

Clinician perspectives on nonoperative management of hip fractures during COVID-19

AN INTERNATIONAL SURVEY

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Aims

To identify factors influencing clinicians' decisions to undertake a nonoperative hip fracture management approach among older people, and to determine whether there is global heterogeneity regarding these factors between clinicians from high-income countries (HIC) and low- and middle-income countries (LMIC).

Methods

A SurveyMonkey questionnaire was electronically distributed to clinicians around the world through the Fragility Fracture Network (FFN)'s Perioperative Special Interest Group and clinicians' personal networks between 24 May and 25 July 2021. Analyses were performed using Excel and STATA v16.0. Between-group differences were determined using independent-samples *t*-tests and chi-squared tests.

Results

A total of 406 respondents from 51 countries answered the questionnaire, of whom 225 came from HIC and 180 from LMIC. Clinicians from HIC reported a greater median and mean estimated proportion of admitted patients with hip fracture undergoing surgery (median 96% (interquartile range (IQR) 95% to 99%); mean 94% (SD 8%)) than those from LMIC (median 85% (IQR 75% to 95%); mean 81% (SD 16%); $p < 0.001$). Global heterogeneity seems to exist regarding factors such as anticipated life expectancy, insufficient resources, ability to pay, treatment costs, and perception of risk in hip fracture management decision-making.

Conclusion

This study represents the first international sampling of clinician perspectives regarding nonoperative hip fracture management. Several factors seemed to influence the clinician decision-making process. Further research is needed to inform the development of best practice guidelines to improve decision-making and the quality of hip fracture care among older people.

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Introduction

Hip fractures among older people are associated with substantial morbidity and mortality, and are viewed as a worldwide epidemic.^{1,2} Globally, over 1.66 million hip fractures occur annually, costing more than \$10 billion per year in the USA alone.³ The

annual incidence of hip fractures is projected to increase to 6.26 million worldwide by 2050, in part due to the ageing population.⁴ Hip fractures can be managed operatively or nonoperatively. Nonoperative management of hip fracture includes bed rest/traction or early weight-bearing and mobilization.⁵

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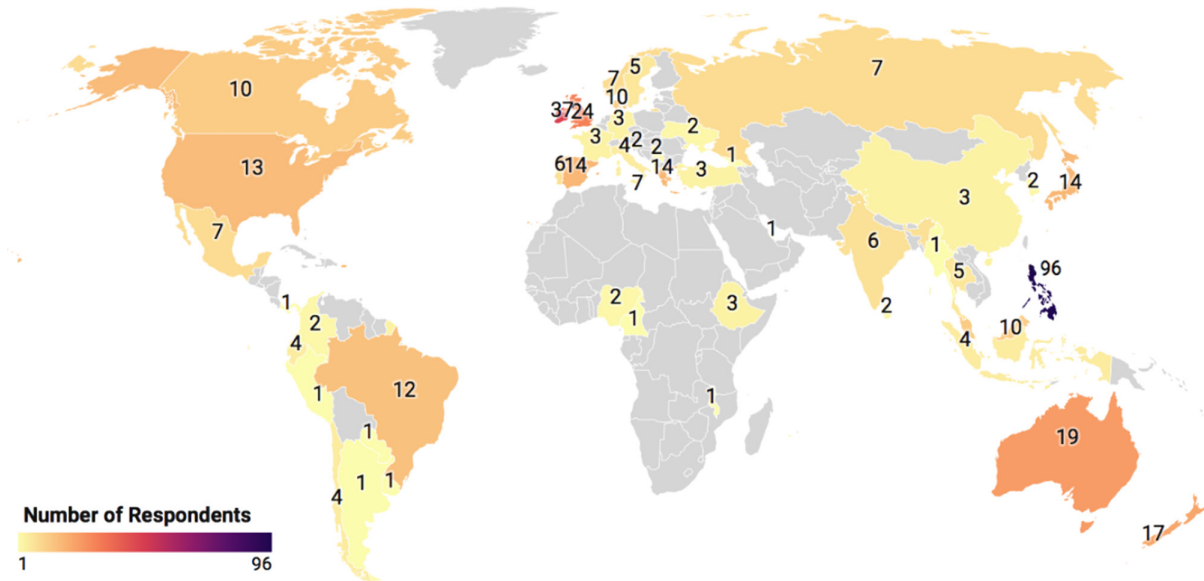


Fig. 1

Respondent work location (by country).

There is relatively little high-quality research comparing operative and nonoperative management, although some studies have compared cost and mortality rates, prognosis, functional rehabilitation, and radiological and clinical outcomes between hip fracture operative and nonoperative management.^{2,6-11} To our knowledge, there are no national or international practice guidelines regarding the precise role and decision-making of nonoperative hip fracture management. There are cultural, social, structural, and economic differences between healthcare systems across the world, and these are likely to result in differing approaches to nonoperative management.

The objectives of this study were to identify factors influencing clinicians' decisions to undertake a nonoperative hip fracture management approach among older people, and to determine whether there is global heterogeneity regarding these factors between clinicians from high-income countries (HIC) and low- and middle-income countries (LMIC). It is hypothesized that global heterogeneity may be present between clinicians from HIC and LMIC.

Methods

Study design. A cross-sectional study was conducted to assess clinician perspectives and determinants of decision-making on nonoperative hip fracture management in older adults. An online English-language survey/questionnaire instrument was designed using SurveyMonkey.¹² The survey scope and question formats were developed by IKM and LM with input from an international multi-professional group to ensure content relevance, understanding, and coverage. The questions

were all piloted with clinicians from HIC and LMIC areas before release. No personally identifying information was collected.

Sampling/respondent recruitment. The questionnaire was electronically distributed to any clinician working with patients with a hip fracture around the world through the Fragility Fracture Network (FFN)'s Perioperative Special Interest Group and clinicians' personal networks between 24 May and 25 July 2021. Advertising at conferences was also used to increase participation. National leads were encouraged to share the survey links to relevant contacts, and the survey was widely advertised through social media.

Survey instrument. The questionnaire included 28 questions grouped into the following domains: respondent and population (demographic) characteristics, estimated epidemiology, medical reasons, external influences, and clinical decision-making (Supplementary Material). Demographic characteristic questions consisted of geographical work location, speciality, and type of work setting. Questions assessing clinical decision-making focused on reasons to not operate on a person with hip fracture, including patient age, cognitive status, frailty, socioeconomic factors, surgical factors, resource availability, acute and chronic medical comorbidities, life expectancy, use of risk stratification tools, and perception of risk. Additionally, questions relating to patient and family wishes, cultural or religious views, and professional judgment of the clinicians in the context of a patient with and without the capacity to make informed decisions were assessed.

Statistical analysis. Based on the geographical distribution of the responses, respondents were grouped

Table 1. Demographics of respondents and patient population.

Respondent demographics	Combined, n (%)	HIC, n (%)	LMIC, n (%)
Speciality (n = 405)			
Physicians	378 (93.3)	205 (91.9)	173 (45.8)
Nursing	17 (4.2)	10 (4.5)	7 (3.1)
Allied health professionals (physical therapy, occupational therapy)	8 (2.0)	7 (3.1)	1 (0.4)
Academia	2 (0.5)	1 (0.4)	1 (0.4)
Total	405 (100)	223 (55.1)	182 (44.9)
Work location (n = 526)			
Acute hospital	317 (60.3)	207 (75.3)	110 (40.0)
University/college	80 (15.2)	31 (11.3)	49 (17.8)
Government agency	47 (8.9)	6 (2.2)	41 (14.9)
Outpatient department & rehabilitation centre	42 (8.0)	16 (5.8)	26 (10.4)
Inpatient rehabilitation centre	20 (3.8)	12 (4.4)	8 (3.2)
Long-term care facility/nursing home/residential care	8 (1.5)	3 (1.1)	5 (2.0)
Private institutions (hospital, clinic, office)	11 (2.1)	0 (0)	11 (4.4)
Military hospital	1 (0.2)	0 (0)	1 (0.4)
Total*	526 (100)	275 (52.3)	251 (47.7)
Patient demographics			
Approximate number of admissions to institution with hip fracture annually (n = 401)			
0 to 50	102 (25)	15 (7)	87 (49)
51 to 150	71 (18)	34 (15)	37 (21)
151 to 300	85 (21)	60 (27)	25 (14)
301 to 500	83 (21)	71 (32)	12 (7)
501 to 4500	60 (15)	43 (19)	17 (10)
Total	401 (100)	223 (56)	178 (44)
Mean (SD)	320 (452)	409 (451)	211 (433)
Median (IQR)	220 (50 to 400)	350 (200 to 500)	60 (30 to 200)
Approximate proportion (%) of people with hip fracture admitted to institution (n = 246)			
≤ 50	58 (24)	16 (10)	42 (47)
51 to 90	57 (23)	21 (13)	36 (40)
91 to 99	43 (17)	38 (24)	5 (6)
100	88 (36)	82 (52)	6 (7)
Total	246 (100)	157 (64)	89 (36)
Mean (SD)	78 (30)	89 (23)	57 (29)
Median (IQR)	95 (60 to 100)	100 (95 to 100)	60 (30 to 80)
Approximate proportion (%) of hip fracture admissions undergoing surgery (n = 395)			
≤ 50	25 (7)	2 (1)	23 (13)
51 to 75	56 (14)	8 (4)	48 (27)
76 to 90	99 (25)	43 (20)	56 (32)
91 to 99	176 (45)	147 (67)	29 (16)
100	39 (10)	18 (8)	21 (12)
Total	395 (100)	218 (56)	177 (44)
Mean (SD)	88 (14)	94 (8)	81 (16)
Median (IQR)	95 (80 to 98)	96 (95 to 99)	85 (75 to 95)
Data source (n = 399)			
Best guess	277 (69)	139 (63)	138 (78)
Systematic audit/data collection	122 (31)	83 (37)	39 (22)
Total	399 (100)	222 (56)	177 (44)

*Some settings have multiple departments.

HIC, high-income countries; IQR, interquartile range; LMIC, low- and middle-income countries; SD, standard deviation.

into two categories using the World Bank Country Classification:¹³ HIC and LMIC. The LMIC group contained

low-, lower-middle-, and upper-middle-income countries to have a sufficiently large group sample size for analysis.

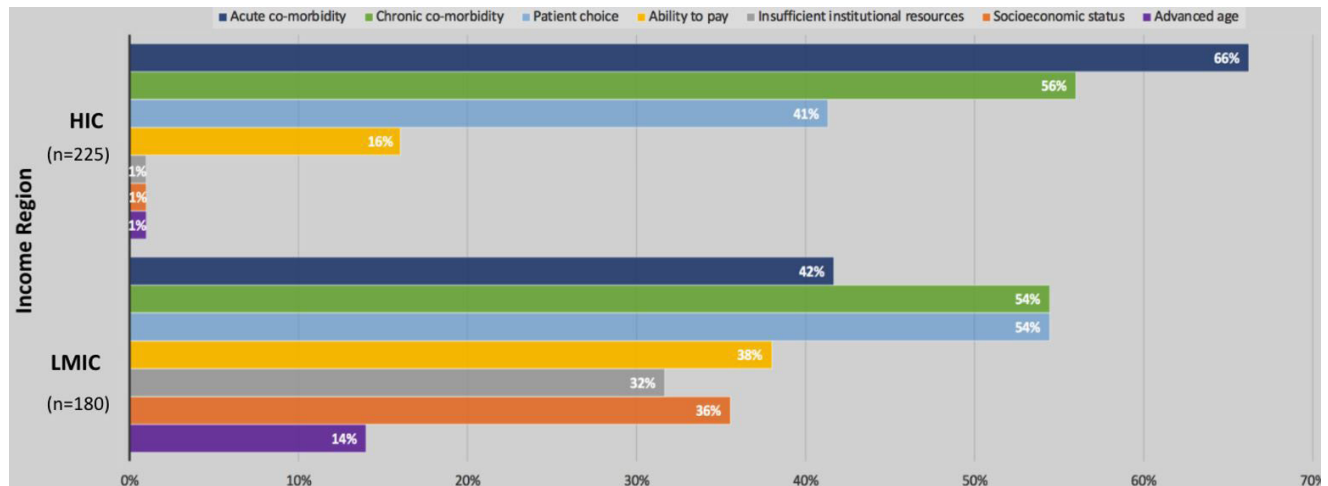


Fig. 2

Factors influencing clinician hip fracture management decision-making. HIC, high-income countries; LMIC, low- and middle-income countries.

Survey data were exported to Microsoft Excel (Microsoft, USA) and Stata v16.0 (StataCorp, USA) to facilitate data visualization and quantitative analysis. Proportions and statistical analyses using independent-samples *t*-tests and chi-squared tests were performed to determine between-group differences. Statistical significance was set at the 5% level.

Results

Demographics. A total of 406 respondents from 51 countries answered the questionnaire (Figure 1). Of these, 225 respondents came from HIC and 180 respondents from LMIC. One questionnaire was partially completed and excluded from analysis as only one question was answered.

A total of 378 respondents (93.3%) were physicians, and 27 (6.7%) were nurses, allied health professionals (physical therapists and occupational therapists), or other. Most (245/406, 60%) respondents reported working in an acute care hospital. The median (interquartile range (IQR)) estimated number of admissions was greater for clinicians from HIC (350 (IQR 200 to 500)) versus LMIC (60 (IQR 30 to 200)). Clinicians from HIC reported a greater median and mean estimated proportion of admitted patients with hip fracture undergoing surgery (median 96% (IQR 95% to 99%); mean 94% (SD 8%)) than those from LMIC (median 85% (IQR 75% to 95%); mean 81% (SD 16); $p < 0.001$, independent-samples *t*-test) (Table I).

The survey was sent through multiple email channels. SurveyMonkey as well as provider/organization email systems do not have a feature that displays the number of individuals that have seen the survey post-advertisement, which limits our ability to estimate and makes it impossible to calculate the response rate.

Factors influencing clinician hip fracture management decision-making. The three most commonly selected

reasons for choosing nonoperative hip fracture management were identical among HIC and LMIC clinicians: acute comorbidity, chronic comorbidity, and patient choice. LMIC clinicians were more likely to select insufficient resources, socioeconomic status of the patient, and the patient's ability to pay as common reasons to undergo nonoperative hip fracture management than HIC clinicians (Figure 2) ($\chi^2 = 42.8$, $p < 0.001$, chi-squared test).

Among survey respondents who identified as surgeons, 26% from HIC and 29% from LMIC responded that the pattern of hip fracture did influence their decision to not operate on a hip fracture. Stable hip fractures were most likely to receive nonoperative treatment in both groups, while extracapsular hip fractures were noted to undergo operative treatment. There was no statistically significant difference between these two groups ($\chi^2 = 0.343$, $p = 0.558$, chi-squared test).

Clinicians from both HIC and LMIC most frequently reported the use of the American Society of Anesthesiologists (ASA) physical status score,¹⁴ followed by the Clinical Frailty Score,¹⁵ as risk stratification tools. There was no statistically significant difference between HIC and LMIC clinicians across all tools ($\chi^2 = 5.04$, $p = 0.284$, chi-squared test). Patient age, however, was reported as being used more frequently in hip fracture nonoperative management decision-making in LMIC (17%) compared to HIC (3%) (Figure 3).

HIC clinicians responded that they were more likely to undergo nonoperative hip fracture management if a patient's anticipated life expectancy was of a shorter duration (i.e. < 24 hours, < seven days), whereas LMIC clinicians had a more even distribution of responses across all anticipated life expectancy durations ($p < 0.001$) (Figure 4).

HIC clinicians were less likely to report hip fracture treatment costs as a factor influencing the decision

Table II. Acute and chronic medical comorbidities on decision to operate on a hip fracture.

Comorbidities	Combined, n (%)	HIC, n (%)	LMIC, n (%)
Acute medical conditions			
Cognitive function (delirium)			
Mild delirium	1 (0.2)	0 (0)	1 (1)
Moderate delirium	16 (4)	1 (1)	15 (8)
Severe delirium	102 (26)	24 (11)	78 (44)
Decision to operate is not influenced by delirium	269 (69)	186 (88)	83 (47)
Total	388 (100)	211 (54)	177 (46)
Acute kidney injury			
Acute kidney injury requiring dialysis	96 (25)	28 (13)	68 (40)
Decision to operate is not influenced by delirium	284 (75)	181 (87)	103 (60)
Total	380 (100)	209 (55)	171 (45)
Infection			
Current infection in the same leg (e.g. diabetic foot infections)	110 (16)	30 (13)	80 (44)
Urinary infection	59 (9)	19 (8)	40 (22)
Current asymptomatic COVID-19 infection	55 (8)	14 (6)	41 (23)
Current symptomatic COVID-19 infection	153 (22)	55 (24)	98 (54)
Pneumonia	145 (21)	54 (24)	91 (51)
Decision to operate is not influenced by infection	171 (25)	123 (55)	48 (27)
Total*	693 (100)	295 (43)	398 (57)
Chronic medical conditions			
Cognitive function (dementia)			
Mild dementia	1 (0.3)	0 (0)	1 (1)
Moderate dementia	0 (0)	0 (0)	0 (0)
Advanced dementia	135 (36)	66 (32)	69 (42)
Decision to operate is not influenced by dementia	235 (63)	141 (68)	94 (57)
Total	371 (100)	207 (56)	164 (44)
Frailty			
Inability to perform self-care activities of daily living (ADLs)	46 (12)	12 (6)	34 (18)
Advanced frailty	161 (41)	83 (41)	78 (41)
Decision to operate is not influenced by frailty	187 (47)	109 (53)	78 (41)
Total	394 (100)	204 (52)	190 (48)
Cardiovascular disease (CVD)			
Permanent pacemaker	8 (1)	0 (0)	8 (4)
Implanted cardioverter-defibrillator (ICD)	15 (2)	0 (0)	15 (7)
Moderate mitral regurgitation	9 (1)	0 (0)	9 (4)
Severe mitral regurgitation	64 (10)	16 (7)	48 (21)
Moderate aortic stenosis	13 (2)	0 (0)	13 (6)
Severe aortic stenosis	117 (19)	47 (21)	70 (31)
Moderate heart failure	25 (4)	2 (1)	23 (10)
Severe heart failure	244 (40)	113 (50)	131 (58)
Decision to operate not influenced by chronic CVD	122 (20)	93 (41)	29 (13)
Total*	617 (100)	271 (44)	346 (56)
Malignancy/cancer			
Well-controlled malignancy/cancer within last 5 yrs generally a contraindication to surgery	1 (0.3)	0 (0)	1 (1)
End-stage malignancy/cancer under hospice or palliative care	165 (44)	86 (42)	79 (45)
Metastatic/locally advanced disease generally a contraindication to surgery	55 (15)	17 (8)	38 (22)
Decision to operate not influenced by active malignancy	157 (42)	101 (50)	56 (32)
Total	378 (100)	204 (54)	174 (46)
Chronic kidney disease (CKD)			
Dialysis-dependent CKD	56 (15)	8 (4)	48 (28)
Other threshold of CKD	18 (5)	4 (2)	14 (8)
Decision to operate Not influenced by CKD	296 (80)	189 (94)	107 (64)
Total	370 (100)	201 (54)	169 (46)

*Respondents were able to select more than one response.

HIC, high-income countries; LMIC, low- and middle-income countries.

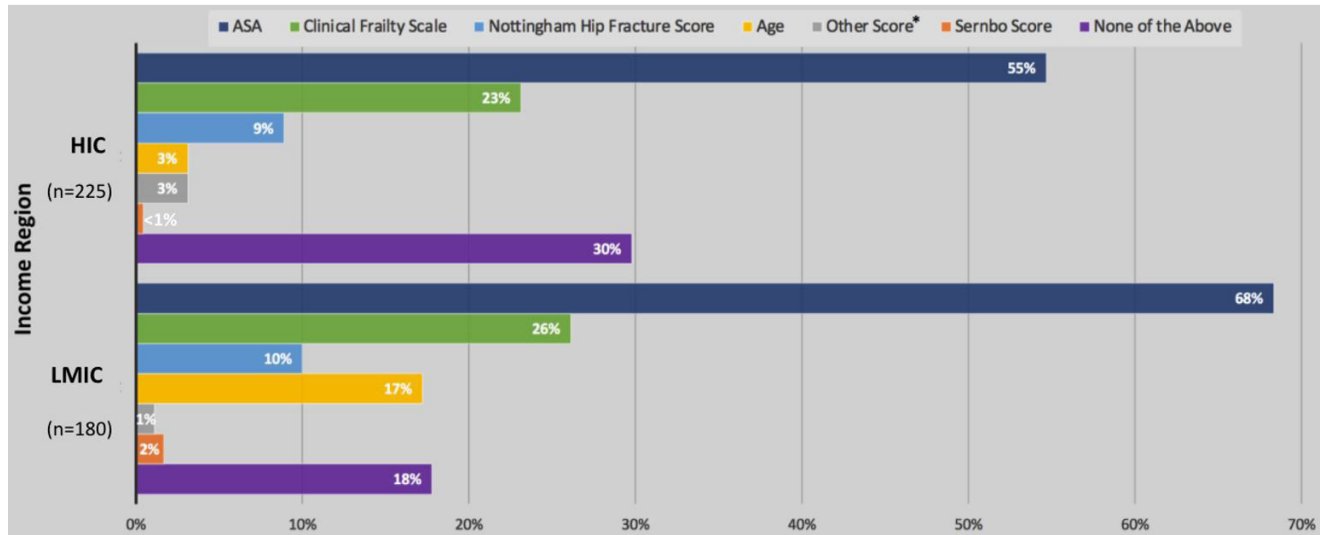


Fig. 3

Use of risk stratification tools to support nonoperative hip fracture management. ASA, American Society of Anesthesiologists; HIC, high-income countries; LMIC, low- and middle-income countries.

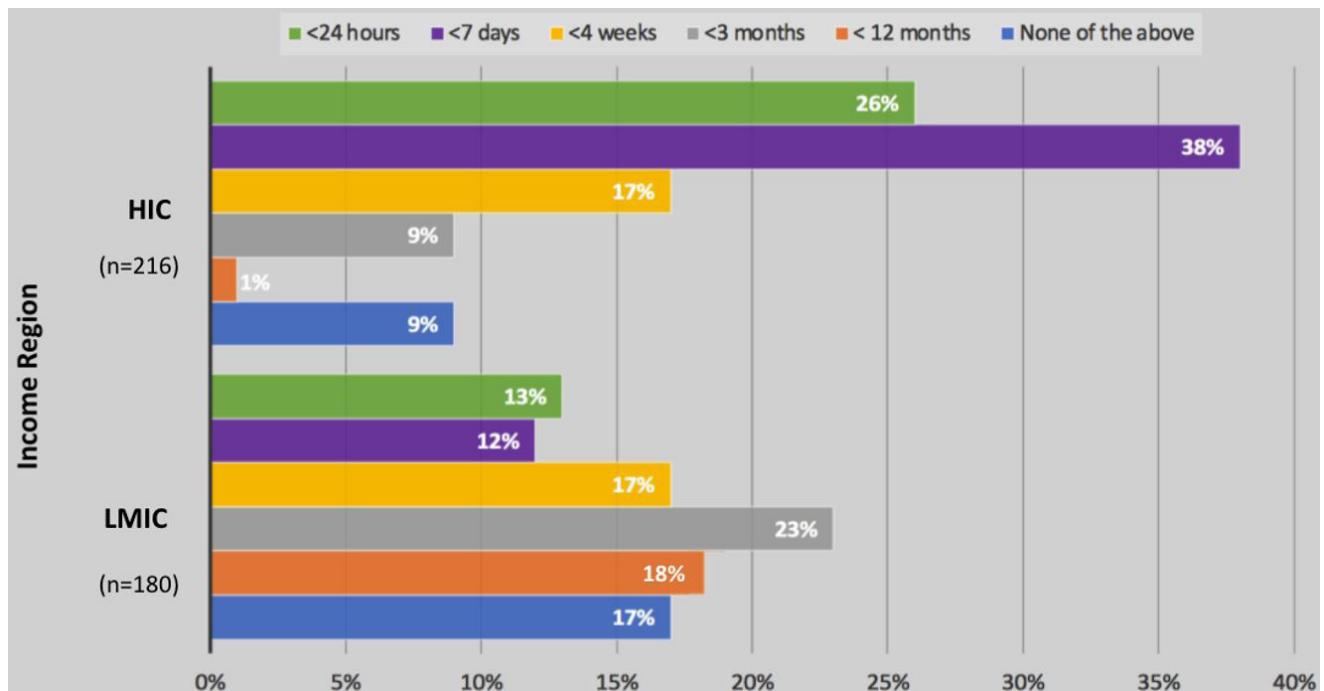


Fig. 4

Decision to undergo nonoperative hip fracture management by patient's anticipated life expectancy. HIC, high-income countries; LMIC, low- and middle-income countries.

to undergo nonoperative hip fracture management compared to LMIC clinicians. The difference between HIC and LMIC clinicians was statistically significant for both factors looking at the patient and/or family's inability or unwillingness to pay ($\chi^2 = 201.6$, $p < 0.001$, chi-squared test) as well as insufficient hospital resources ($\chi^2 = 149.2$, $p < 0.001$, chi-squared test) (Figure 5). Across all potential sources of insufficient hospital resources, LMIC clinicians

had a higher reporting frequency of insufficient resources compared to HIC clinicians. Equipment, operating time, and hospital bed availability were more frequently listed as insufficient resources compared to staffing resources (nurse, surgeon, and anaesthetist availability) among LMIC clinicians (Figure 6).

In the context of a patient with a hip fracture able to make their own decisions, HIC and LMIC clinicians seemed to be

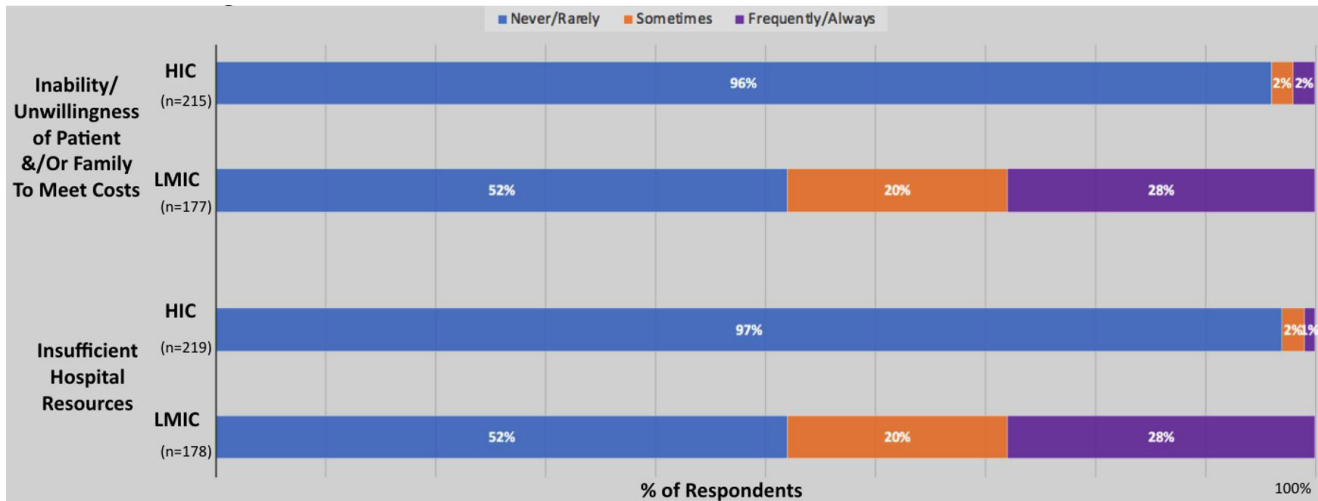


Fig. 5

Treatment costs and insufficient resources on nonoperative hip fracture management decision-making. HIC, high-income countries; LMIC, low- and middle-income countries.

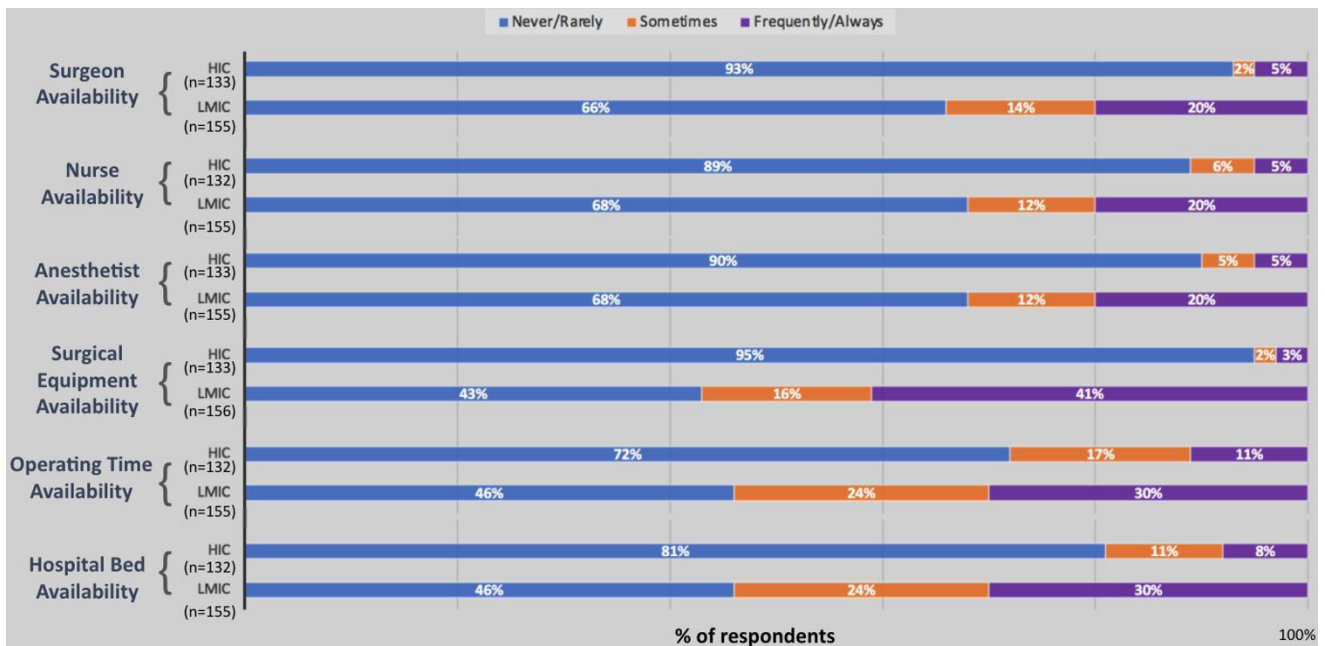


Fig. 6

Sources of insufficient resources on nonoperative hip fracture management decision-making. HIC, high-income countries; LMIC, low- and middle-income countries.

in agreement regarding the importance of factors such as clinician professional judgment and patient thoughts and wishes (Figure 7). However, family thoughts and wishes as well as the cultural and religious views of the patient were more frequently reported to be important among LMIC clinicians compared to HIC clinicians ($p = 0.010$, independent-samples t -test). In the context of a patient with a hip fracture unable to make their own decisions, there are no statistically significant differences among the same factors between HIC and LMIC clinicians ($\chi^2 = 10.6$, $p = 0.227$, chi-squared test) (Figure 8).

Among acute medical conditions, a minority of clinicians reported that the decision to operate was influenced by a patient's cognitive status (delirium) (31%, $n = 119$) and acute kidney injury (25%, $n = 96$). A large majority (75%, $n = 522$) of clinicians reported overall that infections influenced the decision to provide nonoperative management. A minority of clinicians reported that the decision to operate was influenced by a patient's cognitive status (dementia) (37%, $n = 135$) and chronic kidney disease (20%, $n = 74$). Notably, 80%, 58%, and 53% ($n = 495$, $n = 221$, $n = 207$) of clinicians reported

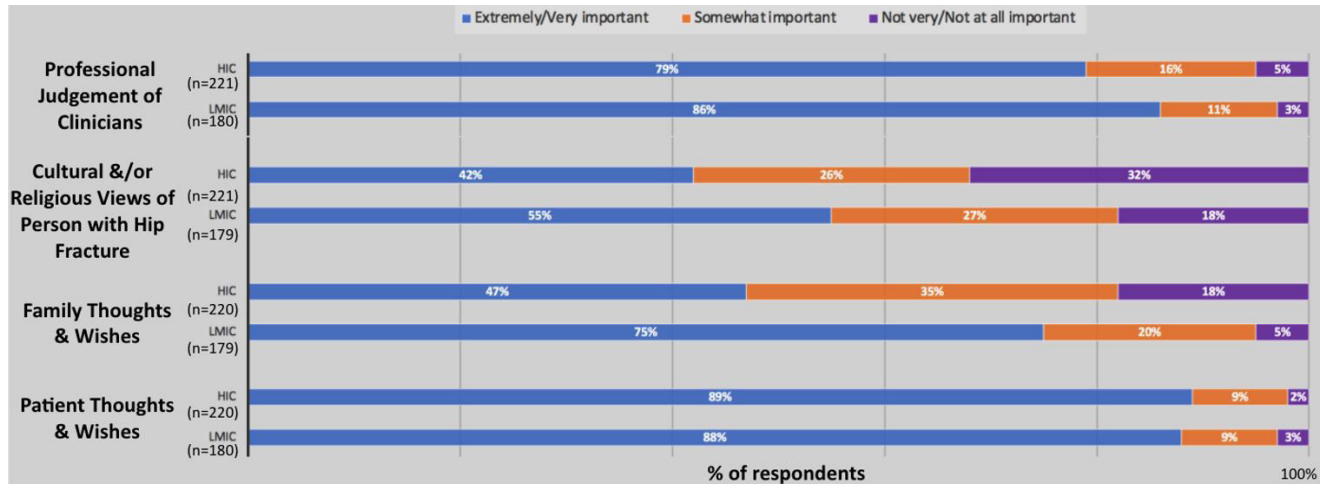


Fig. 7

Factors affecting nonoperative hip fracture management in patients with capacity (i.e. able to make their own decisions). HIC, high-income countries; LMIC, low- and middle-income countries.

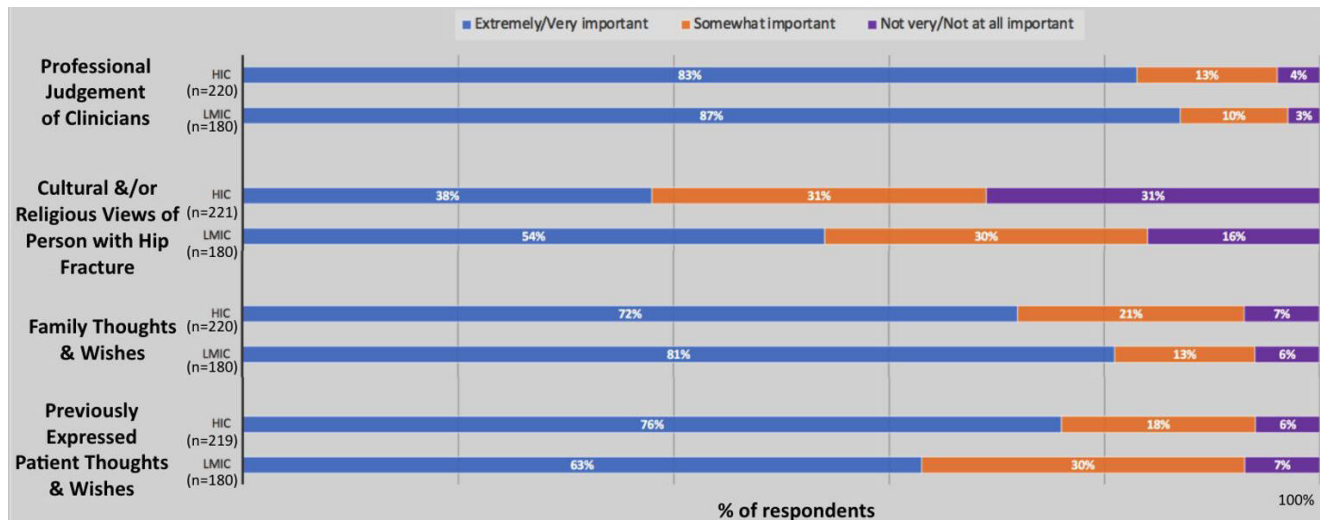


Fig. 8

Factors affecting nonoperative hip fracture management in patients without capacity (i.e. unable to make their own decisions). HIC, high-income countries; LMIC, low- and middle-income countries.

that cardiovascular disease, malignancy/cancer, and frailty, respectively, did influence the decision to operate. There were no statistically significant differences between HIC and LMIC clinicians across all acute ($p = 0.184$) and chronic medical conditions ($p = 0.251$, both independent-samples t -test) (Table II).

Clinicians from LMIC were more likely to report that the perception of risk to the individual clinician (51%, $n = 92$) and to the institution (40%, $n = 72$) if the patient were to die influenced their decision to not operate on a hip fracture compared to clinicians from HIC, at 14% and 12%, respectively ($\chi^2 = 55.7707$, $p < 0.001$, chi-squared test). Across all potential sources of risk to the individual clinician (colleagues, coroner, law enforcement, internal hospital managers, external hospital regulators, and media) and to the institution (law enforcement, external

hospital regulators, media, and coroner), except for coroner, LMIC respondents reported a higher frequency of perceived risk compared to HIC respondents. The differences between groups for all sources of risk were statistically significant ($p < 0.05$), except for coroner ($p = 0.381$ for risk to the clinician; $p = 0.074$ for risk to the institution, all independent-samples t -test).

Discussion

This study represents the first international survey of clinician perspectives on nonoperative hip fracture management, with 51 participating countries. There seems to be some agreement among HIC and LMIC survey respondents on factors influencing hip fracture management decision-making such as the presence of acute and chronic comorbidities, the type of hip fracture pattern,

the use of risk stratification tools, and patient thoughts and wishes.

The estimated proportion of patients presenting to hospital with hip fracture, and the estimated proportion receiving surgical management, were lower among LMIC respondents than those from HIC. Although such data are sparsely reported, these have face validity, and accord with national registries and published case series from HIC^{16,17} and LMIC.¹⁸

Several domains that might influence nonoperative decision-making were considered. Fracture pattern influences were predominantly, although not entirely, related to stable fracture patterns. Clinicians from both HIC and LMIC evaluated the risks and benefits for the patient in undergoing operative hip fracture management to be important factors in decision-making, especially when other acute or chronic medical comorbidities were present. The impact of acute medical conditions appears qualitatively similar between HIC and LMIC countries. Clinicians noted that there was a tendency to wait for clearance from a specialist (i.e. nephrologist for kidney injury, geriatrician for frailty assessment, etc.), and to delay surgery until the acute infection was treated and stable before undergoing hip fracture surgery. The influence of chronic conditions – including age, dementia, frailty, and perceived life expectancy – appeared to be different between HIC and LMIC, with LMIC clinicians appearing to take these factors into account more than those from HIC. Differences seem to exist between HIC and LMIC clinicians regarding factors such as anticipated life expectancy, insufficient resources, ability to pay, treatment costs, and the perception of risk in hip fracture management decision-making.

Importantly, the nature of the survey did not allow us to explore the strength of influence of these factors for individual patients. For patients who lacked the capacity to make their own decisions, the perspective of the patient's family seemed to play a more central role in nonoperative hip fracture management decision-making among LMIC clinicians compared to HIC. Resource availability was a clear, and unsurprising, difference between HIC and LMIC response. Of note, external factors such as external perceptions from managers and external agencies appeared to have a greater influence in LMIC respondents than HIC.

Among all clinicians, the hip fracture injury seemed to never be considered in isolation, suggesting that other factors did influence the decision-making process on the type of management for the patient. Taken together, these results suggest that there are multifactorial reasons why those with hip fractures are more likely to receive surgery in HIC than in LMIC. Although operating on almost all people with hip fracture is viewed as the correct course of action in many HIC (particularly north European) healthcare settings, this does not necessarily

mean that this is the correct approach across all settings. While there is considerable debate on the comparative clinical outcomes for operative and nonoperative hip fracture management,^{9,19} further prospective studies are necessary to determine when to undergo which type of hip fracture management.

There are limitations inherent in our survey approach, which was chosen to maximize responses and applicability to all settings at the expense of richer exploration as might have been achieved through interviews or the use of case vignettes.

It is important to note that the survey data collection period was during the global COVID-19 pandemic. Since its onset, to mitigate potential transmission risk to staff and patients, conservative management has been advised in certain settings.²⁰ These practices may change following the pandemic, potentially leading to a shift back towards operative hip fracture management. Additionally, responses to questions on the availability of institutional resources will have been impacted by the course of the pandemic.

This survey does not fully capture the variability across individual clinician local contexts, and it does not capture every possible factor influencing clinician decision-making regarding hip fracture management. Further investigation into other factors such as patients' previous functional status level, availability of palliative care and community resources, patient's desire to live, etc., as well as potential hypothetical scenarios can be explored in future questionnaires.

As for any online voluntary surveys, response rate and response bias must be considered. There were more responses from HIC clinicians, with the majority of the responses from LMIC coming from the Philippines ($n = 96$). A larger sample size among both groups may aid in further discerning the commonalities and differences between HIC and LMIC clinician responses. Although geographical spread was wide, the number of responses from individual countries was relatively small, precluding per country analysis. Additionally, the number of responses from World Bank Regions was disproportionate, precluding a World Bank regional analysis. It is also likely that, particularly in LMIC settings, responses may have come from those with particular interest (and resources) to manage hip fracture.

In conclusion, this study represents the first international sampling of clinician perspectives regarding nonoperative hip fracture management. When considering the type of hip fracture management for a patient, other factors seemed to influence the clinician decision-making process. Global heterogeneity seems to exist between HIC and LMIC clinicians regarding factors such as anticipated life expectancy, insufficient resources, ability to pay, treatment costs, and perception of risk in hip fracture management decision-making. There seems

to be some agreement among HIC and LMIC clinicians on factors such as the presence of acute and chronic comorbidities, type of hip fracture pattern, use of risk stratification tools, and patient thoughts and wishes. Further research needs to be conducted to inform the development of best practice guidelines to improve hip fracture management decision-making and the quality of hip fracture care among older people.



Take home message

- This study represents the first international sampling of clinician perspectives regarding nonoperative hip fracture management.

- Continued research is needed to inform the development of best practice guidelines to improve decision-making and the quality of hip fracture care among older people.

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Supplementary material



The supplementary material includes the questions used in this survey.

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