Participants perceived the number of nurses at the unit level as adequate for half of the time (27; 48.2%); moreover, they reported to be responsible for an average of 16.8 patients in the last shift (3.1 newly admitted and 2.3 discharged). With regards to the degree of satisfaction, participants reported, on average, 3.7 out of 5 (very satisfied) in the nursing role, on average 4.5 of being a nurse, and of 3.8 with teamwork (Table 1).

Table 1. Characteristics of participants.

Variables	**Nurses N (%) 56 (100)**
Mean age CI (95%)	31.6 (29.6–33.6)
Females	39 (69.6)
Undergraduate education	
Bachelor's degree in nursing	53 (94.6)
Post-graduate education	
Master's degree course	14 (24)
Continuing education course(s) on delirium	15 (26.8)
Work setting	
Medical	31 (55.4)
Geriatrics	15 (26.8)
Post-acute-intermediate care	10 (17.8)
In the current unit	
I spent the most time of my professional experience	38 (67.9)
Years of experience, mean (95%CI)	4.5 (2.7–6.2)
On shift	52 (92.9)
Working hours per week, mean (95%CI)	36.6 (36.1–37.2)
Overtime hours in the last 3 months, mean (95%CI)	19.8 (14.2–25.3)
Adequacy of the nursing resources in my unit	
100% of time	2 (3.6)
75% of time	17 (30.4)
50% of time	27 (48.2)
25% of time	8 (14.3)
0% of time	2 (3.6)
Patients in charge in the last shift, mean (95%CI)	16.8 (15.2–18.4)
Newly admitted patients in the last shift, mean (95%CI)	3.1 (2.6–3.6)
Discharged patients in the last shift, mean (95%CI)	2.3 (1.8–2.8)
Satisfaction in the current role*, mean (95%CI)	3.7 (3.5–3.8)
Satisfaction with being a nurse*, mean (95%CI)	4.5 (4.3–4.7)
Satisfaction with the teamwork*, mean (95%CI)	3.8 (3.5–4.0)

*from 1 (Very dissatisfied) to 5, (Very satisfied). **Abbreviation:** CI, confidence interval.

The Prioritisation Process at the Overall Level

At the overall level, the highest priorities identified were: 'ensuring a safe environment (e.g., reducing bed height)' (2.29; 95%CI:1.81, 2.76); 'communicating with verbal and non-verbal language in a clear, simple way and positioning oneself in front of the person' (1.86; 95%CI:1.40, 2.31); and 'continuous monitoring of mental (e.g., orientation, short- and long-term memory) and physical state (e.g., Barthel Scale)' (1.82; 95%CI: 1.35, 2.29). On the other hand, the lowest priorities were: 'providing a clock, calendar, and signs in the room (where they are and in which city)' (-2.07; 95% CI: -2.45, -1.69); and 'educating the family and/or caregiver on reorientation interventions for the person' (-1.95; 95% CI: -2.47, -1.42) (Table 2).

Four interventions were ranked on average, above 1 as priority (with 4 as the highest priority) while nine were ranked below 1 (with -4 as the lowest priority). Additionally, while in some interventions the priorities given were clearly different (e.g., 2.29 out of 4 in 'ensuring a safe environment (e.g., reducing bed height)' and 1.86 out of 4 in 'communicating with verbal and non-verbal language in a clear, simple way and positioning oneself in front of the person'), in others they were limited or absent (e.g., 'motivating to take oral nutrition and water according to their metabolic needs (avoiding caffeine and heavy meals in the evening) ' 0.05 out of 4, and 'detecting issues in intestinal elimination (diarrhoea and constipation)' 0.14 out of 4) (Table 2).

Table 2. Overall level: How nurses prioritise interventions to manage episodes delirium.

Q-sample statements	**Mean[a]**	**SD**	**95% CI**
(21) Ensuring a safe environment (e.g., reducing bed height)	2.29	1.79	1.81, 2.76
(27) Communicating with verbal and non-verbal language in a clear, simple way and positioning oneself in front of the person	1.86	1.70	1.40, 2.31
(3) Continuous monitoring of mental (e.g., orientation, short- and long-term memory, calculation, attention and concentration, object naming, command execution, writing, orientation in space and time, abstract reasoning, judgement) and physical state (e.g., Barthel Scale)	1.82	1.76	1.35, 2.29
(26) Communicating with the person (calling him/her by name, explaining where I am, who I am, what my role is, what activities are taking place)	1.80	1.50	1.40, 2.21
(4) Monitoring the vital parameters (heart rate, blood pressure, oxygen saturation)	1.75	2.39	1.11, 2.39
(10) Detecting issues in intestinal elimination (diarrhoea and constipation)	1.52	1.64	1.08, 1.96
(17) Assessing pain with verbal and non-verbal expression or using scales (e.g., PAINAID)	1.14	1.86	0.64, 1.64
(34) Administering and monitoring the effects of administered medication (e.g., haloperidol)	1.04	1.50	0.63, 1.44
(2) Assessing the changes in the vigilance, attention, and cognitive and behavioural status within the first 24 hours and demonstration of a marked change or fluctuating course in attention, comprehension, or other cognitive-behavioural functions, reassessing at each change (hours or days) (e.g., with 4 AT scale)	0.93	2.10	0.37, 1.49
(1) Assessing predisposing and precipitating risk factors for delirium (for hyper- or hypokinetic or mixed delirium) within the first 24 hours and reassessing at each change (hours or days)	0.82	1.96	0.30, 1.35
(6) Preventing restraints (physical, pharmacological, environmental, psychological, or relational restraints)	0.59	1.99	0.06, 1.12
(28) Encouraging the presence of the family and/or caregiver on a daily basis and sharing the experience of delirium with the caregiver	0.55	1.93	0.04, 1.07
(18) Minimising the effects of the hospital environment such as noises (doorbell, alarms, pumps, monitors) and lights (avoiding direct light and using soft lights)	0.55	1.90	0.05, 1.06
(35) Treating pain (administration of medication and non-pharmacological treatments)	0.50	1.71	0.04, 0.96
(11) Detecting issues in urinary elimination (presence of bladder globus)	0.32	1.78	-0.16, 0.80
(14) Encouraging sleep by avoiding nighttime procedures	0.02	1.69	-0.43, 0.47
(8) Motivating to take oral nutrition and water according to their metabolic needs (avoiding caffeine and heavy meals in the evening)	0.00	1.68	-0.45, 0.45
(22) Minimising the number of people in the room and placing the person in a single room (delirium room)	-0.13	1.83	-0.61, 0.36
(32) Evaluating therapy (number, dosage, pharmaceutical form of medications) together with the doctor	-0.14	2.08	-0.70, 0.42

(24) Working in teamwork, carrying out multi-professional interventions, performing multiple interventions together	-0.14	1.64	-0.58, 0.30
(13) Assessing sleep activity and patterns	-0.21	1.33	-0.57, 0.14
(9) Encouraging the person to drink	-0.27	1.84	-0.76, 0.23
(7) Assessing the integrity, functioning, and placing of hearing, sight, and dental aids	-0.34	1.81	-0.82, 0.15
(25) Tailoring interventions according to the person's needs and the setting, trying to maintain a daily routine for the person	-0.46	1.73	-0.93, 0.00
(33) Controlling and managing medication interactions	-0.41	1.84	-0.90, 0.08
(5) Preventing infection (assessment, testing, medication administration)	-0.84	1.58	-1.26, -0.42
(12) Removing urinary catheter as soon as conditions permit and/or avoiding urinary catheterisation to encourage spontaneous urination	-1.07	1.46	-1.46, -0.68
(23) Minimising room and ward changes	-1.30	1.65	-4.0, 2.0
(31) Facilitating communications with family members and/or caregivers by phone or video call	-1.36	1.80	-1.84, -0.88
(15) Encouraging the person to walk and providing walking aids (appropriate and accessible)	-1.38	1.78	-1.85, -0.90
(16) Getting the person out of bed every day	-1.71	1.36	-2.08, -1.35
(20) Encouraging the presence of personal items (photos, bedspreads)	-1.79	1.72	-2.25, -1.32
(29) Educating the family and/or caregiver. Contents: risk factors and signs and symptoms of delirium, and changes in the person. Tools: information leaflets	-1.95	1.90	-2.46, -1.44
(30) Educating the family and/or caregivers. Contents: re-orientation interventions for the person. Tools: information leaflets	-1.95	1.97	-2.47, -1.42
(19) Providing a clock, calendar, and signs in the room (where they are and in which city)	-2.07	1.42	-2.45, -1.69

[a]From + 4 as the highest priority to – 4 as the lowest priority. **Abbreviation:** CI, confidence interval; SD, standard deviation; PAINAD, Pain Assessment IN Advanced Dementia; 4 AT, assessment test for delirium and cognitive impairment.

Relationships, if any, in the priorities ranked were assessed by calculating correlations that ranged from Rho -0.266 $p < 0.05$ to Rho 0.802, $p < 0.01$. The strongest correlations were between the following interventions:

- 'Educating the family and/or caregiver on risk factors, signs and symptoms of delirium and changes in the person, with information leaflets and 'Educating the family and/or caregiver on the reorientation interventions for the person, risk factors, signs and symptoms of delirium and changes in the person with information leaflets' (Rho 0.802, $p < 0.01$);
- 'Assessing pain with verbal and non-verbal expression or using scales (e.g., Pain Assessment IN Advanced Dementia [PAINAID])' and 'Treating pain (administration of medication and non-pharmacological treatments)' (Rho 0.669, $p < 0.01$);
- 'Assessing sleep activity and patterns' and 'Encouraging sleep by avoiding night-time procedures' (Rho 0.473, $p < 0.01$);
- 'Controlling and managing medication interactions' and 'Administering and monitoring the effects of administered medication (e.g., haloperidol)' (Rho 0.454, $p < 0.01$); and
- 'Assessing predisposing and precipitating factors of delirium within the first 24 hours of admission and reassessing at each change (hours or days)' and 'Assessing the changes in the vigilance, attention, cognitive and behavioural status within 24 hours' (Rho 0.419, $p < 0.01$).

No strong negative correlations emerged (Rho < -0.500): the highest were between 'Preventing infections (assessment, testing, medication administration)' and 'Minimising the effects of the

hospital environment, such as noises (doorbell, alarms, pumps, monitors) and lights (avoiding direct light and using soft lights)' (Rho -0.455, $p < 0.01$) (Supplementary Table 1).

The Prioritisation Process at the Subgroup Level

Three prioritisation patterns accounting for a total variance of 50.21% have emerged. Specifically, the first factor was labelled 'Individual needs-oriented' (33.82% variance explained), by 41 nurses and their prioritisation patterns; the second 'Prevention-oriented' (8.47% variance explained) regarding five nurses; and the third 'Cognitive-oriented' (7.92% variance explained), by six nurses (Table 3). Four nurses did not report a common view regarding the prioritisation process.

There were no significant differences in the factor analysis across settings (medical, geriatric, and post-acute) for the first factor ($p=0.20$) and the third ($p=0.51$), whereas for the second a significant difference emerged between the geriatric and medical settings (ANOVA = 3.79 with $p=0.03$); (Bonferroni difference between the mean values 0.81; $p=0.025$).

Table 3. By-person factor analysis: The prioritisation process according to the nurses' individual characteristics

Q-sample statements	Factor 1 Individual needs - oriented	Factor 2 Prevention-oriented	Factor 3 Cognitive-oriented
(1) Assessing predisposing and precipitating risk factors for delirium (for hyper- or hypokinetic or mixed delirium) within the first 24 hours and reassessing at each change (hours or days)	0	4	3
(2) Assessing the changes in the vigilance, attention, cognitive, and behavioural status within the first 24 hours and demonstration of a marked change or fluctuating course in attention, comprehension, or other cognitive-behavioural functions, reassessing at each change (hours or days) (e.g., with 4 AT scale)	1	3	3
(3) Continuous monitoring of mental (e.g., orientation, short- and long-term memory, calculation, attention and concentration, object naming, command execution, writing, orientation in space and time, abstract reasoning, judgement) and physical state (e.g., Barthel Scale)	3	2	-1
(4) Monitoring the vital parameters (heart rate, blood pressure, oxygen saturation)	3	4	-3
(5) Preventing infection (assessment, testing, medication administration)	0	-3	0
(6) Preventing restraints (physical, pharmacological, environmental, psychological, or relational restraints)	-1	3	-1
(7) Assessing the integrity, functioning, and placing of hearing, sight, and dental aids	-1	1	-2
(8) Motivating to take oral nutrition and water according to their metabolic needs (avoiding caffeine and heavy meals in the evening)	2	3	0
(9) Encouraging the person to drink	0	1	-1
(10) Detecting issues in intestinal elimination (diarrhoea and constipation)	-2	-1	-2
(11) Detecting issues in urinary elimination (presence of bladder globus)	0	-1	0
(12) Removing urinary catheter as soon as conditions permit and/or avoiding urinary catheterisation to encourage spontaneous urination	0	-2	0
(13) Assessing sleep activity and patterns	-2	0	-4
(14) Encouraging sleep by avoiding nighttime procedures	-3	0	-3
(15) Encouraging the person to walk and providing walking aids (appropriate and accessible)	2	1	-2

(16) Getting the person out of bed every day	1	-2	1
(17) Assessing pain with verbal and non-verbal expression or using scales (e.g., PAINAID)	-3	-4	-1
(18) Minimising the effects of the hospital environment such as noises (doorbell, alarms, pumps, monitors) and lights (avoiding direct light and using soft lights)	-3	-2	0
(19) Providing a clock, calendar, and signs in the room (where they are and in which city)	4	0	4
(20) Encouraging the presence of personal items (photos, bedspreads)	0	-1	-1
(21) Ensuring a safe environment (e.g., reducing bed height)	-2	-1	-1
(22) Minimising the number of people in the room and placing the person in a single room (delirium room)	0	0	0
(23) Minimising room and ward changes	-1	0	2
(24) Working in teamwork, carrying out multi-professional interventions, performing multiple interventions together	3	0	1
(25) Tailoring interventions according to the person's needs and the setting, trying to maintain a daily routine for the person	4	-3	2
(26) Communicating with the person (calling him/her by name, explaining where I am, who I am, what my role is, what activities are taking place)	1	-3	4
(27) Communicating with verbal and non-verbal language in a clear, simple way and positioning oneself in front of the person	-4	-1	3
(28) Encouraging the presence of the family and/or caregiver on a daily basis and sharing the experience of delirium with the caregiver	-4	-2	2
(29) Educating the family and/or caregiver. Contents: risk factors and signs and symptoms of delirium, and changes in the person. Tools: information leaflets	-2	-4	1
(30) Educating the family and/or caregivers. Contents: re-orientation interventions for the person. Risk factors and signs and symptoms of delirium, and changes in the person. Tools: information leaflets	1	0	-4
(31) Facilitating communications with family members and/or caregivers by phone or video call	-1	2	-1
(32) Evaluating therapy (number, dosage, pharmaceutical form of medications) together with the doctor	2	2	0
(33) Controlling and managing medication interactions	2	1	-2
(34) Administering and monitoring the effects of administered medication (e.g., haloperidol)	-1	1	-3
(35) Treating pain (administration of medication and non-pharmacological treatments)	1	2	1
Number of loading (=nurses with similar profile)	**41**	**5**	**6**
Eigenvalues	18.94	4.74	4.43
% of explained variance	**33.82**	**8.47**	**7.92**

Abbreviation: CI, confidence interval; PAINAD, Pain Assessment IN Advanced Dementia; 4 AT, assessment test for delirium and cognitive impairment.

3.3.4 DISCUSSION

To the best of our knowledge this is the first study combining the selection of interventions most applicable according to the experts [56] and an exploration of the prioritisation process as expressed by nurses as a group and as individuals, when stimulated with a scenario. Eliciting how interventions are prioritised in daily practice as a whole, but also capturing the subjectivity of nurses as individuals so as to explore underlying patterns [27, 30] may inform tailored actions addressing

inappropriate priorities. Units where a high occurrence of delirium [57] has been documented were involved; the nurses' profile (as expert nurses, according to their experience in the unit), mainly working full-time – thus caring for patients with continuity , and mostly satisfied with being a nurse, are all in line with those documented previously [58], as well as the number of patients they care for and the lack of resources perceived. Therefore, considering that a simulated scenario was used, findings may reflect the acute-care process and post-acute units where older individuals are cared for, in Italy.

The Prioritisation Process at the Overall Level

The findings suggest three lines of interpretation. First, at the overall level, nurses prioritise the safety of the environment, and then communication with the patient, the cognitive, physical status, and vital signs monitoring, as well as bowel elimination and pain assessment. Between the priority (e.g., ensuring a safe environment) and the following, a statistically significant distinction (see averages, and 95% CI) emerged suggesting a clear prioritisation of safety. Evidence suggests that the individual cause(s) of delirium (e.g., pain, constipation) should be early identified; and in the meantime, it is necessary to ensure effective communication and reorientation, reassuring patients, involving carers and creating an appropriate care environment [3]. However, our nurses placed emphasis on the safety of the environment, which may indicate a culture centred on safety [59]; in contrast, interventions aimed at identifying the causes of delirium and at promoting a personalised environment (e.g., 'providing a clock, calendar, and signs in the room', 'minimising room and ward changes') are not ranked as a priority. In addition, nurses gave low priority to the education of carers and family members, which have been documented as important [60]. The findings may reflect the situation during the pandemic period when the study was conducted [61], which limited the hospitals' accessibility for family members; but they may also reflect nurses' fear of the medico-legal consequences of delirium, as it often leads to injuries as a result of falls [62, 63], or self-injuries associated with the patient's attempt to remove devices; and their tendency to monitor the delirium rather than acting to detect its underlying causes [64].

Secondly, as emerged in the correlation analysis, some have reported high both positive and negative correlations, suggesting that interventions are close to each other in terms of prioritisation: nurses maximise their capacity when experience a lack of time by performing several nursing activities simultaneously, working in a multitasking manner [65]. However, this process may take nurses away from appropriate priorities when one some interventions are given the same priority, as a bundle, and then are at risk of being considered as high or low priority, thus postponed or missed. Strong correlations emerged between 'Assessing pain with verbal and non-verbal expression or using scales (e.g., PAINAID)' with 'Treating pain (administration of medication and non-pharmacological treatments)' and also 'Evaluating therapy (number, dosage, pharmaceutical form of medications) together with doctor', suggesting that nurses are aware of the strong link between pain and delirium [66]; on the other hand, 'Educating the family and/or caregiver regarding the risk factors, signs and symptoms of delirium, and of the changes in the person' and 'Educating the family and/or caregivers to the reorientation interventions for the person' were strongly correlated and both ranked as low priority, suggesting the need to reconsider the role of family members as a point of reference for the patient in the management of the delirium [65].

Third, no strong negative correlations emerged, and all correlations emerged were mainly positive. This seems to confirm that the provided list of interventions identified as being applicable

was composed of actions strongly connected to each other: the management of delirium as a non-pharmacological approach requires multicomponent interventions that may influence each other and thus increase their effectiveness [67]. The only negative strong correlation to emerge ('Preventing infections' and 'Minimising the effects of the hospital environment such as noises') indicates actions in two directions, independent of each other. Moreover, only one intervention was not correlated with the others, 'Tailoring interventions according to the person's needs and the setting, trying to maintain a daily routine for the person', suggesting that this is a general approach towards these patients, as recommended [3].

The Prioritisation Process at the Subgroup Level

The by-person factor analysis reveals three profiles, suggesting the existence of three prioritisation patterns: 'Individual needs-oriented' includes 41 nurses; 'Prevention-oriented', with five nurses; 'Cognitive–oriented', with six nurses; the remaining four nurses did not report a common view regarding the prioritisation process. Although each pattern has been characterised by a fragmented flow of priorities, with some difficulties in labelling each, the first is shaped around the individualisation of care whereby actions are tailored according to the needs and decided upon within the team, with other professionals. Therefore, it seems that most nurses do not have a precise plan to act in cases of delirium and they wait to shape the interventions according to each patient needs. On the one hand this may be considered the maximum expression of individualised nurses' care and that of a multidisciplinary team [68]; however, on the other, given that nurses work in shifts and care for several patients, it might be difficult to know and deepening the individual needs, resulting in discontinuity in actions and missed care across shifts.

The second pattern suggests that, in the case of delirium, nurses prioritise prevention, with several interventions aimed at prevention ranked as a priority, with several interventions ranked as a priority with preventive intents. This may also be interpreted in two ways: nurses seem focused on the need to prevent additional factors that may prolong the episodes of delirium; however, on the other hand, with the prioritisation that emerged, they seem to be uncertain regarding what actions to undertake, thus postponing the effective treatment of the delirium. The third has been labelled as 'cognitive-oriented' because it implies communication and cognitive reorientation: in this context, communication is ranked as important, as also suggested by the literature [69]. Moreover, according to the findings, the second pattern ('Preventive-oriented') reported a significant difference of 0.81 mean values out of 4 among the settings, with mean values of 0.53 (95% CI: 0.14, 0.93) in geriatric settings and -0.28 (95% CI: -0.65, 0.09) in medical settings. These results show that geriatric settings are more focused on delirium prevention as they implement patient-centred management models with a multi-professional approach [3, 70, 71].

At the overall level, the three patterns that emerged seem to delineate three different ways to manage delirium in which four nurses were not included, thus suggesting the existence of additional individual patterns of prioritisation that may be influenced by professional and personal characteristics [24]. Furthermore, only half of the explained variance has emerged, suggesting that more research is needed; the findings suggest there are diverse patterns of prioritisation across nurses, and this may introduce inconsistencies in daily practice where the patient with delirium is expected to be cared for with an evidence-based set of interventions. The nursing care of patients with delirium has been documented to be still poor [72] and this may be due to the different priorities given by nurses, which may be informed by their different knowledge and attitudes [73].

Limitations

There are several limitations to this study. The first relates to the Q-sample (the list of management interventions), which was derived from the literature and expert consensus [43] and may not have included all applicable interventions despite a valid methodology [55]. Secondly, a scenario was used to identify the prioritisation process [29]: despite the attempts to provide a realistic situation, the limited description offered to prevent distractions may have influenced the clinical reasoning [23, 74]. Thirdly, the data collection was performed online, and this may have also prevented an in-depth engagement in the process [27]. Moreover, we collected data during the pandemic when the circumstances lived by the nurses may have influenced their priorities: accumulating evidence in the field with post-pandemic studies in strongly recommended.

3.3.5 CONCLUSIONS

To the best of our knowledge, this is the first study involving a Q methodology to detect how nurses prioritise interventions aimed at caring for patients with delirium in acute and post-acute settings. At the overall level, nurses attribute high priority to interventions aimed at ensuring safety, followed by those ensuring communication and continuing surveillance by assessing and monitoring the patients' conditions. They also attribute low priority to the family involvement and changing the features of the environment to ensure a calm situation. At the individual level, three different patterns of prioritisation emerged: individual patient-, preventive-, and cognitive-oriented. The different orientation of these patterns may introduce fragmentation in the care, diverse plans for action across shifts and an unclear care pathway. Ultimately, they may affect the quality of care and variations across nurses and shifts, introducing additional issues to cope with when dealing with patients experiencing delirium.

There is a need to combine the respect of the individual needs of patients with delirium, and the relevance of the prevention during the episodes, with a clear action of care among nurses to set a common pattern of prioritisation that, in the case of delirium, may also improve the quality of care and give a point of reference for families and patients.

3.3.6 SUPPLEMENTARY MATERIALS

Supplementary Table 1. Q-sample statements intra-correlations: statistically significant findings

Q-sample statement(s) **Reference statement**	**Q-sample statement(s)**	**Rho**	**Q-sample statement(s)**	**Rho**
(1) Assessing predisposing and precipitating risk factors of delirium (for hyper- or hypokinetic or mixed delirium) within the first 24 hours and reassessing at each change (hours or days)	(2) Assessing the changes in the vigilance, attention, cognitive and behavioural status within the first 24 hours and demonstration of a marked change or fluctuating course in attention, comprehension or other cognitive-behavioural functions; Reassessing at each change (hours or days) (e.g., with 4 AT scale)	0.419**	(21) Ensuring a safe environment (e.g reducing bed height)	-0.313*
	_	_	(26) Communicating with the person (calling him/her by name, explaining where I am, who I am, what my role is, what activities are taking place)	-0.306*
	_	_	(7) Assessing the integrity, functioning and placing hearing, sight and dental aids	-0.301*
	_	_	(13) Assessing sleep activity and patterns	-0.287*
(2) Assessing the changes in the vigilance, attention, cognitive, and behavioural status within the first 24 hours and demonstration of a marked change or fluctuating course in attention, comprehension, or other cognitive-behavioural functions, reassessing at each change (hours or days) (e.g., with 4 AT scale)	_	_	(32) Evaluating therapy (number, dosage, pharmaceutical form of medications) together with the doctor	-0.363*
	_	_	(7) Assessing the integrity, functioning and placing hearing, sight and dental aids	-0.295*
(3) Continuous monitoring of mental (e.g., orientation, short- and long-term memory, calculation, attention and concentration, object naming, command execution, writing, orientation in space and time, abstract reasoning, judgement) and physical state (e.g., Barthel Scale)	(33) Controlling and managing medication interactions	0.335*	(11) Detecting issues in urinary elimination (presence of bladder globus)	-0.313*
(4) Monitoring the vital parameters (heart rate, blood pressure, oxygen saturation)	(35) Treating pain (administration of medication and non-pharmacological treatments)	0.293*	(14) Encouraging sleep by avoiding nighttime procedures	-0.316*
	(5) Preventing infection (assessment, testing, medication administration)	0.270*	(21) Ensuring a safe environment (e.g., reducing bed height)	-0.293*

	_	_	(22) Minimising the number of people in the room and placing the person in a single room (delirium room)	-0.288*
	_	_	(23) Minimising room and ward changes	-0.283*
	_	_	(28) Encouraging the presence of the family and/or caregiver on a daily basis and sharing the experience of delirium with the caregiver	-0.277*
(5) Preventing infection (assessment, testing, medication administration)	(12) Removing urinary catheter as soon as conditions permit and/or avoiding urinary catheterisation to encourage spontaneous urination	0.269*	(18) Minimising the effects of the hospital environment such as noises (doorbell, alarms, pumps, monitors) and lights (avoiding direct light and using soft lights)	-0.455**
	_	_	(14) Encouraging sleep by avoiding nighttime procedures	-0.405**
	_	_	(28) Encouraging the presence of the family and/or caregiver on a daily basis and sharing the experience of delirium with the caregiver	-0.306*
	_	_	(13) Assessing sleep activity and patterns	-0.277*
(6) Preventing restraints (physical, pharmacological, environmental, psychological, or relational restraints)	(22) Minimising the number of people in the room and placing the person in a single room (delirium room)	0.272*	(8) Motivating to take oral nutrition and water according to their metabolic needs (avoiding caffeine and heavy meals in the evening)	-0.270*
	(23) Minimising room and ward changes	0.266*	_	_
(7) Assessing the integrity, functioning, and placing of hearing, sight, and dental aids	(27) Communicating with verbal and non-verbal language in a clear, simple way and positioning oneself in front of the person		(34) Administering and monitoring the effects of administered medication (e.g., haloperidol)	-0.382**
	_	_	(33) Controlling and managing medication interactions	-0.304*
(8) Motivating to take oral nutrition and water according to their metabolic needs (avoiding caffeine and heavy meals in the evening)	(9) Encouraging the person to drink	0.408**	(22) Minimising the number of people in the room and placing the person in a single room (delirium room)	-0.400**
	(16) Getting the person out of bed every day	0.336*	(21) Ensuring a safe environment (e.g., reducing bed height)	-0.379**
	(10) Detecting issues in intestinal elimination (diarrhoea and constipation)	0.304*	(28) Encouraging the presence of the family and/or caregiver on a daily basis and sharing the experience of delirium with the caregiver	-0.351*

	–	–	(19) Providing a clock, calendar, and signs in the room (where they are and in which city)	-0.333*
(9) Encouraging the person to drink	(16) Getting the person out of bed every day	0.275*		
(10) Detecting issues in intestinal elimination (diarrhoea and constipation)	(35) Treating pain (administration of medication and non-pharmacological treatments)	0.279*	(21) Ensuring a safe environment (e.g., reducing bed height)	-0.270*
	(11) Detecting issues in urinary elimination (presence of bladder globus)	0.264*	–	–
	(15) Encouraging the person to walk and providing walking aids (appropriate and accessible)	0.264*	–	–
(11) Detecting issues in urinary elimination (presence of bladder globus)	(12) Removing urinary catheter as soon as conditions permit and/or avoiding urinary catheterisation to encourage spontaneous urination	0.325*	(31) Facilitating communications with family members and/or caregivers by phone or video call	-0.295*
	(35) Treating pain (administration of medication and non-pharmacological treatments)	0.304*	(18) Minimising the effects of the hospital environment such as noises (doorbell, alarms, pumps, monitors) and lights (avoiding direct light and using soft lights)	-0.272*
	–	–	(22) Minimising the number of people in the room and placing the person in a single room (delirium room)	-0.267*
(12) Removing urinary catheter as soon as conditions permit and/or avoiding urinary catheterisation to encourage spontaneous urination	(15) Encouraging the person to walk and providing walking aids (appropriate and accessible)	0.342**	(30) Educating the family and/or caregivers. Contents: re-orientation interventions for the person. Risk factors and signs and symptoms of delirium, and changes in the person. Tools: information leaflets	-0.349**
	–	–	(14) Encouraging sleep by avoiding nighttime procedures	-0.340*
(13) Assessing sleep activity and patterns	(14) Encouraging sleep by avoiding nighttime procedures	0.473**	–	–
(14) Encouraging sleep by avoiding nighttime procedures	(18) Minimising the effects of the hospital environment such as noises (doorbell, alarms, pumps, monitors) and lights (avoiding direct light and using soft lights)	0.406**	–	–
	(23) Minimising room and ward changes	0.286*	–	–

(15) Encouraging the person to walk and providing walking aids (appropriate and accessible)	(16) Getting the person out of bed every day	0.294*	(19) Providing a clock, calendar, and signs in the room (where they are and in which city)	-0.276*
(16) Getting the person out of bed every day	_	_	(28) Encouraging the presence of the family and/or caregiver on a daily basis and sharing the experience of delirium with the caregiver	-0.397**
	_	_	(19) Providing a clock, calendar, and signs in the room (where they are and in which city)	-0.294*
	_	_	(30) Educating the family and/or caregivers. Contents: re-orientation interventions for the person. Risk factors and signs and symptoms of delirium, and changes in the person. Tools: information leaflets	-0.268*
(17) Assessing pain with verbal and non-verbal expression or using scales (e.g., PAINAID)	(35) Treating pain (administration of medication and non-pharmacological treatments)	0.669**	(22) Minimising the number of people in the room and placing the person in a single room (delirium room)	-0.403**
	(32) Evaluating therapy (number, dosage, pharmaceutical form of medications) together with the doctor	0.268*	_	_
(18) Minimising the effects of the hospital environment such as noises (doorbell, alarms, pumps, monitors) and lights (avoiding direct light and using soft lights)	(22) Minimising the number of people in the room and placing the person in a single room (delirium room)	0.364**	(24) Working in teamwork, carrying out multi-professional interventions, performing multiple interventions together	-0.338*
	_	_	(33) Controlling and managing medication interactions	-0.295*
(19) Providing a clock, calendar, and signs in the room (where they are and in which city)	(20) Encouraging the presence of personal items (photos, bedspreads)	0.416**	_	_
	(27) Communicating with verbal and non-verbal language in a clear, simple way and positioning oneself in front of the person	0.346**	_	_
	(26) Communicating with the person (calling him/her by name, explaining where I am, who I am, what my role is, what activities are taking place)	0.272*	_	_
(21) Ensuring a safe environment (e.g., reducing bed height)	(28) Encouraging the presence of the family and/or caregiver on a daily basis and sharing the experience of delirium with the caregiver	0.354**	(33) Controlling and managing medication interactions	-0.290*

(22) Minimising the number of people in the room and placing the person in a single room (delirium room)	(23) Minimising room and ward changes	0.386**	(35) Treating pain (administration of medication and non-pharmacological treatments)	-0.281*
	_	_	(24) Working in teamwork, carrying out multi-professional interventions, performing multiple interventions together	-0.266*
(23) Minimising room and ward changes	_	_	(29) Educating the family and/or caregiver. Contents: risk factors and signs and symptoms of delirium, and changes in the person. Tools: information leaflets	-0.305*
(26) Communicating with the person (calling him/her by name, explaining where I am, who I am, what my role is, what activities are taking place)	(27) Communicating with verbal and non-verbal language in a clear, simple way and positioning oneself in front of the person	0.411**	(33) Controlling and managing medication interactions	-0.306*
(27) Communicating with verbal and non-verbal language in a clear, simple way and positioning oneself in front of the person	_	_	(34) Administering and monitoring the effects of administered medication (e.g., haloperidol)	-0.314*
	_	_	(29) Educating the family and/or caregiver. Contents: risk factors and signs and symptoms of delirium, and changes in the person. Tools: information leaflets	-0.281*
	_	_	(33) Controlling and managing medication interactions	-0.267*
(29) Educating the family and/or caregiver. Contents: risk factors and signs and symptoms of delirium, and changes in the person. Tools: information leaflets	(30) Educating the family and/or caregivers. Contents: re-orientation interventions for the person. Risk factors and signs and symptoms of delirium, and changes in the person. Tools: information leaflets	0.802**	_	_
(33) Controlling and managing medication interactions	(34) Administering and monitoring the effects of administered medication (e.g., haloperidol)	0.454**	_	_

* p = < 0.05; **p = < 0.01. # No significant correlations emerged for the following Q-sample statements: (25) Tailoring interventions according to the person's needs and the setting, trying to maintain a daily routine for the person. Legend: PAINAD: Pain Assessment IN Advanced Dementia; 4AT: Assessment test for delirium & cognitive impairment, Rho: correlation coefficient; Cohen's criteria (small rho = 0.10 to 0.29; medium Rho = 0.30 to 0.49; large Rho = 0.50 to 1.00) (Cohen, 1988).

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3.4 Factors informing the nurses' prioritization process while preventing and managing delirium: findings from a qualitative study

The 3.4 faithfully reports the contents of the work submitted in English to an international journal: Aging Clinical and Experimental Research

3.4.1 BACKGROUND

Delirium is still a priority problem [1] with a prevalence of approximately 30% in geriatric and internal medicine up to 70% among older residents living in long-term care facilities [2-4]. Among the predisposing factors for delirium, advanced age, cognitive impairment, dementia, and frailty have been underlined; in both hospital and long-term care settings, delirium-related adverse outcomes include decreased independence in activities of daily living and an increased risk of mortality. Delirium is still a concern regarding patient safety, mainly among older individuals, causing distress among patients, their relatives, and caregivers, often complicating the work of healthcare professionals and increasing their workload.

Nurses play an important role in preventing and managing episodes of delirium as underlined by available guidelines [5]; however, as emerged recently [6] several recommendations are not applicable due to time and resources restrains [7], thus causing the patient to receive less care than required because other patients and/or interventions are prioritised.

The concept of prioritisation is part of the broader concept of decision making, defined as the ability to choose between two or more alternatives with the aim of pursuing the goal of patient safety [8]. The need to perform multiple tasks (e.g., administering medications) and the cognitive process (e.g., the knowledge and experience possessed) are combined to optimise the decision-making processes [9]. However, as reported in the literature [10,11] when nurses establish a sequence of care activities they may decide to delay or omit those perceived as less important, generating the so-called phenomenon of missed care (MNC) [12] in the so-called Unfinished Nursing Care (UNC) describing any nursing interventions needed by the patient/family which is delayed or omitted [11]. The UNC conceptual model has been established as consisting in multilevel elements (i.e., macrosystem, ecosystem, mesosystem, microsystem, and nurse-related level), with antecedents in poor resources and consequences in the poor quality of care [13].

Although the concept of prioritisation is quite new, several studies have established factors involved identifying antecedents in the patient needs [14]; in the context of care (e.g., acute, chronic; [15]; in the philosophies, models of care and its organisational aspects [16]; in the resources available [16,17]; and in the training; experiences; personalities; values; and beliefs of the nurses [18,19]. The prioritization may also be dependent on the patient's profile: in the specific context of delirium prevention and management, nurses have been reported to prioritise some interventions as 'Monitoring the vital parameters (heart rate, blood pressure, oxygen saturation)' and 'Ensuring a safe environment (e.g., reducing bed height)' [7]; on the other hand, they have been documented to rank at low priority the family and/or caregivers involvement and education (e.g., How to re-orient the beloved) and the presence of clocks, calendars, and specific signs in the room allowing re-orientation [7, 20]. However, the reasons already documented for UNC in general settings (e.g., [21, 22]) have

not been integrated with data regarding patients with delirium. Understanding the reasons informing the prioritization process of at-risk and/or patients with delirium can improve clinical outcomes, reduce the costs for the organisation [23] and suggest strategies to increase attention towards these patients. Therefore, the aim of this study was to explore the reasons informing the prioritisation process among nurses while stimulated to make decisions for patients at risk of and with delirium.

3.4.2 MATERIAL & METHODS

Study design

A qualitative study was conducted in 2021 here reported according to the Consolidated criteria for reporting qualitative research appropriate guidelines [24].

Setting and Participants

The study involved the public research and university hospital in Northern Italy, with 49,000 admissions per year and 1,515 beds with a staff of 6807 employees, of which 2478 are nurses. In addition, we involved three private post-acute and extensive and intensive rehabilitation hospitals, with 90 beds affiliated with the health system and 45 nurses [25]. In this study 11 clinical wards (three post-acute and eight university hospital wards) providing care to patients at risk or with delirium were approached. All wards participated on a voluntary basis: the process of involvement started with the presentation of the project to the nurse managers. Participants were recruited through a communication from the nurse managers and the researcher (LS) at shift change. An intentional sample [26] of nurses with the following characteristics were deemed eligible: a) clinical nurses working full-time in medical, geriatric, post-acute care facilities affiliated to the National Health System; b) able to understand and communicate in Italian; c) with at least six months of clinical experience [9]; and d) providing informed consent for the study. Nurses with organisational roles (e.g., nurse managers) were excluded [27]. Potential participants were invited; at the end, 56 nurses provided their contact details and the willing to participate.

Data collection process

It was developed a scenario (Table 1) to stimulate nurses to think and define priorities regarding preventive and managerial interventions needed. The main questions to investigate the reasons influencing the prioritisation were developed according to the available evidence [28] (Table 2). The scenario was provided prior to the meeting, whereas the interview questions were not shown to participants in advance. After obtaining the consent to participate in the study, interviews were scheduled between May and June 2021. All meetings took place online, via the Zoom platform. Each meeting lasted approximately 105 minutes (range: 120-90minutes). 19 meetings were conducted by two researchers (LS, NVU), where the participants ranged from one to seven. The researchers act as observer (NVU) and interviewer (LS), respectively. Audio-visual recordings and in-the field notes were collected to capture all details [29]. The participants were asked to classify the preventive (first sub-scenario) and the managerial (second sub-scenario) interventions by indicating their priorities; for each priority, the underlying reasons were asked, and audio recorded.

Table 1. The scenario of Mrs. M.

Prevention Female M. aged 84 years, presented to the Emergency Department with dyspnoea, cough and fever for three days. Concomitant diseases: Hypertension, COPD and hypercholesterolemia. Home treatment: on amlodipine, ipratropium bromide and simvastatin. In the emergency room she was given intravenous diuretics, steroids, antibiotics and oxygen, and a bladder catheter was placed for fluid monitoring. Prior to admission she lived with her husband, was autonomous in instrumental and basic activities of daily living, drove a car and played cards. After two hours in the emergency room, she was transferred to the medical unit with the diagnosis of pneumonia. At the nurse's assessment in the medical unit the following data were noted: TC 38.8 °C, regular HR 70bpm, BP 140/68 mm Hg, RR 24 beats/min, SpO2 92% with venturi mask FIO2 28%; shallow breathing, presence of productive cough with dense, yellow sputum; no skin turgor; PAINAID 5/10; wearing glasses and hearing aid. On admission, in the morning shift, Mrs. M is unable to answer questions appropriately, shows difficulty in maintaining attention and disorganised thinking, seems to talk to herself and it's difficult to understand what she says. In addition, she does not know why she is in hospital and thinks it is 1990. Her daughter is worried because she has noticed that her mother is very confused. The following are prescribed: blood cultures, sputum cultures, oxygen therapy with venturi mask FIO2 28%; antibiotic intravenous therapy every six hours, painkiller, antihypertensive, statins, steroids and diuretics.
Management At 3am, Mrs M's daughter called the night nurse because she had psychomotor agitation, had removed her PVC and was trying to get out of bed. Her daughter reported that her mother had been evacuating for the previous three days and had refused food and drink for the last two days.

Legend: BP: blood pressure; COPD: *Chronic obstructive pulmonary disease*; FIO2: inhaled fraction of oxygen; HR: heart rate; RR: respiratory rate; SpO2: Oxygen saturation; PAINAD: Pain Assessment IN Advanced (1-3, mild pain; 4-6, moderate pain; 7-10, severe pain); PVC peripheral venous catheter; TC: body temperature.

Data analysis

Quantitative data from the socio-demographic questionnaire was summarised with frequencies, percentages, means and standard deviations using SPSS (Statistical Package for Social Science version 25). The qualitative data were analysed using the structured and sequential approach of thematic analysis, which ensures completeness by limiting potential bias [29]. The first stage involved transcription, familiarisation with the data and selection of quotations. One researcher (NVU) transcribed the interviews, and a second researcher (LS) checked the accuracy of the entire transcription process. Subsequently, three researchers (SC, LS, NVU) independently familiarised themselves with the data by re-reading it several times. In the second phase, three researchers (SC, LS, NVU) independently identified key words (selection of keywords) from the text. In the third stage (coding), the same researchers (SC, LS, NVU) identified the codes, i.e. short phrases or words explaining the central meaning of the data. Subsequently, in the fourth stage (theme development), the same researchers moved from a careful analysis of the codes to a more detailed interpretation of the themes. In the fifth stage (conceptualisation through interpretation of keywords, codes and themes), the researchers, once they understood the data, carried out the conceptualisation step: the codes were collected according to their relevance, thus creating sub-themes, and were checked for consistency (SC). A fourth researcher was consulted during the process in case of need when disagreements emerged.

Ethical considerations

The study was approved by the Bioethics Committee of the University of Bologna (Italy) register no. 0109186 of 5 May 2021. Participation was voluntary; all nurses gave their written informed consent before being audio and video recorded and they were allowed to withdraw from the

study at any time. In verbatim transcribing the narratives, researchers ensured anonymity by using an alphanumeric code (e.g., RN1); confidentiality was also ensured by anonymising specific details (e.g., the hospital name) encountered during the transcriptions.

Rigour and truthfulness

According to the available literature [30] to ensure credibility, participants working in the areas of interest were involved and the researchers (LS, NVU, SC) had appropriate training and were experts in the topic of investigation. Rigour and reliability were ensured through the following strategies: (a) the use of an interview guide (Table 2); (b) the adoption of a detailed research protocol (description of the methodology, conducting steps and the analysis of the data); (c) a careful documentation of the field notes regarding participants' reasoning, which was shared during data analysis (LS; NVU); (d) the involvement of several researchers both in the interviews (LS; NVU) and in the data analysis (LS, SC; AP), which all were prolonged engaged. Furthermore, an intentional sample was used to ensure transferability, targeting persons caring for patients at risk of or with delirium in the medical and geriatric setting and in post-acute care.

Table 2. Interview guide for clinical nurses.

Interview guide
Presentation Aim of the study and data collection process Consent for interview and audio-recording
First section
Scenario regarding *delirium prevention* Please indicate, in order of priority, the interventions that you will implement to this scenario Questions* Scenario regarding *delirium management* Please indicate, in order of priority, the interventions that you will implement to this scenario Questions*
*** Questions**
'What are your reasons for making such choices?'
Other questions to clarify or better understand. e.g., 'Why?', 'What reasons affect the priorities identified?' 'What do you mean?' 'Can you explain it a little better?' 'What does it mean?' 'Can you give examples?'
Second section
Completion of the socio-demographic questionnaire via the Wooclap platform (a) demographic information (age, gender) (b) undergraduate education; (c) post-graduate education; (d) setting; (e) work experience.

3.4.3 RESULTS

Participants

56 nurses participated, of whom 39 (69.6%) were female, with a mean age of 31.6 years (CI=29.6-33.6). 53 (94.6%) had a bachelor's degree in nursing at university level, and of these 12

(21.4%) had a postgraduate qualification such as a master's degree. 15 participants (26.8%) had attended a specific course on delirium in the ward or in the workplace.

The population was distributed as follows: 31 (55.4%) in internal medicine, 15 (26.8%) in geriatrics and 10 (17.8%) in post-acute care/intermediate care; they had worked for a mean of 4.5 years (CI=2.7-6.2) and the setting in which they worked was the one in which they had spent most of their professional life (n=36; 67.9%) (Supplementary Table 1).

Prioritisation reasons

The reasons informing the prioritisation process in delivering preventive and management interventions towards hospitalised older individuals were identified at three levels: unit, nurse and patient level as reported in Table 3.

Unit Level

This level provides the reasons for prioritisation linked to the unit in which the patient at risk of and with delirium is admitted and cared for. Nurses reported that factors at the environment, human resources, and organization/work processes influences prioritization.

As far as the environment is concerned, numerous inappropriate and chaotic care units with several patients in small rooms have been reported, whereas the equipment and the required material to deliver nursing care was stored in other rooms and corridors. On the contrary, dedicated, safe environments, without architectural barriers and tools (e.g., clock and calendar or with a delirium room), are all limited or absent, thus influencing the prioritization of all space-time reorientation preventive management interventions.

Furthermore, the lack of human resources in terms of nurse-to-patients and nurse aides-to-patient's ratios forces to take care of those needs perceived as most important, urgent, or critical, leaving others unmet. Moreover, while shortages in nurses affect both preventive and managerial interventions, the shortages in nurses-aides influence only the management of the delirium but not its prevention.

A role is played also by the organisation and work processes: the geriatric mission of the unit increases the attention of nurses towards delirium prevention and management, whereas work processes based on strong routines, i.e. 'it has always been done this way', prevent the prioritization of some individual needs, given that all interventions are provided in an established order along the time and the sequence. The poor interprofessional collaboration increases the need to spend time in searching for, discussing, and in communicating with other professionals, thus further reducing the time available for patients. In this context, the lack of specific supportive tools (procedures, guidelines) in the field of delirium prevention and management threatens an effective care delivery, increasing the repetition of some well-acknowledged routinised activities (e.g., evaluating the risk factors), and implicitly delegating the interventions to other professions. The shift work, where subsequent nurses are involved in the 24/24 care of patients with no specific point of reference as a primary nurse, increases the need to collect data, searching for information regarding what has been done in the previous shifts with discontinuous care delivered to patients, which may further confuse patients. Moreover, although at night nurses have more time to devote to the patient by autonomously organising the work processes, the lack of resources (e.g., two nurses on average for 40 patients)

influences the prioritization of the interventions, providing them to urgent/clinical instable patients, leading to UNC.

Nurse Level

Nurses' competencies and attitudes were identified at this level. Among the former, the professional experience in the specific context of patients with delirium supports nurses in the prioritization process as well as in the early identification of the risks. However, the lack of knowledge possessed leads nurses to prioritise according to what they have learnt during under and post-graduate education, planning some unnecessary interventions (e.g., monitoring vital signs) and leaving those required neglected. Nurses set priorities according to the awareness of the situation, as well as to the ability to assess risks, to perceive them and to hypothesise the patient' trajectory, anticipating the course of the events. Identifying, recognising and managing the predisposing and precipitating factors of delirium require competencies influencing the priorities; the lack of knowledge or ability affects the prevention. Nurses' communication abilities also play a role in detecting patients' needs when not verbally communicated, which helps in prioritising those not immediate visible.

Time management skills are reported by nurses as another factor: they emphasise the importance of being able to organise the shift and save time to provide individualised interventions. They are used to focusing first on non-complex and controllable interventions in terms of duration, e.g., blood pressure measurement, and then on complex interventions, such as those required by preventive and delirium management.

Attitudes were recognised as influencing the priority process. Making decisions may be difficult for nurses; not all have the ability to face challenges and to identify what to put aside, because not everything can be done. Moreover, some nurses live in a 'hurry' also when there is no time pressure, as a sort of shaped attitude, reducing the time to invest in the patient care. Additionally, not all nurses are able to do several things simultaneously to optimise time, by overlapping different activities to deliver at the same time, such as communicational-relational and technical interventions, e.g., assessing the risk while taking vital signs. This further reduces the likelihood to prioritise patients at risk of or with delirium.

In setting priorities, nurses follow different schemes, as safety first, needs first, or prescription first, and these different tendencies shaped during education and experience may prevent a common action. The safety approach is not only focused on that of all patients but also on the health care professionals, in order to prevent legal implications.

Patient Level

The multidimensional frailty of the patient, influenced by the absence of carers, the clinical situation and the underlying cognitive impairments, has been reported as influencing the prioritization in both preventive and management interventions. The absence of caregivers, due to the restrictive policies introduced during the pandemic, increases the workloads of nurses, who are required to spend more time reassuring and staying close to patients, by also replacing family members in performing specific activities (e.g., watching out for falls or supervising them when they become agitated). Moreover, high priority is given to the clinical issues as the critical condition/gravity in the context of all patients, not only towards those at risk of and with delirium; the latter have been underlined as more demanding, especially those with psychomotor agitation, consequently reducing the nurses' surveillance of stable patients. Patients' cognitive impairments also influence prioritisation, as nurses

find themselves spending more time to establish a trusting relationship with the patient, to understand his/her needs and to manage them.

Table 3. Reasons informing priorities in preventive and managerial interventions in patients at risk and/or with delirium: Theme, subthemes, labels and quotations.

Theme	Subthemes	Labels	Prevention	Management	Quotations P, Prevention, M, Management
Unit Level	**Environment**	**Inappropriate care environment**	*	*	P 'Then we don't have dedicated environments for these types of patients .....for example a delirium room, single rooms just like a dedicated environment... it's very difficult to manage these patients if you don't have dedicated environments...'(RN40)
					'..Also the lack of dedicated tools to prevent disorientation, like clocks or calendars to help people understand where they are and what time it is so they don't get disoriented.' (RN14)
					M '..important to have a dedicated room like the delirium room. To care for a much more cognitively complex patient, they need a dedicated room close to the ward room.'(RN46)
					'..there are no calendars, there are no clocks, there are no forms of entertainment..' (RN28)
	Human Resources	**Inadequate nurse/patient ratio**	*	*	P '..the shortage of staff, because the adequate nurse/patient ratio also allows me to give him a shave, which may be a "superficial" thing, but for an elderly person who has no one, this could make his day. It could also change his approach to therapy..' (RN42)
					M '..We could act in a thousand other ways, but we lack the resources, we have very complex patients and minimal resources, such a situation is not easy to manage to guarantee a minimum level of care..' (RN46)
		Inadequate nursing aides/patient ratio		*	M 'the nursing aides are an integral part but there is not even one in 44 patients.' (RN35)
	Organisation and work processes	**Mission of the ward**	*	*	P '..I instinctively came to reason as we do in the ward with patients who have problems of this kind...So I tried to focus mainly on priority interventions, those that should be done immediately to prevent or manage a delirium episode..' (RN43)
					M '..I looked at the scenario in the ward where I work.... I in my ward I am really alone..'(RN4)
		Ineffective routines	*	*	P '..guided not only by theory, but also by what is the reality of my daily practice..' (RN18)
					M '..I have always drawn on clinical practice and everyday life..' (RN43)
		Inadequate collaboration with other professionals	*	*	P '..I still work in a team and there is one thing I would instinctively say…For example, I don't do it, the doctor does it.... Or other professionals .... In terms of how I work, the line is very blurred. The aspect of working in a team is definitely a priority..' (RN1)
					M '..managing the patient with delirium within the team..'(RN29)

		Lack of shared documents (Tools/procedure/protocols/guidelines)	*	*	P '..we never make assessments through scales of risk of delirium and with the presence of delirium and we do not have the tools for assessment...we usually assess whether the person is oriented, disoriented, oriented in time and space, we make assessments but not objective ones..' (RN2)
					M '..If we have a cardiac arrest, we know what to do, i.e. we rely on standardised guidelines. I know that if I do this procedure I will get this result. On the other hand, in the case of delirium or a patient at risk of delirium, I don't have much material, I don't have procedures, guidelines, let's say it's a bit of a grey area, quote unquote, where I don't have many elements to refer to..' (RN20)
		Lack of care continuity		*	M '.. We pass them on, but it happens that some information is omitted, they get lost, something is neglected, we are not infallible, maybe also because I do not follow them all the time..'(RN40)
		Night shifts challenges		*	M '.. It's night, so it's really a different situation and even more complicated, patients generally decompensate at night, it's easier for them to get confused and so on and the management is more difficult..' (RN13) '.. Here at night you have more time for individual care. Why should I not give her an enema or change a bladder catheter or give her chamomile tea..'(RN42)
Nurses Level	**Competencies**	**Professional Experience**	*	*	P '..I think it guided the experience. I had a type of patient, or more than one patient on my mind, guiding me..." (RN5)
					M '..experience helps, but it's not necessarily true that someone who's been working for a short time is going to act wrongly compared to someone who's been working for many years..' (RN32)
		Lack of knowledge about Delirium	*	*	P '..I honestly don't have any knowledge about delirium...I haven't done any courses and at university we've had very little to do with it... So I don't have any theoretical knowledge about managing the patient at risk of or with delirium..' (RN40)
					M '..We are professionals, so we should also be able to assess according to our experience, skills and training..' (RN9) M '..the priority is also based on knowing the patient and on continuity. It's logical that it changes, if I see him for the first time and not a colleague who is with this patient and has already known him, for example, for three weeks of the patient's stay, this is very important also to build the relationship of trust that is inevitably created between patient and nurse, patient and doctor, patient and nursing aides..." (RN40)
		Intuitive reasoning	*	*	P '..so I can see at a glance that she is already disoriented..' (RN9)
					M '..I can judge some things at a glance..' (RN42)
		Prognostic abilities	*	*	P '..I can already imagine the first night she spends in the ward..' (RN4)

					M '..when you hear what he says...it doesn't convince me and you keep a closer eye on him than on other patients...I point him out to colleagues on later shifts to assess him carefully because you have that ability to tell how his course is going..' (RN32)
		Assessment abilities	*	*	P '..I have concentrated on the assessment of risk factors for delirium; to identify and treat the possible risk factors for delirium. The lady has various risk factors, so go and intervene on them immediately so that they do not become causes of delirium..' (RN2) '..It's very important to encourage the person to drink, because of course if the person doesn't drink they will become dehydrated and that can lead to infection and then disorientation...' (RN5) '..Pain is very important, I put it as a priority because very often people can't express what they have..' (RN5) '..encourage sleep, bad sleep is going to change the next day's activities anyway, it worsens the cognitive state of the patients..' (RN7) '..also constipation for example, very often people who have not evacuated for a long time start to become very nervous, they show confusion..' (RN5)
					M '..Assess the risk factors that led to the restlessness, understand why the person had this change..'(RN5) '..as it is 03:00 in the morning, I have included among the priority interventions those that assess sleep activity and promote it... elements that could disturb it..' (RN2) '..I have also given importance to the evaluation of the prevention of changes in intestinal elimination..' (RN18) '..I would have invited her and I would have offered her, I don't know, some tea instead of some water and I would have made her go into the room.." (RN26) '...patient is confused so she is not able to express the pain, my attention is also focused on the pain by assessing it through the scale and finally treating the pain..' (RN16)
		Communication abilities	*	*	P '..We try to talk, let them express their thoughts..' (RN52)
					M '.. I concentrated on what to do first to calm the patient down. Right now the patient is agitated and my thought is to communicate with her, to try to calm her down, to make her understand where she is, to assess her state of agitation through communication..' (RN2)
		Time management skills	*	*	P '..I have concentrated on what you should try to do in the first few hours, then the other interventions are postponed to a later time..' (RN43) '..I prioritised according to a temporal moment..' (RN25)
					M '..Unfortunately, sometimes you realise that there are many things that cannot be done because of lack of time. ...With this type of patient...you

					should have a little more personal support, but you can't because you have so many things to do during a shift..' (RN11)
	Attitudes	**Being challenged by decisions**	*	*	P '..so setting the priority and the hardest thing to do, I felt like I was betraying my ideals by putting some things aside...maybe because in practice the distinction is not so clear...like to say maybe because now you think with a cool mind..' (RN1)
					M '..I hate making these decisions. Eh, but it can still be an important one..' (RN42)
		Living in hurry	*		P '..a nurse who is in a hurry and a nurse who does not give her best to the patient and to the patient..' (RN42)
		Being able to do things simultaneously	*	*	P '..There are many interventions that we do in practice at the same time... For example, while I am giving the therapy, I am trying to talk to her to calm her down and give her some instructions... That's the point of doing things at the same time. . I have to rationalise every moment..' (RN26)
					M '..because you can't choose, that is, it should be one, some things overlap with others...for example, the presence of the family member overlaps with the education of the family member...In my opinion, many activities can be done in an integrated way, none of it is separate, everything can be integrated safely..' (RN42)
		Ensuring safety for all as first (each singular patient, all patients cared for, practitioner(s))	*	*	P '..to ensure the safety, especially of the person who is at risk of delirium, because they cannot see where they are hurting themselves and we have to prevent them from hurting themselves..' (RN46)
					M '..That of reassuring the patient, avoiding all interventions of restraint. I look first for other ways, other solutions..'(RN23) '..The effect of restraint always depends on the case, because maybe there are people who are restrained, they get more agitated and maybe by not being restrained they calm down. It has happened that agitated patients have calmed down with restraints and they don't try to climb over the rails..' (RN56) '..First of all, the safety of the person and to prevent them from wandering off or hurting themselves..' (RN46) '..So the choice also goes on whether you have more than one patient like that... Not just one patient, but also the priority of other patients..'(RN39) '..I also have to be safe while the patient is agitated..' (RN19)
		Ensuring basic needs as first	*	*	P '..Having done that, I would tailor interventions according to the person's needs..' (RN29)
		Ensuring prescriptions		*	M '..Autonomy and also the ability to respond promptly and correctly to what the doctor tells you and asks you. I am the one who assesses the situation and intervenes..' (RN34)
Patient	**Multidimensional frailty**	**Other competitive clinical issues**	*	*	P '..I try to stabilise the patient first... there is a possibility of sudden deterioration...' (RN24) You stabilise the patient first..' (RN5)

					M '..More critical, that is for this type of patient, so here let's say we had little information, but I was guided by the fact that, that is, it was an acute event, so that is the lady was agitated, so she took off the CVP, tried to get out of bed, so I, that is, I left the clinical aspect alone..' (RN20)
		Challenges to understanding needs due to the cognitive state	*	*	P '..I chose the second one taking into account the cognitive state, at risk of delirium..' (RN35)
					M '..Because we say that we are dealing with psychomotor agitation of the patient in progress ..' (RN19)
		Unavailable caregivers/relatives	*	*	M '..the person's autonomy must be maintained as much as possible to avoid decompensation again so the nutritional intake must be ... assessed.' (RN33)
					M '..I prefer the presence of family members when we could and when we can.... It's hard, hard for patients not to see their children, people get disorientated and even more so without their loved ones. . I have often found patients in a state of confusion..' (RN24)

Legend: RN: Registrer Nursing; P: Prevention; M: Management; RN, n: Registered Nursing, number of interview.

3.4.4 DISCUSSION

To the best of our knowledge, this is the first qualitative study based on scenarios involving expert nurses caring for older patients, with different professional and educational backgrounds to discover reasons informing the process of prioritization in hospitalised older patients at risk of and with delirium. The several reasons emerged, identified at three level, unit, nurses, and patients, can be discussed considering the evidence available.

Priorities are influenced at three different levels: the findings substantially confirm the reasons documented in the literature in the context of UNC for general patients [21, 22] by adding some factors that seems to be specific for patients at risk of or with delirium. At the unit level, the inappropriate environment has been emphasised, but its change is out of the scope of the professions, leaving nurses aware regarding the issues, but ineffective. Programmes, such as the Delirium Room model [31] involving structural, environmental (e.g., lighting) and reorientation tools (e.g., calendar, clock) reduce the duration of delirium [32] but their development is under the responsibility of the hospital. Moreover, nurses have mentioned these factors without any connection with the scenario, suggesting that, also in simulated circumstances, they set priorities as they are used to in the real context, which might highlight the challenges lived by them on a daily basis, as well as the barriers that may be encountered in any attempt to change priorities when the environment remains unchanged. Issues in human resources of both nurses and nursing aides [33] have also been mentioned – and further affect the care given to patients at risk of and with delirium who require more time to be understood [34] and managed. Patient with delirium increase the workloads of nurses, thus further limiting the time available; also in this case, factors influencing priorities are out of the responsibility of the nurses.

The multiple activities required in integration with other healthcare professionals to provide personalised care have been already underlined in their importance [35]; the lack of time available prevents multiprofessional initiatives, forcing nurses to work alone to save time. On the other hand, some factors characterising the work and organisation processes, such as the routinised approaches, the lack of tools for assessment and management and the poor continuity across shifts, which may all affect the early identification and the following management of patients with delirium, are under the responsibility of nurses. Making decisions at night may increase the likelihood of UNC, both because of the length of the night and the lack of human resources. However, nights are seen by our nurses as an occasion to spend more time outside of routine to deliver personalised care, as already documented [36].

Nurses' competences and attitudes also play an important role in the delirium prevention and management: nurses act in coherence with their experience and education [37], and their physical and psychological exhaustion [38] may increase the difficulties in making decisions, leading to a prevalence of routinised interventions. Except for some aspects already documented in the literature (e.g., multitasking, [37]), the different priorities set around needs, safety, and medical prescriptions suggest different patterns of actions that may increase uncertainty in the care of patients at risk of delirium. Nurses have been recognised as important in promptly identifying risks and interventions [5] and should be supported by specific tools (e.g., [39]) for identifying, recognising and managing predisposing and precipitating factors for delirium. As in other settings, intuitive and prognostic reasoning is the basis of prioritisation and is influenced by the experience acquired in the specific field [40]; however, recognising risks may be useless if nurses are not trained to implement evidence

[41], as emerged in our study. Educational programmes and strategies shaping attitudes are needed, for example by identifying expert nurses in delirium prevention and management at the unit level to coach the capacity to identify right priorities and to prevent UNC. In addition, factors influencing prioritization seems to stimulate both intuitive and analytic reasons processes: the former, when nurses lack knowledge, tools, protocols regarding how to manage delirium; the latter, when the risk is assessed according to experience and knowledge by recognising and managing predisposing and precipitating factors.

Finally, the multidimensional frailty of patients seems to have a catastrophic effect on prioritization. Firstly, patients with other clinical issues are prioritised, suggesting that delirium is not considered as a relevant clinical condition; secondly, the time required to understand the patients' needs, which may be difficult to identify, is not available: as a consequence, needs are left unmet. The absence of relatives at the bedside further increases the challenges: family members have already been reported as safe keepers and as a source of additional surveillance of patients [42]. Therefore, patients without relatives should be carefully considered and prioritised, to prevent any form of UNC. Overall, according to the continuum theory model, the time available influences priorities, both because the scarcity of time stimulates the identification of some priorities, and because the care and management of patients with delirium requires time to assess their needs and build a trusting relationship [37]. In this context, the silent and imperceptible risk of delirium leads nurses to postpone or miss some interventions, whereas the explosion of delirium requires immediate prioritization of patients; however, some organizational and nurse factors influence the prioritization.

Moreover, some reasons affect only the prevention (e.g., living in a hurry), while others only the management phase (e.g., night shifts); however, as most reasons are common to the two phases, both preventive and managerial interventions may benefit from strategies ameliorating the prioritization process.

Limitations

There are several limitations to this study. First, it was conducted during the pandemic, and this may have influenced the findings; moreover, we have only considered nurses working in medical, geriatric and post-acute settings, suggesting therefore that future studies should expand the involvement also in other settings where delirium may occur (e.g., surgical settings). Data collection based on a scenario may have prevented a full exploration of the reasons at the bedside.

3.4.5 CONCLUSIONS

Nurses are used to prioritising interventions; however, while the factors influencing the process among acute patients has been investigated to detect why nurses unfinish some activities in favour of others, in the context of older people at risk or with delirium, no data have been collected to date. To the best of our knowledge, this is the first study attempting to identify reasons affecting the prioritization process among these patients. Findings suggest that the process is influenced by reasons set at three levels, some of which are under the nurses' control while others are not, that mainly affect both preventive and managerial interventions.

To promote the right identification of the priorities that may protect older patients from an escalation towards delirium, targeting the (a) resources available at the unit level, the (b) nurses'

competence and attitudes and the (c) patient' profile is crucial. Changes in the environment, and effective work and organisation processes through collaboration and integration between professionals, by also providing decision-making support tools, are required. Moreover, nurses should be educated and supported in developing competencies and attitudes, not only during undergraduate education, but also in postgraduate and continuing education settings. In addition, given that the mission of the units, as the geriatric one, seems to influence the right prioritization, investments devoted to nurses working in other setting than that geriatric, are important.

3.4.6 SUPPLEMENTARY MATERIALS

Supplementary Table 1. Demographic characteristics of nurses.

Variables	Nurses N (%) 56 (100)
Age, CI (95%)	31.6 (29.6–33.6)
Females	39 (69.6)
Undergraduate education	
Bachelor's degree in nursing	53 (94.6)
Post-graduate education	
Master's degree course	12 (21.4)
Continuing education course(s) on delirium	15 (26.8)
Work setting	
Internal medicine	31 (55.4)
Geriatrics	15 (26.8)
Post-acute-intermediate care	10 (17.8)
In the current unit I spent the most time of my professional experience	38 (67.9)
Years of experience, CI (95%)	4.5 (2.7–6.2)

Legend: CI, confidence interval.

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Chapter 4

Care of the patient at risk or with Delirium: validation study of the Unfinished Nursing Care Survey on a sample of nurses

4.1 The reasons of Unfinished Nursing Care during the COVID-19 pandemic: an integrative review

This 4.1 faithfully reports the contents of the work published in an international journal:

Sist L, Chiappinotto S, Messina R, Rucci P, & Palese A. (2024). The Reasons for Unfinished Nursing Care during the COVID-19 Pandemic: An Integrative Review. Nursing reports (Pavia, Italy), 14(2), 753–766. https://doi.org/10.3390/nursrep14020058

4.1.1 BACKGROUND

In recent years, the phenomenon of missed nursing care (MNC), defined as care required by patients that nurses have planned and for various reasons delay or omit partially or completely, has converged into that of unfinished nursing care (UNC) [1]. The latter has been established as an umbrella concept and includes all terminologies, theories and traditions developed in the field of MNC. Moreover, UNC has been recognised as an issue relevant to public health because of its potential consequences for patients, professionals and healthcare organisations. It has also been emphasised that the occurrence of the UNC phenomenon affects citizens' trust in the National Health Service (NHS).

The lack of resources as the main reason, and the deterioration of service quality as the outcome, constitute the well-established evidence available on UNC over the years.

However, priority in terms of research has been given to discovering the reasons that promote and/or hinder the occurrence of UNC: an in-depth understanding of the reasons for UNC can inform interventions to mitigate/prevent the phenomenon and avoid possible negative events [1].

. Theoretically, it has been documented that UNC is influenced by factors on multiple levels, where the higher levels (e.g., policies regarding the amount of nursing care in units) can influence the lower levels and, ultimately, nurses' decision not to fulfil a patient's need [2, 3]. Empirically, these assumptions have been tested in primary studies (e.g., [4]) in a real-world context, with a view to informing actions and strategies pre-venting the occurrence of UNC. Specifically, a recent systematic literature review summarised all primary studies published in the pre-pandemic era documenting the reasons for UNC [5]. The findings showed that factors at the unit (e.g., the resources available), nurse (e.g., priority setting abilities) and patient (e.g., the increased complexity of needs) level all play an important role in increasing the occurrence of UNC.

During the pandemic era, studies conducted revealed some changes in the factors triggering UNC; however, these studies [6-12] used mainly tools validated before the pandemic with the aim of comparing changes, if any, in the weight of different causes already known. However, during the challenging times of the pandemic, new additional (and unknown) factors may have played a role in

triggering UNC. Summarising the empirical knowledge discovered in the field of reasons for UNC during the pandemic may: (a) describe changes in the causes of UNC in times characterised by un-precedent levels of pressures applied to the NHS; (b) inform new UNC mitigation and/or prevention interventions that may also be important in the post-pandemic era considered its long-term consequences; (c) decrypt which factors most expose systems to unfinished care in pandemic times to inform future pandemic plans. Moreover, given the dramatic changes incurred in the NHS due to the recent coronavirus (COVID-19) pandemic, re-evaluating the reasons for UNC can help the system, the executives, and the clinical nurses to make better decisions and set new priorities in their education, and implement policies to promote quality of care [13]. The purpose of the study was to describe the reasons for UNC as documented during the COVID-19 pandemic.

4.1.2 MATERIAL & METHODS

An integrative review was conducted following the Whittemore and Knafl's [14] methodological model, as it includes research from experimental and non-experimental studies: to (a) extract results in a meaningful and systematic manner and (b) integrate evidence from various sources. This framework consisted of five steps: problem identification; literature search; data evaluation; data analysis and presentation [14]. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) was followed for the identification, screening, eligibility, and inclusion stages of this review (Figure 1) [15].

Identifying the research questions

The review question was as follows: “What causes, factors, and predictors (here in after reasons) have been proven to trigger UNC during the pandemic?”

Eligibility criteria

The literature search was conducted by consulting the PubMed, the Cumulative Index to Nursing and Allied Health Literature (CINAHL) and the Scopus databases, using the following keywords: “missed nursing care”, “rationing nursing care”, “un-finished nursing care”, “reasons”, “causes” and “factors/predictors” (Supplementary Materials S1). The following papers were included: (a) all primary studies relevant to the research question reporting (i) the abstract and (ii) the data collection period from January 1st 2020 to May 1st 2023 according to the official declaration of the starting and ending of the pandemic period [16]; (b) published in English, Italian or German; and (c) conducted with scientifically sound methodologies.

Studies using UNC measurement tools and assessing reasons according to these tools were excluded because they were developed and validated before the pandemic (e.g., MISSCARE Survey, Unfinished Nursing Care Survey), capturing factors established as relevant in that times. The pandemic have changed the organization and the process of health care systems and that of the nursing care, thus the previous tools may not capture the realistic reasons triggering the UNC [6-10].

Quality appraisal

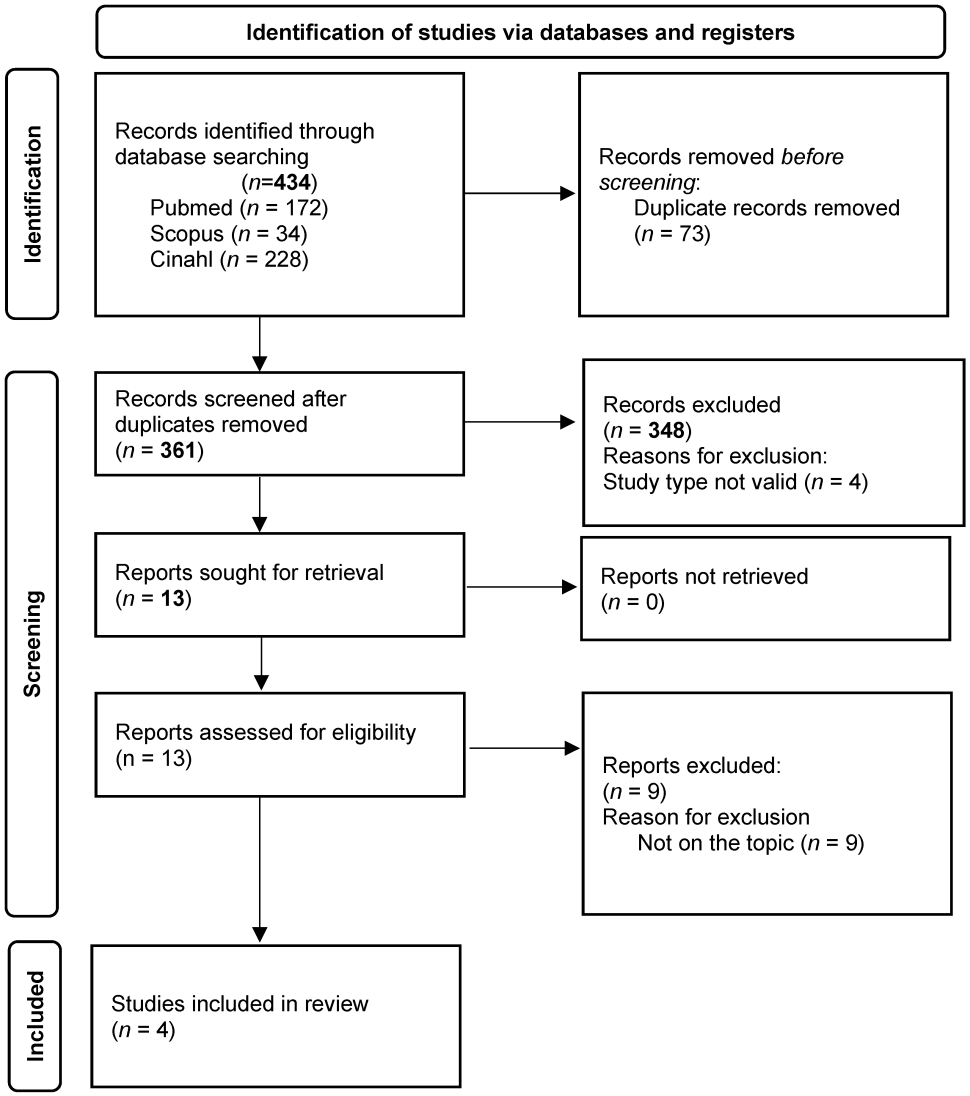
A methodological quality assessment was carried out with the Critical Appraisal Skills Programme (CASP) for qualitative studies [17] and the Mixed Methods Appraisal Tool (MMAT) for mixed methods [18]. The grids required a judgement to be entered for each item (Y, Yes; N, No; CT, Can’t tell) after having read each study carefully. The evaluation was conducted by two researchers

(LS and SC, as well as other authors when the study was written by some of them) before they independently compared the findings. In the case of disagreements, a discussion meeting was held to reach a consensus. All identified studies showed sufficient quality, with 8/10 (CASP tool) and 13/17 (MMAT tool) (Supplementary Materials S2; S3).

Data extraction and synthesis

On a preliminary basis, a data extraction grid was designed and piloted for clarity, feasibility and utility in one study. No changes were required. Then, from the included studies, the following data were extracted and recorded in the grid: (a) authors, year of publication, country/study context, study period; (b) aim(s), type of study, data collection process; (c) sampling method, participants, demographic data (age, gender, professional experience); and (d) main results. The reasons for UNC reported were identified and extracted from each study; then, reasons extracted were categorised according to the levels where they originated (system, unit, nurse manager, nurse, patient) following the socio-ecological model as reference (2). Subsequently, reasons were categorised and narratively described according to their similarities and differences.

Figure 1. Flowchart of studies screening process (PRISMA guidelines).



4.1.3 RESULTS

Study Characteristics

A total of 171 studies were identified and four were included [19] (Figure 1). These were all primary studies (Supplementary Materials S4) – three based on a qualitative design [20-22] and one based on a cross-sectional design with an open-ended final question [23]. The studies were conducted in Italy [20, 21], Finland [22] and Iran [23] in acute hospital settings [20, 21, 22]. The perspectives investigated were those of both healthcare professionals [20, 22, 23] and patients [21] involving from 14 [22] to 29 [20] participants in the qualitative studies and 462 [23] in the quantitative one. All studies were intended to explore the reasons for UNC as perceived during the pandemic, in the first months of 2021 [20, 22, 23] and between April and July 2022 [21], with well-designed and -conducted research methodologies.

Reasons for UNC

The UNC factors were categorised into system, unit, nurse manager, clinical nurse and patient levels (Table 1).

Table 1. The reasons for unfinished nursing care in pandemics survey.

Level	Theme	Subtheme	Authors (Year)
System	**New healthcare system priorities**	Dramatic changes due to the COVID-19 pandemic	Chiappinotto et al., 2023 [21] Safdari et al., (2023) [22]
		Cost restraints	Chiappinotto et al., 2023 [21]
	Pre-existing frailty of healthcare facilities	Unsuitable environment layout	Chiappinotto et al., 2023 [21] Safdari et al., (2023) [22]
		Old technologies	Chiappinotto et al., 2023 [21] Safdari et al., (2023) [22]
		Discrepancies in resource allocation across units	Chiappinotto et al., 2023 [21]
	Poor support for nursing care	Lack of nurses and nursing care value	Chiappinotto & Palese, (2022) [20] Safdari et al., (2023) [22]
		System insensitive to UNC issues	Chiappinotto & Palese, (2022) [20]
		High bureaucratisation and lack of investments in electronic records	Chiappinotto & Palese, (2022) [20] Hackman et al., (2023) [23]
	Challenges in leading nursing care	Lack of effective professional community	Hackman et al., (2023) [23] Safdari et al., (2023) [22]
		High turnover	Hackman et al., (2023) [23]
Unit	**Inappropriate care environment**	Layout of the environment	Chiappinotto & Palese, (2022) [20]
		High number of patients in each room	Chiappinotto & Palese, (2022) [20]
		Chaotic environment	Chiappinotto & Palese, (2022) [20]
	Insufficient material resources	Material resources unavailable or limited	Chiappinotto & Palese, (2022) [20]
		Restrictions in furniture/equipment	Safdari et al., (2023) [22]
	Insufficient human resources	Higher nurse/patient ratio	Chiappinotto & Palese, (2022) [20]

			Chiappinotto et al., 2023 [21]
		Nurse shortages	Chiappinotto & Palese, (2022) [20] Chiappinotto et al., 2023 [21] Safdari et al., (2023) [22] Hackman et al., (2023) [23]
		Nursing aide shortages	Chiappinotto & Palese, (2022) [20]
		Physicians unavailable (e.g., off the unit)	Chiappinotto & Palese, (2022) [20]
	Ineffective inter- and intra-professional cooperation	Poor teamwork (lack of collaboration and communication/lack of in-group reflection on action)	Chiappinotto & Palese, (2022) [20] Safdari et al., (2023) [22]
		Tension or communication breakdowns between nurses and medical staff, nurses and nursing aides, nurses and ward managers, and nurses and patients	Chiappinotto & Palese, (2022) [20] Safdari et al., (2023) [22]
	Ineffective shift design	Lack of staff during the day, nights and weekends Excessive length of shifts	Chiappinotto & Palese, (2022) [20] Chiappinotto et al., 2023 [21]
	Ineffective unit organization and work process	Work process unpredictability due to unexpected internal (e.g., a new hospitalization, an urgency of a particular patient) or external (e.g., COVID-19) situations	Chiappinotto & Palese, (2022) [20] Hackman et al., (2023) [23]
		Mission of the ward (specialised wards have a greater focus on the individual needs of patients)	Chiappinotto et al., 2023 [21]
		Large number of discharges and admissions	Chiappinotto & Palese, (2022) [20]
		Overlapping activities	Chiappinotto & Palese, (2022) [20] Chiappinotto et al., 2023 [21] Safdari et al., (2023) [22]
		Limited capacity to react to unpredictable events (admissions/emergencies)	Chiappinotto et al., 2023 [21]
		Ineffective routine	Chiappinotto & Palese, (2022) [20] Safdari et al., (2023) [22]
		Lack of shared procedures	Chiappinotto & Palese, (2022) [20] Safdari et al., (2023) [22]
		Higher frequency of interruptions	Chiappinotto & Palese, (2022) [20] Chiappinotto et al., 2023 [21]
	Ineffective models of nursing care delivery	Poor nursing care models of care delivery: functional nursing	Chiappinotto & Palese, (2022) [20] Chiappinotto et al., 2023 [21]
		Incomplete or ineffective handovers	Chiappinotto & Palese, (2022) [20]
Manager	**Inadequate nurse manager's leadership**	Inadequate nurse manager's leadership	Chiappinotto & Palese, (2022) [20] Chiappinotto et al., 2023 [21]
Nurse	**Nurses' attitudes, competences and performances**	Being in a hurry	Chiappinotto et al., 2023 [21]
		Reduced work capacity due to increased age	Chiappinotto & Palese, (2022) [20]
		Lack of experience, knowledge, competences (e.g., empathic)	Chiappinotto & Palese, (2022) [20]

		Lack of responsibility	Chiappinotto & Palese, (2022) [20] Chiappinotto et al., 2023 [21]
		Low motivation	Chiappinotto & Palese, (2022) [20] Chiappinotto et al., 2023 [21] Hackman et al., (2023) [23]
		Higher stress, fatigue	Chiappinotto & Palese, (2022) [20] Chiappinotto et al., 2023 [21] Hackman et al., (2023) [23]
		Poor time management skills	Chiappinotto & Palese, (2022) [20]
		Ineffective delegation skills	Chiappinotto & Palese, (2022) [20] Chiappinotto et al., 2023 [21]
		Ineffective priority-setting skills	Chiappinotto & Palese, (2022) [20]
		Wrong nursing care planning	Chiappinotto & Palese, (2022) [20] Safdari et al., (2023) [22]
	Weaknesses in education	Incomplete training/mentoring (in the transition as a newly qualified graduate)/inadequate orientation of the new staff	Chiappinotto & Palese, (2022) [20] Hackman et al., (2023) [23]
		High turnover among nurses	Chiappinotto & Palese, (2022) [20]
	Poor humanistic view of patient care	Nursing care not patient-centred	Chiappinotto & Palese, (2022) [20]
Patient	**Increased demand of patient care**	Clinical instability	Chiappinotto & Palese, (2022) [20] Hackman et al., (2023) [23]
		Complexity/needs Worse clinical conditions	Chiappinotto & Palese, (2022) [20] Hackman et al., (2023) [23] Safdari et al., (2023) [22]
		Age	Safdari et al. (2023)
		Cognitive impairments	Chiappinotto & Palese, (2022) [20] Safdari et al., (2023) [22]
		Loneliness	Chiappinotto & Palese, (2022) [20]
	Lack of carer support	The absence of relatives/caregivers Hospital restriction to relatives	Chiappinotto & Palese, (2022) [20] Safdari et al., (2023) [22]
	Increased nursing care needs and care expectations	Demanding patients	Chiappinotto & Palese, (2022) [20] Chiappinotto et al., 2023 [21]

Abbreviations: ADL, activities of daily living; UNC, unfinished nursing care.

System level

The system level is defined as the highest organisational level that influences policies, programmes, and culture of the entire institution, and is capable of triggering UNC [2]. At this level, available studies have identified the following reasons for UNC:

- New priorities of the health system. The healthcare system has undergone major reorganisation, related to the drastic changes due to the COVID-19 pandemic, which have further reduced resources by exacerbating the pre-existing issues of the system [20, 22] and leading to cost restraints in some sectors to rendering available resources to others [21].

- Pre-existing frailty of healthcare structures and processes. The inadequate environments, such as the old layouts of hospital buildings [21, 22], as well as the discrepancies in the allocation of resources across units, have been seen as pre-existing frailties that have been exacerbated during the pandemic, thus increasing the risk of UNC. The structural and processual factors combined with an unbalanced workforce across units, and poor environments (e.g., distance between units), have been reported as leading to UNC [21].

- The poor support for nursing care. Systems causing a lack of nurses at the unit level [20, 22], and not emphasising and/or communicating internally and externally the role and the value of nurses, have been documented as increasing the risk of UNC. Moreover, those systems not considering appropriately the early signs of poor-quality care (e.g., by analysing incident reports) have been perceived as insensitive towards UNC issues, neglecting its relevance and consequently strategies aimed at preventing it. In addition, some systems perpetuated some UNC factors when they did not invest in technologies facilitating nursing care [20]: the high level of bureaucratisation increased further during the pandemic (e.g., the need to collect certifications and to check issues) and led to time being wasted on administrative tasks leading nurses to postpone care [20, 23].

- Increased challenges in leading nursing care. The fragmentation in the community of nurses as a profession and as a system has been reported as affecting its capacity to effectively address changes and policies, as an independent body, both at the political and institutional levels [22, 23]. Similarly, the increased nursing turnover [23] has been reported as triggering UNC.

Unit level

The unit level, as that lived by both nurses and patients, reflects the context where UNC occurs, and where some additional factors have played a role during the pandemic:

- Inadequate care environment. The environments within the units have been reported as inadequate in terms of their layouts, leading to time being wasted by nurses in getting to rooms or retrieving material. Moreover, with many patients being in the same room, the increased attention and processes needed to protect them from safety issues required more time and, when nurses were lack in resources, more occurrence of UNC. In some units, the perceived chaos and confusion distracted nurses while they were providing the necessary care [20].

- Insufficient material resources. Material resources [20], both in terms of supplies and equipment [22], were poorly available or limited: nurses have been reported as spending time searching for them in other units, postponing the care required [20, 22].

- Insufficient human resources. The lack of human resources, reflected in the high nurse/patient ratio [20, 21], due to the shortage of nurses [20-23] and of nursing aides [20] has been documented. In addition, the absence of physicians (e.g., when they are outside the unit) also increased workloads, resulting in some care needs being missed [20].

- Ineffective shift design. An adequate presence of staff was not always planned during the day, at night and at weekends; the length of shifts was also a problem with shifts being too long. The idea

that there are fewer care activities to provide at the weekend generated ineffective shift planning, reducing the number of nurses at the unit level during weekends [20, 21]; on the other hand, excessively long shifts led to fatigue and lowered the standard of nursing work.

- Ineffective unit organization and work process. The mission of the unit and its continuing change have triggered uncertainty regarding the priorities [21]. Specifically, nurses were continuously called to review their work processes, redefining priorities and activities [20], due to continuous unexpected events [20] related to internal (e.g., emergencies) and/or external (e.g., COVID-19 patients) new conditions [23] such as the high number of discharges and admissions [20]. The continuous need to redefine care plans was also influenced by the high frequency of interruptions (e.g., answering the telephone) [20, 21] and the disrupted routines due to changes imposed on the work processes in managing the pandemic [20, 22]. The several competitive activities [20, 21, 22] have increased the occurrence of UNC. The high number of newly qualified nurses, deployed from other wards, prevented the possibility of working with shared procedures [20, 22], leading to uncoordinated decisions, the wasting of time and ultimately UNC [20, 21]. Expanding the capacity of the unit in response to the numerous unpredictable events was not always possible; therefore, with the same resources, all patients were cared for, but not all care needs were catered for, thereby increasing the occurrence of UNC.

- Ineffective models of nursing care. The delivery models did not support the personalisation of care expected both by patients and nurses. Specifically, the functional model in which tasks are fragmented, accompanied by the need to limit the exposure to patients due to the risk of contagion, have been reported as threatening care needs; also, handovers were incomplete or ineffective, due to the fragmentation of care, with failure to communicate patient needs ultimately leading to UNC [20].

- Ineffective inter- and intra-professional collaboration. The lack of collaboration and communication inside the nursing profession and across the various professionals has been reported as causing tensions or interruptions in communication during the care process, thus increasing the risk of UNC [20, 22].

Nurse manager level

At the nurse manager level, inadequate leadership, lacking in clear and shared aims and interest in the professional protection and growth of the nurses in difficult times, has been reported to increase the occurrence of UNC [20, 21].

Clinical nurse level

The issues belonging to the clinical nurse level are those strictly related to each individual nurse and may all contribute to UNC.

- Issues with nurses' attitudes, competences and performances. The lack of empathy triggered poor needs communication and understanding, while working in a hurry prevented any contact with patients, thereby threatening the capacity to identify patients' needs [21]. Moreover, reduced working abilities related to an increase in age [20], and a lack of work experience, knowledge and skills [20], as well as professional responsibility [20, 21] and/or motivation [20, 21, 23], have also been reported as in-creasing the occurrence of UNC. Furthermore, the tiredness caused by high workloads [20, 21, 23] and the poor ability to manage time, to attribute priorities [20] or to delegate [20, 21] have

generated UNC. Errors in care planning (for example, scheduling of unnecessary interventions) have also been underlined as leading to UNC [20, 22].

- Weaknesses in education: incomplete training or mentoring [20, 23] led to long periods of time being needed to work effectively as an independent nurse among those just introduced into the unit. An increased risk of missing under-recognised needs was also reported. On the other hand, excessive burden among some more experienced nurses has been documented as causing a high nursing turnover, which implied the need to support new colleagues [20].

- Poor humanistic vision of the patient. Nursing care not centred on the person, but rather on the activities/tasks to be provided, forced by the extreme working conditions experienced, have reduced the capacity to consider all needs (for example emotional ones) that have been missed [20].

Patient level

The last level identified, related to patients, underlines the important change in the patient profile.

- Increased demand for patient care. During the pandemic, an increased number of patients were in unstable conditions [20, 23], with highly complex and/or worse clinical conditions [20], many with co-morbidities [22, 23], and elderly people with cognitive decline [20, 22] and living alone [20]. These patients required more care, as they were not always able to communicate their needs, and above all, they were not supported by caregivers [20, 22, 23].

- Lack of carer support. During the pandemic, relatives could not access the hospitals due to the restrictive policies; consequently, the simplest care activities [20, 22] often delegated to families were not performed.

- Increased nursing care needs and expectations. In some contexts, patients became more demanding; they also resisted treatments because they did not believe that the pandemic and the need for treatment were truthful; for example, they rejected educational interventions regarding vaccinations [20, 21].

4.1.4 DISCUSSION

Only four studies have investigated the reasons for UNC during the pandemic without using tools using a predefined set of UNC causes: on the one hand, using predefined tools as many researchers did [24] may provide valid and comparable evidence, whereas on the other hand, innovative approaches may provide new insights to inform on additional factors influencing the occurrence of UNC during challenging times like those lived through in the pandemic. Qualitative studies were mainly per-formed during the pandemic [20-22], providing innovative perspectives from those who were experiencing the issue. Nurses' experience has mostly been investigated, at the bedside and at the different levels of healthcare services [20, 22, 23]. It has been widely recognised that the nursing workforce has been affected by the pandemic [25, 26]; therefore, giving them voice by involving all levels from the bedside to the executive one is important. However, the patients' perspective has been investigated in only one study so in the pre-pandemic era their perspectives remained mostly neglected. The patients' perceptions are important [20] in valuing their reported experience (e.g., Patient-Reported Experience Measures (PREMs)) given that unfinished care is mostly related to their expectations.

At the overall level, all participants were expert informants according to their professional experience, age or experience with hospital care. Therefore, the reasons for UNC that emerged reflect those lived by experts that may have compared the pre-pandemic professional experience with that encountered during the pandemic. However, two studies have been conducted in Italy [20, 21] reflecting on the country most affected by the pandemic, forcing the adoption of urgent – and unprecedented – healthcare policies that made significant changes to the nursing care; others were conducted in Iran and Finland. Therefore, the reasons for UNC reflect specific contexts, and more research is needed in the future to accumulate more evidence but conducted with good-quality methodologies despite the difficult times experienced also affecting hugely the research capacity.

The reasons for UNC

To date, reasons triggering UNC have been documented by measuring their significance over a list of potential causes listed in the MISSCARE survey (e.g., [6-9]) and in the Unfinished Nursing Care Survey (e.g., [10]). In this context, the lack of staff (e.g., the inadequate number of nurses) [7-9], or the increased number of patients [7, 10], as well as their unpredictable clinical condition [7, 10], or some issues in making the right priorities [10], have been established as facilitating UNC. Specifically, factors were identified in the MISSCARE survey [27], namely communication, labour resources and material resources, and UNC [3], factors have been identified in terms of communication, prioritisation, supervision of nursing assistants, material resources, human re-sources and predictability of workflow.

During the COVID-19 pandemic, some additional reasons emerged at the system, unit, nursing management, clinical nurse and patient levels. At the theoretical level, Jones had already established the importance of some factors above the simple unit that were capable of applying negative forces leading to UNC [2]. These factors, set at the system level, suggest that unfinished care is not an isolated phenomenon but mirrors the values, priorities, investments and strategic plans of the entire system towards nursing care. During the pandemic, at this level it also emerged that the contribution of the nurses as a profession or body has been perceived as important in representing, claiming and addressing the policies. Therefore, the empirical studies performed during the pandemic confirm the theoretical framework of Jones regarding the importance of the system by adding the role of the professional bodies; however, all these elements should now be operationalised and measured to weigh their contribution, compare their relevance in the context of other factors at the micro level and to benchmark across countries [2]. In the traditional approach of UNC studies, bedside nurses have been involved in ranking the causes at the unit level; in different systems, the same reasons emerged with slight differences during the pandemic [28]. Possibly, some fac-tors at the system level may modulate the occurrence by applying negative or positive forces that merit being discovered.

At the unit level, which was mostly investigated in pre-pandemic studies with tools (29), new reasons appear linked to ineffective work and organizational processes [20, 22] and to the design of shift work, which also consider the use of personal protective equipment (PPE) [20, 21]. The units were exposed to major revisions, of limited duration. Previous routines were destroyed, and the new nurses hired could not always be helped to understand how to work. The continuous internal and external unforeseen events have further weakened the organizational structure and work processes; furthermore, the modification of the patients' needs [28, 30] has created new priorities that have probably not been understood. Some reasons (for example, problems related to shifts) may be addressed with already established evidence [5], and others (for example, problems related to ward

organisation and models of nursing care delivery) with disaster management strategies. Above all, at the unit level, a new reason for UNC emerged concerning the leadership of the nurse manager [20, 21]: being close to the nurses, guiding and supporting them in the extreme conditions experienced, is challenging. Therefore, preparing future leaders for facing prolonged challenging situations might be important.

Factors related to nurses have also been identified previously: in the pre-pandemic era, the reasons focused more on the experience of nurses, on the mix of skills [5], while in the pandemic era the educational gap is more evident [20, 22], influencing competences, skills and also attitudes that may impact negatively on patients (errors, infections and low satisfaction with care; [31]. These new reasons for UNC coincide with the main challenges that nurses have faced in this period in dealing with the emergency and managing changes. The high intentional turnover (moving nurses from one department to another in urgent situations) has made it difficult to ensure the appropriate training; on the other hand, limiting the clinical rotations [29] due to the pandemic may have prevented the development of competence during nursing education. Universities should refocus their education and priorities, and hospitals must identify adequate introductory plans, designing one for routine times and a second one for dealing with crises/disasters.

Finally, during the pandemic the care demand has increased significantly in all systems: therefore, it is not surprising that UNC was also triggered by the patients' condition. In many systems, relatives were involved in contributing to nursing care by compensating for the nursing shortage; the restrictions also imposed on volunteers have made the need for nurses even more evident. The increased needs of patients and the unavailable nursing care have generated moral distress [32]; the same values and beliefs of patients (for example against vaccinations, refusing treatments because the pandemic ‘does not exist’), in contrast to what was happening, made the relationship difficult, creating tensions and difficulties in ensuring the care needed.

The map of factors that emerged in the pandemic can help identify other strategies to be included in future pandemic plans in an interdisciplinary approach [33]. Nurse executives and managers are crucial in in creating positive professional environments aimed at supporting professionals and work processes, through organisational models of care that ensure the support of professionals in decision-making, good practice and patient safety [34]. Educators can promote awareness among new professionals. Researchers can implement studies to facilitate the application of new knowledge to practice, not only by continuing to investigate the phenomenon of reasons but also by measuring it in different contexts.

We conducted an integrative review by identifying all studies; however, the language limitations and the publication time lag may have introduced some selection bias. In fact, we included studies conducted during the pandemic, and more may be in the process of being published. Therefore, updating this review is recommended. Moreover, some studies have investigated reasons with different methodologies, sometimes as predictors/factors and experiences. We used these concepts inter-changeably, even if they have different meanings as reasons associated with the UNC phenomenon and factors as influencing the occurrence of UNC. In the future, it will be necessary to differentiate their contribution by summarising the evidence accordlying (Supplementary Materials S5).

4.1.5 CONCLUSIONS

To the best of our knowledge, this is the first integrative review summarising the reasons for UNC as reported in primary studies during the pandemic. Taking the socio-ecological model as reference, the reasons that emerged affected five levels, namely the system, the unit, the nurse manager, the clinical nurse and the patient. New reasons emerged as compared to the pre-pandemic literature suggesting that the UNC is also triggered by some pre-existing frailties of the NHS regarding nursing care. The map of reasons that emerged may be used in informing future pandemic plans as a complex intertwined and multilevel phenomenon that suggests a need for a systemic approach.

4.1.6 SUPPLEMENTARY MATERIALS

Supplementary Materials Table S1. Search strategies used in approached databases.

Database and search strategy	**Results obtained**
PubMed ("unfinished nursing care "[All Fields] OR " Rationing Nursing care "[All Fields] OR " missed nursing care "[All Fields]) AND ("reasons "[All Fields] OR "causes" OR "factors/predictors)	172
CINAHL ("unfinished nursing care "OR " Rationing Nursing care " OR " missed nursing care ") AND ("reasons " OR "causes" OR factors/predictors")	228
Scopus ("unfinished nursing care "OR " Rationing Nursing care " OR " missed nursing care ") AND ("reasons " OR "causes" OR factors/predictors")	34

Legend: CINAHL The Cumulative Index to Nursing and Allied Health Literature.

Supplementary Materials Table S2. Study quality Assessment: Critical Appraisal Skills Programme (CASP) for a Qualitative Research (Critical Appraisal Skills Programme; CASP 2018) [17].

	Chiappinotto & Palese, 2022 [20]	**Chiappinotto et al., 2023 [21]**	**Safdari et al., 2023 [22]**
Item 1. Was there a clear statement of the aims of the research?	Y	Y	Y
Item 2. Is a qualitative methodology appropriate?	Y	Y	Y
Item 3. Was the research design appropriate to address the aims of the research?	CT	Y	Y
Item 4. Was the recruitment strategy appropriate to the aims of the research?	Y	Y	Y
Item 5. Was the data collected in a way that addressed the research issue?	Y	Y	Y
Item 6. Has the relationship between researcher and participants been adequately considered?	Y	Y	Y
Item 7. Have ethical issues been taken into consideration?	CT	Y	Y
Item 8. Was the data analysis sufficiently rigorous?	Y	Y	Y
Item 9. Is there a clear statement of findings?	Y	Y	Y
Item 10. How valuable is the research?	Y	Y	Y

Legend*:* Y: Yes; N: No; CT: Can't tell.

Supplementary Materials Table S3. Study quality Assessment: Mixed-Method Appraisal Tool (MMAT) [18].

Hackman et al., 2023 [23]			
Item 1. Are there clear research questions?	Y	**Item 10** Are the findings adequately derived from the data?	Y
Item 2. Do the collected data allow to address the research questions?	Y	**Item 11** Is the interpretation of results sufficiently substantiated by data?	Y
Item 3. Is there an adequate rationale for using a mixed methods design to address the research question?	N	**Item12** Is their coherence between qualitative data sources, collection, analysis and interpretation?	Y
Item 4. Are the different components of the study effectively integrated to answer the research question?	N	**Item 13** Is the sampling strategy relevant to address the research question?	Y
Item 5. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?	Y	**Item 14** Is the sample representative of the target population?	Y
Item 6. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?	Y	**Item 15** Are the measurements appropriate?	Y
Item 7. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?	Y	**Item 16** Is the risk of nonresponse bias low?	N
Item 8. Is the qualitative approach appropriate to answer the research question?	Y	**Item 17** Is the statistical analysis appropriate to answer the research question?	Y
Item 9. Are the qualitative data collection methods adequate to address the research question?	CT	-	-

Legend*:* Y: Yes; N: No; CT, Can’t Tell

Supplementary Materials Table S4. Description of included studies.

Authors, year, country, context and study period	Objective, type of study, data collection process	Sampling methodology, Participants, Demographic data	Results
Chiappinotto & Palese, 2022 [20] Italy A large public health care trust of the National Health Service, Northeast Italy with 9332 health workers, including 3868 nurses, and organized in six hospitals with a total of 2390 beds. Period: May to August 2021	To investigate the reasons for UNC at all levels of nursing service Qualitative study Semi-structured online and face-to-face interviews	Convenience nurses (n=29): clinicians (n=19) nurse managers (n=7), managers (n= 3) Women: 27/29 Age in years (mean): 35.6 nurses, 48.1 coordinators, 50 managers Role experience in years (mean): 11.2 nurses, 4.3 coordinators, 7.7 managers	UNC reasons identified on five levels: (1) System: “Insufficient nursing support”. (2) Unit: “Inadequate care environment”, “Inadequate material resources”, “Inadequate human resources”, “Ineffective intra-professional collaboration”, “Ineffective work processes”, “Ineffective shift planning” and “Ineffective nursing care delivery models”; (3) Nurse manager level: “Inadequate coordinator leadership”; (4) Nurse level: “Ineffective performance of clinical nurses”, “Deficiencies in training”, "Inadequate humanistic view of the patient" and "Ineffective prioritisation skills"; (5) Patient: “Increased demand for patient care” and “Lack of caregiver support”.
Chiappinotto et al., 2023 [21] Italy Two medical wards (66 beds each) two surgical wards (52 beds each) of a large discharge hospital (35,000 admissions/year) Period: April to June 2022	To explore the reasons for UNC perceived by patients. Qualitative study Semi-structured interviews	Convenience Patients: 23 Women: 11/23 Age in years: 66.2 mean Experience in the Hospital care: hospitalized for more than 48 hours	UNC factors articulated in four levels: (1) System: “New health system priorities” and "’Pre-existing fragility of health structures”; (2) Unit: “Lack of resources allocated to operational units”, “Ineffective organisation of operational units” and “Inadequate leadership of the coordinating nurse”; (3) Nurses: “Attitudes and competences of the nursing staff”; (4) Patient: “Increased care needs and expectations”
Safdari et al., 2023 [22] Iran Three hospitals considered as referral centres for patients with COVID-19. Period: December 2020 to February 2021	To investigate factors influencing missed care during COVID-19 from the nurses’ point of view Qualitative study Semi-structured interviews	Intentional Nurses: 14 Age in year: 31.85 mean Role experience in years (mean): 7.7	Reasons/factors categorised in four main categories: (a) Care-related factors, e.g., uncertainties in care; (b) Disease-related factors, e.g., extent of symptoms; (c) Patient-related factors, e.g., comorbidity, elderly patients; and (d) Organisational related factors, e.g., lack of human resources, unfavourable working environment.

Hackman et al., 2023 [23] Finland Nursing Home Period: January to May 2021	To describe uncompleted nursing care activities in residences for the elderly and the reasons for UNC Cross-sectional study Online BERNCA-NH questionnaire with a final open question	Convenience Health workers: 468 out of 2700 (17.8%) Women: 462 (95.1%) Age 35-55: 249 (51.3%) Role experience in years (mean):14	On 7.3 out of 20 nursing activities remained unfinished: the most frequently unfinished nursing activities were: cultural and social for residents, creation of residents' care plans. Five main categories of reasons leading to UNCs: (a) Insufficient resources, e.g., lack of human resources, lack of expertise; (b) Patient characteristics, e.g., health status; (c) Unexpected situations in work units, which may be internal (e.g., consulting paramedics or physicians) or external (e.g., cold weather); (d) Lack of cooperation, e.g., non-nursing activities and administrative activities; (e) Challenges in organising and directing work, e.g., lack of a functioning work team.

Abbreviations: UNC: Unfinished Nursing Care; N/A: not applicable, BERNCA-NH: Basel extent of rationing of nursing care for nursing homes instrument.

Supplementary Materials Table S5. Study Limitations.

Limitations	**Integrative review**
Including Publication Bias	Have introduced some selection bias
Time-Lag Bias	*The publication time lag (we included studies conducted during the pandemic, and more may be in the process of being published)
Language Bias	*The language limitations
Outcome reporting Bias	Moreover, some studies have investigated reasons with different methodologies, sometimes as predictors/factors and other times as experiences. We used the concepts interchangeably, even if they have different meanings as reasons associated with the UNC phenomenon and factors as influencing the occurrence of UNC. In the future, it will be necessary to reflect, from a methodological point of view, on their different meaning

Abbreviations: UNC: Unfinished Nursing Care.

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4.2 Unfinished Nursing Care Survey for patients at risk and with Delirium: Validation Study

The 4.2 faithfully reports the contents of the work submitted in English in an international journal

4.2.1 BACKGROUND

Delirium is defined as a neuropsychiatric syndrome characterized by disturbances in attention (reduced ability to direct, focus, sustain, and shift attention), awareness (reduced orientation toward the environment), and an additional disturbance in cognition (e.g., deficits in memory, disorientation, language, visual-spatial ability, or perception) that usually has a rapid onset and fluctuating course, and represents a significant change from a previous level of functioning [1].

Internationally, the phenomenon of delirium shows different prevalence based on the setting, with higher prevalence among intermediate care (39.8%) [2], internal medicine (from 33.1%, to 34.2%) [2, 3] and neurology units (30.43%) [2], and lower among other as geriatrics (20-29%) and nursing homes facilities (14.0%) [4]. In Italy, internal medical (21.4%) and rehabilitation (14.0%) units have reported the lowest prevalence, while nursing homes (36.8%), neurology (28.5%) and geriatrics (24.7%) the highest [5, 6]. These setting are often characterized by a poor nurse-to-patient ratio [7] which is a well-known risk factor of Unfinished Nursing Care (UNC) [8, 9] that may lead to omitting or delaying preventive and essential interventions towards patients at risk for delirium [10] thus leading to the development of the episodes of delirium.

Complex patients have been documented to be at risk of receiving delayed care or no care as defined in the UNC as those risk or with delirium [11] due to the high care necessities which may be difficult to be understood [12].

Patients exposed to UNC may be affected in their safety (e.g., functional impairment, falls) and the quality of nursing care may be poor (e.g., patient unsatisfaction) [13]. Moreover, patients at risk of delirium, may develop the syndrome because preventive interventions recommended [14] by the literature are not performed or delayed. However, several studies [15–18] have been conducted in the context of general population to measure the UNC with validated tools, to detect its occurrence, underlying reasons, and designing specific interventions preventing or minimizing UNC. Despite the wide range of instruments validated [19], no tools have been designed around specific vulnerable population as those at risk or with delirium; therefore, the prioritization processes, the UNC occurrence and the underlined reasons are not well understood to date. Measuring UNC among patients at risk of with delirium is a priority because it may help in identifying possible causes [12]. The main intent of this study was to overcome this research gap.

AIM

The aim of the study was to (a) develop an instrument measuring UNC in patients at risk or with delirium and (b) to evaluate its psychometric properties.

4.2.2 MATERIAL & METHODS

Study design

A development and a validation study was conducted in two phases:

-Phase 1: aimed at developing the instrument and assessing its cross-cultural, content and face validity, and

-Phase 2: aimed at validating the instrument regarding acceptability, construct validity, internal consistency, hypothesis testing and criterion validity.

The properties established in the COnsensus-based guideline Standards for the selection of health Measurement Instruments [20] were assessed.

Phase 1: Unfinished Nursing Care instrument development

No instruments measuring UNC for specific groups of patients – such as those at risk or with delirium have been established to date. In this field of research, the most recent instrument established is the so-called Unfinished Nursing Care Survey (UNCS) [15] that measures the unfinished care as perceived by nurses for a general population of patients [16]. This tool has been validated in the Italian context reporting excellent psychometric properties in terms of high acceptability (>90%), construct validity, internal consistency, criterion validity; furthermore, it considers the broader concept of UNC as recently established, also measuring the underline reasons [15].

To develop the tool, the following steps were taken: (a) author authorization, (b) adaptation of the instrument by a group of experts using the Delphi method [21], (c) preliminary content and face validity, (d) confrontation with the author of the original tool in view of the modifications suggested to the UNCS and (e) pilot test validation.

First, the author, Dr. Erika Bassi, was asked for permission to use the UNCS, explaining the aim of the study. The adaptation of the instrument was carried out by a panel of ten experts composed by geriatricians and nurses, recruited nationally, and representing different fields namely research, education, management, and advanced practice [22]. The panellist was asked to select items from part A and B of the original UNC tool relevant to the at-risk patient with delirium through a seven-shift Delphi consensus process [21]; they were also asked to perform a preliminary content and face validation.

The adapted instrument was called the Unfinished Nursing Care Survey for patients at risk and with Delirium (UNCSD) and consists of two parts, namely part A and part B in addition with a general introductory section derived from the UNCS [15]:

-part A consisted of 39 interventions, derived from the experts' selection; namely 13 items of the UNCS [15] were considered appropriate, thus retained; six were reformulated and the remaining were derived the literature [23]. Nurses were asked to indicate on a 5-point Likert scale, from 1 'never' to 5 'always', how often they omitted or delayed each specific intervention in the last shift; there were also possible the option 'this intervention not applicable in my setting'.

-part B consisted of 23 possible UNCS reasons derived from the experts' selection and literature; namely, 13 reasons were derived from the previous tool UNCS [15] and the others from the review of literature [24]. The nurses were asked to rate the reasons on a four-point Likert scale, where 1 corresponded to 'not significant' to 4 to 'very significant' reason.

-the introduction included: a) demographic data; b) education; c) work experience and profile; d) available resources (from never to always) in the unit where they were working as a nurse at the time of survey; e) number of patients cared for in the last shift; f) role, professional and group degree of satisfaction (from 1, 'Very dissatisfied' to 5, 'Very satisfied') and the g) intention to leave (no or yes, in the next six months/in the next 12 months). In addition, there were asked the number of patients at risk or with delirium in the last shift; the model of care delivered used (individualised care, no specific model, functional model of care) and resources (nurses and nurses' aides), as well as undergraduate and postgraduate education whether it was appropriate to prioritise patients at risk or with delirium (from not at all appropriate to completely appropriate)

Once the instrument was completed, it was sent to the author of the UNCS for her advice and comment and some items were asked to be made explicit.

A pilot study was then carried out to test content and face validity [20, 25]: 17 nurses were recruited using a convenience sample, with the research team identifying individuals with experience in the prevention and management of patients with delirium, working in critical care, medical and intermediate care settings. The pilot study revealed the need to reformulate two questions in the socio-demographic section, while part A and part B remained unchanged. The instrument was acceptable in terms of length of completion and comprehensibility of the items.

Phase 2: Instrument Validation

Sampling, recruitment and data collection

A convenience sampling method [26] was used; nurses were eligible if they: (a) were involved in the care of patient aged >=65 years; (b) were fluent in Italian; (c) with at least six months of experience in the unit [27]; and (d) willing to participate. Therefore, those who were (a) unwilling to provide their consent, (b) students, and (c) not involved in direct patient care, were excluded. The sample size was defined to allow the exploratory factor analysis (EFA) of part B of the questionnaire, for which a participant item ratio of at least 10:1 is recommended [28]. Considering that the number of items in part B is 26, the expected sample size was 260 nurses.

Moreover, in order to test the criterion validity, the correlation between the original UNCS and the UNCSD was assessed in a convenience sample of two ward manager and all nurses in their respective units. during a refresher course on the management of the patient at risk and with delirium, in which nurses were asked to fill out both instruments [15].

Participants were recruited through formal and informal networks. In particular, the link to participate was disseminated through formal networks of nursing societies (e.g. Italian Society of Geriatrics and Gerontology) and through the involvement of hospital managements in northern, central, and southern. In addition, participants were involved through informal networks by disseminating the link within professional groups via e-mail and social networks such as LinkedIn or WhatsApp.

Through the link, participants accessed the UNCSD tool in the EUSurvey platform for between November 2023 and February 2024; completion required on average30-35 minutes.

Data analysis

Descriptive statistics included mean, standard deviations (SD) and 95% confidence intervals (CI) for continuous variables, while categorical variables were summarised using absolute and

relative frequencies. Student's t-test and analysis of variance (ANOVA) or Mann-Whitney test and Kruskal-Wallis test were used to compare mean scores among groups of nurses. The following psychometric properties were assessed:

(a)Acceptability. To measure the acceptability of the instrument, the percentage of missing items in part A and part B of the instrument was calculated.

(b)Construct validity. Mokken Scale Analysis [29–31] was performed to assess the unidimensionality of part A of the scale. Mokken analysis output include Loevinger's H coefficient, measuring scalability for items and the total scores and Cronbach's alpha coefficient, measuring scale reliability. According to Mokken (1971), a scale is considered weak if $.30 \leq H < .40$, medium if $0.40 \leq H < 0.50$ and strong if $H \geq 0.50$. The items constitute a Mokken scale if $Hj \geq 0.30$. Cronbach's coefficient is considered good if alpha is >=0.8 The validity of Mokken's analysis is based on compliance with several assumptions: unidimensionality, local independence and latent monotonicity.

In part B, an exploratory factor analysis (EFA) was carried out to examine construct validity, with principal component extraction and oblique rotation (promax with Kaiser Normalization). The number of factors was selected by inspecting the scree plot and selecting components with an eigenvalue >1. Cronbach's alpha was used to assess the internal consistency of the factors [32]. UNCSD questionnaires with more than 10% missing values were omitted from the assessment of internal consistency [20].

(c)Hypothesis testing

- Increased experience is associated with a higher perception of unfinished care [15, 33]. Therefore, the mean UNCSD scores were compared across different levels of experience (Kruskal-Wallis test).

- More nursing education is associated with higher UNC perception [15]. Specifically, the mean UNCSD scores were compared between nurses with basic and advanced training (Student t-test).

- A higher exposure of the nurse to the same patient (possibility to follow the patient in several shifts; the adoption of personalised model of care) [15] is associated with a higher perception of UNC for patients with risk or presence of delirium (Student t-test).

Specifically, differences were analysed using parametric or non-parametric tests depending on the number of groups and the frequency distribution of variable (Student's t-test or ANOVA), non-parametric tests (Mann-Whitney or Kruskal-Wallis).

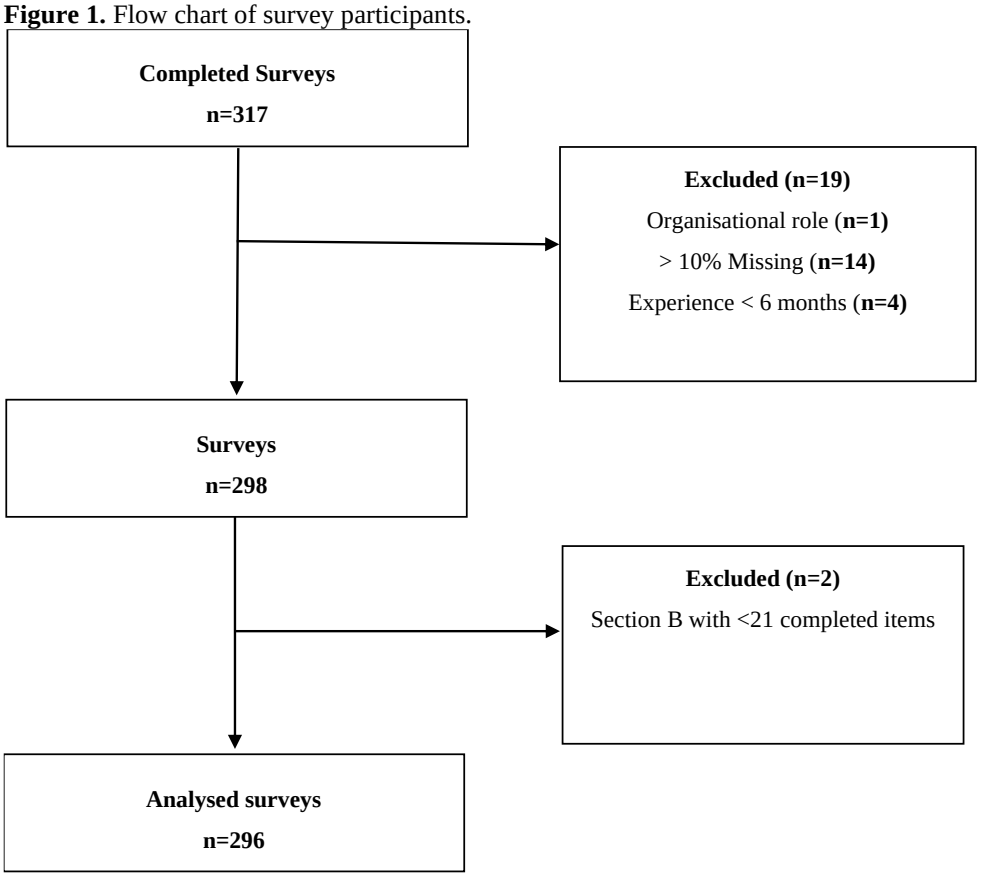
(d)Criterion Validity: The mean scores of part A and part B the UNCSD and UNC instruments mean scores were compared using paired-sample Student t-test. In addition, the overall of part A and part B the UNCSD instruments mean scores of the ward manager were compared with those of the nurses working in the same unit.

Statistical analyses were performed using IBM SPSS Statistics version 25.00. R was used for MSA (Mokken package).

Ethical Consideration

The study followed the principles of the Declaration of Helsinki and was approved by the Bioethics Committee of the University of Bologna, Italy, register no.0151991, 6 June 2023. Nurses were free to participate and those who wished were offered a training on the topic of patients at risk and with delirium after the survey participation; their anonymity was ensured. In addition, the data were analysed at an aggregate level, thus ensuring anonymity of the settings and facilities.

Figure 1. Flow chart of survey participants.



Legend, n=number

4.2.3 RESULTS

Participants

A total of 317 questionnaires were collected and analysed by eliminating those which were incomplete or that do not follow the inclusion criteria (Figure 1). At the end, 296 clinical nurses participated (35.6 years on average, Table 1), the majority of whom were female (231; 78%) and with a bachelor's degree in nursing (170; 57.4%) with post graduate courses (78; 26.3%) or master's degree (93; 31.4%). At the time of participation, they were working in the Public Health Service (252; 85.2%), with an average experience as Registered Nurse (RN) of 11 (95%CI 10.03-12.19) and working on average 36.6 hours/week. Participants reported being responsible for an average of 26.26 (95%CI 24.13-28.39) patients on their last shift (1.72 newly admitted and 1.53 discharged); among them, on average of 6.93 (95%CI 5.8-8.05) were patients at risk of delirium and 3.44 (95%CI 5.8-8.05) with delirium. The prevalence of delirium within the settings was 11.6 % and 179 (60.5%) expressed that they had no specific model of care delivery for patient at risk of with delirium. The nurse-to-patient ratio was on average 1:7.33 whereas the nurses' aides-to-patient ratio for nurses was

1:11.36. They perceived human resources at the unit level to be almost always adequate as perceived by nurses (123; 41.6%) and half of the time for nurse's aides (103; 34.8%). Participants reported that they had received adequate training at undergraduate (138; 46.6%) and postgraduate (123; 41.6%) education to establish prioritise patients at risk of delirium or with delirium. About the degree of satisfaction, participants reported an average of 3.31 out of 5 (very satisfied) with the nursing role, an average of 3.64 with being a nurse and 3.36 with the teamwork (Table 1).

Table 1. Characteristics of participants.

Variables	**Nurse N (%) 296 (100)**
Region	
North	252 (85.2)
Central	32 (10.8)
South	12 (4.0)
Heath care facility	
Public	252 (85.2)
Hospital	115 (38.7)
Academic Hospital	54 (18.2)
Scientific Institute of Medical Research	60 (20.2)
Health Care Companies	24 (8.1)
Private	22 (7.4)
Freelance Nurse	16 (5.4)
Other	6 (2.0)
Mean, age CI (95%)	35.6 (34.51-36.72)
Females	231 (78.0)
Bachelor's degree in nursing	170 (57.4)
Post-graduate education[§]	
Post graduate course	78 (26.3)
Master's degree course	93 (31.4)
Experience on current unit (years), mean (95%CI)	6.57 (5.74-7.39)
Experience function as RN (years), mean (95%CI)	8.76 (7.85-9.66)
Experience in role as RN (years), mean (95%CI)	11.11 (10.03-12.19)
Working hours per week, mean (95%CI)	36.65 (36.21-37.09)
Overtime hours last 3 months, average (95%CI)	24.80 (21.37-28.22)
Sick day, last 3 months average (95%CI)	1.71 (1.20-2.21)
Work-related accident absence day, last 3 months average (95%CI)	0.08 (0.02-0.15)
Intention to leave the unit	
No	188 (63.5)
Yes, in the next 6 months	50 (16.9)
Yes, in In the next 12 months	58 (19.6)
Does the unit have an adequate number of nurses?	
Always	11 (3.7)
Almost always	123 (41.6)
Half of the time	101 (34.1)
Hardly ever	48 (16.2)
Never	13 (4.4)

Does the unit have adequate nursing aides?	
Always	15 (5.1)
Almost always	82 (27.7)
Half of the time	103 (34.8)
Hardly ever	82 (27.7)
Never	7 (2.4)
Nursing aides are not available in my unit	7 (2.4)
Patients in charge in the last shift, mean (95%CI)	26.26 (24.13-28.39)
Number of patients cared for at risk of delirium, average (95%CI)	6.93 (5.8-8.05)
Number of patients present with delirium, average (95%CI9%)	3.44 (2.62-4.27)
Newly admitted patients in the last shift, average (95%CI)	1.72 (1.48-1.96)
Discharged patients in the last shift, average (95%CI)	1.53 (1.30-1.77)
Number of nurses present, average (95%CI)	3.58 (3.34-3.83)
Number of nurses' aides present, average (95%CI)	2.31 (2.04-2.57)
Model of care delivery	
Individualised care	83 (28.0)
No specific model for patient at risk of with delirium	179 (60.5)
Functional model of care	34 (11.5)
Undergraduate education to establish priorities in patient at risk or with delirium received: quality	
Not at all appropriate	13 (4.4)
Slightly appropriate	112 (37.8)
Fairly appropriate	138 (46.6)
Very appropriate	29 (9.8)
Completely appropriate	4 (1.4)
Postgraduate education to establish priorities of the patient at risk or with delirium received: quality	
Not at all appropriate	18 (6.1)
Slightly appropriate	111 (37.5)
Fairly appropriate	123 (41.6)
Very appropriate	40 (13.5)
Completely appropriate	4 (1.4)
Satisfaction in the current role*, mean (95%CI)	3.31 (3.18-3.45)
Satisfaction with being a nurse*, mean (95%CI)	3.64 (3.50-3.78)
Satisfaction with the teamwork*, mean (95%CI)	3.36 (3.23-3.49)

Abbreviation: CI, confidence interval, RN, Registered Nurse*from 1 (Very dissatisfied) to 5, (Very satisfied). **§** Multiple answers are possible

Acceptability

To measure the acceptability of the UNCDS, the percentages of missing items from part A and part B of the instrument were calculated. 100% of the respondents completely completed part A and 93.7% of the respondents completed part B without omitting any items.

UNCSD part A- Unfinished Care

The Mokken analysis included Loevinger's H to measure scalability of items and total scores and Cronbach's alpha coefficient to measure scale reliability. The validity of the Mokken analysis is

based on compliance with a number of assumptions: unidimensionality, local independence and latent monotonicity.

The Mokken scalability coefficients were examined, which include item pair scalability (Hij), item scalability (Hj) and total scalability (H). According to Mokken (1971), scalability is considered weak if .30≤H<.40, medium if 0.40≤H<0.50 and strong if H≥0.50. Items can be included in a Mokken scale if Hj≥0.30. Cronbach's coefficient is considered good if alpha is >=0.8. The scalability coefficient for each item (Hi) was above the lower limit of 0.30 and the overall scale had H=.58, indicating strong scalability and high reliability (Cronbach's alpha =.97). The data were checked for Invariant Item Ordering violations and sequential removal of items with significant violations greater than 10% and with Hi<0.50 was performed; 4 items were removed, and 35 interventions were retained. By repeating the scaling coefficient analysis on a scale (35 items), the results were better than those obtained with the entire item set. Table 2 shows the results of the nursing interventions: at the top are the items with a lower priority, which means that nurses have less difficulty in omitting or delaying them, while at the bottom those with a high priority as nurses have more difficulty in leaving them unfinished.

Table 2: Mokken Scale Analysis of items included in part A- Elements of Unfinished Nursing Care.

Items	**N (296)**	**Mean score[a]**	**CI 95%**	**H_i (SE)**
(25) Ensuring the presence of objects for spatio-temporal orientation in the environment (e.g. clock, calendar, 'where am I and where am I' signs)	296	2.59	2.40-2.78	0.583 (0.039)
(28) Assessing the actual need to accommodate the person in a single room (Delirium Room)	296	2.57	2.37-2.77	0.487 (0.050)
(26) Encouraging the presence of personal objects (e.g. photos)	296	2.52	2.31-2.67	0.606 (0.032)
(2) Continuous monitoring of precipitating risk factors with each change in the patient's condition	296	2.52	2.34-2.70	0.407 (0.050)
(33) Educating/informing the family and/or caregiver about delirium (what it is, what are the possible causes) about re-orientation interventions and care management to be continued at home	296	2.36	2.18-2.55	0.604 (0.038)
(23) Minimising of the negative effects of the hospital environment such as noise (bell, alarms, pumps, monitors) and lights (using indirect lights)	296	2.35	2.17-2.53	0.576 (0.041)
(9) Assessing the integrity, functioning and correct positioning of visual, hearing and dental prostheses	296	2.29	2.12-2.46	0.594 (0.045)
(32) Taking time and providing emotional support to patients and their family/caregivers by listening to their needs/concerns/feelings about delirium	296	2.28	2.11-2.45	0.612 (0.038)
(3) Assessing the changes in vigilance, attention, cognitive and behavioural status within the first 24 hours after admission with instruments (e.g. 4 AT, CAM) or by clinical judgment	296	2.22	2.04-2.40	0.413 (0.053)
(38) Defining the personalised care plan and priorities for each patient trying to maintain the patient's daily routine	296	2.17	2.00-2.34	0.657 (0.030)
(35) Involving patients and caregivers in the discharge planning	296	2.16	1.99-2.33	0.567 (0.041)
(16) Providing mouth care to patients who need it	296	2.15	1.97-2.33	0.573 (0.040)
(22) Minimising room/unit transfers	296	2.13	1.96-2.31	0.566 (0.044)
(24) Ensuring patient comfort (e.g. microclimate, posture)	296	2.04	1.89-2.20	0.663 (0.036)
(11) Promoting and assessing sleep in terms of quantity and quality, avoiding unnecessary nursing procedures during the night hours	296	2.01	1.84-2.17	0.552 (0.049)

(14) Support, encouragement and provision of walking aids according to the patient's needs and problems	296	1.98	1.82-2.13	0.571 (0.048)
(31) Properly documenting the interventions provided and reviewing the care plan	296	1.98	1.82-2.14	0.603 (0.046)
(27) Encouraging the presence of the family member	296	1.96	1.82-2.11	0.533 (0.048)
(18) Providing oral nutrition and water intake according to metabolic needs	296	1.95	1.81-2.13	0.592 (0.045)
(39) Performing clinical handover to adequately inform the next shift nursing team about patients at risk and/or with delirium (hypoactive, hyperactive and mixed)	296	1.92	1.75-2.08	0.527 (0.049)
(30) Assessing the effectiveness of care activities provided (e.g. visiting patients to ascertain that needs have been met)	296	1.92	1.77-2.07	0.655 (0.033)
(29) Monitoring the side effects of administered drug therapy (e.g. haloperidol, benzodiazepines and anticholinergic drugs)	296	1.89	1.73-2.05	0.616 (0.040)
(20) Encourage the patient to maintain their autonomy or regain it	296	1.89	1.75-2.03	0.653 (0.036)
(6) Performing physical/objective assessment of the patient (e.g. assessing the risk of pressure injury; signs and symptoms of infection at the insertion sites of the devices)	296	1.89	1.75-2.04	0.513 (0.060)
(36) Monitoring more intensively by reassessing patients who are unstable or at risk of deteriorating condition	296	1.87	1.72-2.02	0.618 (0.038)
(15) Mobilising in the chair patients who need it	296	1.85	1.70-2.00	0.614 (0.040)
(19) Encouraging drinking and helping those who are unable to do so independently and/or have clinical problems	296	1.83	1.68-1.97	0.647 (0.035)
(37) Preventing negative outcomes for patient at risk (e.g. falls, pressure injuries, malnutrition)	296	1.77	1.63-1.91	0.663 (0.036)
(12) Assessing and preventing alterations in bowel elimination (diarrhoea and constipation)	296	1.76	1.62-1.90	0.636 (0.040)
(10) Assessing and preventing alterations in urinary elimination (bladder globe) by promoting spontaneous urination and/or removing the bladder catheter as soon as conditions permit	296	1.75	1.61-1.90	0.631 (0.043)
(8) Treating pain by administering prescribed medication and using non-pharmacological techniques (e.g. relational, distraction)	296	1.75	1.59-1.91	0.562 (0.050)
(34) Communicating effectively with the person: positioning myself in front of the person, calling him/her by name, specifying where he/she is, who I am, what my role is, the activities I am going to do (e.g. dressing, taking a blood sample), using consistent verbal and non-verbal language, with simple words and short sentences	296	1.74	1.60-1.87	0.626 (0.040)
(7) Monitoring pain (verbal and non-verbal rating scales, e.g. PAINAID)	296	1.70	1.55-1.86	0.542 (0.061)
(17) Helping to feed patients who are unable to feed themselves and/or have clinical problems (e.g. dysphagia)	296	1.69	1.54-1.84	0.539 (0.059)
(13) Providing personal hygiene to patient who need it	296	1.48	1.36-1.60	0.629 (0.047)

Note H=0.581(0.033); Cronbach's (1951) alpha =0.9753 . Abbreviations: CI, confidence interval ,4AT=Assessment Test for Delirium & Cognitive Impairment; CAM= Confusion Assessment Method; PAINAD= Pain Assessment IN Advanced Dementia; H= scalability; H^i= single item scalability; H^T= mean distance between scale items; Cronbach's alpha scale reliability. [a] 5-Point Likert Scale, from 1 "never" to 5 "alwals" unfinished.

UNCSD part B- Reasons for unfinished care

An exploratory factor analysis was performed using the principal component extraction method with oblique rotation (promax with Kaiser Normalization), assuming that extracted factors were correlated with each other. The assumptions underlying the analyses were all met: Kaiser-Meyer-Olkin (KMO) test, that measures the suitability of the data for factor analysis was 0.931 (Table 3). Factors with an eigenvalue greater than 1 were extracted. A 4-factor solution emerged. The first factor

Table 3. UNCSD part B- Reasons for unfinished care - an exploratory factor analysis (EFA).

Q-sample statements	Factor 1	Factor 2	Factor 3	Factor 4
	Nurses' performance issues	Human Resources issues	Communication issues	Models of care delivery issues
(20) Ineffective performance of nurses (e.g. lack of experience, competence, culture, knowledge on the approach to the patient with delirium)	**0.92**			
(21) Deficiencies in Education (e.g. incomplete education, in mentoring in the transition from graduate to nurse)	**0.85**			
(17) Incomplete nursing handover by the staff of the previous shift (e.g. on aspects concerning patients at risk/with delirium)	**0.76**		0.19	**-0.10**
(19) Poor time management and/or time optimisation skills	**0.74**		0.16	
(18) Inadequate balance of nursing competences in the shift (e.g. too many new or inexperienced delirium nurses)	**0.73**	0.23	0.17	-0.20
(15) Incorrect allocation of priorities	**0.45**	-0.15	0.34	0.25
(6) Insufficient number of nurses aides	0.17	**0.84**		
(5) Insufficient number of nurses		**0.83**	0.14	
(4) Inadequate number of patients at risk or with delirium assigned to each nurse		**0.73**		
(10) High number of admissions/discharges during the shift	-0.16	**0.48**	0.33	0.14
(23) Increased nursing care needs of other patients (e.g. worsening clinical condition, complexity of care)	0.30	**0.47**	-0.348	0.402
(7) Interrupted/incomplete communication/presence of tensions between nursing aides and nursing staff members			**0.84**	
(8) Interrupted /incomplete communication/presence of tensions between nursing staff members	0.19		**0.81**	
(9) Interrupted /incomplete communication/presence of tensions between medical and nursing staff members	0.23		**0.63**	
(3) High staff turnover	-0.11	0.44	**0.51**	
(16) Inadequate organisational model of nursing care delivery (e.g. task-based model)	0.23		**0.45**	0.15
(11) Lack of shared procedures/protocols for the patient at risk and/or with delirium	0.17	-0.13	0.13	**0.81**
(2) Inadequate environment (e.g. chaotic, large number of patients in each room)	-0.44	0.21	0.16	**0.77**
(13) Inadequate planning of nursing care (e.g. activities to be performed simultaneously, unnecessary interventions)	0.17	-0.13		**0.71**
(12) Repeated interruptions of nursing activities or/and continuity of care	-0.13	0.31		**0.67**
(14) Inadequate review of priorities during the shift	0.38	-0.18	0.29	**0.41**
(22) Unexpected increase in the number of patients at risk or with delirium in critical condition	0.24	0.38	-0.16	**0.41**
(1) Inadequate attention to missed/delayed nursing care	0.14		0.33	**0.40**
Explained variance %	44.30	10.20	5.89	4.86

Method with oblique rotation (promax with Kaiser Normalization); Kaiser-Meryer-Olkin=0.931

"Nurses' performance issues" (2.53, CI 95% 2.43-2.62; variance explained=44.30%; alpha=0.704) consisted of six items; the second factor "Human Resources issues" consisted of five items (3.11, CI 95% 3.02-3.20; variance explained=10.20%; alpha=0.782); the third factor "Communication issues" included five items (2.56, CI 95% 2.46-2.65; variance explained=5.89%; alpha=0.709); and the fourth factor "Model of care delivery issues" seven items (2.46, CI 95% 2.73-2.90; variance explained=4.86%; alpha=0.680). The overall explained variance was 65.2%, while the overall internal consistency of part B was alpha 0.775.

Two factors were positively and strongly correlated according to Cohen's criteria (Cohen, 1988) "Nurses' performance issues" with "Communication issues" (Rho=0.573); "Nurses' performance issues" with "Models of care delivery issues" (Rho=0.559) and "Communication issues" with "Models of care delivery issues" (Rho=0.500), supporting the choice of the oblique rotation. The most significant reasons for the unfinished care perceived by the nurses were "Insufficient number of nurse's aides" (average score 3.22, 95%CI 3.07-3.36), followed by "Inadequate number of patients at risk or with delirium assigned to each nurse" (average score 3.15, 95% CI 3.00-3.30) and "Repeated interruptions of nursing activities or/and continuity of care" (average score 3.13, 95% CI 2.99-3.28) as shown in Table 4.

Table 4. UNCSD Part B- Reasons for Unfinished Nursing Care: Descriptive Findings.

Items	N (296)	Mean score[a]	CI 95%
Factor 1: Nurses' performance issues	296	2.53	2.43-2.62
(21) Deficiencies in Education (e.g. incomplete education, in mentoring in the transition from graduate to nurse)	295	2.73	2.58-2.89
(20) Ineffective performance of nurses (e.g. lack of experience, competence, culture, knowledge on the approach to the patient with delirium)	296	2.72	2.57-2.87
(18) Inadequate balance of nursing competences in the shift (e.g. too many new or inexperienced delirium nurses)	295	2.64	2.48-2.80
(15) Incorrect allocation of priorities	294	2.62	2.48-2.76
(17) Incomplete nursing handover by the staff of the previous shift (e.g. on aspects concerning patients at risk/with delirium)	295	2.61	2.45-2.77
(19) Poor time management and/or time optimisation skills	295	2.58	2.44-2.72
Factor 2: Human Resources issues	296	3.11	3.02-3.20
(6) Insufficient number of nurses aides	296	3.22	3.07-3.36
(4) Inadequate number of patients at risk or with delirium assigned to each nurse	296	3.15	3.00-3.30
(23) Increased nursing care needs of other patients (e.g. worsening clinical condition, complexity of care)	295	3.12	2.98-3.27
(5) Insufficient number of nurses	296	3.12	2.96-3.27
(10) High number of admissions/discharges during the shift	295	2.81	2.65-2.97
Factor 3: Communication issues	296	2.56	2.46-2.65
(9) Interrupted /incomplete communication/presence of tensions between medical and nursing staff members	295	2.73	2.58-2.89
(3) High staff turnover	296	2.72	2.56-2.88
(16) Inadequate organisational model of nursing care delivery (e.g. task-based model)	294	2.67	2.51-2.83
(7) Interrupted/incomplete communication/presence of tensions between nursing aides and nursing staff members	294	2.65	2.50-2.80
(8) Interrupted /incomplete communication/presence of tensions between nursing staff members	296	2.48	2.32-2.64
Factor 4: Models of care delivery issues	296	2.81	2.73-2.90

(12) Repeated interruptions of nursing activities or/and continuity of care	296	3.13	2.99-3.28
(2) Inadequate environment (e.g. chaotic, large number of patients in each room)	294	2.98	2.83-3.14
(11) Lack of shared procedures/protocols for the patient at risk and/or with delirium	296	2.95	2.79-3.11
(22) Unexpected increase in the number of patients at risk or with delirium in critical condition	295	2.89	2.74-3.05
(13) Inadequate planning of nursing care (e.g. activities to be performed simultaneously, unnecessary interventions)	295	2.78	2.64-2.93
(14) Inadequate review of priorities during the shift	296	2.71	2.57-2.85
(1) Inadequate attention to missed/delayed nursing care	292	2.53	2.37-2.70

Abbreviations: CI, confidence interval. 4-Point Likert Scale, from 1 "not significant reason" to 4 "very significant reason".

Hypothesis testing

Nurses with more experience in their role reported a higher perception of UNC in risk patient with delirium (Kruskal-Wallis test p=0.015). Nurses with undergraduate education had a lower perception of UNC for patients at risk and with delirium than nurses with postgraduate education (Student t-test: -2.695 p= 0.007), also nurses use a personalized model of care delivery had a higher perception of UNC compared to other models of care (no specific model, other functional model of care) (Student t-test: -3.660 p< 0.001).

Criterion validity

Nurses reported lower scores on average in all items of the part A UNCSD as compared to the UNCS instrument (mean score 1.84±0.73 vs. 2.13±0.58, Student t-test: -2.12; p=0.041) also for reasons (mean score 2.90±0.51 vs. 2.93±0.50, Student t-test: -0.33; p=0.739).

In one unit, nurses reported higher scores of UNCSD than their ward manager. (mean score 2.03±0.64 vs. 1.85, Student t-test:1.09; p =0.291). In contrast, in the second unit, nurses reported similar compared to the ward manager (mean score 1.68±0.77 vs. 1.55, Student t-test: 0.71; p =0.485). Moreover, the first nurses reported lower scores in the reasons as compared to their ward manager. (mean score 3.15±0.37 vs. 3.65, Student t-test: -5.12; p<0.000) as in the second unit (mean score 2.70±0.53 vs. 2.83, Student t-test: -1.01; p=0.323).

4.2.4 DISCUSSION

We validated UNCSD in the Italian context among nurses working mostly in public health services, with higher registered nurse staffing levels (e.g. nurse-to-patient ratio was on average 1:7.33) and with fragile patient types (11.6% prevalence with delirium), in line with previous Italian studies in which an incidence of 6-56% is documented depending on the setting [34].

Some nurses (28%) reported caring for patients with individualised care models of care delivery involving a multi-component approach (e.g. Hospital Elder Life Program) and aiming at prevention and management of risk factors by involving the caregiver in the care process (e.g. Delirium Room) [35].

Part A- Element of Unfinished Nursing Care for patients at risk and with Delirium

35 items were retained in the statistical analysis out of the original 39 UNCSD items in part A. The UNCSD part A, demonstrated, in line with previous evidence [15], its unidimensionality. The number of interventions included in the UNCSD part A scale, are more numerous than those of the

UNCS (21 items), as patient at risk and with delirium require specific, multi-component [36] and complex [37].

Nurses considered the following interventions to be of high priority “Providing personal hygiene to patient who need it”; “Helping to feed patients who are unable to feed themselves and/or have clinical problems (e.g. dysphagia)” and “Monitoring pain (verbal and non-verbal rating scales, e.g. PAINAID)”. In contrast, nurses reported low priority interventions in the following “Ensuring the presence of objects for spatio-temporal orientation in the environment (e.g. clock, calendar, 'where am I and where am I' signs)”; “Assessing the actual need to accommodate the person in a single room (Delirium Room)” and “Encouraging the presence of personal objects (e.g. photos)”.

Nurses prioritise interventions for patients at risk and with delirium in the basic care (e.g. hygiene and nutrition) [38] and the risk factors of the delirium, e.g. pain monitoring (verbal and non-verbal rating scales, e.g. PAINAID) [36]. In contrast, the nurses noted that interventions involving environmental modifications, e.g. the presence of personal items or changes in the environment, are not prioritised and are therefore unfinished, suggesting that nurses focus more on the aspects of the person being cared for which are under their care responsibilities [39].

Part B- Reasons for Unfinished Nursing Care for patients at risk and with Delirium

Factor analysis identified four factors in the UNCSD compared to six factors in the UNCS [15]. Internal consistency was found to be good with a Cronbach's alpha >0.7 [40] for all factors except for “Models of care delivery issues”.

Two new factors emerged from the study: “Nurses’ performance issues” and “Models of care delivery issues”. Three factors were interrelated: “Nurses’ performance issues” and “Communication issues” and “Models of care delivery issues”. According to the study, the reasons attributed to the unfinished nursing care the patient at risk and with delirium were “Insufficient number of nursing assistants”, “Inadequate number of patients at risk or with delirium assigned to each nurse” but also “Repeated interruptions of nursing activities and/or continuity of care”. It is emphasised that patients at risk and with delirium need continuous nursing care and to promote a safety-oriented culture through appropriate nurse-patient relationships [41] use strategies to reduce activity interruptions [42]. Our results show that the factor “Nurses' performance issues” carries more weight than the other in fact results a 44.30 % of explained variance. Indeed, we show that experience, training, culture, knowledge influence the care of the patient at risk and with delirium; both in the recognition of risk factors and in management [43, 44].

Hypothesis testing

Nurses with more experience reported high levels of perception of UNC: in fact, nurses with more experience had a better understanding of complex situations arising from practice in identifying patients at risk and managing the patient with delirium [45]. In addition, those with postgraduate education had high levels of perception of UNC for patients at risk or with delirium: nurses with advanced knowledge had skills in early recognition of patients at risk and in managing delirium [44].

- Nurses with a personalised model had a lower perception of missed care: the personalised model makes it clear that there is less likelihood of missed care as it focuses on the person and their needs and improves knowledge of the patient [46].

The results for criterion validity between ward managers and nurses differed from the literature. While one group of nurses confirmed that nurses have higher levels of perception of lack of care than coordinators [47], there was no difference in the other group. Differences in perceptions depend on the model of care delivery [47] and the interventions that nurses perform at the patient's bedside [48]. Criterion validity results for reasons show that ward manager nurses have higher scores than nurses. There is also evidence that the ward manager nurse's perspective expands and complements that of the nurse [49].

Criterion validity

Finally, the UNCSD tool resulted in lower scores than those obtained with the UNCS tool, both in Part A and Part B. By adapting a specific tool for patients at risk of and with delirium, it is possible to assess unfinished care in a specific population that, as highlighted in the literature, is more at risk of impaired care [11]; however, the level of impaired care in patients at risk of and with delirium is lower when measured with other tools [15]. The study highlights that the topic certainly needs further investigation, as these lower scores may be related to a lack of education and knowledge about the topic, as the phenomenon is underestimated [44].

Limitations

The study has several limitations. We used online methods to disseminate the survey which, while facilitating social media, did not allow us to describe response rates [50].

In addition, we disseminated the instrument in different settings and while the results may be generalisable, certain settings may not have had the knowledge and expertise to assess patients at risk and with delirium [44].

The developed tool aims to understand the activities and reasons for the patient at risk and with delirium; however, due to the complexity of the patient profile, it would also be necessary to stratify the results by settings, e.g. geriatrics and post-acute care. It was not possible to perform stratified analyses by type of surgical unit, as the nurses involved responded to this open question in a generic way, specifying only the hospital or area and not the specific unit.

4.2.5 CONCLUSIONS

The UNCSD tool, consisting of Part A (unfinished care elements, 35 items) and Part B (reason, 23 items) for patients at risk of or with delirium, was validated in terms of acceptability, construct validity, hypothesis testing and criterion validity, despite some limitations and the need for further research in specific contexts and with different staff. Nurses highlighted that the interventions most likely not to be completed were those related to environmental and organisational aspects. This is in contrast with previous studies as there is a high level of attention to personal needs such as hygiene, nutrition, pain monitoring and communication. In contrast to other studies, nurses suggested that the reasons for poor care are not only the lack of human resources and communication, but also nurse performance and models of care delivery. The study highlights that patients at risk of or with delirium would require an individualised model of care and nurses with advanced skills and knowledge. Further studies are recommended to gather evidence on the validity of the UNCSD tool.

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Chapter 5

Discussion

The aim of the research project and studies was to acquire and deepen knowledge about a) the prioritisation process: the concept, theoretical models and tools; b) the applicability of the interventions recommended in the literature and the priorities in the prevention and management of the patient at risk and with delirium; and c) the development and validation of an Unfinished Nursing Care tool for the care of the patient at risk or with delirium. The various results were discussed through the main project objectives, starting with the salient aspects of the studies conducted and then addressing the methodologies used and the implications for practice and research. The limitations of the project are also presented.

Decision making and missed nursing care: Results from a scoping review

In the context of Unfinished Nursing Care, it is of fundamental importance to understand how nurses decide on activities [1]. In the literature, how nurses decide is referred to prioritisation of clinical care' within the broader term of Decision Making. As mentioned above, the concept introduced with the Concept Analysis of Missed Nursing Care in 2009 [2] with 'prioritisation of care' was revised in 2015 by defining it as 'clinical prioritisation' within the term Unfinished Nursing (UNC) [1]. The concept of decision making encompasses other terms, such as priority setting, prioritisation of clinical care, and implicit rationing. The results of the scoping review allowed us to understand the term prioritisation, defined as the ability to choose between two or more alternatives, which is aimed at pursuing patient safety [3]. From the results, a new term *Time scarcity*, emerged as a new variable with respect to time, as it is considered unpredictable and can generate both prioritisation and rationing. Among the available theoretical models on decision making, only one considers time, and the other models emphasise decision makers' reasoning and judgement abilities. Decision making can be measured according to self-report systems: Watson-Glaser Thinking Appraisal (W-GCTA) [4–6]; Nursing Decision Making Instrument (24-item version of the W-GCTA) [6, 7]; Critical Thinking Skills [8]. From the synthesis of the evidence, the nurse defines priorities according to a preferential sequence, with the nursing activities resulting in delaying the less significant ones, while implicit rationing consists of delaying selected activities, generating UNC. The prioritising nurse performs reasoning through intuitive and situational processes and through an analytical-systematic approach; furthermore, the prioritising nurse considers the variables of urgency, time, knowledge, condition, safety, and team process. The synthesis also highlights the factors preceding decision-making, e.g., patient conditions, context, philosophies, care models, training, experience, personality, values, beliefs and well-being. Only a few studies emphasise the activities that are most common in UNC, such as the emotional, educational, mobility and hygiene needs of patients.

The synthesis of the evidence was carried out through the Arksey and O'Malley model, which involves six steps. The scoping review was described at all stages to be able to replicate it; different types of qualitative and quantitative studies have been synthesised not according to conceptual models

but according to related concepts. In conclusion, this first article was instrumental in understanding and clarifying the concept through existing evidence.

Future perspectives for research and clinical practice

Knowing the terminology, reference models and tools allows nurses to choose activities in order not to perform UNC. The problem of UNC is an important issue, understanding how nurses' think enables the orientation of clinical practice and research interventions. These findings can help degree course educators to prepare new graduates to work in complex and understaffed health and/or social care contexts and environments, where care prioritisation and time management skills are required [9]. The concept can also provide new knowledge for nursing managers to design and implement strategies to support nurses in the prioritisation process, e.g., tools to support the prioritisation process and training to increase prioritisation skills [10].

In the following years of the Scoping Review, two publications have emerged with respect to the topic: a book that devotes a chapter to the concept of prioritisation with the possibility of case practice [11] and a concept analysis, written in Japanese, which was performed according to Rodgers' model by synthesising 47 items, bringing out the antecedents, attributes and consequents [12]. However, the scoping review and the literature show that there is a need for studies on this topic, starting with a structured conceptual analysis with reference models and continuing with further studies, e.g., a) investigating which activities prioritise nurses in different settings and with different populations; b) describing what reasons and patterns nurses consider in prioritisation activities; and c) investigating the prioritisation capabilities of nurses.

Applicability of recommended interventions in the literature and priorities in prevention and management

In recent years, nurses have increasingly found themselves in complex social and health care systems, which has led to an evolution of the National Health Service and continuous changes, e.g., the National Recovery and Resilience Plan (PNRR), for elderly patients with multiple chronic and degenerative diseases [13]. In this context, nurses are challenged to provide effective, high quality and safe services, with time and resource constraints, with high loads and under special conditions such as the COVID-19 pandemic emergency (May/June 2021).

In this context, the second chapter of the doctoral project therefore made it possible to explore how nurses prioritise interventions in practice, to describe the prioritisation process according to the individual characteristics of nurses and to describe the reasons for these choices within the acute (Northern Italy Hospital) and post-acute (Northern Italy Territory) settings for patients at risk or with delirium.

Applicability of the interventions recommended for patients at risk or with delirium

The topic of delirium in the last decade has been the subject of multiple research studies, and the care of patients at risk and with delirium has undergone changes towards a personalised model of care [14]. To construct a comprehensive list of activities for at-risk and delirium patients, a systematic review and nominal group technique of experts was conducted for the Q-Methodology study, which produced a list of 35 activities applicable in daily care in medical, geriatric and post-acute settings from 96 activities summarised from the literature.

The results of these interventions were compiled by a group of delirium experts (three nurses, one geriatrician and two experienced nurse facilitators) in the fields of clinical practice, management, research and education in management and research. The list of interventions is summarised in the following sections: prevention interventions, nonpharmacological management, communication, and pharmacological management. Defining a list of activities for patients at risk and with delirium, but above all applicable for the national context and in the medical, geriatric and post-acute contexts, is certainly an important result, especially because patients within the non hospital setting (e.g., post-acute) are also considered in the study.

How nurses prioritise intervention to prevent and manage disease

Nurses select the activities to be carried out for patients and carry out the prioritisation process to ensure safe, high quality and competent care [15]. The nurses initiated the prioritisation process through two scenarios of the patient at risk (preventive scenario) and with delirium (management scenario) at two different times of the day (morning/afternoon and night) to allow for the situation to be assessed in different time periods.

In the prevention scenario, the nurses assigned to the highest priority to the following interventions were “Monitoring the vital parameters (heart rate, blood pressure, oxygen saturation)” followed by “Assessing the changes in vigilance, attention, and cognitive and behavioural status within the first 24 hours and demonstrating a marked change or fluctuating course in attention, comprehension, or other cognitive-behavioural functions, reassessing at each change (hours or days) (e.g., with 4AT scale)” and “Communicating with the person (calling him/her by name, explaining where I am, who I am, what my role is, what activities are taking place)”. The preventive interventions receiving the lowest priority were “Educating the family and/or caregivers on the person's reorientation interventions”, followed by “Educating the family and/or caregiver on risk factors and signs and symptoms of delirium, and changes in the person”.

Nurses assigned high priority in the management scenario to the following interventions: ensuring a safe environment (e.g., reducing bed height); “communicating with verbal and nonverbal language in a clear, simple way and positioning oneself in front of the person”; and “continuous monitoring of mental (e.g., orientation, short- and long-term memory) and physical state (e.g., Barthel Scale)”. On the other hand, the lowest priorities were “providing a clock, calendar, and signs in the room (where they are and in which city)” and “educating the family and/or caregiver on reorientation interventions for the person”. Nurses considered the following interventions to be of high priority: “providing personal hygiene to patients who need it”; “helping to feed patients who are unable to feed themselves and/or have clinical problems (e.g., dysphagia)” and “monitoring pain (verbal and nonverbal rating scales, e.g., PAINAID)”. In contrast, nurses reported low priority in the following interventions “Ensuring the presence of objects for spatiotemporal orientation in the environment (e.g., clock, calendar, 'where am I and where am I' signs)”; “Assessing the actual need to accommodate the person in a single room (Delirium Room)” and “Encouraging the presence of personal objects (e.g., photos)”.

The results of the study highlight the activities that nurses prioritise most in their care by differentiating between the prevention and delirium phases. Four important findings emerge, the first with respect to prevention, the second with respect to safety, the third with respect to communication, the five with respect to caregiver education and the fifth with respect to pain. The first aspect is

prevention, since delirium is multifactorial in that it is caused by several factors, and identifying this factor means treating the causes of delirium. The nurse prevents the onset of delirium with non-pharmacological interventions and by assessing the patient several times, as many acute factors that trigger delirium are modifiable. The study showed that assessing patients clinically and cognitively is an aspect that reduces the occurrence of delirium [16]; in fact, nurses also use validated scales (e.g., 4AT) to assess patients at risk and with delirium.

The second outcome is the topic of safety of care; nurses, in the management scenario first implement interventions that prevent adverse events, such as falls, and that ensure and promote the safety of care and professional responsibility [17].

The third result emphasises that communication with the patient, in both the prevention and management phases, represents an intervention that nurses put in place to understand and assess the patient, given that they have difficulty expressing their needs. Furthermore, the very similar scores between the interventions indicate that nurses simultaneously implemented care interventions together with communication/evaluation. The fourth result is that education interventions in both prevention and management scenarios should be improved, especially by involving the family in the care process. Certainly, education is a complex process that takes time, but in recent years, the involvement of the caregiver and patient has been recognised as an indicator of quality of care [18] to make him or her a participant involved in the entire process of care. These results may also differ from those in the literature given the period in which the study was carried out, in which restrictions were placed on the entry of family members due to the COVID-19 pandemic.

The fifth outcome is pain, which, in the prevention scenario, has a strong correlation with sleep.

Nurse know pain assessment and management can affect sleep but also decrease agitation and aggression, who that its assessment and management [19].

The prioritisation process

The models found in the study provide a basis for understanding how nurses make decisions and highlight the importance of a more personalised and integrated approach to healthcare to avoid the problem of delirium and to intervene in management to avoid patient outcomes [20].

Fifty-six nurses from medical, geriatric and post-acute wards were involved, from which different prioritisation models emerged depending on the scenario; in fact, they used “clinical-oriented” and “family/caregiver-oriented” models in the prevention phase. most nurses make decisions in the recognition phase and orient their actions toward patients at risk of delirium, focusing more on the “clinical orientation”, i.e., assessing the signs and symptoms of the person in a structured manner. Nurses make decisions with a “family/caregiver-oriented” model involving the family and caregiver by emphasising how the role of the family and caregiver plays a key role in recognising signs of the person's impairment and educating them in implementing preventive interventions. In the management of a patient with psychomotor agitation scenario, nurses implement the following models: “Individual needs-oriented”, “Prevention-oriented” and “Cognitive-oriented”.

According to the study conducted, nurses prioritise delirium according to the person's needs; nurses recognise delirium, implement non-pharmacological and pharmacological interventions to address and treat the patient by identifying the causes and managing the symptoms. Furthermore,

nurses should prioritise interventions aimed at preventing complications by implementing nonpharmacological management interventions.

In conclusion, nurses make decisions according to cognitive aspects and are aware that delirium has outcomes for the patient, such as cognitive decline, i.e., the inability of the person to communicate his or her needs, e.g., agitation and auditory and visual disturbances.

To our knowledge, this is the first study to investigate this topic not only in hospital settings but also in post-acute care settings. In fact, nurses use patterns that can also be influenced by the setting; those working in geriatrics have a different approach than those working in other settings. Nurses working in geriatrics can perform a multidimensional assessment to develop a personalised plan by assessing frailty and residual capacities. The patterns that emerged do not represent the whole of the sample considered, highlighting that nurses have both group and individual approaches.

Factors informing nurses' prioritisation process while preventing and managing delirium

The reasons leading to the prioritisation process were considered during the COVID-19 pandemic using a scenario and based on the clinical situation of the patient in the prevention versus management phase, suggesting that the time of day should also be considered. The socioecological theoretical model Unfinished Nursing Care [21] was used to understand and summarise the reasons for the prioritisation process. The reasons informing the prioritisation process while providing preventive or management interventions towards a patient at risk of or with delirium are categorised into three levels: (1) unit level, as factors belong to the "environment", "human resources", and "organisation and work processes"; (2) nurse level, as factors belonging to the "competencies" and "attitudes" possessed; and (3) patient level, according to the 'multidimensional frailty'. The nurses reported that they choose priorities for patients at risk and with delirium presence according to models of care delivery, organisation and work process, i.e., whether they have support within the organisations of guidelines, environment, and routines. Nurses choose which activity to perform also according to the availability of staff resources. For nurses, caring for patients with delirium is an emotionally charged situation, so much so that studies show that nurses are "Being challenged by decisions" and prioritisation when dealing with a complex situation; a necessity, so much so that they need to have certain skills and attitudes. To understand how nurses think, the present study used an innovative Q-methodology that combines qualitative and quantitative approaches and investigated the prioritisation processes in depth, starting with the individual and ending with the group [22, 23]. For the construction of the interventions (Q-Sample) to be used during the scenario, first, a systematic review [24] and then a Nominal group technique were performed to obtain agreement on items to be identified through an interactive expert process [25]. We also used a qualitative study methodology, thematic analysis, to synthesise data from the semistructured interviews for various reasons.

Future perspectives for research and clinical practice

In general, the results obtained outline the activities, models and rationale for patients at risk and with delirium. Prioritising is an important skill in nursing, and attention should be given to basic and advanced education of nurses, as it is a skill that needs to be acquired and maintained through teaching strategies that foster self-learning, experience, and critical thinking with practical application [26]. In addition, the need for predictive models that support prioritising and that help practitioners recognise delirium early to implement timely and appropriate preventive strategies is emphasised [27]. The nurse managements should promote customised organisational models, which include

teamwork and systematic programmes to support practitioners in the treatment of delirium via a multiprofessional approach involving the support of volunteers. The prevention of delirium system of care (POD) is an example of a model in the field of prevention where in a structured manner through protocols and systematic practical actions, patient care is improved by addressing the risk factors associated with the development of delirium among vulnerable patients [28]. Furthermore, the prioritisation process for nurses should be supported, both through the application of the entire process, further evaluation of outcomes and the use of digital tools [29] and advances in artificial intelligence [30].

Therefore, it is important that future studies continue to investigate the prioritisation concept to evaluate it together with the use of evaluation tools [5] in different scenarios and with different types of delirium, e.g., hypokinetics, to understand decision-making processes through mixed methods methodologies, that favour the collection of data at both quantitative and qualitative levels and with real data from direct observation, with the aim of improving practice and promoting change within the context [31].

Care of patients at risk or with delirium: a validation study of the Unfinished Nursing Care Survey on a sample of nurses

It adapted and validated the Unfinished Nursing Care Survey for patients at risk and with Delirium (UNCSD) and consisted of two parts, part A and part B, plus a general introductory section derived from the Unfinished Nursing Care Survey [32].

The UNCSD, consisting of part A (unfinished care items, 35 items) and part B (motivations, 23 items) for patients at risk or with delirium, was validated in terms of acceptability, construct validity, hypothesis testing and hypothesis and criterion validity according to the Consensus-based guideline methodology Standards for the selection of health Measurement Instruments [33].

Ten experts (8 nurses and 2 geriatricians) in clinical, research, management and education were involved in adapting the tool using the Delphi methodology. For the construction of Part A-39, which was derived from expert selection, 13 UNCS items [32] were considered appropriate and were thus retained; six were reformulated, and the remaining were derived from the literature [34]. For the construction of Part B, we started with a literature review; then, with the involvement of experts, we selected 23 possible UNCS reasons, 13 of which were derived from the previous UNCS tool [32] and the others from the literature review [35]. For part B, it was necessary to revise the reasons in light of the new post-COVID-19 context.

This is the first UNCSD validation study that focused on a specific type of patient. The instrument was evaluated, and its psychometric properties were found to be good.

The prevention and management activities

According to the results of the validation study, hygiene, nutrition, pain monitoring, communication and pain management are the most common activities for patients at risk of developing delirium. The first two activities, hygiene and nutrition, together with communication, are ensured because they are part of the fulfilment of basic human needs and are among those activities that complete patient care. Patients at risk and with delirium are not able to express their needs from a physical, psychosocial or relational point of view and therefore have more needs. Ensuring these

activities is important for the quality of care, although the literature points out that they are not always performed [32]. Caring for people with delirium means meeting the needs of the individual person and their needs, it means recognising the person as a unique human being and engaging with them in a meaningful way [36]. Effective communication for patients and families with delirium is person-centred through consistency, respect, compassion, family support and consideration of family needs. Nurses recognise that they need to improve their communication skills, particularly their ability to involve carers and patients in the decision making process [37].

Another aspect that the validation study points out is the monitoring and management of pain.

Nurses assess and manage pain because they know that it is strongly associated with delirium [19], which is regulated by Law 38/2010 on access to pain management and palliative care and respect for the person's dignity and autonomy.

With respect to environmental changes, although many studies have reported the effectiveness of interventions for the incidence of delirium [20], these studies have shown that nurses underestimate these aspects because they are considered organisational aspects that can be delegated to other figures.

The reasons

Nurses reported that the reasons for patients being at risk and experiencing delirium in the UNC are “Nurses’ performance issues”, “Human Resources issues”, “Communication issues” and “Model of care delivery issues”. Nurses play a key role in the identification, prevention and management of patients with delirium. According to nurses’ performance issues, knowledge, education, attitudes, culture and experience lead to a lack of confidence and ineffective practices. Our findings are in line with the literature [38, 39], which emphasises the urgent need for delirium-focused training programmes to bridge the existing knowledge gap among nursing staff.

The second result concerns human resources, which are the reasons for UNC. This study emphasised that the reason “human resources” concern both nursing staff and nurses’ staff and produced is UNC. The second finding relates to the human resources reasons for the UNC. This study emphasised that the reason 'human resources' concerns both nurses and support staff and produced the UNC. To measure human resources, we went beyond the logic of time and asked about the ratio of nurses to patients (e.g. in the validation study it was 1:7.33 on average). The nurses also reported that the nurses' aides-to-patient ratio was not adequate for half of the time in the validation study. Nurses reported a lack of resources although the data provided in the validation study were very similar to European standards. The interpretation of these data with respect to resources is that they were not differentiated with respect to the settings; thus, an average was obtained, which may be lower than the national average, which reports a nursing shortage [13]. Human resources are associated with UNC and are an indicator of care; however, nurses' aides-to-patient ratio should be investigated [40].

Nurses report that “communication” is one of the reasons for UNC; as interruptions, tensions between team nurses report a new motivation for UNC, which are “models of care delivery issues”. Only 28% of the sample in the validation study had individualised care as a model of care delivery. According to the results, this model increases the perception of UNC. Our studies suggest that integrated multi-professional management models, such as the Hospital Elder Life Program (HELP) [41], are not yet widely used despite improving the quality of care [42].

The fourth chapter of the thesis used methodologies first as an integrative review following Whittemore and Knafl's framework and then methodologies to obtain agreement on specific issues through an interactive process, e.g., Delphi [43], and methodologies for conducting and validating the instrument [33]. Members have an impact on the continuity of patient care.

Future perspectives for research and clinical practice

The results may have implications for clinicians, management and education.

Identifying missed treatment and reasons are important for the safety of patients at risk and with delirium is an important step in improving their care and should be studied in line with patient outcomes. In the literature, there is heterogeneity of measures used to evaluate patients with delirium, and it is desirable to have an optimal selection of outcomes constructed by all actors to allow studies that evaluate similar interventions in similar populations [44].

Managers can use the tool to measure the activities that are performed on patients and understand the reasons, including multiple professionals and the caregiver, to construct standards for at-risk patients with delirium. The study showed that education plays a central role in knowledge and awareness, and it is suggested that continuous staff education should be carried out to change practitioners' behaviour and vision [45, 46] through the use of different training methodologies, such as simulators, video training, clinical case discussions, and individual coaching sessions.

5.1 Limitations

This research project has several limitations. We conducted our research project during the COVID-19 period (from May 2021) and in the post-COVID-19 period; certainly, the data should be expanded to investigate the current period as well. The Q-methodology study was carried out only in the Bologna, where some pathways for the patient at risk and with delirium are already active; a hyperkinetic delirium scenario was used, and it is advisable to re-evaluate the study by also proposing a hypokinetic delirium scenario to the nurses. In this regard, the present study did not explicitly report the data of other professional figures but rather revealed collaboration with other figures, such as geriatricians, in the construction of the Identifying the Q-sample and in the preliminary validation of the content and face of the instrument through the Delphi method.

The point of view of other professionals would be important to provide comprehensive results with respect to UNC for patients at risk and with delirium. Therefore, future studies are needed to investigate UNC with other professionals [47] and the patient. Another limitation of these studies is that they included a relatively younger sample of nurses compared to the national population, in which the average age was 47.4 years [13]. In fact, in the Q-Methodology study, there mean age was 31.6 years, and in the validation study, the mean age was 35.6 years; it is recommended to extend the studies to a larger population of nurses. The validation study was carried out in the national territory, and it would be interesting to extend the validation logic to the international level as well. Another limitation, is the choice to carry out only surveys, on a limited number of participants, although the literature also supports the need to provide data on associations between staffing factors, education and working environments, patient outcomes (patient satisfaction, medication errors, infections, accidents and readmissions) and missed treatment [48]

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6. Conclusions

This project has highlighted the importance of considering how nurses prioritise, motivate and measure unfinished care.

Nurses prioritise activities for patients with delirium as their care takes time. Our findings support the recognition of the patient as a unique human being and a meaningful effort to ensure a tailored approach to the person and family to meet individual needs, despite the context of health systems. Prevention is still underdeveloped in healthcare settings, especially to prevent the onset of delirium and its possible negative consequences. In the management of the person with delirium, non-pharmacological treatment and communication are the elements that provide a clear and supportive environment to improve orientation and maintain and support the person's residual abilities. In caring for the person with delirium in order to organise appropriate care for the patient and family with delirium, the disease trajectory must also be considered in order to describe the course or progression of delirium over time and to activate services to support the person.

Guidelines, personalised pathways to the person and the definition of minimum standards of care support nurses in decision-making. Similarly, education, professional support (e.g. team discussion) on the management of delirium is fundamental to patient care and can be made successful through education that is both sustainable and reflects the person's knowledge and support.

To the best of our knowledge, this is the first study to consider this type of patient and the results are intended to promote clinical, management and research in order to promote safe care with the goal of quality care, reduce UNC and monitor practitioner and patient outcomes.