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Review

Identification and information management of cognitive impairment of patients in acute care hospitals: An integrative review

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ABSTRACT

Objectives: Recognition of the cognitive status of patients is important so that care can be tailored accordingly. The objective of this integrative review was to report on the current practices that acute care hospitals use to identify people with cognitive impairment and how information about cognition is managed within the healthcare record as well as the approaches required and recommended by policies.
Methods: Following Whittemore & Knafl's five-step method, we systematically searched Medline, CINAHL, and Scopus databases and various grey literature sources. Articles relevant to the programs that have been implemented in acute care hospitals regarding the identification of cognitive impairment and management of cognition information were included. The Mixed Methods Appraisal Tool and AACODS (Authority, Accuracy, Coverage, Objectivity, Date, Significance) Checklist were used to evaluate the quality of the studies. Thematic analysis was used to present and synthesise results. This review was pre-registered on PROSPERO (CRD42022343577).
Results: Twenty-two primary studies and ten government/industry publications were included in the analysis. Findings included gaps between practice and policy. Although identification of cognitive impairment, transparency of cognition information, and interaction with patients, families, and carers (if appropriate) about this condition were highly valued at a policy level, sometimes in practice, cognitive assessments were informal, patient cognition information was not recorded, and interactions with patients, families, and carers were lacking.
Discussion: By incorporating cognitive assessment, developing an integrated information management system using information technology, establishing relevant laws and regulations, providing education and training, and adopting a national approach, significant improvements can be made in the care provided to individuals with cognitive impairment.

What is known?

- Cognitive impairment is common among patients admitted to acute care hospitals, but cognitive status is not often assessed or recorded.
- The way in which cognitive status is assessed and reflected in patient medical records, utilised during a hospital stay, communicated to patients, and interpreted at future episodes of care, is important for coordination and continuity of care.

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What is new?

- The results of this review describe the gaps between policy and practice regarding the identification of cognitive impairment and management of cognition information in acute care hospitals.
- It is recommended that incorporating cognitive assessment, developing an integrated system using information technology, establishing relevant laws and regulations, providing staff training, and adopting a national approach should be considered to improve the care provided to individuals with cognitive impairment.

1. Introduction

A growing proportion of aged people worldwide has also led to an increase in the proportion of people with cognitive impairment (CI) [1,2]. Globally, the median prevalence of CI in adults older than 50 years of age is 19.0% (25th percentile = 12.0%; 75th percentile = 24.9%) [3]. CI describes "a temporary or permanent condition resulting in clinically significant difficulties with remembering, new learning, concentrating, making decisions, and carrying out daily tasks" (p.7) [4]. The most common underlying causes of CI are dementia and delirium [5,6]. Dementia is a syndrome associated with insidious, chronic and progressive deterioration in cognitive function; Alzheimer's disease is the most common form of dementia [6,7]. Mild cognitive impairment represents the transitional stage between normal aging and dementia [8,9]. Delirium is "a severe neuropsychiatric syndrome characterised by the acute onset of deficits in attention and other aspects of cognition" (p.1) [10].

CI is common among patients admitted to acute care hospitals [11], affecting up to two-fifths of older inpatients in medical wards at any given time [12,13]. People with CI have greater needs for hospital services than those without CI [14]. In the acute care hospital setting, experiencing CI places patients at higher risk of further decline in cognition and physical function [15]; significant adverse events such as falls, pressure injuries, and medication errors [15]; discharge to a higher level of care [16]; and increased risk of mortality either in hospital or soon after discharge than those who do not have CI [11,17]. The social costs related to such adverse events for people with CI in acute care hospitals are disheartening, along with the additional economic costs incurred through longer lengths of stay [16,18]. In Australia, the presence of CI (either dementia or delirium coded on admission) leads to a 51% increase in the costs associated with hospital stays [19]. In the UK, patients with dementia experience significantly higher costs due to increased lengths of stay, with dementia estimated to triple the average cost of a hospital admission [20].

Acute care hospitals are not well designed to cater to the needs of people with CI [17,21]. Historically, their design has been primarily driven by the need to efficiently treat acutely unwell people with severe disease and quickly respond to emergencies [22], rather than to provide the therapeutic psychosocial care required to support people with CI and avoid responsive behaviours [22,23] that may arise as a result. Additionally, CI is often secondary to the primary reason for people attending acute care hospitals [24]. Consequently, CI often goes undetected, misdiagnosed, or undocumented on admission [25,26]. Previous research reveals that more than half of delirium is undiagnosed or unrecognised on hospital admission [26,27]. 42%–64% of delirium is misdiagnosed as dementia or other psychiatric illness [28]. Around half of the admitted patients with an existing dementia diagnosis do not have the dementia diagnosis documented in hospital medical records [17,29].

Early identification of CI and documentation of correct cognitive status should, in theory, improve patient outcomes [30] as appropriate care could be promptly provided to prevent iatrogenic complications. Furthermore, sudden changes and fluctuations from the patient's cognitive baseline at admission may facilitate prompt identification and investigation of delirium. The change in cognitive status over a patient's hospital stay is an important indicator of the patient's health status and should inform healthcare decisions. In delirium, cognitive changes occur suddenly, fluctuate over the day and often resolve within a matter of a few days [10], while for people with dementia, the cognitive status may decline over hospital admission, often due to residual effects after recovery from a concomitant delirium [31]. How cognitive status is documented in a patient's medical record, utilised during a hospital stay, communicated to patients, and interpreted at future episodes of care, is an important aspect of the patient's medical history.

Our initial research indicates that the current literature reviews primarily focus on the prevention, diagnosis, and treatment of CI. While some reviews touch upon the screening and early identification of CI, most of these studies are limited to patients with specific conditions. Additionally, some studies have examined the documentation of CI, but with an emphasis on the accuracy and quality of such documentation [32]. There are also several studies available that explore the clinician's ability to recognise CI [33,34]. However, there remains a knowledge gap regarding the practical approaches to identifying CI and managing CI information within real-world acute care hospital settings. Although policies may address the identification and management of CI, further research is needed to understand how CI is identified and how the related information is subsequently managed once CI has been identified in real-world acute care hospital settings. To address the research gap, the objective of this integrative review was to report on the current practices that acute care hospitals use to identify people with CI (including mild CI, delirium, and all types of dementia) and how information about cognition is managed within the health care record as well as the approaches required and recommended by policies.

2. Method

2.1. Protocol and registration

We utilised an integrative review methodology, consisting of five stages: problem identification, literature searches, data evaluation, data analysis, and presentation [35]. An integrative review allows the inclusion of studies with different methodologies and summarises past empirical and theoretical literature to provide a comprehensive understanding of a healthcare problem or phenomenon [35]. This review was pre-registered on PROSPERO (CRD42022343577) and reported following the PRISMA 2020 guidelines [36].

2.2. Problem identification

The review was guided by three research questions.

(1) How is cognitive screening triggered in acute care hospitals and what is the source of cognition information?
(2) How is information regarding cognitive status managed (i.e., recorded, stored, reported, utilised, shared, and referred to) in acute care hospitals?
(3) How are patients, families and carers (if appropriate) involved in the assessment and management of CI in acute care hospitals?

2.3. Literature search

To ensure a comprehensive search strategy, literature searches were conducted in three stages. Stage 1: A search of computerised databases (Medline, CINAHL, and Scopus) was carried out on February 18, 2022 and updated on May 24, 2023 using keywords (cognitive impairment; hospital/acute care; healthcare service/implementation science) (Table 1, Appendix A). The keywords healthcare service/implementation science were used to specifically target programs that have been implemented in healthcare services in the real world. Filters were added to limit the search to more recent publications (post-2000) and the English language. Stage 2: A targeted search of grey literature sources, including grey literature databases, clinical guideline repositories, and healthcare organisations/associations, was carried out on October 7, 2022 (Appendix B). Stage 3: Scanning the reference list of papers (backward citation search) identified in Stage 1 and their citations (forward citation search) was also performed using the Web of Science database to search for studies not identified in previous searches.

Literature was initially collated with duplicates removed in reference management software (Endnote Online) and then imported to literature review management software (COVIDENCE) for screening, extraction, and quality assessment. The inclusion and exclusion criteria (Table 2) were guided by the PICo (Population/Patient/Problem, Interest, Context) framework [37]. Articles identified from Stage 1 were reviewed against inclusion and exclusion criteria by PP and BW or PP and BX at the title and abstract level, with the remaining full-text articles reviewed by PP and BX using the same criteria. The percent agreement between PP and BW was 0.933, and between PP and BX it was 0.863. All articles identified from Stages 2 and 3 were reviewed against inclusion and exclusion criteria by two of the three authors (PP, BX, DB) at both title/abstract and full-text levels. All the conflicts were resolved by a third author (MMK). The selection process followed the PRISMA checklist, as shown in Fig. 1.

2.4. Data extraction

Data were extracted from the included studies and entered separately into a pre-fabricated form supported by the COVIDENCE by two reviewers. Any discrepancy was resolved by reviewing and discussing the full text. The following data were extracted for each publication by two of the three authors (BX, PP, DB): author(s), publication year, location, aim, cognitive status, summary, source of cognition information, data transparency, patient interactions, outcome, and conclusions.

2.5. Data evaluation

For primary studies, the Mixed Methods Assessment Tool (MMAT) was used to assess their quality. The MMAT is an efficient and reliable tool that can be used to assess five different types of study designs (qualitative studies, quantitative RCT, quantitative non-randomised studies, quantitative descriptive studies, and mixed methods studies) [38]. The MMAT includes a set of two screening questions and 25 criteria, with 5 criteria dedicated to each type of study design [39]. All studies included in the assessment met the two screening questions, which determined their suitability for evaluation using the MMAT. Each criterion was rated as “yes,” “no,” or “can’t tell”. As the 2018 version of MMAT encourages quality appraisal, no item-level appraisal scores are reported [39,40]. The AACODS (Authority, Accuracy, Coverage, Objectivity, Date, Significance) checklist, a widely acknowledged appraisal tool, was used to assess the grey literature [41]. The quality assessment was completed by two of the three authors (DB, PP, BX). Any conflicts were resolved by the third author (MMK). Because the aim was to synthesise a body of literature to provide a picture of data transparency in acute care hospitals, studies were not excluded based on this assessment.

2.6. Data analysis

To identify how key concepts (data transparency and patient interaction) were defined, one author (BX) attempted to extract definitions from each of the included papers. As no clear definition of both terms was included in the articles, a reasonable level of inference was used to extract a definition from the publication in collaboration with two other authors (DB, MMK). “Data transparency” was defined as recording, storing, reporting, utilising, referring, and sharing information regarding cognitive status during an episode of care. “Patient interaction” was defined as involving patients in cognitive assessment, informing patients, families, and carers (if appropriate) of the outcome of cognitive screening, seeking consent for medical procedures, and involving the patient, families, and carers in decision-making about the management of CI.

An integrated synthesis of all qualitative, quantitative, and mixed-method studies, along with government/industry publications, was undertaken. As the research questions are qualitative in nature, the analysis focused on a high-level analysis of themes rather than a more targeted analysis of studies based on research methodologies. Before integration, primary studies and government/industry publications were synthesised separately using thematic synthesis. Units of analysis for research studies included data under “background”, “methods” and “findings” or “results” headings in the abstract and paper. Government/industry publications lacked uniformity in headings, hence any data reporting triggers of cognitive assessment at admission, data transparency issues, and patient interactions were classed as units of analysis.

Data synthesis was initiated by one author (BX). First, the extracted data from the articles that included information about the review question was imported into a spreadsheet. The original expressions were reduced, and similar reductions were translated

Table 1
Search strategy for electronic databases (Medline example).

No.	Term	Search strategy
1	Cognitive Impairment	Cognitive impairment.mp. OR mild cognitive impairment.mp. or Cognitive Dysfunction/OR cognitive decline.mp. OR cognitive status.mp. cognitive loss.mp. OR Alzheimer Disease/OR Dementia/or delirium.mp.
2	Hospital, Acute Care	Hospital.mp. or Hospitals/OR acute care.mp. OR acute setting.mp. OR acute care setting.mp. OR short-term care.mp. OR short-term care setting.mp.
3	Health Care Service, Implementation Science	health care service.mp. OR healthcare service.mp. OR health service.mp. or Health Services/OR implementation science.mp. or Implementation Science/
	COMBINE	1 AND 2 AND 3
	Filter	Language: English AND Publication year: 2000 and later

Table 2
Inclusion and exclusion criteria applied at abstract and full-text levels.

Inclusion	Exclusion
Population/Patient:	
• Adult patients	
Problem:	**Cognition information is:**
• Cognitive impairment; Mild cognitive impairment; Delirium; Dementia	• Only a demographic characteristic and secondary to the primary aim of the articles
Interest:	**Research project**
• Active health care service	• With no service implementation
• Translation research project with the intention of implementation	• Population-level study focused on health records linkage, service utilisation, health outcomes
• Program related to "screen, record, store, report, utilise, share, and refer" of cognition information	
• Quality standards/guidelines and related resources that are required for implementation into routine practice (often mandated)	
Context:	**Settings consist only of:**
• Acute care hospital	• Pediatric
	• Maternity
	• Outpatient
	• Emergency department
	• Rehabilitation/post-acute care/palliative care
	Publication
	• Pre 2000
	• Not peer-reviewed
	• Non-original research (e.g., editorials)
	• Abstract without full-text (e.g., conference publication)

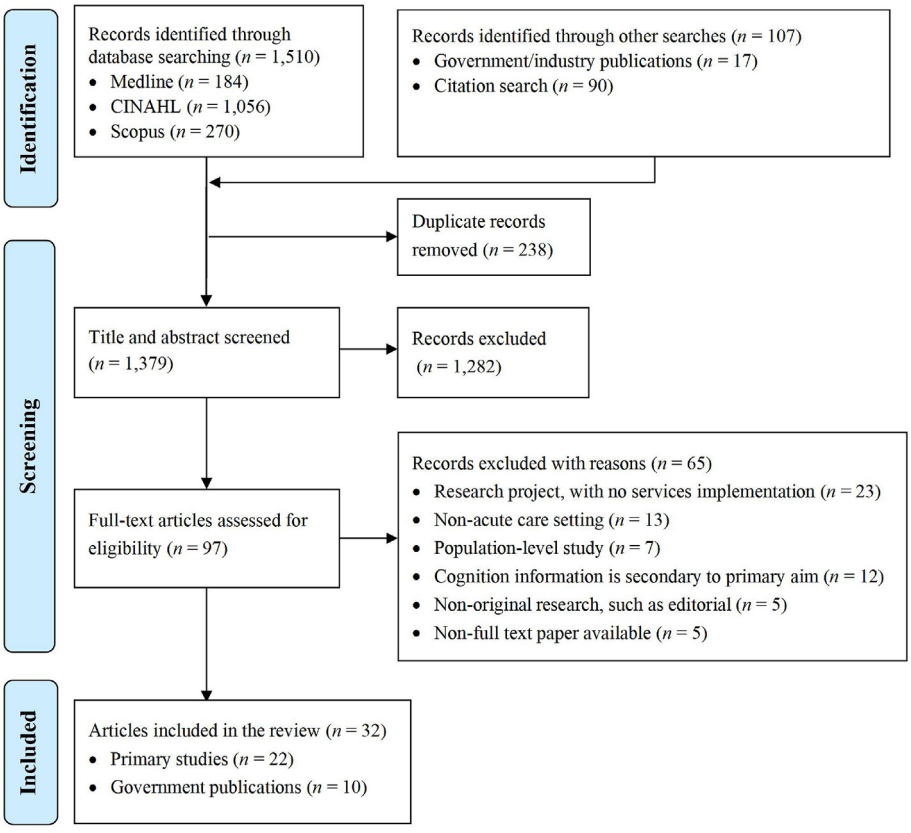

Fig. 1. PRISMA diagram of the exclusion and exclusion of papers for the review.

into a standard format. Descriptive codes were combined into subcategories (source, tool, record, store, report, utilise, refer, share, patient interaction), which were then combined to form main categories (source of cognition information, data transparency, and patient interaction). The original articles and the spreadsheet were rechecked by the working group (DB, PP, MMK) to ensure the reliability of the analysis. This process was iterative, with the working group constantly referring to original sources. Any conflicts were discussed by the working group to reach an agreement.

2.7. Patient and carer involvement

The literature review protocol was reviewed by the evaluating Quality of Care (eQC) Patient and Carer Advisory Board (the Board) prior to registration and implementation. The Board is made up of seven patients and carers with expertise in CI and patient and community advocacy. The establishment of the Board and background information about each Board member can be found at https://chsr.centre.uq.edu.au/improving-quality-of-care-for-people-with-dementia-in-the-acute-care-setting and Appendix C. The Board's insights shaped the development of the research objective and the formulation of research questions, aligning both with academic rigor and practical patient and carer concerns. In addition, the Board members were invited to express their opinions on which two issues (among screening, recording, storing, reporting, utilising, sharing, and referring) were likely to have the most impact on patient care in terms of recommendations for resource allocation and use. Six members' responses on nominated priorities and comments were collected via an anonymous questionnaire. This input directly informed recommendations for resource allocation. The Board also reviewed the draft of the manuscript, ensuring the final output reflects a blend of scholarly rigour and real-world applicability. This collaborative effort with the Board underscores the commitment to a patient-centred approach, enriching the literature review with insights that go beyond conventional academic boundaries.

3. Results

3.1. Characteristics of included papers

Twenty-two primary studies were included in the review, including fourteen quantitative [12,42–54], four qualitative [30,55–57], and four mixed methods studies [29,58–60] (Table 3). The included studies were published between 2003 and 2023 and were conducted in the UK ($n = 7$), the USA ($n = 4$), Australia ($n = 4$), Canada ($n = 3$), New Zealand, Finland, Italy, and Germany. Fifteen examined delirium ($n = 12$) or dementia ($n = 3$) alone. Seven studied a mix of CI as a general concept, delirium, or dementia ($n = 7$).

Ten government/industry publications were included in the analysis, including three quality standards, three clinical guidelines, and four reports or other resources (Table 4). They were published between 2010 and 2021 and were from Australia ($n = 5$) and the UK ($n = 5$). Among these, six specifically examined delirium ($n = 4$) and then dementia ($n = 2$). The remaining four covered a mix of CI as a general concept, delirium, or dementia ($n = 4$).

3.2. Quality of included articles

More than half of the quantitative studies (8/14) did not meet the evaluation criteria (Table 3) [43,44,46,47,50,51,53,54]. Two studies did not provide sufficient information on the data [43,46], and one [46] of which also had an issue of a small sample size. Two had a risk of bias due to a low response rate [51,54], while two others did not account for confounders [44,53]. Speed et al. (2007) [47] used an inaccurate measurement of delirium, while Voyer et al. (2008) [50] had incomplete measurements for the symptoms of delirium in the outcome measures.

Half of the four qualitative studies (2/4) [30,55] did not meet the evaluation criteria. These studies did not present sufficient data for the authors to ascertain if data collection methods were adequate to address the research questions, findings adequately derived from the data, or interpretation of results sufficiently substantiated by data.

Half of the mixed method studies (2/4) [59,60] did not meet the evaluation criteria. One had the issue of small sample size and recall bias [59], and the other had a sample that was not representative of the target population [60].

Overall, the quality of the included grey literature was high, with no concerns raised by the working group (Table 4). All documents were published by health authorities and most are national quality standards or guidelines.

3.3. Source of cognition information

Sources of cognition information in practice were obtained from 19 studies (19/22). Among these, two-thirds were from routine admission assessments ($n = 12$), three were from nurse evaluation ($n = 3$), and the remainder were from a mix of sources, including self-reports, families and/or carers, general practitioner (GP) referrals, and specialists ($n = 4$). Among those that reported a tool for assessing cognition at admission ($n = 12$), the Confusion Assessment Method (CAM) or CAM-ICU ($n = 7$) and the 4 'A's Test (Arousal, Attention, Abbreviated Mental Test-4, Acute change) (4AT) ($n = 4$) were most frequently used. In Alhaidari's study (2022) [58], 4AT, as a mandatory admission assessment alternative to CAM, had a high adherence of 83.2% and 14.8% of positive test results. A delirium toolkit, which included the 4AT, developed by the National Health Service (NHS) Scotland, showed an increase in the identification of delirium, a reduction in falls, and a reduced mean length of stay [30]. Only one of the studies explicitly reported when the cognitive assessment should be completed, i.e., within 24 h of admission [50].

In Australia and the UK, it is required that people at risk of delirium should be assessed and screened within 24 h of admission [17,61,62]. Risks of delirium include 1) aged 65 years or older, 2) past or present CI and/or dementia, 3) current hip fracture, and 4) severe illness or risk of dying [61–63]. Clinicians should also respond promptly when patients, families, carers, or other key informants raise concerns about cognitive function [63]. The screening takes place in the pre-admission clinic or within 24 h of admission [17,61,62]. Cognitive information should be obtained from multiple sources, including GP, patients, families, and carers ([64]. However, as indicated in a report from Alzheimer's Australia (2014) [17], carers are often inadequately involved in consultations. In Australia, the tools of assessments are not designated but must have been validated [63]. In the UK, the use of the 4AT screening tool is recommended and if indicators of delirium are identified, the use Diagnostic and Statistical Manual of Mental Disorders 5 (DSM-V) or short CAM (or CAM-ICU in critical care) is recommended to confirm a diagnosis [61,65].

3.4. Data transparency

The current status regarding the data transparency of cognition information in practice was obtained from 19 studies (19/22). Most often, cognition information was recorded and stored in patient health records ($n = 12$), while two studies reported fragmented practices where the results of delirium screening were not included in the documentation [48,56]. One study implemented a geroinformatics tool where patients' CI information was stored [55]. Each time a physician enters an order for a patient, the computerised decision support system (CDSS) will alert them if the patient has CI and recommend referring the patient to a geriatric service for personalised care. Nearly one-third reported that cognition information was written in the discharge summary and/or referred to a GP ($n = 7/22$). None of the studies reported how long the information on cognitive status remains current in the hospital records.

In Australia, it is required that diagnosis and details of which

Table 3
Extracted data from journal articles showing current practices about the identification and information management of cognitive inpairment in acute care hospitals ($n = 22$).

Author, year, and country	Approach	Cognitive status	Source of cognitive status information	Data transparency	Patient interactions	Quality assessment
Balentine et al., 2022 [57] UK	Qualitative interviews	Delirium	Source: delirium assessment and management protocol Tool: not clear (authors noted validated assessment tool)	Record and store: patient medical record; Utilise: information is displayed as a 'tracker' for monitoring and management of delirium, influencing the use of medication that increases delirium risk.	Not reported	Concerns: none
Bond et al., 2015 [30] UK	Qualitative description	Delirium	Source: routine admission assessment; Tool: 4AT	Share: engage with patient, family and carers and explain diagnosis within 2 h or if family/carers were not present within 24 h.	Discuss risks using delirium information leaflets and posters within 2 h or if family/carers not present within 24 h.	Concerns: inadequate information about the data
Boustani et al., 2007 [55] USA	Qualitative description	CI	Source: routine admission assessment for patients ≥65 years of age; Screening tool: SPMSQ, CAM	Store: the gero-informatics; Utilise and refer: each time a physician enters an order, the CDSS will notify the physician of the presence of CI and recommend referral to geriatric service in reference to the CI.	Lack of interaction	Concerns: inadequate information about the data
Grealish et al., 2019 [56] Australia	Ethnographic study	Delirium	Source: seek information initiatively from multiple sources (such as residential facilities, family); Screening tool: not reported	Record: delirium screening was not included in the documentation; Report: seek or share information at handover	The patients valued being included in care decisions but reported cases where this did not happen.	Concerns: none
Bakhru et al., 2023 [51] USA	Cross-sectional survey	Delirium	Source: delirium assessment and management protocol (43% of the ICUs) Tools: CAM ICU (35%)	Not reported	Not reported	Concerns: risk of bias due to 31% non-response rate and social desirability in responses and 18-month survey collection period
Chuen et al., 2022 [42] Canada	Case-control study	Delirium	Source: routine admission assessment; Screening tool: CAM	Record and store: patient's electronic charts; Refer: discharge summary	Lack of interaction varied among physicians or medical teams	Concerns: none
FitzGerald et al., 2020 [43] UK	Descriptive cross-sectional study	Delirium superimposed on dementia	Not reported	Refer: delirium diagnosis disclosed to GP via discharge summary	Patients and or families/carers were given information about delirium and its impact	Concerns: inadequate information about the data
Gilmore-Bykovskyi et al., 2021 [44] USA	Cohort study	Dementia	Not reported	Record and store: clinical notes Refer: written discharge summary (both have high rates of omission)	Not reported	Concerns: confounders were not reported
Laurila et al., 2004 [45] Finland	Analytical cross-sectional study	Dementia and delirium	Not reported	Record and store: medical records taken by ward physicians and nurse's notes	Not reported	Concerns: none
Nouvenne et al., 2022 [52] Italy	Retrospective cohort study	CI, delirium	Source: rapid assessment for admitted patients (≥65 years of age, having general medical or geriatric complaints, predicted length of stay less than 72 h); Tools: CAM for assessment of delirium, mini-COG scale for screening of CI	Record and store: patient charts Utilise: inform the development of tailored treatment by multidisciplinary team	Not reported	Concerns: none
Nydahl et al., 2022 [53] Germany	Before and after quasi-experimental design	Delirium	Sources: delirium screening three times within 24 h at admission to the stoke unit Tools: NU-DESC; validation by treating physician using the DSM-V criteria	Record and store: patient charts Refer: refer to physician for validation Utilise: interprofessional evaluation of possible reasons and treatment of underlying causes using checklists, interventions	Not reported	Lower than expected delirium incidence; No solid adjustment for confounders; not all participating sites meeting the planned time frame
Rapolthy-Beck et al., 2022 [54] Australia	Survey	CI	Sources: routine assessments used in intensive care units by occupational therapists Tools: most commonly daily administration of measures	Utilise: various interventions were used to prevent cognitive deterioration	Not clear (authors noted family and patient education; though this may not relate to the patient's cognition results.)	Risk of bias due to low response rate

(*continued on next page*)

Table 3 (*continued*)

Author, year, and country	Approach	Cognitive status	Source of cognitive status information	Data transparency	Patient interactions	Quality assessment
			included the GCS (37.5%), CAM ICU (9.5%); weekly administration of measures included informal or non-standardised cognitive screens (21.7%).			
Russell-Babin et al., 2013 [46] USA	Descriptive cross-sectional study	Delirium	Source: post-surgery assessment from a nurse; Screening tool: evidence-based delirium predictor tool and CAM	Record and store: clinical information system Report and refer: communication handoff of case identification between the post-anaesthesia care unit and orthopaedic unit and communication of results to a physician.	Not reported	Concerns: inadequate information about data collection & small sample size
Speed et al., 2007 [47] Australia	Descriptive cross-sectional study	Delirium	Source: nurse evaluation of delirium and "confusion" (p.40) Screening tool: not reported	Record and store: patient medical records	Not reported	Concerns: inaccurate measurement
Taylor et al., 2016 [48] UK	Before-and-after comparison study	Delirium, dementia	Source: comprehensive geriatric assessment, diagnosis reported by the patient/relative or in medical records Screening tool: not reported	Record and store: outcomes of cognitive assessment were not recorded, and dementia diagnoses would be coded into secondary care records Refer: communicated to GP via hospital discharge letter	Lack of interaction	Concerns: none
van Zyl et al., 2003 [49] Canada	Cohort study	Delirium	Source: consultation-liaison psychiatry service Screening tool: DSM-IV for screening; DRS/DRS-R-98 for diagnosis	Refer: hospital discharge summaries were referred to as the main communication link between hospitals and primary practitioners.	Not reported	Concerns: none
Voyer et al., 2008 [50] Canada	Analytical cross-sectional study	Delirium	Source: nurse evaluation within 48 h of admission Screening tool: no	Record and store: patient medical records and nursing notes Report: reported to other clinicians either orally or in writing, Utilise: utilised for treatment for monitoring and response to treatment, Refer: referral and post-care information depend on the organisation (varies)	Always some interaction with patients, sometimes with relatives as well depending on the severity of the diagnosed impairment.	Concerns: incomplete measurements
Mudge et al., 2022 [12] Australia	Multimethod study (descriptive cross-sectional study and survey)	Dementia, delirium, CI	Source: routine admission assessment information sought from patients, family (most commonly), friends, GP, community services) screening tool: 4AT	Record and store: 4AT screening result is recorded on paper and generally remain at the bedside for the duration of admission; a scanned copy is stored and available at subsequent admission. Report: abnormal screen score reported by the assessing nurse to the admitting medical officer, formal assessment for delirium by a trained health professional (doctor or occupational therapist), Refer: diagnosis of delirium conveyed to primary care doctor in discharge summary (in the survey, 78% of those with a medical diagnosis of delirium had CI documented)	Only half of carers had been asked about changes in cognition, fewer than half felt invited to contribute to the care, only one in seven had received any information about delirium prevention, quality of communication changed depending on ward and team.	Concerns: none
Alhaidari and Matsis, 2022 [58] New Zealand	Sequential mixed-methods	Delirium	Source: routine admission assessment for patients ≥75 years of age; Screening tool: 4AT	Record and store: doctors' electronic admission forms Utilise: used for care planning and treatment for underlying causes	Not reported	Concerns: none
Burn et al., 2019 [59] UK	Concurrent mixed-methods	Dementia	Source: routine admission assessment; Screening tool: not reported	Refer: flagged to their GP for further investigation and referral	Lack of interaction	Concerns: recall bias, small sample size
		Dementia		Not reported	Not reported	Concerns: none

Table 3 (*continued*)

Author, year, and country	Approach	Cognitive status	Source of cognitive status information	Data transparency	Patient interactions	Quality assessment
Crowther et al., 2017 [29] UK	Sequential mixed-methods		Source: informally via self-report or GP referrals; Screening tool: not reported			
MacLullich et al., 2019 [60] UK	Sequential mixed method	Delirium	Source: routine admission assessment Screening tool: 4AT and CAM (in the survey, 54% (1,103/2,061) used a tool where CAM (61%, 630/1,041) and 4AT (60%, 625/1,043) are most frequently used; 69% (57/83) used 4AT as part of routine assessment)	Not reported	Not reported	Concerns: sample is not representative of the target population

Note: 4AT = 4 'A's Test (Arousal, Attention, Abbreviated Mental Test - 4, Acute change). CAM = Confusion Assessment Method. CDSS = computerised decision support system. CI = cognitive impairment. DRS = Delirium Rating Scale. DSM = Diagnostic and Statistical Manual of Mental Disorders. GCS = Glasgow Coma Scale. GP = general practitioner. mini-COG = mini-Cognitive Assessment Instrument. Nu-DESC = Nursing Delirium Screening Scale. SPMSQ = Short Portable Mental Status Questionnaire.

Table 4
Extracted data from government/industry publications showing current policies and guidelines about the identification and information management of cognitive impairment in acute care hospitals (n = 10).

Source, year, country	Approach	Cognitive status	Source of cognitive status information and screening tool	Data transparency	Patient interactions	Quality assessment
ACSQHC 2014 [63] Australia	Resource	Dementia, delirium	Source: routine admission assessment for delirium among patients at risk: aged 65 and over, known cognitive impairment or dementia, severe illness or risk of dying, hip fracture, or cognitive concerns raised by others; screening takes place in the pre-admission clinic or within 24 h of admission; Tool: specific tool not recommended	Record and store: the patient's cognitive status information and management plan are documented; diagnosis should be documented as well as details of which cognitive screening tests are used to improve the transfer of care Utilise: this information provides a baseline for further testing and is used to develop a comprehensive care plan Report, refer, and share: cognitive status information and care plan are communicated to the patient, family, and all relevant healthcare providers (including GP) in handover, referrals, and discharge notes in a timely manner and with sufficient detail.	Provide patient, carer and family, other support person or substitute decision-maker with information on cognitive status that is easy to understand, provide education and support about delirium prevention and management, involve them in clinical handover, and encourage them to report any changes in behaviour, encourage their participation in decision-making and comprehensive care planning (including planning for transitions of care) and delivery.	Concerns: none
ACSQHC 2019 [66] Australia	Resource	CI, delirium, dementia				Concerns: none
ACSQHC 2019 [5] Australia	User guide	CI, delirium, dementia				Concerns: none
ACSQHC 2021 [62] Australia	Quality standard	Delirium				Concerns: none
Alzheimer's Australia 2014 [17] Australia	Organisation report	Dementia, delirium				Concerns: none
NICE 2010 [61] UK	National clinical guideline	Delirium	Source: assessment within 24 h of admission of people at risk for CI: aged 65 and over, known cognitive impairment or dementia, severely ill or broken hip. Tool: 4AT is recommended for risk screening, if indicators of delirium are identified, use DSM-V or short CAM (or CAM-ICU) to confirm diagnosis.	Record and store: diagnosis should be documented in both hospital records and primary healthcare records. Utilise: this information is used to develop a comprehensive care plan Transfer/sharing: refer the person to a specialist dementia diagnostic service; a person's diagnosis of delirium during a hospital stay should be formally included in the discharge summary sent to their GP, and the term 'delirium' should be used Share: provide patient, carer and family, and other support persons with information on cognitive status that is easy to understand	Provide patient, carer and family, and other support persons with education and support about delirium prevention and management, the inclusion of carers and family in monitoring the patients behaviour, encourage their participation in decision-making about investigations, treatment and care, provide people living with dementia with a single named care coordinator, ensure post-discharge support plans in place, and ensure they have access to a memory service or equivalent hospital- or primary-care-based multidisciplinary dementia service	Concerns: none
NICE 2014 [67] UK	Quality standard	Delirium				Concerns: none
NICE 2018 [64] UK	National clinical guideline	Dementia				Concerns: none
NICE 2019 [65] UK	Quality standard	Dementia				Concerns: none
SIGN 2019 [68] UK	National clinical guideline	Delirium				Concerns: none

Note: ACSQHC = Australian Commission on Safety and Quality in Health Care. CAM = Confusion Assessment Method. CI = cognitive impairment. GP = general practitioner. NICE = The National Institute for Health and Care Excellence. SIGN = The Scottish Intercollegiate Guidelines Network.

cognitive screening test is used should be documented in hospital records to improve the transfer of care, handover, referrals, and discharge notes [62]. Cognition information and care plans should be communicated to patients, families, and all relevant healthcare providers (including a GP) in a timely manner and with sufficient detail [17,63,66]. In the UK, it is required that diagnosis should be recorded in both hospital records and primary healthcare records and communicated to a GP, and patients are referred to a specialist dementia diagnostic service when necessary [61,64,65,67].

3.5. Patient interactions

Information about patient interaction in practice was obtained from nine studies (n = 9/22). Patient interaction was valued but was lacking (n = 6) [12,42,48,55,56,59]. Three papers reported the interaction with patients, families, and carers to provide education

and support regarding the diagnosis, prognosis, and management [30,43,50]. Bond and Goudie (2015) [30] implemented a delirium toolkit, where clinicians were required to engage with the patient, families and carers and to explain the diagnosis and discuss risks using delirium information leaflets and posters within 2 h or 24 h if families/carers were not present at the time of diagnosis.

In Australia and the UK, it was specified that patients and their families and carers should be: engaged in discussions regarding their needs and preferences; ensured full participation in decision-making about treatment and care; and provided with training and support, including discharge support [5,17,61–67]. Patients, families, and carers should be involved in clinical handover and encouraged to report any changes in patient behaviours [5,61,63,66]. In the UK, it is required that people living with dementia should be provided with a single named care coordinator who is responsible for planning and coordinating the delivery of an individualised care plan, ensuring that post-discharge support plans are in place, and facilitating access to a memory service or equivalent hospital- or primary-care-based multidisciplinary dementia service [68].

3.6. Patient and carer input

The seven elements were identified in the literature review (screening, recording, storing, reporting, utilising, sharing and referring), and then the eQC Patient and Carer Advisory Board nominated their priorities for quality improvement activities. The results of their nominations are as follows.

- "Screening" ($n = 5$)
- "Reporting" ($n = 2$) and "sharing" ($n = 2$)
- "Recording" ($n = 1$), "utilising" ($n = 1$), "referring" ($n = 1$), and "storing" ($n = 0$)

All but one member selected "screening" as one of the two starting points for quality improvement. Justification for not selecting "screening" in this instance was given on the assumption that screening was already in place.

> *"Screening for cognitive impairment should be a component of admission assessment therefore screening should already be underway."* (Member 4)

The Board felt that a comprehensive admission screening was important to identify patients with a high risk of CI and thus improve patient care.

> *"To identify/assess cognitive status as a first step, and then actively utilise this information during an admission would be a priority for the patient and family/caregivers."* (Member 2)

Two members each thought "reporting" ($n = 2$) and "sharing" ($n = 2$) were important. They felt reporting could increase staff awareness and communication of CI. Also, keeping patients informed was deemed important for promoting patient engagement with their own care and fostering patient-centred care.

> *"Inter-ward and intra-facility transfer documentation could include a mandatory field to identify if there is a history of CI; this too would also facilitate information sharing."* (Member 4)

Three members each recommended "recording" ($n = 1$), "utilising" ($n = 1$), and "referring" ($n = 1$). None of the members recommended starting with "storing", as they believed that a focus on 'storing' alone would not be sufficient to impact patient care. However, "storing" would be a necessary condition for any quality improvement program.

4. Discussion

This review presents a synthesis of current literature on the recognition of CI status, including three key elements: 1) identification of CI, 2) transparency of CI information, and 3) interactions with patients, families, and carers to address CI. Although these three elements are required practices according to the standards and guidelines, such as those from Australia and the UK [62,64], there are indications that they are not being fully implemented.

4.1. Gaps in policy and practice need to be addressed

This review has identified three gaps in practice and policy concerning the recognition of CI status in acute care hospitals.

First, formal cognitive assessment at admission by a trained clinician or using a validated screening instrument can improve adherence to dementia and delirium care guidelines, yet formal assessment is often overlooked [69]. Three studies, for example, reported that cognitive assessment was informal or relied upon the knowledge and experience of clinicians, which could cause the under-recognition of CI [29,45,56].

Second, recording and storing cognition data is crucial for optimising care for people with CI; however, two studies reported that CI information was not recorded or stored in the patient health records [48,56]. Furthermore, all patients with a diagnosis of delirium should have the diagnosis recorded on a discharge summary to be sent to a GP, but some evidence shows this clinical standard is not consistently met [43].

Third, patients, families, and carers have a right to be informed of any diagnosis of CI to facilitate care planning and decision-making [56,62,70]; however, interactions with patients, families or carers appear to be lacking or go unreported despite the importance [43,56].

Some studies were trying to implement quality improvement programs due to a recognition that standards/guidelines were not being met [55,58]. However, there was little evidence to indicate continued service implementation or dissemination to other acute care hospitals beyond these studies.

Given the importance of recognising CI status and providing high-quality, person-centred care, it is crucial to address these identified gaps between current practice and policy, as highlighted in this review. Some key recommendations for improvement are outlined below.

4.2. Standardised admission assessment is necessary for the identification of patients with CI

As recommended by the eQC Patient and Carer Advisory Board, when resources are short in acute care hospitals, screening is the most important area for improving care for patients with CI, followed by reporting and sharing of cognitive information. Unstructured assessment that relies upon clinicians' initiative, GP referrals, or self-reports from patients, families, and carers is prone to errors [29,45]. Current evidence indicates that clinicians' knowledge of CI is generally insufficient for the recognition of CI without a standardised assessment protocol [40,71]. It is likewise unclear whether patients, families, and carers have the ability to provide an adequately clear history for the recognition of CI [72]. GPs, patients, families, and carers are still important sources, however, and should be included in any formal assessment of a patient's cognitive status.

Routine assessment for the presence of CI when admitting

patients who are at high risk can increase the identification of patients with CI. Previous studies showed implementing a system-wide delirium program that incorporated a cognitive assessment tool (e.g. 4AT) as part of a mandatory admission assessment could increase adherence to conducting admission cognitive assessment, thus identifying patients with CI [30,58]. Research also shows that acute care hospitals that use standardised admission assessments tend to have better clinical outcomes for people with dementia [17]. Therefore, it is important to incorporate standardised admission assessments to facilitate the early identification of CI.

Standardised admission assessment may be limited by some barriers including staff shortages, limited staff knowledge, communication barriers, and prioritising patients' wellness and comfort [40,56,58]. Education and training of staff on the use of assessment tools and effective strategies to address these barriers are crucial to support the effective implementation of standardised admission assessment [73].

4.3. A system is required for data transparency across care providers and settings

Data transparency is crucial to improving the quality of patient care and reducing redundant assessments. After the identification of CI, the next step is to ensure that this information is appropriately documented and the patient is linked to appropriate support. Fragmented practice is a key barrier to a streamlined approach to providing comprehensive care to people with CI [56]. The development of an effective system is needed to document the diagnosis of CI in patients' health records and communicate this information to those involved in the care of the patient. Furthermore, it is important to involve all relevant clinicians in reshaping practices, reviewing the adequacy of current forms, procedures, and policies, and securing adequate resources for the implementation of a holistic approach to patient care [74].

In one study, dementia case-finding in acute care hospitals did not necessarily lead to a GP follow-up or referrals for further investigation, nor lead to new supportive services being put into place [59]. Often, neither patients nor their families or carers were informed that a cognitive assessment had been carried out while in the hospital and what the outcomes of such assessment meant in terms of future care and treatment [59]. Additionally, reporting of dementia among older patients admitted to/discharged from acute care hospitals requires closer collaboration/information sharing between primary care, mental health and hospital healthcare services [29]. Effective and efficient processes are needed to facilitate sharing of information across care providers and settings.

Using information technology to support the use of CI information and decision-making can effectively improve the care and safety of hospitalised patients with CI. Boustani et al. (2007) [55] shared their experiences of using a system that integrated active CI screening and CDSS with the existing geriatric service. This CDSS can notify clinicians of the presence of CI at the time of decision-making, thus improving patient safety and care.

4.4. Involving patients, families, and carers is always important

Extensive and systematic involvement of patients, families, and carers is important to support the health care of people with CI. Carers who stay at the patient's bedside can offer reassurance and meaningful activity, monitor for any changes in health and well-being, and maintain the safety of people with CI [62,70]. If it is safe or appropriate to involve families and carers or they elect to be involved, it is important to provide them with support and education [75]. People living with CI value being involved in decision-making about their care [56]. Many people with CI still have the capacity to make decisions, thus relevant laws and regulations should be in place to support their involvement.

The involvement of patients, families, and carers (if appropriate) in patient care and decision-making is mandatory in the UK and Australia [62,65], but this is poorly addressed in practice [43,56]. Common barriers include limited skills in shared decision-making with patients, families, and carers, language barriers, limited time, and staff shortages [56]. Training should be provided to staff including techniques for effective communication and shared decision-making with families, and carers.

4.5. A national approach is essential to promote change in acute care hospitals

Adopting a national approach to improving the identification and data transparency of CI status can promote changes in acute care hospitals. A national approach has many benefits, including developing a broader perspective, facilitating collaborative work throughout the country, and sharing new knowledge and experience [30,76]. NHS Scotland has developed a delirium toolkit, a national improvement program, which has been shown to improve the identification and immediate management of delirium [30]. It is also important to establish a national education strategy that builds on existing education and training programs. Improving care professionals' knowledge and skills about CI alone is insufficient to influence the recognition of CI [77]. Leadership and sustained commitment from policymakers, senior management, and healthcare professionals are all essential to achieving the cultural change that is required to improve the identification and care of people with CI in the acute care hospital setting [17].

4.6. Strengths and limitations

One of the strengths of our study lies in the inclusion of a policy aspect, whereby we conducted a thorough search of grey literature to identify the procedures required by policy and compared them to the actual practices in place. Through this process, we were able to identify a significant policy-practice gap, which underscores the need for more effective implementation of policy to enhance the management of cognitive information in acute care hospitals. Furthermore, we involved patients and carers in the proposal design and interpretation of the findings. By incorporating the perspectives and experiences of those directly impacted by CI, we were able to inform key recommendations for improvement that reflect the needs and concerns of people with CI and their families and carers.

This study also has some limitations. Despite searching citations and querying colleagues in the medical field from the USA and Canada, no mandatory quality standards or guidelines were found for either country. Only national databases were searched due to limited resources, thus some quality standards or guidelines from states or provinces may have been missed. Data transparency was poorly reported in the studies, and contacting the authors (14/17) for further information only resulted in six responses. This may be partly because data transparency was outside the scope of these papers. Future research with a report on data transparency is imperative to improve care for patients with CI. Additionally, this study did not distinguish between delirium and dementia but focused on screening of CI in general. In this integrative review, our primary focus is on CI as a broader concept, encompassing conditions such as dementia and delirium. Given the scope of our research question, we did not allocate specific space to address all types of CI individually. However, it is important to recognise the difference between the two as the use of a wrong screening tool, misdiagnosing and incorrect management can have adverse

consequences. Finally, we acknowledge that our study is focused solely on acute care hospitals and may not reflect the full spectrum of care settings for patients with CI.

5. Conclusion

This review identified gaps between policy and practice regarding the identification of CI and management of cognition information in acute care hospitals. Although recognition of CI, data transparency, and interaction with patients as well as family and carers (if appropriate) are highly valued at a policy level for the acute care setting, in practice, it is poorly addressed. Standardised admission assessment is necessary for the identification of people with CI. A system that incorporates standardised admission assessment and facilitates data transparency across care providers and settings is required to improve the identification and management of CI. A national approach that prompts such a system can promote the necessary changes. This review indicates that no studies have been conducted on the process of data transparency through an episode of care. Most studies only focused on screening, recording or another single element of data transparency. Future studies of high quality are needed to better promote the identification of CI, the process of data transparency throughout episodes of care and communication with patients with CI as well as their families and carers (if appropriate).

6. Implications

Gaps in practice and policy concerning the recognition of CI status in acute care hospitals were identified. With the increasing prevalence of CI and the significant burden it imposes on individuals, families, and society, addressing these gaps becomes crucial to ensure a high quality of care and patient safety. To achieve this, acute care hospitals should consider incorporating cognitive assessment as part of mandatory standardised admission assessments to facilitate the early identification of CI. Additionally, future research is needed to develop a system using information technology to support the use of CI information and facilitate shared decision-making across care providers and settings. Furthermore, the establishment of relevant laws and regulations is necessary to support the active involvement of patients, families, and carers (where appropriate) in patient care and decision-making processes. Adequate staff training is also vital to enhance the use of assessment tools, improve communication, and foster shared decision-making with families and carers. Adopting a national approach is crucial to driving change in acute care hospitals, enabling healthcare systems to provide better support to hospitals in implementing necessary policies and protocols, and allocating resources that enhance the quality of care for individuals with CI. Addressing these aspects comprehensively will contribute to improving the quality of care for individuals with CI.

Ethics approval

Ethical approval was not required for this study as it is a literature review of existing published data.

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CRediT authorship contribution statement

Beibei Xiong: Conceptualization, Methodology, Software, Investigation, Formal analysis, Investigation, Data curation, Writing - original draft, Writing - review & editing, Project administration. **Daniel X. Bailey:** Conceptualization, Methodology, Investigation, Formal analysis, Writing - review & editing. **Paul Prudon:** Conceptualization, Investigation, Formal analysis, Writing - original draft, Writing - review & editing. **Elaine M. Pascoe:** Conceptualization, Validation, Writing - review & editing. **Leonard C. Gray:** Conceptualization, Resources, Writing - review & editing. **Frederick Graham:** Conceptualization, Writing - original draft, Writing - review & editing. **Amanda Henderson:** Conceptualization, Writing - review & editing. **Melinda Martin-Khan:** Conceptualization, Methodology, Resources, Writing - original draft, Writing - review & editing, Visualization, Supervision, Funding acquisition.

Declaration of competing interest

The authors have declared no conflict of interest.

Data availability statement

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

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Appendices. Supplementary data

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