BMJ Open

Scoping review of potential quality indicators for hip fracture patient care

Kristen B Pitzul,[1] Sarah E P Munce,[2] Laure Perrier,[3] Lauren Beaupre,[4,5] Suzanne N Morin,[6] Rhona McGlasson,[7] Susan B Jaglal[1,2,8]

To cite: Pitzul KB, Munce SEP, Perrier L, *et al*. Scoping review of potential quality indicators for hip fracture patient care. *BMJ Open* 2017;**7**:e014769. doi:10.1136/bmjopen-2016-014769

▸ Prepublication history and additional material is available. To view please visit the journal (http://dx.doi.org/10.1136/bmjopen-2016-014769).

Received 17 October 2016
Revised 17 January 2017
Accepted 21 February 2017

For numbered affiliations see end of article.

Correspondence to
Kristen B Pitzul;
kristen.pitzul@mail.utoronto.ca

ABSTRACT

Objective: The purpose of this study is to identify existing or potential quality of care indicators (ie, current indicators as well as process and outcome measures) in the acute or postacute period, or across the continuum of care for older adults with hip fracture.

Design: Scoping review.

Setting: All care settings.

Search strategy: English peer-reviewed studies published from January 2000 to January 2016 were included. Literature search strategies were developed, and the search was peer-reviewed. Two reviewers independently piloted all forms, and all articles were screened in duplicate.

Results: The search yielded 2729 unique articles, of which 302 articles were included (11.1%). When indicators (eg, in-hospital mortality, acute care length of stay) and potential indicators (eg, comorbidities developed in hospital, walking ability) were grouped by the outcome or process construct they were trying to measure, the most common constructs were measures of mortality (outcome), length of stay (process) and time-sensitive measures (process). There was heterogeneity in definitions within constructs between studies. There was also a paucity of indicators and potential indicators in the postacute period.

Conclusions: To improve quality of care for patients with hip fracture and create a more efficient healthcare system, mechanisms for the measurement of quality of care across the entire continuum, not just during the acute period, are required. Future research should focus on decreasing the heterogeneity in definitions of quality indicators and the development and implementation of quality indicators for the postacute period.

Strengths and limitations of this study

- This study includes potential indicators and indicators for hip fracture quality of care throughout the entire continuum of care and not just within the acute care period.
- The search strategy was performed by an experienced information scientist and peer-reviewed by another information scientist outside the study team.
- The screening and extraction were performed completely in duplicate.
- Non-English studies were not included, and there may therefore be a bias towards inclusion of studies performed in English-speaking countries.

BACKGROUND

In 2000, ~1.6 million people worldwide suffered from a fragility hip fracture (herein referred to as 'hip fracture'), with this number projected to increase to 21 million by the year 2050.[1 2] In the UK alone, there is predicted to be over 100 000 hip fractures by the year 2020.[3] Half of the persons who suffer from hip fractures never return to premorbid function, even two years postfracture, and the direct attributable one-year mortality rates for hip fractures are between 20 and 30%.[4–7] Patients with hip fractures have significantly higher acute care costs than matched controls as well as high postacute costs due to rehabilitation required after surgery.[7–12]

To help mitigate this extensive morbidity, mortality and healthcare use, it is imperative that quality care is delivered to patients with hip fracture. The Institute of Medicine defines quality care as "the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge".[13] In essence, delivering quality care means delivering evidence-based care that has a good chance of improving a patient's health outcome(s).

To ensure that quality care is delivered, a number of countries that have traditionally funded their institutions with global budgets (eg, Canada,[14] the UK[15]) have begun implementing performance-based funding (ie, linking quality of care delivery to funding policies). One of the goals of performance-based funding, such as the Best Practice Tariff implemented in 2010 in the UK, is to assign increased accountability to institutions for the care that they deliver.[16] Although the

measurement of quality of care has always been imperative to healthcare delivery, the importance of choosing which aspects of quality of care to measure is highlighted in the context of performance-based funding models.[17]

Quality of care indicators are typically embedded within a performance framework (eg, a balanced scorecard) and are used to measure the structure, process and/or outcomes of care.[18–20] Quality of care indicators measure how much deviation (if any) there is between the healthcare being delivered and best practice.[13] Examples of the use of quality of care indicators to improve care delivery include the Surgical Safety Checklist (implemented in eight countries), and the National Hip Fracture Audit in the UK.[15 21] There are a variety of approaches for developing quality of care indicators, including deductive (from concept to data) and inductive (from data to concept).[17 22 23] Using either approach, when evidence is weak or non-existent, expert consensus is used to develop the indicator.[23]

Current hip fracture quality of care indicators target the acute care period, most likely due to the focus on performance-based funding for acute care institutions (ie, an incentive to measure quality). In the UK, The National Institute for Health and Care Excellence (NICE), along with the British Orthopaedics Association (BOA), has developed several hip fracture quality indicators (eg, time to surgery, assessment by ortho-geriatrician within 72 hours of admission) as part of their performance-based funding for acute care.[3 15 24 25] These indicators have subsequently been used in other health systems worldwide (eg, Australia, Canada and other European countries).[26–33] However, these indicators are focused solely in the acute care period and therefore do not measure the quality of care in the post-acute care period.

Although some studies have used process and outcome measures to evaluate care delivered in the post-acute period (eg, a home-based rehabilitation programme), there is a lack of identified, evidence-based quality of care indicators in the postacute care period for patients with hip fracture.[34–38] Without measures of quality of care in the postacute period for patients with hip fracture, frontline staff, administrators and policymakers are left without required information to assess the delivery of care during the postsurgical rehabilitation period.[39 40]

The objective of this study is to synthesise the evidence on existing or potential quality of care indicators for the acute period, the postacute period and across the entire continuum of care for patients following a hip fracture. Using a scoping review methodology, the specific research question to be addressed was: "What patient, institutional, and system-level indicators are currently in use or could potentially be used for measuring quality of care in the acute period, post-acute period, and across the continuum for older individuals following a hip fracture?".

METHODS

Study design and literature search strategies

A scoping review methodology was employed, of which details are published elsewhere (see online supplementary file 1).[41] Briefly, Arksey and O'Malley[42] as well as Levac *et al*[43] frameworks were used to guide the scoping review. Measures targeted at patients, institutions or health systems were included and encompassed care processes and outcomes in the acute and postacute period. For the purposes of this review, quality indicators were defined as validated process or outcome measures with a descriptive statement that were used to describe quality of care delivered.[22] A potential quality indicator was defined as a process or outcome measure of care that was not specifically identified or referenced as an indicator of quality of care by the authors. This synthesis focused on quality of care indicators for older adults (aged 50 years and over) with non-pathological hip fracture caused by low trauma (eg, a fall from standing height or less). All study designs were included and only studies or abstracts published from the year 2000-January 2016, or in English were included to ensure relevance to the current healthcare context and feasibility.

Literature search strategies were developed using medical subject headings (MeSH) and text words related to hip fracture quality indicators. MEDLINE, EMBASE, CINAHL, Ageline, PEDRO (physiotherapy evidence database) and the Cochrane Central Register of Controlled Trials (CENTRAL) databases were searched on 18 January 2016, and the MEDLINE search was peer-reviewed.[44] Searches were performed with no language restrictions and limited from 1 January 2000 (see online supplementary file 2). The search used combinations of the following terms: hip fracture, femoral fracture, process indicator, process measure and quality indicator. Appropriate wildcards were used in the search to account for plurals and variations in spelling.

Study selection and data abstraction

Two reviewers (KBP and SEPM) piloted level 1 (titles and abstracts) and level 2 (full article texts) screening forms, as well as the extraction form (see online supplementary file 3). All screening and extraction were completed in duplicate. Disagreements were discussed between the two reviewers and a third party reviewer (LB, SNM or SBJ) was contacted if disagreements could not be resolved.

Abstracted data included study characteristics (eg, year of publication, country of study), indicator definitions (eg, length of stay defined as the number of total days stayed at institution without interruption) and numerator and denominator definitions when applicable (eg, per 1000 hip fractures). We examined the purpose and components of the indicators as well as the reported measurement properties, if applicable. Study setting was abstracted and defined as follows: acute care (any acute care institution or department within an acute care

institution); postacute care (any institution or community setting used after discharge from acute care) or across the continuum of care (studies that include acute and postacute settings). Study quality was not assessed during the scoping review as the objective of a scoping review is to identify gaps in the literature and highlight future areas for systematic review.[42 43] Studies were then summarised using numerical counts, and definitions of indicators or potential indicators were summarised.

RESULTS

The literature searches yielded a total of 3828 articles (figure 1). After duplicates were removed, 2729 articles were included in level 1 screening. After level 1 screening was complete, 638 articles (23%) were included in full-text screening (ie, level 2). After level 2 screening was complete, data were extracted from 302 articles (11% of initial yield). Agreement between the two reviewers (KBP and SEPM) ranged from 75 to 85% for both searches. Reasons for article exclusion varied, but were primarily due to incorrect study population (ie, study included older adults with pathological hip fractures).

Synthesis

Owing to the volume of studies included in data extraction (N=302), indicators or potential indicators were grouped into process and outcome constructs that the authors were trying to measure. The creation of these constructs was therefore data-driven and included measures of mortality, time-to (eg, time to surgery, time spent in the emergency department), length of stay, functional ability, comorbidities and complications, discharge destinations, balance and mobility, quality of life, pain, cognitive, readmissions, the UK's Best Practice Tariff indicators (BPTs), prophylaxis (eg, antibiotic prophylaxis) and blood (eg, blood loss, blood transfusion), osteoporosis testing and medications, falls, healthcare usage, nutrition (eg, vitamin D levels), biometrics (eg, muscle strength tests), catheters, patient satisfaction, caregivers (eg, burden and stress), self-efficacy (eg, self-

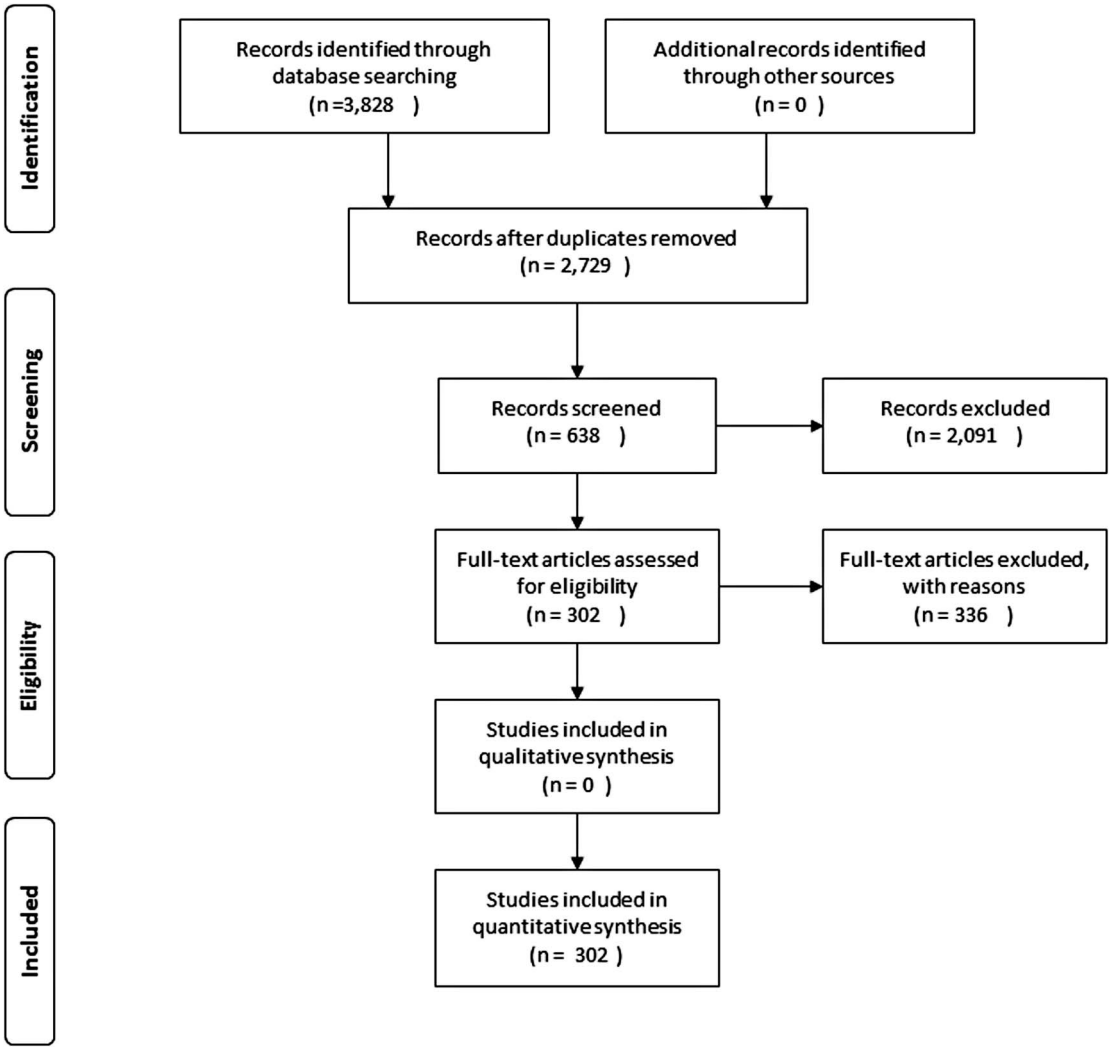

Figure 1 The total number of articles yielded from the literature search in 2016, and the final number of articles included in the study. CENTRAL, the Cochrane Central Register of Controlled Trials; PEDRO, physiotherapy evidence database.

care ability) and other (eg, patient safety strategies). Developing these constructs greatly improved the feasibility of data synthesis, particularly for comparing variations in indicator or potential indicator definitions between studies. If the same indicator or potential indicator (eg, Berg Balance Scale) was used by different studies for measuring different constructs (eg, functional ability as well as balance and mobility), it was placed into all relevant constructs. Owing to the nature of the topic reviewed (ie, indicators or potential indicators), after screening, there were no qualitative studies for data extraction.

General characteristics of included studies

When individual countries were compared, most studies were conducted in the UK (27%), the USA (22%) or Australia and New Zealand (13%) (table 1). Most study settings were within the acute care period (78%), with a paucity of studies conducted in the postacute care period (8%) (table 1). The most common study design was retrospective cohort (28%), followed by prospective cohort (18%) and reviews (17%) (table 1). Within the included studies, the majority of indicators or potential indicators were at the patient level.

Table 1 Country of study, study setting and study design, number of included studies (n, % total n)

	Number (% total*) of Studies
Country of study	
Other Europe	84 (28%)
UK	81 (27%)
USA	67 (22%)
Australia and New Zealand	39 (13%)
Nordic Countries (Norway, Denmark, Finland, Sweden)	48 (16%)
Canada	28 (9%)
Asia	13 (4%)
Middle East (Israel, India)	8 (3%)
Study setting	
Acute	237 (78%)
Postacute (any)	24 (8%)
Across the continuum of care	41 (14%)
Study design	
Retrospective cohort	85 (28%)
Prospective cohort	53 (18%)
Review (scoping, systematic, etc)	50 (17%)
Randomised controlled trial	34 (11%)
Clinical Audit	31 (10%)
Experimental (eg, pre-post)	19 (6%)
Population-based cohort	9 (3%)
Descriptive	7 (2%)
Cross-sectional	6 (2%)
Focus groups/interviews/ consensus meetings	4 (1%)
Pilot study	2 (1%)
Survey	2 (1%)

*The total percentage does not add up to 100% for country of study as some studies took place in multiple countries.

Most common indicators or potential indicators

When indicators or potential indicators were grouped into process and outcome constructs, mortality and time-to (eg, time to surgery) constructs were most commonly reported (42% and 35%, respectively, of the included studies) (table 2). Length of stay, functional ability, comorbidities and complications, discharge destinations and balance and mobility indicators or potential indicators were present in over 20% of the included studies. Indicators or potential indicators of self-efficacy, caregivers and patient satisfaction were the least commonly reported (2%, 2% and 2%, respectively).

Indicators or potential indicators by study setting

When the constructs are stratified by study setting, the paucity of potential indicators or indicators in the postacute period or across the continuum of care is highlighted (table 3). All of the studies with indicators or potential indicators in the Best Practice Tariff construct are set in the acute care period, as are the vast majority of studies with indicators or potential indicators in the 'other' construct (88%) or within the 'time-to' construct (87%) (table 3).

The proportion of studies with indicators or potential indicators classified as functional ability or quality of life constructs was distributed between the acute care and the postacute periods as well as across the continuum of care (table 3). Since the goal of rehabilitation is to restore prefracture functional ability and quality of life, this broader distribution is not surprising. Finally, certain indicators or potential indicators are unlikely to occur in the postacute period because they are less relevant (eg, those within the catheter or prophylaxis and blood constructs) (table 3).

When indicators or potential indicators were examined within each construct, there was substantial heterogeneity in definitions, including variations in when the indicator or potential indicator was measured, as well as the categorisation of categorical measures (eg, different cut-points on a scale). For example, length of acute care stay was measured from time to ward admission to discharge as well as from time to emergency department presentation to discharge.[45 46] Definitions of time to surgery also varied, as some studies defined time to surgery as the time from medical stability to surgery;[47 48] some studies defined time to surgery as time from admission to surgery,[48–55] and others created a binary variable for time to surgery (eg, had surgery within 24 hours).[56–59] The one exception was the UK's Best Practice Tariff indicators, which are clearly defined across studies.

Compared to potential indicators or indicators implemented in the acute care period, even greater variability was seen for potential indicators or indicators implemented in the postacute period. Potential indicators and indicators within the functional ability and quality of life constructs are discussed below as exemplifiers of this extensive variability, as both constructs are established goals of rehabilitation and were prevalent in studies set in the postacute period and/or across the continuum of care (see online supplementary files 4 and 5).

Table 2 Number of studies (n, % total N studies), by process or outcome constructs containing indicators or potential indicators

Construct	Indicators or potential indicators	n (%N)
Mortality	In-hospital mortality; postdischarge mortality (eg, 30 days, 90 days)	125 (41%)
Time-to	Time from presentation to admission; time from admission to medical clearance; time from admission to surgery/surgical delay; operative time; time to rehabilitation	106 (35%)
Length of stay	During acute care; during intensive care; during rehabilitation; during a readmission	93 (31%)
Comorbidities and complications	Developed in-hospital; developed postoperatively; number present at admission; classification (major vs minor); adverse events in-hospital; pressure ulcers; urinary tract infections; venous thromboembolism; reoperation; infections	86 (29%)
Functional ability	Activities of daily living (ADLs) or instrumental ADLs (IADLs); short physical performance battery (SPPB); functional independence measure (FIM); Barthel or Modified Barthel Index; Katz or Modified Katz; Timed up and go; Harris Hip Score; SF36; Tinetti's Fall Efficacy Scale; Berg Balance Scale; sit to stand test; Frenchay's Activity Index; Activity Measure for Post-acute care (AM-PAC); Other measures	84 (28%)
Discharge destinations	Novel institutionalisation; change in premorbid level of care; discharge destination (eg, home, long-term care); successful community discharge	64 (21%)
Balance and mobility	Mobile yes/no; ability (eg, walking distance); ambulation decline; balance (eg, postural sway); weight bearing	62 (21%)
Quality of life (QOL)	EQ5D, EuroQOL (includes EQ5D and EQ-Visual Analog Scale); Health-related QOL (HRQOL); Dementia assessment for QOL (DEMQOL); Swedish QOL (SWED-QUAL); WHO's Brief QOL (WHOQOL-BREF); Short Form 12 (SF12), 36 (SF36) and 6D (SF6D); Western Ontario and McMaster Short Form (WOMAC-SF); Other (eg, Health Utilities Index)	39 (13.0%)
Other	Organisation's performance evaluation system (130 simple indicators and 50 composite measures); day of admission; maintainability (ie, unexpected event, including deaths, readmission or change in level of care); weight; composite poor outcome (eg, death or readmission); patient safety strategies	30 (10%)
Pain	Presence of pain (acute, chronic); pain score in EQ5D; assessment of pain (yes/no); use of analgesia (yes/no and type)	29 (10%)
Readmissions	15, 28 or 30 days; 2 months, 4 months, monthly; 1 year	26 (9%)
Cognitive	Score or status (eg, mini mental status examination score); depression (yes/no); delirium (yes/no)	25 (8%)
UK's Best Practice Tariff Indicators (BPT)	Admission under consultant-led joint orthogeriatric care; admission using a multidisciplinary assessment protocol; Geriatric-directed multidisciplinary rehabilitation; perioperative assessment by geriatrician or ortho-geriatrician within 72 hours of admission to emergency department; Admission to ward from emergency department within 4 hours; Assessment for falls and bone protection	24 (8%)
Prophylaxis and blood	Antibiotic prophylaxis and anticoagulation (yes/no and type); blood loss (amount); blood transfusion (yes/no)	23 (8%)
Osteoporosis testing and medication	Bone mineral density testing; medication postoperatively or at acute discharge	21 (7%)
Falls	Crude count; prevention (eg, falls prevention programme); assessment for falls risk (in-hospital and postdischarge); Tinetti's fall efficacy scale; self-report falls at various time points postacute discharge	19 (6%)
Healthcare usage	Costs; community services; physical therapy visits (acute and postacute); composite measures (readmission, emergency department visit)	16 (5%)
Nutrition	Compliance with diet/nutrition interventions; vitamin D (amount); assessment (includes time to assessment)	13 (4%)
Biometrics	Neuromuscular assessment or status; muscle strength; muscle contraction; knee specific measures	11 (4%)
Catheters	Catheter yes/no; time to removal	8 (3%)
Patient satisfaction	Questionnaire/interview with various questions (eg, questions about satisfaction with information provided about hospital care)	5 (2%)
Caregivers	Support provided (eg, Social Support Scale); burden and stress (eg, Caregiver Strain Index)	4 (1%)
Self-efficacy	Self-care ability; self-efficacy for exercise	4 (1%)

Table 3 Construct of indicators or potential indicators, stratified by study setting (n and % total N of each construct)

Construct	Acute (n, %N)	Postacute (n, % N)	Across the continuum (n, %N)
Mortality	95 (76%)	6 (5%)	24 (19%)
Time-to	93 (88%)	0 (0%)	13 (12%)
Length of stay	65 (70%)	8 (9%)	20 (22%)
Comorbidities and complications	60 (69%)	2 (2%)	24 (28%)
Functional ability	51 (50%)	22 (26%)	25 (30%)
Discharge destination	38 (59%)	13 (20%)	13 (20%)
Balance and mobility	33 (53%)	12 (19%)	17 (27%)
Quality of life	15 (39%)	9 (22%)	15 (37%)
Other	26 (87%)	0 (0%)	4 (13%)
Pain	17 (59%)	4 (14%)	8 (28%)
Readmissions	15 (58%)	3 (12%)	8 (31%)
Cognitive	17 (68%)	4 (16%)	4 (16%)
Best practice tariff	24 (100%)	0 (0%)	0 (0%)
Prophylaxis and blood	17 (74%)	0 (0%)	6 (26%)
Osteoporosis testing and medication	16 (76%)	2 (10%)	3 (14%)
Falls	14 (74%)	3 (16%)	2 (11%)
Healthcare utilization	8 (50%)	5 (31%)	3 (19%)
Nutrition	10 (77%)	0 (0%)	3 (23%)
Biometrics	2 (18%)	9 (82%)	0 (0%)
Catheters	6 (69%)	0 (0%)	2 (25%)
Patient satisfaction	2 (40%)	0 (0%)	3 (60%)
Caregivers	1 (25%)	1 (25%)	2 (50%)
Self-efficacy	2 (50%)	2 (50%)	0 (0%)

Indicators or potential indicators in postacute: functional ability and quality of life

Most measures of functional ability were validated scores or scales, such as the Functional Independence Measure (FIM),[60–72] the Barthel Index (BI) (or Modified Barthel Index (MBI)),[38 73–91] and the Activity Measure for Post-acute Care (AM-PAC)[34 92] (see online supplementary file 4). Furthermore, change in functional ability (ie, difference in functional ability between two time points)[36 69 70 78 93–97] was only used in 13.0% of studies measuring functional ability (see online supplementary file 4).

Quality of life, similar to functional ability, was measured primarily using validated scores or scales, such as the SF36[38 66 76 87 97–102] (see online supplementary file 5). Some studies used modified validated scales or scores, such as the EuroQOL (European Quality of Life measure which includes EQ5D and a visual analogue scale for pain).[103 104] When quality of life was measured, it varied substantially from 3 to 4 days postoperatively to 1 year after acute care discharge.[76 102 105] Changes in quality of life between two time points (compared to measurement of quality of life at one time point) were not measured in any of the included studies (see online supplementary file 5).

DISCUSSION

The purpose of this study was to synthesise the literature for quality indicators or potential quality indicators for patients with hip fracture within the acute period, postacute period and across the continuum of care. Most studies were from the UK and contained patient-level indicators implemented within the acute care period. There was substantial variability in terms of indicator or potential indicator definitions among studies, particularly in the postacute period. This is particularly evident in the functional ability and quality of life constructs, two outcome constructs that are important to rehabilitation of patients with hip fracture.

The most common process or outcome constructs were those that measured mortality, 'time-to' (eg, time spent in the emergency department on presentation) and length of stay. They were most often implemented in the acute care period. This prevalence may be, in part, due to the fact that these constructs contain measures currently in use as quality indicators in numerous health systems: in-hospital and 30-day mortality, time from emergency department to acute admission and time to surgery.[3 14 24] However, even with respect to these known metrics, there were differences in time and type of measurement between studies. Although these differences may sometimes appear to be nuanced or negligible (eg, whether or not length of acute care stay includes time spent in the emergency department), they can be impactful if the indicator or potential indicators play a role in institutional funding (ie, performance-based funding). Differences in definitions may also be due to changes in best practice that occurred during the study time frame (eg, recommendation of time to surgery within 48 hours compared to time to surgery within 36 hours).[3 24]

This study highlights the lack of indicators or potential indicators implemented within the postacute care period for patients with hip fracture in the literature. This finding supports the conclusions of Duncan and Velozo[39] and Leland and colleagues.[40] Almost 10 years ago, Duncan and Velozo concluded that although validated outcome measures exist in the postacute rehabilitation period, there is a lack of quality indicators to actually assess the care delivered in the USA.[39] Similar conclusions were made more recently by Leland and colleagues, who stated that owing to the limited number of quality of care measures in the postacute period, stakeholders (ie, patients, families, payers and providers) are left without required information to make important decisions for hip fracture rehabilitation in the USA.[106] Two important potential indictors for quality of rehabilitative care in the postacute period that were found in the literature were functional ability and quality of life.

Functional ability and quality of life constructs were very heterogeneous, in terms of potential indicators and indicator definitions, with no dominant measure reported, making comparisons among studies difficult. This also limits the utility of evidence in the development of quality indicators that can be applied to entire health systems and tied to financial models. The heterogeneity between performance measures for hip fracture was also discussed in a review performed by Giusti and colleagues, which concluded that measures for functional ability varied so substantially that results between studies were not comparable.[107]

The results of this study are supported by current literature in other rehabilitation populations. Mont *et al*[108] found that few rating scales assessed all aspects of outcomes (including quality of life, rehabilitative and patient satisfaction) following total knee arthroplasty. A systematic review by Ritchie *et al*[109] on measures of community integration for persons with traumatic brain injury found that more research is needed to inform best practice guidelines. Sleat *et al*[110] reviewed current practice of trauma registries and found that most registries failed to measure outcomes such as morbidity and quality of life, which are needed to drive service improvement in the long term. Rinere O'Brien systematically reviewed the evidence to determine the impact of a new payment system implemented in the USA on quality of care indicators for inpatient stroke rehabilitation and found that lack of data with respect to the quality of care indicators made it difficult to ascertain conclusions.[111]

Recently, however, cardiac rehabilitation (which includes stroke rehabilitation) has made progress in terms of quality indicator development and implementation compared to other rehabilitation populations.[112] Grace *et al*[112] described the creation of quality indicators for cardiac rehabilitation (eg, 'percentage of eligible in-patients referred to a cardiac rehabilitation program' and 'number of days between receipt of referral to a cardiac rehabilitation program and patient enrollment for eligible patients') and secondary prevention through a literature review and consensus process led by the Canadian Cardiovascular Society. These advancements in quality indicators for cardiac rehabilitation can help inform future research and protocols on the development of indicators to assess quality of care delivered to patients with hip fracture and other rehabilitation populations in the postacute period.

This study was not without limitations. First, scoping reviews do not assess study quality and, as such, information extracted from weak and strong studies is considered. Second, non-English studies were not included and there may therefore be a bias towards inclusion of studies performed in English-speaking countries. Third, owing to the considerable amount of time required to conduct scoping reviews, the search was completed 11 months ago and therefore more recent and relevant studies may be excluded. Fourth, inclusion of original research and review articles may have resulted in duplication of some results.

Despite these limitations, this study has several strengths. First, it includes potential indicators and indicators for hip fracture quality of care throughout the entire continuum of care and not just within the acute care period. Second, the literature search was performed by an experienced information scientist, and the screening and extraction were performed completely in duplicate. Third, the search itself was peer-reviewed.

To improve quality of care for patients and create a more efficient healthcare system, mechanisms for the measurement of quality of care are required. The implementation of quality of care indicators enables stakeholders to target areas for improvement in service delivery. Although acute care quality indicators for patients with hip fracture have been implemented in many health systems, there is a paucity of indicators and heterogeneity in potential indicators in the postacute care period. Owing to the requirement for rehabilitation after surgery for patients with hip fracture, the inability to measure quality of care in the postacute period is concerning. Future research should focus on collaborative efforts to decrease indicator heterogeneity as well as to develop a framework for indicators that could be shared globally. This would increase accountability and help ensure that quality care is delivered to patients with hip fracture worldwide.

Author affiliations
[1]Institute of Health Policy, Management, and Evaluation, University of Toronto, Toronto, Ontario, Canada
[2]Toronto Rehabilitation Institute, University Health Network, Toronto, Ontario, Canada
[3]Gerstein Science Information Centre, University of Toronto, Toronto, Ontario, Canada
[4]Department of Physical Therapy, University of Alberta, Edmonton, Alberta, Canada
[5]Department of Surgery, University of Alberta, Edmonton, Alberta, Canada
[6]Department of Medicine, McGill University, Montreal, Quebec, Canada
[7]Bone and Joint Canada, Toronto, Ontario, Canada
[8]Department of Physical Therapy, University of Toronto, Toronto, Ontario, Canada

Acknowledgements The authors thank Ms Saima Hossain, Ms Atiya Hemraj and Ms Julie Zhang for their help in retrieving articles.

Contributors KBP involved in writing protocol, screening for all levels, extraction, synthesis and writing of manuscripts and was the project coordinator. SEPM involved in editing of protocol, screening for all levels, extraction, synthesis and editing manuscripts. LP involved in editing of protocol, search strategy and editing manuscripts. LB contributed to editing of protocol, content expert input (rehabilitation), partial screening level 1 and editing manuscripts. SNM involved in editing of protocol, content expert input (clinical), partial screening level 1 and editing manuscripts. RM contributed to editing of protocol, stakeholder input (BJC), partial screening level 1 and editing manuscripts. SBJ involved in project conception, editing of protocol, partial screening level 1 and editing manuscripts and was the senior responsible investigator.

Funding This work was supported by a Technology Evaluation in the Elderly Network Knowledge Synthesis Grant # 2013–07, which is funded federally through the National Centers of Excellence.

Competing interests None declared.

Provenance and peer review Not commissioned; externally peer reviewed.

Data sharing statement Further details on studies included in this scoping review can be retrieved by contacting the corresponding author at kristen.pitzul@mail.utoronto.ca.

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