Geriatric nursing-sensitive indicators, a framework for delivering quality nursing care for the older person: A scoping review

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Thesis Abstract

Objective: This thesis aims to explore the concept of geriatric nursing-sensitive indicators (NSIs), which are used to measure care for the older population.

Introduction: By the year 2050, the global number of older people is predicted to double, creating fiscal and practice challenges for nursing. Nursing is the largest workforce in the health sector and is best placed to influence the quality of care received by the older person as system demand increases. Geriatric NSIs provide the opportunity to describe this influence, as they reflect the quality and effectiveness of geriatric nurses when caring for the older person.

Methods: Due to the broad nature of the research topic, a scoping review was considered appropriate. The methods were based on those of the Joanna Briggs Institute, which were in turn informed by Arksey and O'Malley. In addition, a group of context experts were utilised to ensure the conduct of the review was meaningful for clinical staff and policy makers. This thesis outlines the results of a scoping review prepared as a manuscript for publication. The manuscript presented for publication is positioned in chapter four as a continuation of the thesis that outlines the methods and results of the scoping review.

Results: The scoping review was completed, and a manuscript was prepared and submitted for publication. Many indicators were identified that described the nursing care of the older person. In line with the methodology, these were mapped in a variety of ways including Donabedian's Domains and Fundamentals of Care that are existing taxonomies and Specificity which was a novel approach. It was apparent that there was a great deal of inconsistency in the description of the indicators but grouping of indicators through commonality and classification simplified indicator descriptions.

Conclusions: The scoping review identified that concepts associated with geriatric nursing sensitive indicators are complex, and that extracted indicators did not comprehensively reflect contemporary geriatric nursing care. The complexities identified in the scoping review included issues such as lack of indicator definition and consistency, relationships between indicators, methodology for risk adjustment of patient outcomes and performance measurement of indicators.

Contemporary nursing issues were not comprehensively reflected in the extracted indicators. Additional indicators are required to address issues such as the consumer

perspective of geriatric nursing care, nursing hospital avoidance strategies and case management of inpatients.

The achievements of this project extended beyond the mere conduct of a review and subsequent reporting of results. The project provided an opportunity for the lead reviewer to immerse themselves and learn the methodology of a scoping review. In addition, the decision to present the thesis in this form also provided the experience of submitting a manuscript for publication.

Thesis Declaration

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I acknowledge the support I have received for my research through the provision of an Australian Government Research Training Program Scholarship.

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Kim Griggs

Editorial Advice

Acknowledgements

Abbreviations

ACOVE	Assessing Care of Vulnerable Elders
CAG	Clinical Advisory Group
COPD	Chronic Obstructive Pulmonary Disease
FONC	Fundamentals of Nursing Care
HAC	Healthcare-Acquired Complications
JBI	Joanna Briggs Institute
LHN	Local health network
MDT	Multidisciplinary teams
NICHE	Nurses Improving Care for Health System Elders
NP	Nurse Practitioner
NSI	Nursing-sensitive indicators
PCC	Population, concept, context
PICO	Patient, problem or population, intervention, comparison, control, or comparator an outcome
PRISMA-ScR	Preferred Reporting Items for Systematic Reviews and Meta-Analysis – Scoping Review
LTC	Residential aged care facility
RN	Registered nurse
RUG	Resource Utilisation Groups
SAFE	Systems Addressing Frail Elders
SPO	Structure, process, outcome
URTI	Upper respiratory tract infection
USA	United States of America

Chapter 1: Introduction

Background

Population projections for South Australia indicate that the older population (or the number of people over the age of 65 years) will double by the year 2040 in comparison with 2011 demographics.[1] An increase in older persons in our health system has the potential for cascading effects on length of stay, patient injury, rationing of care practices and depleted health budgets.[2]

The recent Royal Commission into Aged Care Quality and Safety continues to highlight systemic failures of clinical governance that have resulted in substandard nursing care. The Commission's interim report summarises the findings of the commission as a 'shocking tale of neglect'.[3] These moments in our national history require reflection, planning and response.

The inclusion of geriatric nursing-sensitive indicators (NSIs) in clinical governance frameworks is one approach to identify and describe the nursing resources, tasks and interactions that deliver the best possible care to older persons and address the findings of the commission. Caring for an older person requires nurses to have advanced clinical skill and knowledge to deliver the best possible care.

When older persons enter a health service, they are admitted with an increased probability of cognitive impairment, frailty and/or complex clinical needs, creating unique challenges for nursing staff in the delivery of quality care. It is estimated that 30 percent of older persons who enter the South Australian Hospital System have a cognitive impairment.[4] Cognitive impairment alters the person's perception of and ability to process information, particularly in unfamiliar surroundings such as a hospital.[5] The medical conditions of older persons who enter a health system may have a degree of complexity and acuity that is the amalgamation of both an acute illness and chronic disease in a single presentation. For instance, an older person who has an acute exacerbation of chronic obstructive airways disease (COAD) may develop an upper respiratory tract infection (URTI) necessitating hospitalisation. The older person may have endeavoured to cope at home for some weeks, becoming malnourished and dehydrated before presenting to hospital. On presentation to the emergency department, the older person has shortness of breath associated with a URTI, as well as being underweight, dehydrated, and delirious, with reduced lower limb muscle mass due to extended limited mobility at home.

This presentation of COAD and URTI in a younger person would typically exclude the accompanying malnutrition, dehydration, delirium, or loss of muscle mass noted in the older person, because the baseline wellness of the younger person exceeds that of the older person. Therefore, the outcomes of the older person (when compared with the younger person) include a longer length of stay; increased probability of falls, pressure injury, urinary tract infection due to dehydration and infrequent toileting; or pneumonia that may result in death, highlighting the frailty of some individuals in the older person cohort.

Some older people are referred to as 'frail elderly'. Frailty is defined as 'a state of decreased physiological reserve and vulnerability to stressors'.[6(p1549)] This vulnerability means that older persons are more likely to experience adverse events, take longer to improve, or be less likely to recover in comparison with other patient groups.[2] Frailty can contribute to the complexity of the older person's chronic state, and this effect has a cumulative effect over time that often delays recovery. Substandard management of care comes at an extensive cost to the patient as well as the health services budget. Therefore, effective, and efficient clinical management of the older person's care is an imperative for all health professionals, as well as those in management. To ensure effective and efficient management of clinical care nursing staff require knowledge, skills and a positive attitude towards ageing when caring for older persons. These nursing attributes should be described and measured to guide nursing policy makers, education programs, managers, clinicians, and consumers in the expectations of quality geriatric nursing care and practice improvement initiatives.

Nursing-Sensitive Indicators

Nursing-sensitive indicators (NSIs) are not a recent consideration and describe the nursing contribution to clinical care. The concept first appeared in the work of Florence Nightingale in the 1800s. Nightingale was the 'architect of professional nursing' who 'studied nursing statistics to understand the impact of nursing care on patient outcomes'.[7(p195)] The nursing profession has developed Nightingale's work through the advancement of nursing measures that describe issues such as staffing, nurse education, basic care tasks and wanted or unwanted patient outcomes.[8] There is limited agreement in the literature regarding definitions and concepts of NSIs, or on the relationships that exist between the indicators. In broad terms, NSIs

are viewed as 'those indicators that capture care or its outcomes most affected by nursing care'.[8(p2471)] Considerable academic endeavour has resulted in projects such as the American Nurses Association Nursing Safety and Quality Initiative in 1994 and the California Nursing Outcomes Coalition 2000, both of which developed the concepts of NSIs.[9] Indicators specific to the care of the older person by multi-disciplinary teams in a hospital setting have been developed through the Assessing Care of Vulnerable Elders Quality Indicators Project. However, this body of work does not specifically describe nursing care.[10] Geriatric NSIs have been developed to support consistent quality care for older people. This is in recognition of the fact that substandard nursing care of older people has significant implications for the person at the centre of the care, their family, the nursing workforce, and the healthcare organisation.

Review Problem

For senior nursing staff in Local Health Networks (LHNs), nursing care for older persons and corresponding health outcomes across our services are ongoing concerns. Within my network, there are more than 1,000 acute hospital beds, over 200 sub-acute beds and transitional community aged care more than an additional 200 beds. With over 1,400 inpatient beds and an estimated 840 older persons on any given day in an inpatient bed, how to deliver consistent quality care of the older person should be a core component of every healthcare worker's professional knowledge and skills.

One of the challenges for my LHN and other large complex health services is the capacity to provide consistent quality geriatric care regardless of a consumer's location in the health service. Executive and clinical nursing leaders, therefore, require a mechanism to describe, evaluate and improve care of the older person at an organisational, program, unit, and patient level across all health service delivery settings.

This thesis reports on a scoping review designed to locate and describe the international literature relating to geriatric NSIs and summarise how nursing measures are utilised to evaluate and improve care of the older person. The specific question of this review was 'What definitions and key concepts of nursing-sensitive indicators are identified in the current literature that are relevant in evaluating nursing care of the older person?'

Thesis Outline

The thesis is organised as follows.

Chapter 1: Introduction

This chapter outlines the historical work undertaken in the area of NSIs and the importance of identifying NSIs specific to the older person. The scoping review (and accompanying background detail) describes some of the challenges for older people entering the health system and the importance of performance measures in describing care of the older person.

Chapter 2: Literature Review

A review of the current literature, which includes a summary of NSIs and the clinical context in which they are applied.

Chapter 3: Methodology

An overview of scoping review methodology including its history, correlations and comparative methodologies between systematic and scoping review methodologies is outlined in this chapter.

Chapter 4: Manuscript

This chapter includes the manuscript for 'Geriatric nursing-sensitive indicators, a framework for delivering quality nursing care for the older person: A scoping review', submitted to the Journal of the American Geriatrics Society for consideration (October 2020).

Chapter 5: Discussion

This chapter outlines the manner in which the key concepts surrounding geriatric NSIs emerged, as well as potential implications for practice and research.

Conclusion

The premise of the scoping review is that the care of the older person is complex and requires specialised nursing care. Additionally, it is important to recognise potential growth in the numbers of older persons who will enter the health system by the year 2050, which has the potential to overwhelm the nursing workforce and the healthcare budget. The increase in numbers of older persons entering the health system and the corresponding impact on the health budget highlight the value of establishing a mechanism to measure and maintain the quality of geriatric nursing care.

Chapter 2: Literature Review

Introduction

A search of the literature was undertaken to summarise the challenges facing older persons and nursing staff in the delivery of quality geriatric nursing in current and future health systems.

 Throughout the literature, the predominant issues were

- the unique health issues facing the older person when entering the health system,
- the need for innovative practice to meet the growing number of older persons,
- NSIs as a concept, and
- the application of NSIs to improve care.

An overview of the issues identified in the review is outlined below.

The Older Person and the Health System

The literature suggests that several factors need to be considered when addressing issues pertaining to older people in the health system. These include the intrinsic factors that influence the wellness of the older person, the ability of nursing staff to deliver quality geriatric care, and the systems in which nursing practice is embedded. As older people enter a health service, they bring with them unique intrinsic vulnerabilities linked to geriatric syndromes and chronic disease, such as diabetes, hypertension and dementia. Geriatric syndromes encompass conditions such as frailty, urinary incontinence, falls, delirium, and pressure injury.[11] The Landon Centre on Aging (which is composed of experts in the field of interdisciplinary care of older people) acknowledge that nurses have a significant role to play in the management of geriatric syndromes.[11] They suggest that care focused on geriatric syndromes is 'smarter care' and is essential for the delivery of efficient and effective healthcare.[11(p216)] However, Morella-Herrera et al.[12] suggest that it is 'difficult to discern the specific effect attributable to' nursing when working in multidisciplinary teams.[(p290)] How well the nursing role is defined and evaluated within multidisciplinary teams addressing geriatric syndromes is crucial because without this definition, the unique contribution of nursing will remain unstated.

Frailty is a contemporary geriatric syndrome and is of increasing interest to healthcare providers. As such, it warrants additional discussion. Between 2001 and 2014, the global rate of frailty has increased from 4.9% to 27.3%.[12] Frailty increases the likelihood of adverse events for those entering a health service.[12] The prevalence of frailty has significant implications not only for older people, but also for the nursing workforce. To quantify the existence of frailty, a frailty index was developed by Rockwood and Mitnitski[13] and has informed many other frailty indexes such as the Clinical Frailty Scale and the Edmonton Frailty Scale. Within the parameters of the index, 'the presence of three or more of the following components: unintentional weight loss, fatigue, weakness, decreased walking speed and low physical activity level' is indicative of frailty.[11(p214)] Rockwood and Mitnitski[14] suggest that the presence of one or two of these components indicates that the older person is in a pre-frailty state. On admission to a health service, it is also suggested that nursing personnel should apply frailty assessment indicators for older persons.[12(p390)]

The role of the nurse on admission is vital in identifying geriatric syndromes by incorporating routine screening of patients 65 years and older. A number of initiatives have been undertaken in health services such as the Dementia Care in Hospitals Program, which highlights the need to screen older people for delirium, dementia, or cognitive impairment on admission.[4] For those persons with a cognitive impairment, it is suggested that there is a tenfold increase in death, slower recovery rates and an increased likelihood of hospital-acquired complications.[15]

Current practice in Australian hospitals involves the screening of patients for the risk of falls and pressure injury, while the identification of frailty or cognitive decline is poorly recognised.[16] Admi [17] suggests that when older persons are admitted to hospital, this is often followed by the risk of an 'irreversible decline', further highlighting the need for risk screening on admission.[(p1)]

Arora[10] suggests that 'defining quality in a medically, functionally, or cognitively impaired frail older patient is a difficult undertaking because of the medical complexity of these patients'.[(p1705)] This complexity is in part due to the presence of concurrent geriatric syndromes and chronic disease, which necessitates skilled geriatric nursing care to ensure quality patient outcomes. Geriatric NSIs are required to define, measure, and evaluate the nursing management of geriatric syndromes across all clinical settings.

Nursing Knowledge and Skill

It is clear from the issues discussed thus far that the care of the older person is complex and requires specialist nursing skills to be delivered with sufficient quality. For a Registered Nurse (RN) to deliver long-term care, they should possess skills relating to indirect care tasks such as coordination of care, care planning, monitoring of care and supervision of less skilled staff.[18] It is suggested that competence, confidence and leadership are needed to take on roles in long-term care.[19] In contrast, the acute care RN is often involved in the delivery of direct care; however, the concepts of competence, confidence and leadership are relevant to all nurses, regardless of setting.

Dahlke[20] suggests that graduate nurses are ill prepared to care for the older person and lack the competency required to deliver quality geriatric nursing care. Kiljunen[21] indicates that competence is a result of the individuals ability to acquire additional knowledge and skills, accompanied by their internal beliefs and values. The development and measurement of these attributes (both in the education and work environments) is essential to the delivery of quality care of the older person. Geriatric NSIs are needed to describe and highlight the unique training needs and skills required to deliver quality geriatric nursing care. Specialist skills and education alone are insufficient to deliver sustainable healthcare. An innovative integrated workforce and supportive organisational structures are required alongside education and training to meet the demands of the older person.

Nurse Practice Environment

There are multiple factors that influence the quality of care which an older person receives. So far, the literature review has highlighted the importance of both the intrinsic factors of the older person and the education of staff who influence patient outcomes; however, the nurse practice environment is of equal importance. Aitken[22] suggests that 'care environments must be optimised alongside nurse staffing and education to achieve high quality of care'.[(p223)]

The care environment is influenced by multiple factors, including people, organisational perspectives, and system integration. Pearson[23] suggests that a healthy work environment is one that delivers preferred outcomes for both consumers, staff and the broader organisation concurrently. Healthy work environments have been noted to improve older persons' length of stay and re-

admission rates and patient/family satisfaction.[24] There have been a number of examples of organisational or system supports, including Older Person Nursing Programs (which is similar to Nurses Improving Care for Health System Elders; NICHE), the Systems Addressing Frail Elders (SAFE) care model and dedicated geriatric resource nurses that deliver better care for older persons in hospital.[25,17,4] The journey of the older person through the health system often requires a transition from one health context to another. It should be noted that transition programs which monitor and support the movement of an older person through the health trajectory are of vital importance in the quality of their care. These movements within the health system are often challenging and characterised by a high risk of injury.[25] All organisational and system supports for the delivery of geriatric nursing care require geriatric NSIs to describe their effectiveness and capacity to keep patients safe.

Innovative Practice

The predicted rise in the number of older persons entering the health system will have a significant impact on both the older person, the nursing workforce, and the healthcare budget. Innovative nursing models and integrated systems to support the nursing workforce in delivering quality care to older people are necessary to meet the predicted demand.

Staffing models

The importance of the RN role, stability of the workforce, time at the bedside and satisfaction of staff were some of the staffing issues identified in the literature. Many scholars explored correlations between staffing and patient outcomes, particularly in long-term care.

Other researchers, such as Dellefield,[26] have looked beyond patient outcomes and asked academics to consider the positive impacts of registered nurse hours on improvement in quality and efficiency of the long term care. Researchers such as Horn[27] have undertaken studies that satisfy Dellefield's imperative. Horn's[27] retrospective quantitative study explored RN hours and patient outcomes in long-term care. Horn[27] concluded that, in the context of long-term care, direct care by RNs for '30 to 40 minutes per resident per day' saw the greatest reduction in adverse patient outcomes.[(p62)]

Adverse events often have an associated healthcare cost, whether direct (e.g., surgical repair of fracture following a fall) or indirect (e.g., increased length of stay).

No studies were identified that estimated the cost of adverse events compared with the cost of additional staffing resources or alternative staffing models designed to prevent adverse events.

The review of the current literature identified that studies are required across multiple settings to determine cost-effective nursing models that can deliver quality geriatric nursing care and maintain patient safety. Harris[11] suggests that 'understanding the value of health improvement from an economic standpoint provides a strong rationale for improved resource allocation to health and health-related resources'. [(p222)] Future nursing models which consider the economic value of adverse event prevention when caring for older persons are required. Geriatric NSIs can be applied to describe and monitor staffing models and the associated patient and fiscal outcomes, allowing for a more objective evaluation of effectiveness.

Scope of practice

Globally, the number of general physicians is declining.[28] General practitioner availability in an Australian context is of particular concern and authors suggest that in developing countries, where it is reported that 60% of the worlds current ageing population resides, a greater shortfall exists.[24] Nurse practitioners (NP) or advanced practice nurses with a geriatric speciality are a potential solution.[29] Lovink[30] suggests that NPs in conjunction with personal care assistants are a 'feasible' substitute for physicians in long-term care.[(p2098)] The scope of practice and preferred patient outcomes for NP interventions require definition and clarification through geriatric NSIs specific to the role.

Nurse-led clinics

Not all nurses are required to work in an extended scope of practice; they may also work within a nursing role of greater autonomy. Nurse-led clinics are one example of such autonomy, though they require extensive supervisory, and system supports to ensure patient safety. Harris[11] suggests that there is opportunity for nurse-led clinics to address frailty and geriatric syndromes. Evaluation of such clinics would require geriatric NSIs in conjunction with longitudinal studies to validate effectiveness.

Integrated care

Expanding the scope of practice for nursing staff is an essential step towards building the health system's response capacity to meet the needs of older people. However, an integration of nursing and health services is also required. Older

persons often have multiple health conditions, necessitating treatment and care from various health services. The degree of fragmentation of these health services is the premise for 'integration of care', or the development of connection between services.[31] The World Health Organisation suggests that integrated care is necessary to strategically manage the increasing number of older persons predicted to enter the health system.[32] Mittinty[31] supports this view indicating that integration of health services is needed to provide a safe and sustainable health system. There is a need for descriptions and measurements that can quantify the role, effectiveness, and professional contribution of nursing staff in integrating healthcare systems.

The Concept of Nursing-Sensitive Indicators

The literature review identified a small number of studies that focused on the theoretical concepts of NSIs, while many papers explored NSIs for speciality areas or areas of practice that were not specific to geriatrics.[33] No studies explored the theoretical concepts of geriatric NSIs. Many studies considered NSIs for settings predominantly occupied by older people, such as long-term care, medical wards and community aged care.

Theory

According to Heslop,[8] a 'theory comprises concepts, definitions and propositions', and she explores all three theoretical elements of NSIs, but not in a geriatric context. [(p2477)] Heslop has also suggested that considerable progress has been made in the theory of NSIs with increased validity and reliability in the evaluation of nursing practice.[8] However future endeavour in the area of NSIs is required, particularly as NSIs and their utility in health analytics remains minimal, leaving nursing value 'invisible'.[8]

For those studies that explored individual indicators or quality of care, NSIs were discussed in the context of Donabedian's quality model. Donabedian's theory suggests that quality measures 'must be translated to more concrete representations that are capable of some degree of quantification'.[34(p1747)] The concrete representation cited by Donabedian is embedded in the structure, process and outcome elements commonly referenced in the included papers.[34] These elements can be applied to clinical practice with relative ease to organise nursing sensitive indicators. Structural elements include systems or resources that support practice such as education, policy development or staffing indicators, process elements

include tasks undertaken by the nurse such as personal care, mobilisation or feeding assistance indicators and outcome elements such as falls, pressure injuries or consumer satisfaction indicators.

Specialty areas

Stalpers[35] has stated that NSIs are 'widely used to evaluate the quality of nursing care'.[(p5)] The breadth of literature available on the topic of NSIs would support this assumption. NSIs were noted across several speciality areas such as emergency departments, ambulatory care and other high acuity areas.[36,37,38] According to Cooper, 500,000 older people in the United Kingdom receive community care, though there are limited studies or indicators to monitor the quality of care or carer wellbeing.[39 (p603)]

Practice areas

Nurse staffing or structural indicators and patient outcome indicators had significant representation in the literature, but few papers explored the process of care.[9, 40] NSIs that focused on a particular aspect of care were noted in the literature, with indicators such as failure to rescue, falls, pressure injury and restraint being of particular relevance to the older person.[41,42] Contemporary healthcare topics, such as the capacity of the patient experience to describe NSIs, emerged in the literature,[43] while broad overviews of nursing indicators were also present.[44] Limited papers focused on risk adjustment of patient outcome measures.[45, 46]

Application of Nursing-Sensitive Indicators

The practical utility of NSIs was noted in many papers and took on varying forms, including national databases, organisational dashboards and website-based data dashboards for consumer comparison. The American Nurses Association has progressed the dashboard concept to implement the National Database of Nursing Quality Indicators, and this database was noted in a number of papers.[47,46,33] Various papers referred to NSIs being incorporated into organisational dashboards, characterising NSIs as a mechanism to support robust governance.[48, 49] Grajewski[50] and others have indicated that statistical approaches such as Bayesian modelling are of particular relevance to the application of NSIs when measuring nursing performance, but suitably qualified staff are required to apply these approaches. Benchmarking of indicators across services was also mentioned, providing an additional resource for clinician accountability.[51]

More contemporary projects utilised NSIs to inform web-based tools to provide public visibility of indicators and so allow for informed consumer choice.[52] The use of NSIs to provide financial incentives for performance is reminiscent of recent changes in Australia, where the introduction of hospital acquired complications funding penalties was noted.[53]

Conclusion

The older person's healthcare needs are complex, and unique skills are required to provide nursing care to this patient group.[21] The literature does not provide a current concept analysis of geriatric NSIs, but does include studies that outline nursing indicators of care for various clinical environments in which an older person may receive care. The predicted future demographics of older persons will place significant pressure on the healthcare system and require geriatric NSIs to ensure that quality geriatric nursing care is delivered consistently, regardless of the demand and clinical setting. The next chapter discusses the methodological approach used for the systematic review.

Chapter 3: Methodology

Introduction

Scoping reviews are becoming increasingly popular as an enquiry method which can summarise available literature on an area of interest. The scoping review methodology is a relatively new approach when compared with the systematic review methods that emerged in the early 1970s.[54] However, with the dominance of evidence-based practice, the need to diversify review approaches has resulted in increasing acceptance of scoping reviews. The methodology necessary to undertake a scoping review is outlined throughout this chapter, alongside a comparison of this approach with systematic review methodology.

As pioneers of the scoping review, Arksey and O'Malley[55] provided the review process with a methodological definition and structure. Conceptually, they describe the systematic, scoping and traditional literature reviews as a 'set of tools'. Scoping reviews 'aim to map rapidly the key concepts underpinning a research area', in contrast to the systematic review, which is focused on a definitive question.[56(p134)] Systematic and scoping reviews have discrepant objectives and methodologies.[55] Systematic review methodology is highly structured and prescriptive, whereas the scoping review is flexible and iterative.[57] Further contrasts are found in the systematic review's critical appraisal, meta-analysis, and synthesis of scholarly papers, compared to the scoping review's mapping of data, iteration of concepts and narrative summary (Table 1).[58]

It should be noted that some academics consider these contrasts to indicate that the scoping review is less reputable than the systematic review.[57] However, not all authors consider this to be the case, with Peterson[57] suggesting that 'scoping reviews should not be considered a less rigorous version of systematic reviews; rather scoping reviews have a different purpose and objectives'.[(p14)] It has also been suggested that the scoping review should be undertaken as a first step towards a 'larger endeavour' such as the systematic review or primary research.[57(p14)] To ensure the integrity of a scoping review, a robust methodology is required.

Table 1. Sucharew's [58] comparative table of systematic and scoping review elements.

Elements	Systematic Review	Scoping Review
Purpose	Provide empirical evidence that meets pre-specified criteria	Provide a narrative or descriptive account of available information
Research question	Specific, focused on a single issue	Broadly defined
Study protocol	A priori	A priori and post hoc
Search strategy	Explicit and transparent	Explicit and transparent
Study selection	Restricted to certain study types, meeting quality standards	All study types, nonstandard sources of information
Inclusion/exclusion criteria	Developed at the protocol stage before the review is conducted	Informed by the review process, applied at the study selection stage
Data extraction	Well-defined process for extracting information relevant to evidence synthesis	Data charting according to key general themes
Bias assessment	Mandatory critical appraisal	Optional (but desirable)
Results	Formal synthesis of findings	Overview of the literature and general themes emerging from the review

Scoping Review Methodology

The strength of the scoping review is in its capacity to broadly summarise and iterate its findings. The iterative nature of the scoping review relies heavily on the experience and capacity of the reviewer to discuss, analyse, and respond to the concepts identified in the literature. Quite often, scoping reviews are undertaken within a team, and this collective response requires the appropriate structure to plan and conduct the scoping review. Commonly, this is formalised in an a priori review protocol at the beginning of the study. Systematic review protocols are stored in international registries such as PROSPERO, while scoping review protocols are listed in registries such as Open Science Framework, Figshare and ResearchGate. The structure of a systematic scoping review will now be discussed.

Review aims

As mentioned earlier, the purposes of systematic and scoping reviews are different. The systematic review aims to answer a 'well defined question' and the scoping review aims to map a well-defined 'field of interest'.[55(p4)] Therefore, it is important to outline the intent of a scoping review to guide discussion and critical decision-making as scoping review iterations progress. Broad aims of a scoping review can include the following:[55(p6-7)]

1. 'To examine the extent, range and nature of research activity'
2. 'To determine the value of undertaking a full systematic review'
3. 'To summarise and disseminate research findings'

4. 'To identify research gaps in the existing literature'

Aims one and two are appropriate for the scoping review to pre-empt a full systematic review, while aims three and four are more commonly associated with scoping reviews that do not transition onto a systematic review. Where possible, it is valuable to determine whether the scoping review is to be an independent body of work or a transition step to a systematic review at the commencement of the review project. However, it should be noted that these statements are broad, and, at times, systematic and scoping reviews may address aims three and four, even though these are not the primary objectives of the systematic review.

Defining the review objective

The review objective is essential to the design and development of the review. JBI uses the PCC (population, concept, context) mnemonic to develop scoping review objectives, due to the broad nature of such reviews.[59] The PCC mnemonic is unique to JBI and differs from the traditional PICO (patient, problem or population, intervention, comparison, control or comparator and outcome) mnemonic developed by Richardson for systematic reviews.[59] The 'intervention' and 'outcome' elements are less relevant to scoping reviews than the other elements of the PICO, due to the broad nature of such reviews. As such, they are not included in the PCC.[59] The intent of the PCC and a description of its elements are outlined below.

Participant: 'Participant' outlines the population to be included in the review. Criteria for participants may include demographics such as nationality, sex, academic qualifications, lived experience or age. With regard to age, definition of 'aged' may require reference to national or international guidelines. This element is the same as the 'P' of 'PICO', which is utilised within systematic reviews.

Concept: The concept provides the focal point of the review and is a significant point of difference when compared with the systematic review. The objective of a scoping review is to provide an overview of the literature for a particular area of interest. Concepts are therefore pivotal to this objective, as they form the building blocks of the review. However, systematic reviews do not incorporate this focus in their methodology, as their purpose is to answer a defined question and propose critically appraised recommendations for practice.

Deliberations on the concepts that should be included in the review may be extensive and require extended periods of time for the reviewers to reach a

consensus. However, these conclusions may be challenged as the review progresses, and are reshaped as new information and ideas emerge from the included papers.

Context: As in the case of 'participants', 'context' allows for a definition of the depth and breadth of review boundaries, and facilitates the development of a manageable, focused review. Criteria such as geographic location, clinical setting or time period can serve to define a review's context. It is of the utmost importance to select/ define broad context criteria. If the context criteria are overly restrictive, the iterative nature of the review can potentially be stifled. It should be noted that the development of context may not be a static process. As papers are identified and considered for inclusion, the context may be reconsidered. This allows for iteration of the context and expansion of the scoping review boundaries if required. All iterations necessitate critical decision-making and collaboration of the review team to ensure the review's integrity. In contrast, the systematic review does not allow for this iteration or expansion of the review boundaries and finds its integrity in rigidity of process.

Identifying the review question

Arksey and O'Malley[55] note that for any scoping review, 'the starting point is to identify the review question to be addressed as this guides the way that search strategies are built'.[(p9)] The review question should reflect the scoping review objective(s). Both the objective and the review question are to be embedded in the review title. Levac, Colquhoun, and O'Brien [60] suggests there is a synergy and correlation that exists between the review title, question and objective. This synergy is pivotal as it contributes to the design of the scoping review, providing direction for decision-making and resolution of discussions as the review progresses.[60] The importance of the objective, review question and title is common between both scoping and systematic reviews. However, the nature of the review question provides a point of methodological distinction; systematic reviews ask specific, narrowly focused questions, while scoping reviews ask questions that are expansive and broad.

Identifying relevant studies

The effectiveness of the scoping review is reliant on a structured search of the literature.[54] A three-step search strategy is utilised, including initial search, full search, and confirmation of search effectiveness.[59]

Before the search of the literature can commence, the identification of key words is necessary. Key words are informed by the review question and objective. The aim of the limited search is to identify existing reviews and/or the prevalence of scholarly papers for consideration, and to draw a conclusion as to the feasibility of the scoping review. The search involves the key words in conjunction with a generally small number of academic databases. Boolean operators are determined to ensure that the search is both inclusive of relevant papers and exclusive of unrelated papers. With the search complete, additional key search words established and the feasibility of the scoping review confirmed, the extended full search of the literature can progress.[59]

The extended full search of the literature involves multiple academic databases, such as the Cumulative Index of Nursing and Allied Health Literature, the Cochrane Library, Embase, the Joanna Briggs Library of Systematic Reviews, PubMed, ProQuest Dissertations and Theses, and Scopus that include both published and unpublished papers. Unpublished papers were considered in view of their association with academic institutions such as dissertations; editorial papers were not considered. The search strategies of systematic and scoping reviews bear similarities, although their approaches to the selection of papers are dissimilar.

Study selection

The nature of the scoping review necessitates extensive dialogue and critical decision-making to reach a consensus on paper inclusion. A collaborative team approach is necessary to consistently align and consider the inclusion criteria when undertaking paper selection. In the absence of a critical appraisal of papers, the review team must ensure the review's integrity. In addition to analytical reasoning and collaborative discourse, the team's 'increasing familiarity' with the considered papers contributes to effectual study selection.[55(p14)]

Study selection is based on a pre-determined inclusion criteria. The process however not always straightforward and often relies on dialogue and consensus between reviewers. It is recommended that a minimum of two researchers review the title and abstracts from identified papers, excluding those which do not meet the inclusion criteria. Levac, Colquhoun, and O'Brien [60] suggest that full texts of papers should again be reviewed by a minimum of two researchers, who can make final decisions on inclusion.

An examination of the reference lists of included papers is undertaken to establish whether additional papers can be identified.[59] If a significant number of papers are identified in the reference lists of included papers, the effectiveness of the search strategy should be reviewed.

To ensure transparency of process, the scoping review study selection should be outlined in a Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) extension of Scoping Reviews (ScR) flow chart.[61] Although there are some minor differences in the application of the PRISMA-ScR to scoping reviews and systematic reviews, the study selection process is identical for both types of reviews. The most significant and overt difference between scoping and systematic reviews is in the next step. In the case of a systematic review, an assessment of methodological quality is performed. Most scoping reviews do not undertake assessment for quality and move to extracting data from included studies. The inclusion criteria and the capacity of the papers to address the review objective/question are essential guides for study selection. The inclusion criteria provide the stabilising elements of the paper selection and guide the scoping review team in consistent reproducible selection.

Charting the data

Charting is described by Arksey and O'Malley[55] as a qualitative process of 'sifting, charting, and sorting material according to key issues and themes'. [(p15)] As an initial step in the charting process, the main findings and concepts of the included papers are summarised in a table, in order to inform the narrative of the scoping review. A data extraction tool is required to provide structure to the 'descriptive-analytical method of narrative'.[55(p16)] This tool is developed to align with the requirements of the JBI scoping review manual.[59] The tool allows for the concepts within individual papers to be identified, grouped and understood as a collective, rather than as the disconnected elements of singular papers. This process contributes to the reproducible aspect of the research, providing consistency and integrity. As such, it bears similarities to systematic review processes, although the two approaches are directed towards different goals. The goal of a scoping review is to summarise existing content in the literature, while systematic reviews aim to use meta-analysis or 'specific statistical techniques' to answer a specific question.[55(p16)]

Collating, summarising, and reporting the results

Arksey and O'Malley[55] suggest that the 'key strength of the scoping study is that it can provide a rigorous and transparent method for mapping areas of research'.[(p23)] How this information is then presented to provide a 'flavour of the main areas of interest' is crucial.[55(p18)] Multiple analysis can be conducted for each of the extraction tool criteria to build a narrative or overview. Representation may be in the form of tables, diagrams, numerical data and other descriptive mechanisms. The representation of findings and results should be in a format that is meaningful for the reader and should consider the audience during development.[55(p23)]

Consultation

Oliver suggests that reviews can benefit from a clinician's involvement in the scoping review.[62] A Clinical Advisory Group (CAG) can be established to guide decision-making for more controversial aspects of the scoping review that necessitate expert clinical direction.

Conclusion

The scoping review methodology is far from inferior to that of the systematic review, but the methodologies of each approach are clearly influenced by different objectives. The systematic review aims to extract an answer and the scoping review to describe a narrative. While these formative differences exist, the continued debate over the validity of the two methods will most likely continue. However, with persistent reliance on the scoping review by clinicians and academics, the value of the iterative narrative may be fully embraced. The next chapter provides the scoping review manuscript that has been submitted for publication.

Chapter 4: Manuscript

Publication Statement
We certify that this work is novel as it provides a unique summary of literature that is related to nursing-sensitive indicators specific to geriatrics across the care continuum. The findings and mapping of indicators in the scoping review have the potential to inform policy development, performance monitoring and subsequent practice improvement for nursing care of the older person. The scoping review provides a platform for future research to strengthen frameworks that describes quality geriatric nursing care. For the purposes of the thesis, the manuscript tables are incorporated into the thesis table numbering, the manuscript supplemental tables are repositioned as appendices at the end of the thesis and the manuscript reference list is included within the thesis reference list.

Geriatric nursing-sensitive indicators, a framework for quality nursing care of the older person: A scoping review

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Contribution to the Paper	Concept and design, data mapping, data interpretation, preparation of drafts, revision of manuscript for intellectual content and approval of final version for publication.
Overall percentage (%)	70%
Certification:	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature and is not subject to any obligations or contractual agreements with a third party that would constrain its inclusion in this thesis. I am the primary author of this paper.
Signature	Date 17/12/2020

Co-Author Contributions

By signing the Statement of Authorship, each author certifies that:

i.   the candidate's stated contribution to the publication is accurate (as detailed above);

ii.   permission is granted for the candidate in include the publication in the thesis; and

iii. the sum of all co-author contributions is equal to 100% less the candidate's stated contribution.

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Please cut and paste additional co-author panels here as required.

Abstract

Objectives: To locate and describe literature relating to geriatric nursing-sensitive indicators and their use in evaluating care of the older person.

*Design***:** Scoping review of quantitative and qualitative literature.

Participants: Studies focused on measures that describe nursing care of the older person or persons over 65 years of age.

Setting: Studies were sought in which the clinical setting included medical wards, residential settings, or a stated older person setting/context (such as geriatric wards), or where the focus was on older persons. All study types were included except expert opinions and editorials.

Measurements: We searched CINAHL via EBSCOhost, PubMed, Scopus, Embase, the Cochrane Library, the Joanna Briggs Library of Systematic Reviews and ProQuest Dissertations and Theses. The reference lists of all identified papers were searched for additional papers. All considered papers were screened for eligibility by at least two authors.

Results: A search of the literature identified 35 papers for inclusion. Papers included acute (n=7), long-term care (n=26), and community (n=2) settings. There were 131 nursing-sensitive indicators identified in relation to care of the older person; these were derived from 364 descriptors. Indicators were then mapped using three taxonomies to summarise indicator types. Indicators reflecting contemporary nursing, such as nursing-initiated avoidance strategies, inpatient coordination, and consumer perspectives, were limited. Key concepts identified in the literature were as follows: (a) geriatric nursing-sensitive indicators are complex, (b) geriatric nursing-sensitive indicators describe nursing practice, (c) inconsistent indicator descriptions and lack of definition limit the utility of NSIs, (d) dynamic relationships exist between indicators and (e) risk-adjusted patient outcomes are important to accurately describe geriatric nursing practice.

Conclusion: There are a large number of geriatric nursing-sensitive indicators that describe the effectiveness and quality of geriatric nursing care. Future studies should be conducted with the purpose of standardising indicator descriptions, articulating the associations between indicators, and developing new indicators that reflect contemporary geriatric nursing and the perspective of older people.

Keywords: nurse-sensitive outcomes; nursing quality indicators; nursing-sensitive indicators, older person.

Introduction

Care of the older person in today's health system requires enterprising nurse leadership to accommodate emerging shifts in the health landscape.[63] By the year 2050, the global number of people over the age of 60 years is predicted to double to 2.1 billion, creating challenges for the health system and for older people.[64] A mechanism is required to ensure that the older person receives quality nursing care when entering a health service regardless of the service demand. Geriatric NSIs are an important mechanism to support quality nursing care for older people. According to Heslop,[8] NSIs are measures that describe 'care or its outcomes most affected by nursing care'.[(p2471)]

NSIs are currently utilised across healthcare organisations in various forms such as dashboards, audit criteria and quality measures. However, NSIs are not routinely identified as having geriatric or non-geriatric attributes, restricting organisational capacity to evaluate the quality of geriatric nursing care. The identification and implementation of geriatric NSIs provides an opportunity for organisations to minimise the prevalence of adverse events, improve the patient experience and negate unnecessary financial penalties for older persons in the health system. Nursing is the profession most likely to influence care of the older person. The effectiveness of that care and its associated measures are essential to provide a robust governance mechanism for quality care, and this is the focus of this review.[43]

Multiple terms are used to describe individuals in our society who are over the age of 65. 'Older person' is the term adopted by the General Assembly of the United Nations, and is reflected in the United Nations Principles for Older Persons.[65] 'Geriatrics' is a historical word used to describe a speciality area of healthcare where care of the older person is the focus. Throughout this scoping review, both the terms 'older person' and 'geriatrics' are utilised. It should be noted that some individuals experience aging younger than 65 years depending on co-morbidities, societal and geographical influences.

If an older person enters the health system, they are more likely to develop a healthcare-acquired complication such as delirium, pneumonia, urinary tract infection or pressure injury, particularly if they have a cognitive impairment.[2] This is in part reflective of existing patient vulnerabilities, but can also be indicative of

ineffective health system interactions. The frequency of interactions between a nurse and a patient is significant when compared with the number of other patient/clinician interactions. A mechanism is required to evaluate these interactions and identify opportunity for practice improvement. NSIs provide the opportunity to establish such a mechanism.

However, NSIs are not routinely identified as having geriatric or non-geriatric attributes, which restricts capacity to evaluate the quality of geriatric nursing care. The identification and implementation of geriatric NSIs underpins organisational efforts to minimise the prevalence of adverse events, improve the patient experience and highlight the value of quality geriatric nursing care in the healthcare system. It is the intent, therefore, of this review to identify geriatric NSIs and understand their capacity to describe quality geriatric nursing care.

It is noted that considerable progress has been made internationally in the implementation of geriatric quality indicators, with work such as the Assessing Care of Vulnerable Elders (ACOVE) Indicators Project, InterRai and Nursing Outcomes Classification[10,66,67] Due to the multidisciplinary nature of the ACOVE Project and InterRai, papers focussing on these projects were not included. In undertaking the database searches, two systematic reviews were noted; however, their content was not such as to make a scoping review unnecessary. Both systematic reviews involved residential aged care settings and did not overlap the breadth of topics covered by this scoping review, which encompassed geriatric NSIs regardless of setting.[68, 69] The importance of providing a review of all settings can be found in the ecosystem perspective of healthcare. The benefit of viewing nursing from the ecosystem perspective is that it allows considerations for innovation opportunities and service integration, incorporating the complete patient journey. Uniquely, this scoping review provides an opportunity to understand vacuity in the literature on geriatric NSI measures across multiple clinical settings. An a priori review protocol was prepared and published prior to undertaking the scoping review (Appendix A).[70]

The specific review question is 'what definitions and key concepts of nursing-sensitive indicators are identified in the current literature which are relevant in evaluating the nursing care of the older person'.

Methods

To ensure the integrity of the scoping review, the JBI Methodology was adopted to guide the structure and process of the review.[54]

Inclusion criteria

This scoping review considered studies that included nursing staff across multiple settings (regardless of qualification level) and older patients within public or private health systems. Older or geriatric persons are defined as those aged 65 and above. We considered studies that were conducted in acute, community and long-term care settings with a geriatric context. Study designs included qualitative and quantitative studies. In addition, literature reviews, systematic reviews and grey (unpublished) literature were also considered.

Search strategy

The search strategy identified both published and unpublished studies/papers. A limited search of PubMed and CINAHL was undertaken, followed by an analysis of the key words contained in articles' titles and abstracts, and of the index terms used to describe the article. The following databases were then searched without a date limit: CINAHL via EBSCOhost, PubMed, Scopus, Embase, the Cochrane Library, the Joanna Briggs Library of Systematic Reviews and ProQuest Dissertations and Theses. Finally, the reference lists of all identified papers were searched for additional studies. Key search words included aged; geriatric; nurse-sensitive measurement; nurse-sensitive outcomes; nursing quality indicators; nursing sensitive indicators; older person. A search strategy summary and an outline of those excluded papers has been appended (Appendix B, C).

Data extraction

Essential information pertaining to the scoping review objective was extracted from the included papers using the data extraction tool. The tool included fields such as 'author', 'year', 'country of origin', 'study type', 'clinical setting', 'aims/purpose', 'findings' and 'NSIs'. As part of the extraction process, many indicator descriptions were identified and extracted. Indicators from systematic and literature reviews were not included in the data mapping, to minimise duplication in the reporting of NSIs.

Data mapping

Due to the high number of indicator descriptions that represented the same indicator topic, the descriptions were grouped where they described a similar topic to form a

geriatric NSI. The decision to determine which descriptions related to a given geriatric NSI was achieved through the consensus of two reviewers. Following this initial grouping and consensus, the indicators were mapped into the following categories: Donabedian's domains, the Fundamentals of Nursing Care Terms and Specificity.[34,71] Both Donabedian and Kitson's theories are established concepts with Donabedian's Quality Model articulating a methodology that describes health care interactions and Kitson's Fundamentals describes elements of nursing practice. [72,71] In contrast to these established taxonomies, indicators were then determined to be 'specific' if they were predominantly associated with care of the older person or 'relevant' if used in older people but predominantly associated with the care of all patients.

A Clinical Advisory Group (CAG) was established to provide clinical consideration of data mapping concepts (both existing and proposed) in the scoping review. In doing so, the CAG considered a sample of geriatric NSI measures and, as in the case of the mapping outcomes, found that approximately 60% of sample indicators were specific through a process of independent survey. Specific indicators were those indicators predominantly associated with geriatric nursing care, such as mobility assistance, behavioural symptoms, or healthcare-acquired delirium.

Results

Study selection
A search of the literature identified 3,219 papers for consideration and five additional papers from other sources. Of the 3,224 papers, 94 were selected after screening of titles. After these were screened by abstract, 79 papers were selected for full-text review, resulting in the inclusion of 35 papers (Figure 1). Three reviewers were involved in study selection; one in extraction and two in review. Any disagreements that arose between the reviewers when deliberating the papers for inclusion were resolved through extensive discussion and consideration.

Characteristics of included studies
The included papers (n=35) were distributed over an eighteen-year period, with publication years ranging from 2000 to 2018 (Table 1). Primary studies were conducted in 9 countries including Australia (n=1), Belgium (n=1), Brazil (n=1), Canada (n=3), the Netherlands (n=1), New Zealand (1), South Korea (n=1), Sweden (n=1) and the United States of America (n=21). The systematic (n=2) and literature

reviews (n=2) from included papers were conducted in multiple countries (Table 1). The majority of studies were set in long-term care (n=26), seven were set in the acute care sector and (notably) very few studies were set in the community, with only two papers reporting on home-based care (Table 1). A range of study types were identified; approximately 43% (n=15) of studies were cross-sectional, 23% (n=8) were retrospective cohort studies and 9% (n=3) were prospective cohort studies. Less than half of the studies (n=14) used multiple data collection sources to inform study conclusions.

Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). *Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097*
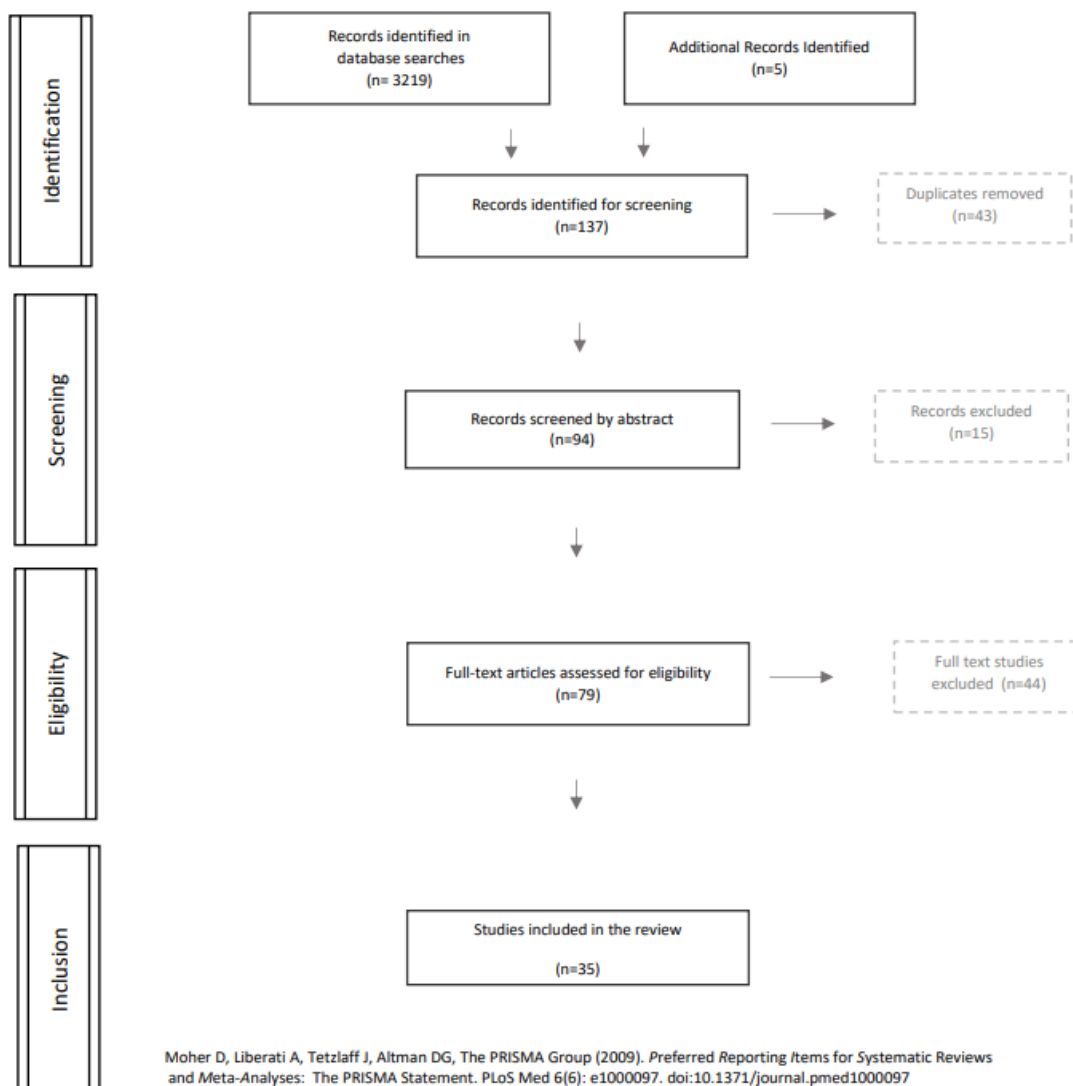
Figure 1. PRISMA flow chart of study selection and inclusion process

The focus of many papers (n=21) was to explore an association between staffing levels and outcomes in older people, while other papers highlighted a variety of issues associated with geriatric syndromes.

Indicator mapping

Multiple indicator measures (n=364) were extracted from the included papers. Three reviewers were involved in data extraction: one in extraction and two in review. Any disagreements that arose between the reviewers when deliberating the extracted data was resolved through extensive discussion and consideration. Indicator descriptions associated with outcome measures represented 43% (n=158) of total measures, while those associated with direct care represented 39% (n=141) and those associated with indirect care represented 18% (n=65).

Outcome measures included both patient and nurse outcomes. Of the 158 outcome measures, 97% (n=154) described patient outcomes, 2% (n= 3) nurse outcomes and 1% (n= 1) organisational outcomes. Healthcare-acquired complications (HAC) represented, 46% (n=72) of outcome measures.

Table 1 Study characteristics and extracted NSI measures

First Author	Country	Study Type	Clinical Setting	Aims/Purpose	No of NSI Measures
Bail (2016)[2]	Australia	Concept Analysis	Acute	To outline the concept of 'Failure to Maintain' with four measurable patient outcome indicators of pressure injury, pneumonia, Urinary Tract Infection (UTI) and delirium.	21
Bates-Jensen (2003)[73]	United States of America (USA)	Prospective Cohort	LTC	To determine if Long Term Care (LTC) with poor pressure ulcer rates differ in nursing tasks from those with lower pressure ulcer rates.	15
Bates-Jensen (2004)[74]	USA	Cross-sectional	LTC	To understand the impact of staffing levels on the 'in-bed time' experienced by residents.	8
Boltz (2013)[75]	USA	Retrospective Cohort	Acute	To explore whether certification in geriatrics improves patient outcomes.	10
Boscart (2018)[76]	Canada	Cross-sectional	LTC	To investigate the influence of staffing practices on quality of outcomes for residents.	12
Bostick (2004)[77]	USA	Cross-sectional	LTC	Study addressing the nursing staff mix and levels required to deliver quality care in nursing homes.	7
Bostick (2006)[9]	Multiple	Systematic Review	LTC	Summary of staffing measures and data sources for LTC found in the literature.	NA
Bowers (2000)[78]	USA	Grounded Theory	LTC	The Nurse Assistant perspective on Quality of Care (QoC) in LTC.	22
Burt (2007)[3]	USA	Prospective Cohort	LTC	To study the way the nurse interacts and cares for the patient influences patient outcomes.	6
Carryer (2017)[79]	New Zealand	Cross-sectional	LTC	To understand the prevalence of four main indicators of care across NZ nursing homes.	21
Castle (2005)[80]	USA	Retrospective Cohort	LTC	Investigation into the impact of nurse turnover on patient QoC in LTCs.	12

| First Author	Country	Study Type	Clinical Setting	Aims/Purpose	No of NSI Measures
Castle (2008)[81]	Multiple	Literature Review	LTC	Summary of literature associated with staffing levels and QoC for patients in LTC.	NA
Castle (2008)[82]	USA	Retrospective Cohort	LTC	To understand if the use of agency staff influenced the quality of care.	21
Choi (2013)[83]	USA	Cross-sectional	Acute	To determine if RN job satisfaction influenced the incidence of pressure injuries.	7
Armour (2014)[44]	Canada	Cross-sectional	Acute	To determine the frequency of six adverse events on an acute medical ward and understand their link to nursing care.	6
Dyck (2007)[84]	USA	Cross-sectional	LTC	Study of staffing levels and the prevalence of weight loss/dehydration in LTC.	5
Head (2003)[67]	USA	Cross-sectional	Community	Community clinicians' perspective of appropriate NSIs.	6
Heeren (2014)[85]	Belgium	Cross Sectional	LTC	Study of staffing levels and restraint use.	11
Hickey (2005)[86]	USA	Descriptive Analytical	LTC	Study of staffing levels and risk adjusted pressure injury prevalence.	6
Horn (2005)[27]	USA	Retrospective Cohort	LTC	Study of staffing levels and multiple patient outcomes.	9
Kercado (2016)[87]	USA	Retrospective Cohort	LTC	Study of staffing levels and pressure ulcer prevalence, UTI and physical restraint.	4
Kontezka (2008)[35]	USA	Retrospective Cohort	LTC	Study of staffing levels and prevalence of pressure ulcers or UTIs.	4
Lindhardt (2008)[88]	Sweden	Cross-sectional	Acute	Investigation into nurse/family collaboration and patient satisfaction.	7
Moreira Arrais (2017)[89]	Brazil	Prospective Cohort	Emerg. Dept.	To identify processes of nursing care that would reduce the likelihood of UTI occurrence with an indwelling urinary catheter insitu in elderly patients.	11
Mueller (2004)[90]	USA	Cross-sectional	LTC	Study addressing relevance of American Nurses Association indicators to residential aged care setting.	8
Nakrem (2009)[51]	Multiple	Literature Review	LTC	NSIs for LTCs in Australia, Norway, NZ, England, Sweden, Denmark.	NA
Okeorji (2017)[91]	USA	Retrospective Cohort	LTC	Study of staffing levels and falls.	2
Schein (2005)[92]	Canada	Randomised Control Trial	Community	RCT addressing nurse case management and older persons' quality of life/functional ability.	19
Schnelle (2003)[93]	USA	Descriptive Analytical	LTC	To identify if differences in nursing processes in caring for continence influence resident continence levels.	12
Schnelle (2004)[42]	USA	Retrospective Cohort	LTC	Study of staffing levels/processes and their impact on patient outcomes.	27
Schnelle (2004)[43]	USA	Cross-sectional	LTC	Study addressing the differences between care process in low- and high-restraint LTCs.	9
Shin (2015)[94]	South Korea	Cross-sectional	LTC	Study of nurse staffing and QoC in LTCs.	20
Simmons (2003)[95]	USA	Cross-sectional	LTC	To determine if processes vary for LTCs with a prevalence of patients who lose weight and those who do not.	18
Spilsbury (2011)[69]	Multiple	Systematic Review	LTC	Review of staffing measures and QoC in LTC.	NA
Van Nie Visser (2015)[96]	Netherlands	Cross-sectional	LTC	Study considering 13 structural indicators and malnutrition.	18

Direct care measures include nursing tasks that necessitate physical or verbal contact with the older person or document that contact. Of the 141 direct care measures, 91% (n=129) were the provision of direct care and 9% (n=12) the documentation of direct care.

Indirect care measures include nursing resources or tasks that support the provision of direct care and were the least represented group of measures. Of the 65 indirect care measures, 86% (n=56) involved staffing, 7% (n=5) involved staff education/certification, 5% (n=3) were related to policy development and 2% (n=1) addressed patient flow.

The measures were classified into 131 geriatric NSIs through common phrasing and intent (Appendix D). Geriatric NSIs were then mapped using three main taxonomies including Donabedian's domains, specificity and FONC categories (Figure 2). Classification of all NSIs into the Donabedian domains resulted in structure (n=17), process (n=62) and outcome (n=52) indicators. Structural indicator groups encompassed areas such as staffing, policy/procedure and education, with many of the structural indicators focused on staffing levels (n=5). Process indicator groupings were those associated with areas such as continence management, meal assistance and repositioning, with many of the process indicators focused on care tasks (n=20) and a small number outlining the relationship with the patient/family (n=4).

Figure 2. Geriatric NSI taxonomy mapping
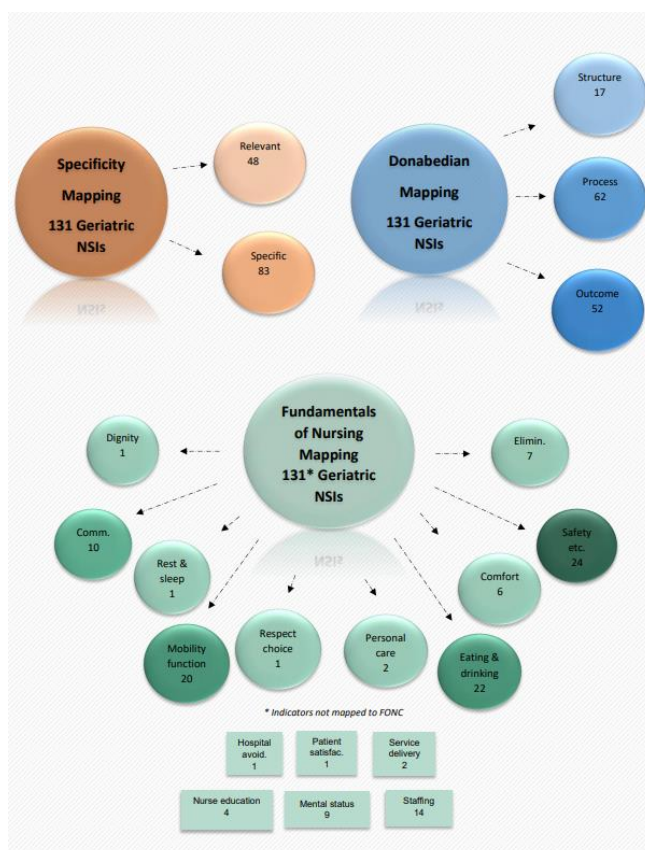
Outcome indicators were typically patient outcomes commonly associated with older persons or geriatric syndromes, including pressure injury, urinary tract infection or falls, with many focused on physical patient outcomes (n=27) and a smaller number focused on the carer or family member of the older person (n=2).

Consideration of specificity resulted in the identification of 48 (37%) relevant geriatric NSIs and 83 (63%) specific geriatric NSIs. Relevant geriatric NSIs were associated with general nursing care such as glucose monitoring, sleep, or pain. Specific indicators as a subgroup of indicators mostly reflect the care of older persons with geriatric syndromes.[97]

The Fundamentals of Nursing Care (FONC) category resulted in geriatric NSIs being assigned to the top three terms of eating and drinking (n=22), mobility (n=20), and communication/education (n=10). It should be noted that 28% of indicators (n=37) could not be grouped into FONC elements as they were mostly indirect care indicators.

The majority of papers (n=30) explored an association between structural, process or outcome domains. From these 30 papers, 21 papers researched an association between staffing levels and patient outcomes and 17 of the 21 papers (81%) found that staffing levels influenced patient outcomes.

Risk adjustment of patient outcome indicators was mentioned or addressed in the literature, with adjustment variables such as Resource Utilisation Groups (RUG), Medicare service items, the Care Dependency Scale or other case mix indicators, facility or environmental factors cited. These adjustment variables account for intrinsic patient factors that influence a patient outcome probability, though there is considerable debate over which variables should be utilised.[98]

Discussion

To evaluate the quality of geriatric nursing care accurately, clearly defined, measurable and validated indicators are necessary. The scoping review question reflects the intent to identify such indicators by asking '*what definitions and key concepts of nursing-sensitive indicators are identified in the current literature that are relevant in evaluating the nursing care of the older person'?* The results of the scoping review will be discussed and include issues such as geriatric NSI definitions, classification of NSIs using Donabedian's domains and the Fundamentals of Nursing Care taxonomies, the concept of specific geriatric NSIs, the need for risk adjustment

of patient outcome indicators, and indicator groups that were absent or had limited representation in the scoping review.

International consensus on what constitutes an NSI for care of the older person or a geriatric NSI was not identified in the included papers. However, the literature suggests that quality indicators are 'measures reflecting a professional care standard which are used as guides to monitor and evaluate the quality of important patient care'.[51(p849)] NSIs were further summarised as 'the quality and quantity of nursing interventions that influence a patient outcome.'[75(p26)] Geriatric NSIs could then be described as the capacity (quantity of nursing interventions) and capability (quality of nursing interventions) of nursing to consistently provide quality care for the older person.

Notably, standardised definitions of indicators and collection methods were limited.[44] The limited standardisation of indicators was also evidenced in the extracted measures, which varied from lengthy outlines of care to short, simple statements of practice. This lack of uniformity in the description of indicators impedes the ability of geriatric NSIs to portray practice and inform consequent practice improvement initiatives. An agreement on geriatric NSI descriptions is required to support consistent utility and benchmarking of geriatric NSIs across organisations.

In an effort to minimise the lack of uniformity and repetition of extracted measures, mapping of all measures was undertaken using the taxonomies from Donabedian's domains, FONC and specificity.[34,71] This mapping highlighted HAC outcomes, direct care tasks and staffing as predominant indicators in the literature. Many direct care task indicators were associated with the prevention or management of HACs commonly experienced by older persons.[2] This representation assumes the premise that an association exists between indicators (similar to the association noted by Donabedian[34]) and describes a cause and effect relationship between direct nursing tasks, staffing or policy and patient outcomes.

This premise is illustrated in Dyck's[84] study, where structure and process NSIs influenced a patient weight loss outcome in long-term care. The study concluded that where residents had at least three hours per day (structure) of direct nursing care (process), there was a 17% decreased likelihood of weight loss (outcome).[84]

Application of indicator associations were further highlighted by Bail in the use of best practice care bundles for pneumonia, urinary tract infections, delirium, and pressure injury.[2] Care bundles describe the associations between both structure

and/or process indicators and patient outcomes. Bail's pneumonia care bundle incorporated process indicators such as 'mobilizing, oral care and hand hygiene' to minimise the likelihood of the pneumonia outcome indicator.[2] Additional research into validated associations between indicators and their practical application in care bundles is required.

Throughout the extraction and mapping process, it became apparent that both relevant and specific geriatric NSIs were represented. Bail's pneumonia care bundle highlights this finding, where relevant indicators were concluded to be those applicable to most patients (e.g. hand hygiene) and specific indicators those pertinent to the older person (e.g. mobilising and oral care) more specifically.[2] There was no comment in the literature regarding the concept of specific and relevant geriatric NSIs. The concept of specificity raises more questions than answers, but it may warrant consideration in future development of geriatric NSIs.

Indicators require uniformity of definition and collection methods, validated associations, and applications, such as care bundles to describe geriatric nursing care. However, the integrity of these descriptions is often questioned because older persons enter the health system with a degree of complexity and acuity that is not evidenced in younger patient groups.[68] This increases their likelihood of adverse outcomes and necessitates a statistical risk adjustment of older person outcome indicators to allow for valid comparison across outcome data from all age groups.[68] Within the literature, there was limited acceptance of the validity of current risk adjustment methodologies, as 'considerable debate' exists regarding the appropriateness of risk adjustment variables.[82] Additional research is required to develop contemporary risk adjustment methodologies that are characterised by a sound statistical approach, in order to ensure statistical integrity and provide a valid account of nursing performance.

This scoping review identified many existing geriatric NSIs, and key concepts associated with their implementation, but also highlighted indicators that were absent or had limited representation in the literature. Representation of indicators such as hospital avoidance in the community, the role of geriatric nursing staff in case management or care coordination, and perceptions of both the consumer and the nurse were either absent or limited.

As the number of older persons in the community expands exponentially, so will the need for community nursing roles to effectively support older persons to live in their

homes and avoid hospital admission. Geriatric NSIs are required to describe the role of geriatric nurses in achieving this aim.

Contemporary nursing acknowledges that the changing demographics of the local community requires adaptation to meet patient and system demands.[99] This adaptation will require that nursing roles provide direct care as well as facilitating significant indirect care roles. Indirect care is relevant to patient flow, complex case management, rostering or staffing support, research, practice improvement, project management or management of an inpatient ward or service. These are significant nursing leadership roles; however, the scoping review identified limited measures attributed to indirect care.

Similarly, indicators that describe consumer perceptions of care were limited and the nurse's perception of the practice environment was unstated. Both of these indicator groups would provide valuable insights into the quality of care received by the older person.

Other indicators with a limited representation included topics such as the relationship between the nurse and the patient, and assessment of the ability of older persons' carers to cope at home. The role of the patient/nurse relationship and the carer's role in the home are issues of considerable interest and warrant additional indicators.[43,100]

Those indicators identified in the scoping review provide opportunity for a collective reflection of practice with the intent to improve care of the older person. Measurement of practice and subsequent improvement of practice can facilitate the delivery of consistent best practice care for the older person. Future research is required to develop priority indicator groups for current and future nursing roles that support quality care of the older person, both in the community and inpatient settings.

Conclusion

The concepts associated with geriatric NSIs are complex but have the potential to provide a comprehensive description of geriatric nursing care and highlight the value of geriatric nurses in the multidisciplinary team. This potential eclipses development of indicator definitions and collection method uniformity, validated associations between indicators and care bundle development, facilitating the strategic planning of nursing services to meet the global needs of the older person. A collaborative

effort is required from clinicians, researchers, and policy makers to develop and implement geriatric NSIs in an evaluation framework that delivers consistent high-quality care to older persons now and into the future.

Acknowledgements

Chapter 5: Discussion

Introduction

This scoping review locates and describes the international literature relating to geriatric NSIs and summarises how nursing measures are utilised to evaluate care of the older person. The specific question of the scoping review is 'What definitions and key concepts of nursing-sensitive indicators are identified in the current literature that are relevant in evaluating nursing care of the older person?' This chapter will specifically address considerations of methodology involved in undertaking the scoping review and findings of the review, including geriatric NSI definitions, extracted indicators, relationships between indicators and implementation of geriatric NSIs in practice.

Methodology Considered

When considering the scoping review methodology, it is evident that the conduct of a scoping review does not always follow a linear path. Although the scoping review begins with a clear purpose of mapping the literature, it often follows many different paths of inquiry. This inquiry is iterative, with the review team summarising commonalities identified in the literature. This summary occurs through critical thinking and in-depth discourse, which are used to map the literature and formulate answers. This approach contrasts with the traditional process of reviews, which pursue an answer to a specific question within the literature.

A scoping review has many processes that mirror those of conventional systematic reviews, such as defining inclusion criteria and conducting an exhaustive search of electronic databases. Once the literature has been identified and confirmed as meeting the inclusion criteria, the mapping of included papers can commence.[55] This process is fundamentally different from the reporting of findings in other types of reviews.

Within the context of the present scoping review, the planning and construction of the protocol identified a number of potentially useful taxonomies to guide the mapping process.[70] Donabedian's structure, process and outcome domains proved to be a suitable approach for the initial mapping of NSIs, and were commonly utilised to categorise types of quality indicators in the included papers.[34] Similarly Kitson's[71] Fundamentals of Nursing Care provided a clinical nursing context for the mapping of NSIs. The use of Donabedian's and Kitson's frameworks provided a varying lens to

inform the mapping of NSIs. In addition to existing taxonomies, other ways of conceptualising the material were then explored.

Findings of the Scoping Review

The scoping review methodology allowed for extensive consideration of the literature and informed the review findings. This chapter discusses many of these findings, including the absence of definitions, geriatric and non-geriatric indicators, relationships between indicators, indicators of limited prevalence and various implications for practice.

The literature did not define or categorise NSIs as being geriatric, although many papers utilised NSIs to evaluate care of the older person. The concept of NSIs and associated definitions, however, are outlined in the literature. Therefore, it is logical that a definition of geriatric NSIs could also be developed based on these concepts and definitions.[8]

Existing databases and repositories consist of indicators that describe nursing care of the older person.[72] These NSIs are not classified as geriatric or non-geriatric, representing a missed opportunity to highlight the performance of geriatric nursing care and practice improvement in care of the older person. This scoping review took initial steps towards the identification of indicators as geriatric or non-geriatric in classification.

During the process of extraction, it was apparent that many NSIs being used in regard to older patients were generic and could be used in many populations, whereas others were more appropriate for use with an older population. These latter indicators were often aligned to geriatric syndromes such as falls, pressure injury and incontinence.[11] This prompted the decision to map NSIs as either relevant (used in broad patient groups) or specific (used more commonly with an older population). To further explore the concept of specificity, the CAG were provided with a sample of extracted indicators and were able to determine what they perceived to be specific or relevant indicators in care of the older person. Feedback from the group suggested some merit in considering specificity. There was some consensus on many of the NSIs, but no definitive criteria were developed. The question of the utility of classifying geriatric NSIs as specific and relevant remains unresolved. A better approach may be to explore how indicators in the existing databases can be classified in terms of specificity. The classification of NSIs as geriatric or non-

geriatric could be supported by the mapping of indicators, in alignment with Donabedian's quality model.[34]

The Donabedian taxonomy utilised the structure, process and outcome (SPO) groupings model.[34] The model suggests that an association or relationship exists between the SPO domains. When considering the literature, many papers summarised supports (structural indicators) and/or nursing tasks (process indicators) that minimise the risk of an adverse event (outcome). These nursing tasks or organisational supports are described in contexts such as care bundles or studies concluding that relationships exist between staffing levels, skill mix, qualifications or specific nursing tasks and adverse outcomes. The relationship between indicators and the challenges of informing indicators are explored in further detail.

The included studies explored the relationship between structural and/or process indicators and patient outcomes, particularly studies that considered structural staffing indicators. This would suggest that nursing practice can be represented as a series of dynamic relationships that exist between structural, process and outcome indicators. Care bundles that describe these dynamic relationships were utilised in only one of the 35 included papers, where they described nursing tasks required to minimise the likelihood of patient outcomes.[2] Those studies that explored a conceptual relationship between indicators presented care bundles, even though they were not described as such.

This bundling of dynamic relationships acknowledges that multiple actions are often required to deliver quality care. This bundling is a valuable way to describe the relationships between geriatric NSIs. Further research is required to validate and describe relationships between indicators.

Care bundles are one way in which geriatric NSIs can be implemented in a clinical context in a concise and meaningful manner. However, other aspects of geriatric NSI implementation need consideration. To ensure the effective use of geriatric NSIs in a busy clinical environment, the description of indicators and the process of performance indicator measurement requires simplification.

Process indicators highlight this need for simplification. Geriatric nursing-sensitive process indicators describe those tasks or interactions that take place between the nurse and the older person.[69] Process indicators can describe one nursing task in a variety of ways. For instance, geriatric NSI catheterisation was described in the literature as 'catheter use, catheterisation and had a catheter inserted and left in

bladder'.[80,27,82] Simplification of common indicators to one concise description would be valuable for benchmarking and provide clarity for clinicians, managers or policy makers.

The way in which indicator performance is measured and the role of technology to minimise collection time for measures requires additional research. Unlike structure or outcome indicators, process indicators often require observational or retrospective documentation audit to inform indicator performance.

Geriatric nursing-sensitive process indicators identified in the scoping review include nursing tasks, such as adequate handwashing, continence assessment and meal assistance.[2,52,95] Observational or retrospective documentation audits are required to provide measures of performance for these indicators. Those papers that utilised process indicators did not outline the time required to collect indicator performance measures. However, as the methods utilised appear resource intensive, time constraints make it unlikely that they could be carried out by nurses in the clinical setting. Innovative technology such as electronic medical record process indicator reports, and robotics are required to inform process indicator performance.

The remaining taxonomy utilised was taken from Kitson's[71] FONC terms. The FONC taxonomy mapping identified those indicators that were prevalent and, in some instances, those that were limited in representation. Those prevalent indicators were mostly related to the provision of direct patient care; however, aspects such as nurse education and skill mix could not be aligned with the FONC taxonomy. Indicator groups that were limited in representation included topics such as consumer experience, hospital avoidance strategies and inpatient coordination of care, which are discussed further.

Consumer experience is increasingly utilised to inform Healthcare Quality Frameworks, particularly the opportunities for co-design of health services and should therefore be included in the development of geriatric NSIs.[101] The inclusion of consumer-focused geriatric NSIs raises awareness of those issues perceived to be a priority by the older person.[101] A recent Australian report on community-dwelling older persons identifies healthcare consumer priorities as including wait times, communication, information about services and integration of care.[102] In developing geriatric NSIs, these older person priorities should inform indicator development to ensure that geriatric NSIs describe nursing actions that address consumer-informed issues.

Similarly, hospital avoidance strategies supported by geriatric nursing care were limited in the literature. These strategies include nursing tasks such as referral for community services or equipment, supports and education for carers, and the development of care planning to minimise the likelihood of chronic disease exacerbation.[103,104] Geriatric NSIs that describe these nursing tasks are valuable in highlighting the role of geriatric nurses in hospital avoidance.

Case management to facilitate discharge from hospital was also under-represented in the extracted indicators.[105] Community and inpatient nursing strategies to either avoid hospital admission or facilitate timely discharge from hospital take considerable nursing time, knowledge and skill.[106] Development of geriatric NSIs to reflect the value of these nursing tasks could contribute to hospital avoidance effectiveness and decreased length of stay in hospital.

There is clearly a reasonably large body of existing research related to NSIs within the context of care for the older person. However, existing geriatric NSIs do not reflect all aspects of contemporary nursing, and additional indicators are required. Therefore, the scoping review findings and key concepts should be considered when reviewing existing evaluation frameworks for care of the older person. Priority research areas identified in the scoping review include

- A concept analysis to provide clear definitions of geriatric NSIs and support the identification of geriatric and non-geriatric NSIs
- A scoping review to determine individual indicator definitions and timely methods to inform indicator performance
- Cohort studies to identify geriatric NSIs that describe nursing care in the community, including those indicators associated with hospital avoidance
- Cohort studies to identify geriatric NSIs in the hospital environment that describe the nurse role in coordination of care, including those indicators that facilitate timely and safe discharge of older persons
- Co-design research involving older people and their families in development of NSIs
- Case report or cross-sectional studies to develop care bundles that describe relationships between indicators and a best practice approach to care of the older person

- Action research exploring the development of existing or new technology to inform timely indicator performance.
- The use of technology by nursing staff to improve care and system efficiencies.

Review Limitations

The limitations of the review included its exclusive use of papers published in English and its subjective manner of mapping. Due to the extensive number of initial papers for consideration, the search was limited to papers published in English. This restriction on search parameters may have limited the extraction of indicator descriptions. Mapping is an iterative process and, as such, is subject to the views and experience of the scoping review team. However, every effort was made to provide a robust representation of the literature evaluating care of the older person.

Conclusions

It was evident from the scoping review that significant effort has already been undertaken to evaluate care of the older person, and that additional work is required to further develop geriatric NSIs in line with contemporary nursing. The findings of the scoping review provide direction and guidance on some aspects of geriatric NSI development.

In a little over thirty years (possibly sooner in South Australia), changing demographics will result in an anticipated strain on the health system, as high volumes of older persons access hospital and community or residential aged care services. In response to this anticipated trend, health budgets may be scrutinised and the role of nurses in caring for the older person considered. This scrutiny may include questions asked of the size or skill mix of the nursing workforce, resulting in significant staff reductions and the necessity to validate nursing value in the provision of care to the older person. Geriatric NSIs are needed to describe the value of geriatric nursing care and ensure that quality nursing care of the older person remains a priority.

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Appendix A Scoping Review Protocol

SYSTEMATIC REVIEW PROTOCOL

Geriatric Nursing Sensitive Indicators and delivering quality nursing care for the older person: a scoping review protocol

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Review question: The objective of the scoping review is to locate and describe the international literature relating to Nursing Sensitive Indicators (NSIs) and their use in evaluating geriatric care. Specifically the review question is: What definitions and key concepts of NSIs are identified in the current literature that are relevant in evaluating nursing care of the older person?
Findings from the review will inform future research and health care responses to support the provision of quality nursing care of the older person.

Keywords aged; geriatric; nurse-sensitive measurement; nurse-sensitive outcomes; nursing quality indicators; nursing sensitive indicators; older person

Introduction

Care of the older person in today's health system provides a unique opportunity to adapt and rejuvenate current approaches to nursing management as the health landscape continues to shift, accommodating real-time and anticipated demand. The complexity of clinical care of the older person requires staff to manage multiple co-morbidities and increasing frailty in a fragmented system that requires them to bring about quality care outcomes with unpredictable or finite resources.[1] The older person has a greater likelihood of experiencing "delirium, functional decline, pressure ulcers, and poly pharmacy" whilst in our care.[2 (p.1706)] Globally, by the year 2050, the number of people over the age of 60 years of age will have doubled close to a formidable 2.1 billion, creating significant clinical and fiscal challenges for health services internationally.[3] These assertions pose a demand on nurses that entails a radical transformation in the current approach to health care. Nursing system and quality measures must be sensitive to the unique clinical need of the older person to ensure organizational responsiveness in meeting future demands.[4]

In addition to these challenges is the emergence of the pay-for-performance structures being introduced to health services globally, creating a new paradigm in which all clinical disciplines will practice.[5] It is imperative that nursing strategically prepares for the health care environment that is going to demand a quantitative measure of its value in the broader health system.[5] The literature suggests that the significance of nursing practice to overall patient outcomes is not well recognized, reinforcing the need for an objective measure of nursing value to rationalize the existence of nurses with the policy and decision makers of health systems.[6]

When considering these current and future challenges, how do nurses, nurse managers and executive nursing directors know that older patients are receiving nursing care that is efficient and effective, delivered within a professionally supportive environment? Health analytics are often "aggregated" across disciplines, making it difficult to provide nursing unit level analysis of performance data and in some instances the nursing data is "invisible" amongst the organizational data, making the identification of nursing specific outcomes incongruous.[7(p.279)]

Specific nursing quality measures are required to provide evidence of nursing value, an objective

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There is no conflict of interest in this project.

evaluation of nursing care and a framework for change.[6] The introduction of NSIs will provide both the framework and the specificity to objectively evaluate nursing practice, the environment in which nurses function and the value that nursing contributes to health services.[8] Simultaneously NSIs can be operationalized to provide a clinical nursing dashboard to guide improvements in nursing practice, quite separate from organizational efforts to improve system performance or outcome measures.[9]

The concept of nursing-specific data has been explored since the mid 1800 s when Florence Nightingale initiated comparative studies of soldier outcomes with environmental conditions.[10] Health analytics have steadily advanced in empirical knowledge to deliver data that can accurately inform nursing practice. Theorists such as Donabedian in the 1960 s and Rantz and Maas in the 1990 s have contributed to the development of quality frameworks for accountability in clinical practice.[11]

The individual criteria associated with NSIs are about what nurses do in the health service and can be defined as "indicators that capture care or its outcomes, most affected by nursing care".[12(p.2471)] Duffy and Hoskins identify that nurses work as part of the health care team making their unique contribution at times hidden within certain patient outcomes.[6] Some authors develop this concept further suggesting that nursing value needs to be "clearly articulated" or measured to ensure the profession receives acknowledgement for its expert practice.[13(p.197)]

Heslop and Lu comment that a number of "surrogate" terms are used to describe NSIs and they include outcome indicators or measures, nursing performance quality indicators, patient safety indicators and nursing sensitive outcomes.[12] Donabedian's conceptual framework compartmentalizes health care into three main domains: structure, process and outcomes.[14] Donabedian's domains are frequently utilized in the literature to expound the diversity and function of NSIs.[15] *Structure* is the setting of care (i.e. nursing staff numbers, skill mix, nurse perception of practice environment); *Process* is the means by which patient care is delivered (i.e. nursing process, assessment tools, clinical pathways); and *Outcomes* is the patient experience (i.e. patient outcomes, patient perception of care received).[15]

The framework articulated by Donabedian shows a functional relationship between each domain, where the structure in which the nurse functions,

the nursing care processes and patient outcomes are interrelated, each having a direct impact on another.[16]

Nursing Sensitive Indicators must have clinical meaning and perspective, be developed within the principles of health metrics that requires "measurable, clear, objective and useful" criteria and at the same time reflect the identified data set that requires measurement.[17 (p.1249)] Once established and standardized, the NSI allows for benchmarking within health services, providing the bed side nurse, nursing manager and executive nurse the opportunity to compare a nursing unit's effectiveness with similarly functioning heath units.[18] Nursing Sensitive Indicators are the next step in efforts to quantify the value of nursing care, provide a supportive practice environment for dedicated staff and improve the quality of care older patients receive.[19]

An initial search of the literature using the words, nursing sensitive indicators, nursing quality indicators, aged, older person and geriatric, identified two systematic reviews expounding the concept of NSIs, with neither review exploring geriatric specific indicators. Heslop outlines the concept of NSIs from a theoretical perspective whilst Stalpers explores the connection between the nurse work environment and patient outcomes in the context of NSIs.[12,20] An initial search of the literature identified over 800 articles for consideration and an approximate figure of 60 articles for inclusion in the scoping review, providing sufficient literature to support research into those nursing performance measures which are unique and/or relevant to those patients in the geriatric cohort.

A diversity of approaches in addressing geriatric NSIs is found in the initial search of the literature, with authors such as Bail proposing new NSIs for the acute sector and Head for the community and both authors having a geriatric specific focus.[21,22] Literature set in the residential setting such as Bostick is valuable in identifying those existing NSIs specific to the older person, as the cohort is clearly defined as aged and in a few instances literature such as Arora clearly addresses care of the older person in the acute care sector.[2,23] Other articles such as Duffy comment on a specific NSI in a general context with no identified setting or are focused on the concept of NSIs such as the work of Heslop to inform the foundational concepts of NSIs.[12,24] All of these approaches will be integral in providing a

comprehensive summary of the literature and valuable insight into evaluation of the care of the older person.

Inclusion criteria

Participants
Nursing staff, regardless of clinical setting or qualification level and those older patients within public or private health systems will be included in the study. Aged, older or geriatric patients are defined as those patients 65 years and over.

Concept
The concepts of interest are the types of indicators used for NSIs internationally in the evaluation of care of the older person. It is acknowledged that NSIs in this instance may be specific and/or relevant to care of the older person; relevant indicates they are not exclusively used for geriatrics but may be applied to other patient cohorts under 65.

Within the literature the phrasing NSIs and nursing quality indicators have been used interchangeably to describe a data set of measures that are specific to nursing care evaluation. For the purposes of this protocol, both phrases will be explored in the literature to describe the concept of NSIs. Clinical indicators which measure the effectiveness of a particular clinical task will not be the focus of the study.

Context
The majority of hospital care for the older persons is not delivered in geriatric specific units but dispersed throughout other medical speciality or surgical wards. For the purposes of this study, inpatient, community and long term care settings will be considered. Developing and developed countries will both be included. Literature associated with NSIs in specialized healthcare units which are not geriatric in orientation will be excluded (e.g. NSIs developed for ICU, ICU being a specialized unit not specific to geriatrics.).

Type of studies
This scoping review will consider qualitative, quantitative and economic studies. In addition, literature reviews and systematic literature reviews that meet the inclusion criteria will also be retrieved. Gray (unpublished) literature will also be included. Text and opinion papers will not be considered for inclusion in this scoping review.

Methods

This scoping review will adopt the methodology for JBI scoping reviews as described in the 2015 JBI Reviewers' Manual.[25]

Search strategy
The search strategy aims to find both published and unpublished studies/papers. A three-step search strategy will be utilized in this review. An initial limited search of PubMed and CINAHL was undertaken followed by an analysis of the text words contained in the title and abstract, and of the index terms used to describe the article. The analysis of text words found that nurse-sensitive outcomes and nurse-sensitive measurement have been identified during the initial search of the literature as valuable additions to the keyword search parameters. Nurse-sensitive outcomes represent those patient outcomes specific to nursing care, and nurse-sensitive measurement is a broader term, encompassing those means by which nursing care is summarized in data descriptors. A second search using all identified keywords and index terms will then be undertaken across all included databases. Thirdly, the reference list of all identified reports and articles will be searched for additional studies. All studies published regardless of date will be considered to optimize the diversity of literature for potential inclusion. Studies published in English will be considered for inclusion in this review. An example search strategy has been appended (Appendix I).

Databases/sources to be searched will include: EBSCO CINAHL, Embase, PubMed, Scopus, Cochrane Library and *JBI Database of Systematic Reviews and Implementation Reports*.

The search for unpublished studies will include: ProQuest Dissertations and Theses, and Google Scholar.

Data extraction
Data will be extracted from papers included in the scoping review using the draft data extraction tool (Appendix II). The data extracted will include specific details about the author, publication year, country of origin, literature type, clinical setting of the studies, Donabedian's Domains and the geriatric relevant NSIs or geriatric specific NSIs significant to the scoping review question and objective. The

geriatric specific indicators will be those identified in the literature to have a residential aged care or predominantly aged patient cohort. Furthermore, those NSIs that are relevant to geriatrics (are applicable to other patient cohorts as well as geriatrics) will require endorsement of their meaningfulness to geriatric nursing through an expert panel external to the literature. To expedite this purpose a Clinical Advisory Group (CAG) has been established consisting of representatives from the South Australian Nursing and Midwifery Office, Central Adelaide Local Health Network Medical Directorate and residential care. The CAG will consider those NSIs identified in the scoping review and determine their clinical relevance to geriatric nursing care based on internationally accepted geriatric syndromes and the geriatric expertise of the CAG.[26] The CAG will be required to outline the rationale for exclusion or inclusion of each relevant NSI in tabular format. The scoping review will provide a comprehensive compendium of those NSIs that can be considered relevant and/or specific to geriatric care.

Any disagreements that arise between the reviewers will be resolved through discussion, or with a third reviewer. Authors of primary studies will be contacted to request missing or additional data, where required. The draft data extraction tool will be modified and revised as necessary during the process of extracting data from each included study. Modifications will be detailed in the full scoping review report.

Data mapping

The extracted data will be presented in diagrammatic or tabular form in a manner that aligns with the objective/s and scope of the scoping review. A narrative summary will accompany the tabulated and/or charted results and will describe how the results relate to the review's objective and question.

Acknowledgements

The Clinical Advisory Group was formed prior to the scoping review protocol publication with the specific role of providing a clinical lens to the academic findings of the scoping review and to ensure the clinical relevance of the scoping review conclusions.

The Geriatric Nursing Sensitive Indicator Advisory Group Membership includes:

- Lydia Dennett, Chief Nurse, Department fo Health and Ageing, Nursing and Midwifery Office, South Australia (SA)
- Lindy Harkness, Director of Nursing, Broker Hill Hospital, New South Wales
- Karen Hales, Nursing Director Geriatric and Palliative Care Services, Central Adelaide Loca Health Network (CALHN), SA
- Kathy Resilli, Community Nurse Practitioner Community Geriatric Service CALHN, SA
- Jane Burgess, Advanced Clinical Practice Consul tant, Medical Directorate, CALHN, SA
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- Fiona Quinn, Clinical Practice Consultant, Olde Person Specialist Nurse RAH, SA.

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Appendix B Search Summary

Database	Search Strategy	Records
Pub Med	(("geriatric or aged or older person") and ("nursing sensitive indicator or nursing quality indicators or nurse- sensitive measurement or nurse-sensitive outcomes"))- English language, Aged +65 years	1291
CINAHL	(("geriatric or aged or older person") and ("nursing sensitive indicator or nursing quality indicators or nurse- sensitive measurement or nurse-sensitive outcomes"))-English language	764
Embase	(("geriatric or aged or older person") and ("nursing sensitive indicator or nursing quality indicators or nurse- sensitive measurement or nurse-sensitive outcomes"))-Aged /Very Elderly+ English language	783
Scopus	(("geriatric or aged or older person") and ("nursing sensitive indicator" or "nursing quality indicators" or "nurse- sensitive measurement" or "nurse-sensitive outcomes"))-side filter English language	42
JBI Database Systematic Reviews	((geriatric or aged or older person) and (nursing sensitive indicator or nursing quality indicators or nurse- sensitive measurement or nurse-sensitive outcomes))	6
ProQuest	(("geriatric or aged or older person") and ("nursing sensitive indicator" or "nursing quality indicators" or "nurse- sensitive measurement" or "nurse-sensitive outcomes"))-side filter English language, full text, nursing, older adults,2010 -2019	333

Appendix B Rationale for Studies not included in the scoping review

Studies	Rationale
Ervin N, Chen SP, Upshaw HS. Nursing Care Quality: Process and Outcome Relationships. Can J Nurs Res. 2006;38(4):174-190.	Multiple settings
Dubois C, D'Amour D, Pomey MP, Girard F, Brault I. Conceptualizing performance of nursing care as a prerequisite for better measurement: a systematic and interpretive review. BMC Nurs. 2013;12(7): http://www.biomedcentral.com/1472-6955/12/7.	Concept analysis for performance framework
Pearson A, Pallas LO, Thomson D, Doucette E, Tucker D, et al. Systematic review of evidence on the impact of nursing workload and staffing on establishing healthy work environments. JBI Sys Rev. 2006:1-69.	Duplicate paper
Bates-Jensen BM, Alessi CA, Al-Samarrai NR, Schnelle JF. The Effects of an Exercise and Incontinence Intervention on Skin Health Outcomes in Nursing Home Residents. J Am Geriatr Soc.2003;51(3):348-355.	Evaluation of intervention
Cox RA. Implementing Nurse Sensitive Outcomes into Care Planning at a Long-Term Care Facility. J Nurs Care Qual.1998;12(5):41-51.	Evaluation of intervention
Boye-Doe SB. Improving Fall Prevention Strategies in an Acute Care Setting. [dissertation]. Minnesota (USA): Walden University; 2017.	Evaluation of Program
Bates-Jensen BM, Alessi CA, Cadogan M, Levy-Storms L, Jorge J, Yoshi J Al-Samarrai N, Schnelle JF. The Minimum Data Set Bedfast Quality Indicator. Differences Among Nursing Homes. Nurs Res. 2004;53(4):260-272.	Facility comparison
Beckel J, Hoolahan S, Wilson R, Wolf G. Identification of Potential Barriers to Nurse-Sensitive Outcome Demonstration. J Nurs Admin.2013;43(12):645-652.	General hospital setting
Doran DM, Harrison MB, Laschinger HS, Hirdes JP., Rukholm E, et al. Nursing -sensitive outcomes data collection in acute care and long-term care settings. Nurs Res. 2006;55(2 Suppl):75-81.	General Hospital Setting
Duclay E, Hardouin JB, Sebille V, Anthoine E, Moret L. Exploring the impact of staff absenteeism and patient satisfaction using routine databases in a university hospital. J Nurs Manag.2015;23:833-841.	General hospital setting
Ma C, Park SH. Hospital Magnet Status, Unit Work Environment, and Pressure Ulcers. J Nurs Scholar. 2015;47(6):565-573.	General Hospital Setting
Mark BA, Harless DW, McCue M, Xu Y. A Longitudinal Examination of Hospital Registered Nurse Staffing and Quality of Care. Health Serv Res. 2004;39(2):279-300.	General Hospital Setting
Park SH, Boyle DK, Bergquist-Beringer S, Staggs VS, Dunton NE. Concurrent and Lagged Effects of Registered Nurse Turnover and Staffing on Unit-Acquired Pressure Ulcers. Health Res Ed Trust. 2014;49(4):1205-1224.	Medico-surgical and Step-Down setting
Aydin, C, Donaldson, N, Stotts, NA, Fridman M, Brown, DS. Modeling Hospital-Acquired Pressure Ulcer Prevalence on Medical-Surgical Units: Nurse Workload, Expertise, and Clinical Processes of Care. Health Serv Res. 2014;50(2):351–373.	Medico-surgical setting
Bae S. Nursing Unit Turnover, Workgroup processes and Unit Level Patient Outcomes [dissertation]. North Carolina (USA): University of Carolina;2008.	Medico-surgical setting
Chau JPC, Lo SHS, Choi KC, Chan ELS, McHugh MD, Tong DWK, Kwok AML, Ip WY, Lee IFK, Lee DTF. A longitudinal examination of the association between nurse staffing levels, the practice environment and nurse sensitive patient outcomes in hospitals. BMC Health Serv Res.2015;15(38): DOI 10.1186/s12913-015-1198-0.	Medico-surgical setting
Coe KP. Patient Falls with injury associated with sitter hours and expenses. [dissertation]. Los Angeles (USA): California State University;2013.	Medico-surgical setting
DiCuccio M. The relationship between perceptions of patient safety culture, nurse advocacy and nurse sensitive patient outcomes. [dissertation] Pittsburgh (USA): The University of Pittsburgh;2018.	Medico-surgical setting
Redekopp M. Relationships of Professional Nurse Characteristics and Nurse Staffing to Adverse Patient Outcomes. [dissertations] Milwaukee (USA); The University of Wisconsin: 2007.	Medico-surgical setting
Staggs VS, Olds DM, Cramer EM, Shorr RI. Nursing Skill Mix, Nursing Staffing Level, and Physical Restraint Use in US Hospitals: a Longitudinal Study. J Gen Intern Med. 2016:32(1):35-41.	Medico-surgical setting
Koualty IA, Nassar N, Nizam M, Kurdahi Badr L. Evidence on Nurse Staffing Ratios and Patient Outcomes in a Low-Income Country: Implications for Future Research and Practice. Worldviews EB Nurs. 2018;15(5):353-360.	Medico-surgical, CCU setting
Ulreich SM, Difference in recommended to Actual Nurse Staffing and Patient Falls. [dissertation] Alabama (USA): The University of Alabama; 2015.	Medico-surgical, CCU setting
Wexler SS. A Comparison of Nurse Sensitive Outcomes of an acute Care for the Elderly (ACE) Unit and a Regular Inpatient Medical Unit. [dissertation] New York (USA): The University of New York; 2007.	Model comparison
Wynne R, Patel M, Pascual N, Medoza M, Ho P, et al. A single centre point prevalence survey to determine prevalence of indwelling urinary catheter use and nurse-sensitive indicators for the prevention of infection. Healthcare Infec. 2014;19:13-19.	Multiple settings
Boyle DK. Unit Type Differences in RN Workgroup Job Satisfaction. West J Nurs Res. 2006;28(6):622-640.	Multiple settings
Martin LC, Arenas-Montoya NM, Barnett TO. Impact of Nurse Certification Rates on Patient Satisfaction and Outcomes: A Literature Review. J Cont Ed Nurs. 2015;46(12):549-554.	Non-specific Setting
Maas ML, Johnson M, Moorhead S. Classifying Nursing-Sensitive Patient Outcomes. J Nurs Schol.1996;28(4):295-301.	Non-specific setting
Waugh SM. Pressure Ulcer Risk and Prevention: Examining the Inter-Rater reliability of the National Database of Nursing Quality Indicators (NDNQI). [Dissertation] Kansas (USA). The University of Kansas;2015.	Non-specific setting
Fiorentini ML. Examining the Impact of Nursing Assistive Personnel Staffing Levels on Injurious	Non-specific setting

Inpatient Hospital. [dissertation] Philadelphia (USA): University of the Sciences in Philadelphia;2017.	
Sengin KK. The relationship between job satisfaction of Registered Nurses and Patient Satisfaction with nursing care in acute care hospitals. [dissertation] Pennsylvania (USA): University of Pennsylvania;2001.	Non-specific setting
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Appendix C Mapping of NSI Measures to Geriatric NSIs

Geriatric NSI (n = number of extracted measures common to the geriatric NSI)		
Ability to perform ADLs (n=8)	HAC fracture (n=1)	Pressure injury risk (n=1)
Ability to perform IADLs (n=1)	HAC pneumonia (n=2)	Pressure ulcer development-
Adequate handwashing (n=1)	HAC pressure injury (n=21)	risk adjusted (n=1)
Adherence to staffing guidelines (n=1)	HAC urinary tract infection (n=8)	Repositioning (n=4)
ADL assessment (n=1)	Height on admission (n=1)	Restraint use (n=11)
Agency staff (n=3)	HEP Diet (n=1)	Risk assessment (n=1)
Ambulation (n=2)	Hospitalization (n=1)	Risk management (n=1)
Antidepressants and sleeping tablets (n=1)	In bed time (n=4)	Skill mix (n=8)
Antipsychotic drug use (n=3)	Incontinence (n=9)	Skin care (n=1)
Anxiety (n=1)	Indwelling catheter (n=1)	Sleep (n=1)
Behavioural symptoms (n=4)	Injurious falls (n=4)	Social engagement (n=4)
Bundle care (n=1)	Knowledge: health behaviour (n=1)	Specialist nurse: malnutrition
Caregiver performance (n=1)	Lifespan care (n=1)	(n=1)
Caregiver physical health (n=1)	Malnutrition (n=5)	Staff per 100 patients (n=3)
Catheterisation (n=3)	Malnutrition management (n=4)	Staff per patient (n=4)
Certification in geriatrics (n=1)	Malnutrition policy/guideline (n=3)	Staff per patient day (n=1)
Chronic pain (n=2)	Malnutrition training (n=1)	Staff turnover (n=10)
Clinical handover (n=1)	Management of per. devices (n=5)	Staffing levels (n=2)
Cognition (n=1)	Meal assistance (n=16)	Surveillance (n=2)
Collaboration with relatives of elderly pts (n=1)	Medication errors (n=2)	Teach patients and family (n=1)
Comfort (n=3)	Medication management (n=1)	Tenure (n=1)
Communication enhancement (n=1)	Mobility (n=1)	Treatment behaviour (n=1)
Consistent staffing (n=5)	Mobility assessment (n=2)	Tube feeding (n=1)
Contact (n=1)	Mobility assistance (n=1)	Unintentional weight loss (n=7)
Continence assessment (n=5)	Monitoring of vital signs (n=1)	UTI management (n=3)
Continence management (n=12)	Mood (n=1)	Vital signs (n=1)
Contractures (n=1)	NHPPD (n=16)	Wait time (n=2)
Coping assistance (n=4)	Normal weight (n=1)	
Dehydration (n=2)	Nurse education (n=1)	
Delivery of prescribed care (n=1)	Nurse education level (n=2)	
Depression (n=3)	Nurse rationing (n=1)	
Dignity (n=1)	Nurse satisfaction (n=3)	
Direct care hours (n=2)	Nurse/patient/family relation. (n=6)	
Documentation – patient weight (n=1)	Nutrition and hydration (n=1)	
Documentation – food and fluid consumed (n=3)	Nutritional management (n=3)	
Documentation – pressure ulcer staging (n=1)	Nutritional status assessment (n=3)	
Documentation – antipsychotic drug use (n=1)	Nutritional supplements (n=1)	
Documentation – behavioural management	Obese (n=1)	
(n=1)	Oral care (n=2)	
Documentation – care (n=1)	Overweight (n=1)	
Documentation – mobility (n=1)	Pain (n=2)	
Documentation – nutrition (n=1)	Pain assessment (n=1)	
Documentation – oral intake (n=1)	Pain management (n=3)	
Documentation – restraint reason (n=1)	Patient choice (n=6)	
Emotional support (n=1)	Patient education (n=2)	
Exercise program (n=2)	Patient flow (n=1)	
Exercise (n=3)	Patient satisfaction (n=5)	
Failure to maintain (n=1)	Patient weigh (n=2)	
Falls (n=11)	Patient/family info: malnutrition (n=2)	
Falls risk assessment (n=1)	Personal care (n=2)	
Food and fluid consumed (n=1)	Physiological complex (n=1)	
Functional ability (n=1)	Pressure injury risk management	
Glucose monitoring (n=1)	(n=1)	
HAC delirium (n=3)	Pressure injury management (n=7)	