



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

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ABSTRACT

Background: This study aimed at (a) exploring how nurses prioritise interventions to prevent delirium among patients identified at risk and (b) describing the underlying prioritisation patterns according to nurses' individual characteristics.

Methods: There was used the Q-methodology a research process following 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.

Results: There were involved 56 nurses working in medical, geriatric and long-term facilities (46; 82.2 %). 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). Two priority patterns emerged among nurses (explained variance 44.78 %), one 'Clinical-oriented' (36.19 %) and one 'Family/care-giver-oriented' (8.60 %) representing 53 nurses out 56.

Conclusion: Alongside the overall tendency to prioritise some preventive interventions instead of others, the priorities are polarised in two main patterns expressing two main individual characteristics of nurses. Knowing the existence of individual patterns and their aggregation informs how to shape educational interventions.

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Introduction

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 calls⁵ are ranked as priorities in acute settings; on the other side,

attending multi-professional meetings⁴ and providing patient's oral care and hygiene⁵ are ranked as the lowest priorities.

The prioritisation process is based on different factors: the clinical judgment⁶⁻⁸ influenced by the conditions of the patient⁹ and his/her urgent needs^{5,7,10} may address priorities in acute care. The time available¹⁰ and the perception of time scarcity¹¹ may shape the priorities chosen. In addition, the context¹² and its underlying philosophies and caring models¹²⁻¹⁴ 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,^{13,17,18} have also been documented as important. Therefore, the prioritisation process implies both explicit¹⁰ factors related to the patient and the

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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 delirium²⁸ 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.

Materials and 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.

Study Design

A Q-methodology was used^{30,31} due to its capacity to in-depth investigate the prioritisation processes²⁰ 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 review³² 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 delirium⁴⁷ 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 checking⁴⁸ 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 field⁷; (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 configuring 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-

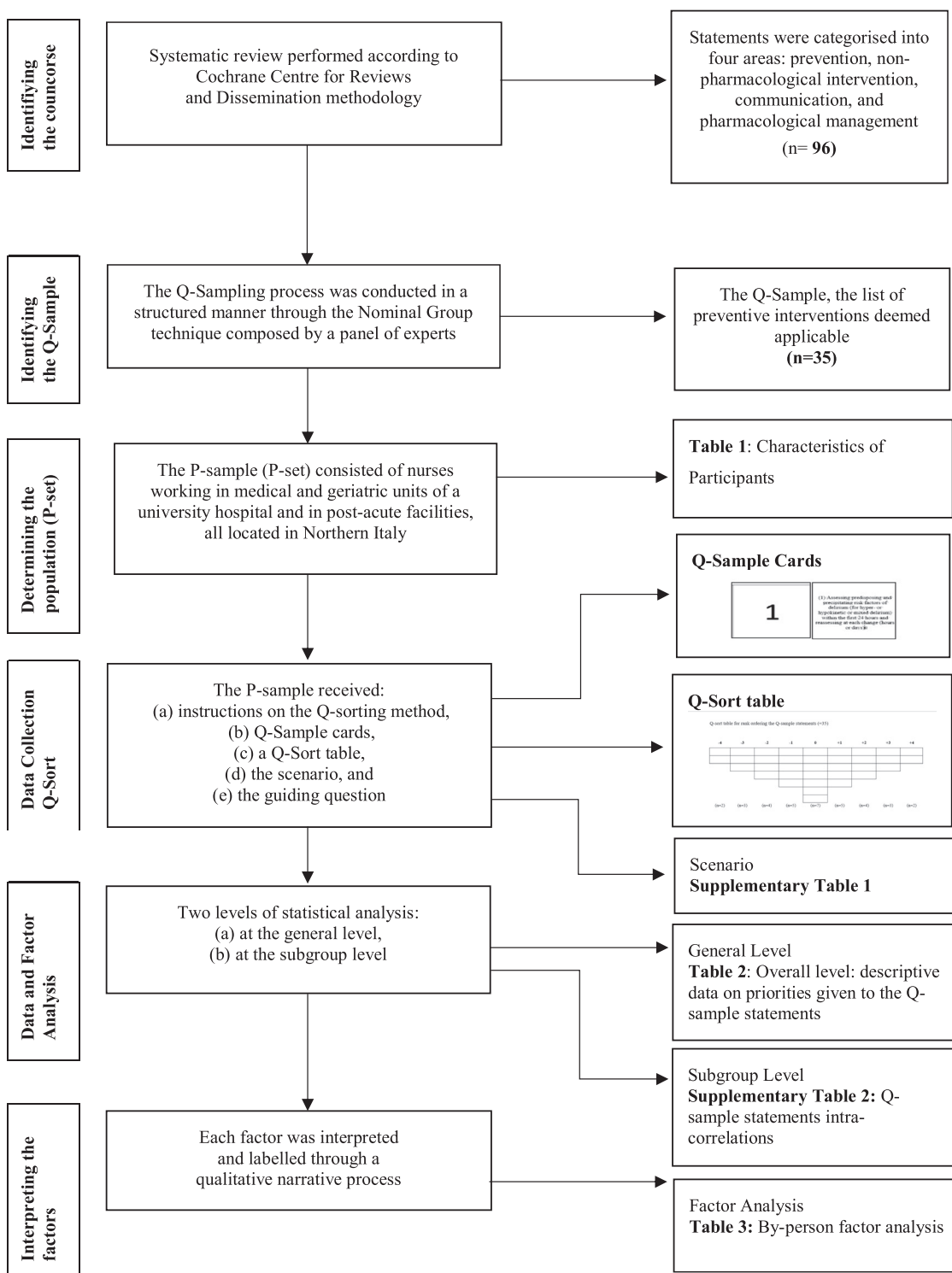


Fig. 1. Flowchart of the Q-methodology.³⁰⁻³²

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).

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	38 (67.9)
I spent the most time of my professional experience	
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 (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,

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

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)’ ($Rho= -0.411, s < 0.01$) (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 $p=0.431$).

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 context⁵⁶ – 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 restraints⁶⁵; thus, it seems to be at intervention embodied in practice, not specifically to patients at risk of delirium. Moreover, some interventions reporting large positive correlations⁵³ 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

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

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 investigations²⁰; the second profile embodies a

humanistic/holistic approach to care¹⁵ that has been suggested to prevent delirium⁶⁶ 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 patient⁶⁷ 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 emerged¹⁰.

Consequently, in the prioritisation process, nurses work as a group, but also according to each individual pattern⁶⁸ 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 prioritisation²³ 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 ubiquitous.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 interventions⁵⁴ 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.

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 patterns 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.

Declaration of competing interest

The authors declare no conflict of interest

CRediT authorship contribution statement

Luisa Sist: Writing – review & editing, Writing – original draft, Formal analysis, Data curation, Conceptualization. **Matteo Pezzolati:** Writing – review & editing, Writing – original draft, Supervision. **Nikita Valentina Ugenti:** Writing – review & editing, Writing – original draft, Supervision. **Silvia Cedioli:** Writing – review & editing, Writing – original draft, Supervision. **Rossella Messina:** Writing – review & editing, Writing – original draft, Methodology, Conceptualization. **Stefania Chiappinotto:** Writing – review & editing, Writing – original draft, Supervision. **Paola Rucci:** Writing – review & editing, Writing – original draft, Software, Methodology, Formal analysis, Conceptualization. **Alvisa Palese:** Writing – review & editing, Writing – original draft, Validation, Supervision, Methodology, Conceptualization.

Ethical approval

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

Informed consent

Informed consent was obtained from all individual participants included in the study

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Supplementary materials

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