Research article

Nonmedical problems among older adults visiting the emergency department for low acuity conditions: A prospective multicentre cohort study

Katherine Tanguay [a,b], Alexandra Nadeau [b,c], Audrey-Anne Brousseau [d], Patrick M. Archambault [a,c,e], Pierre-Hugues Carmichael [f], Marcel Emond [a,b,c], Jean-Francois Deshaies [d], Marie-Josée Sirois [b], Fabrice I. Mowbray [g], Pierre-Gilles Blanchard [a,b,c], Eric Mercier [a,b,c,*]

[a] Département de médecine familiale et de médecine d'urgence, Faculté de médecine, Université Laval, Québec, QC, Canada
[b] Centre de recherche du CHU de Québec - Université Laval, Axe santé des populations et pratiques optimales en santé, Québec, Canada
[c] VITAM – Centre de recherche en santé durable, Québec, QC, Canada
[d] Département de médecine de famille et de médecine d'urgence, Faculté de médecine et sciences de la santé, Université de Sherbrooke, Sherbrooke, QC, Canada
[e] Centre de recherche intégrée pour un système apprenant en santé et services sociaux, Centre intégré de santé et de services sociaux de Chaudière-Appalaches, Lévis, QC, Canada
[f] Centre de recherche du CHU de Québec - Université Laval, Axe de recherche en vieillissement, Québec, QC, Canada
[g] College of Nursing, Michigan State University, East Lansing, MI, USA

A B S T R A C T

Background: Data on the predictors of nonmedical problems (NMP) in older adults attending the emergency department (ED) for low acuity conditions is lacking and could help rapid identification of patients with NMP and integration of these needs into care planning.
Objectives: To determine the prevalence and predictors of NMP among older adults attending EDs for low acuity conditions.
Methods: Prospective cohort study in eight EDs (May–August 2021). We included cognitively intact ≥65 years old adults assigned a low triage acuity (3–5) using the CTAS. A questionnaire focusing on 11 NMP was administered. We used multiple logistic regression to identify predictors of NMP.
Results: Among the 1,061 participants included, the mean age was 77.1 ± 7.6, majority were female, and 41.6 % lived alone. At least one NMP was reported by 704 persons. Prevalence of each NMP: outdoor (41.1 %) and indoor (30.2 %) mobility issues, difficult access to dental care (35.1 %), transportation (4.1 %) and medication (5.4 %), loneliness (29.5 %), food insecurity (10.3 %), financial difficulties (9.5 %), unsafe living situation (4.1 %), physical/psychological violence (3.4 %), and abuse/neglect (3.3 %). Predictors of NMP were: age (OR 1.04 for each additional year), living alone (OR 2.20), pre-existing mental health conditions (OR 3.12), heart failure (OR 1.42), recent surgery/admission (OR 1.75), memory decline (OR 2.76), no family physician (OR 1.74) and consulting for a fall/functional decline (OR 2.48).
Conclusions: Nonmedical problems are frequent among older adults. We need to implement holistic ED processes that integrate these problems into care planning.

1. Introduction

The population of older adults will keep rising in the upcoming years, with the number of people ≥60 years old doubling and those

* Corresponding author. VITAM – Centre de recherche en santé durable, 1401, 18e rue, Quebec, Quebec, G1J 1Z4, Canada.
E-mail address: eric.mercier@fmed.ulaval.ca (E. Mercier).

≥80 years old tripling by 2050 [1]. Population ageing is associated with undeniable consequences on the health care system [2]. Emergency departments (EDs) are particularly impacted as they are a prominent gateway to the health care system, especially for vulnerable older adults who have the highest health services utilization rate [3].

Older adults presenting to the ED have varying health status [4], and while aging is not directly linked to worse health or functional capacities, older adults are at increased risk for disease and disability, which have repercussions on their health care use [3]. Older adults' presenting complaints in the ED are often influenced by chronic and pre-morbid conditions as well as pre-visit community support needs [3]. Nonmedical problems such as financial difficulties, social isolation, loneliness, food insecurity and difficult access to transportation, are common in community-dwelling older adults and impact their quality of life [5]. For instance, poor access to transportation has been directly linked to unmet healthcare needs [6]. Mobility issues are associated with decreased quality of life and are likely frequent in older patients attending the ED [5,7].

Older adults have the highest rates of ED utilization [8]. Compared to younger adults, older patients are more likely to arrive by ambulance, to get more diagnostic tests, to stay longer in the ED, and are less likely to have a medical diagnosis at discharge [9]. They are also more likely to be admitted [10]. Nonmedical problems undoubtedly contribute to these differences. Clinical outcomes of older adults are less favorable, and literature shows that they are more at risk of functional decline, hospitalization, ED revisit and death, in the six months following the index ED visit. Unmet psychological and social needs are associated with poorer outcomes [9,11,12].

Nonmedical problems are however infrequently addressed by emergency clinicians despite their strong association with adverse outcomes and increased health care system utilization following discharge [5,12,13]. Historically, EDs have been designed to care for high-acuity patients and are poorly suited for complex and low acuity conditions [14]. Compared to younger patients, older adults tend to use the ED more frequently for non-urgent conditions, but are 16 times more likely to be admitted to the hospital [15]. Disease-oriented ED models of care need to evolve and use a holistic approach when addressing the complex, and often non-emergent, conditions of vulnerable populations such as older adults [16–19]. Robust data on the prevalence and predictors of nonmedical problems in older adults attending the ED for low acuity conditions is currently lacking and could help rapid identification of patients with nonmedical problems and integration of these needs into care planning.

Our primary objective was to determine the prevalence and predictors of nonmedical problems among older adults attending the ED for low acuity conditions. Considering the high utilization rate of acute care resources by older adults, we can hypothesize that the prevalence of nonmedical problems in this population is high and that some easily assessable factors can be associated with the presence of these problems.

2. Methods

2.1. Study design and setting

We conducted a prospective multicentre study including older adults who presented to one of eight university-affiliated EDs (Hôpital de l'Enfant-Jésus, Hôpital Saint-François d'Assise, Centre Hospitalier de l'Université Laval, Hôpital du Saint-Sacrement, Hôtel Dieu de Québec; Hôtel-Dieu de Lévis, Centre hospitalier universitaire de Sherbrooke - Hôtel-Dieu and Fleurimont sites). Yearly attendance in these EDs ranges between 30 000 to 70 000 visits per year. These EDs are located in three different and distant regions of our province. They are all publicly funded and offer free services. The results are reported in accordance with the Strengthening the reporting of observational studies in epidemiology (STROBE) statement [20] (Appendix 1).

2.2. Selection of participants

We included adults ≥65 years old, well-oriented in time (exact month and year) and who attended the ED for low acuity conditions which were defined by a Canadian Triage and Acuity Scale (CTAS) score of 3, 4 or 5 [21]. As there is an age-modifier embedded within the CTAS, older adults often have a higher triage priority than younger adults for similar conditions, hence the inclusion of elders with a CTAS 3 [21]. Also, to enable the inclusion of older adults with a mental health-related complaint, older adults presenting for suicidal ideation were considered for inclusion despite their CTAS score of 2. Potential participants were excluded if they were unable to speak French or English, hemodynamically unstable, receiving active palliative care in the ED or living in a long-term care facility (CHSLD). For those with multiple ED visits, only the first index visit was considered for inclusion.

2.3. Measurements and procedures

Trained research assistants screened older adults for eligibility using local triage systems. Potential participants were then approached directly (before or after medical contact) and asked for their consent to complete a brief one-on-one 10–15 min interview (on a stretcher, in a designated patient room, or by phone). The interview preferentially took place in the ED, but participants were offered the option to complete the questionnaire over the phone within the next 72 h if they preferred. Recruitment in the ED was conducted on weekdays from 8:00 to 14:00 or from 14:00 to 20:00. Trained research assistants rotated through participating EDs. For a single center (Hotel Dieu de Lévis), as there were no research assistants in the ED, participants were recruited exclusively by phone, following their ED visit. Hence, for this site only, no direct contact was made in the ED. The research assistant called potential participants to conduct the interview and proceeded concomitantly with another project [22]. Participants were recruited between May and August 2021.

Demographic data were collected for all screened participants. For consenting participants, data on the following potential

predictors of non-medical problems were collected: living situation, need for a caregiver, polypharmacy (≥5 medications taken per day), access to a primary care physician, pre-morbid medical and mental-health conditions, previous healthcare utilization, and socioeconomic variables. Participant self-reported reasons for attending the ED were collected in more general categories. Research assistants had no access to participants' medical records, except for a single center (Hotel-Dieu de Lévis). Elsewhere, participants self-reported their medical issues.

2.4. Outcomes

The list of the nonmedical problems included in the questionnaire was established using a multidisciplinary consensus approach following a narrative literature review on the topic. Access to dental care, medication and/or transportation, elder abuse or neglect, financial concerns, food insecurity, loneliness, outdoor and indoor mobility issues, physical or psychological violence and safety of living environment were selected. To minimize the burden for participants, we asked direct questions for each nonmedical problem. This approach was previously and successfully used for conditions such as domestic violence and elder abuse [23,24]. The English version of the questionnaire is presented in Appendix 2.

2.5. Data analysis

Participants' characteristics are described using frequency tables for categorical variables that estimate the prevalence of nonmedical problems and means and standard deviations (SD) for continuous variables. P values were obtained using Student and Chi-squared tests where applicable. The association between predictors and the presence of nonmedical problems was modeled using multiple logistic regression. The model was constructed following the Hosmer-Lemeshow procedure [25]: first, models are fit to the data for each of the 20 potential predictors selected based on clinical relevance. Candidate predictors are then selected at the 15 % level for inclusion in an initial multiple logistic regression model. Backwards selection is then applied to this multiple logistic regression model at the 5 % level to produce the final model. The receiver operating characteristic (ROC) curve is constructed for the initial and final multiple logistic regression models and their predictive power is compared using the area under the ROC curve (AUC). Analyses were performed using SAS™ (Raleigh, NC). A sensitivity analysis comparing participants who were questioned in the ED and by phone was performed.

2.6. Ethics

The Research Ethic Board of the CHU de Québec – Université Laval approved this study (project no. MP-20-2021-5195).

3. Results

3.1. Characteristics of study subjects

A total of 1,218 potentially eligible older adults were screened, among whom 154 declined participation (Fig. 1). The mean age of those refusing to participate was 78.1 years and 58.4 % were female.

A total of 1,064 patients consented to participate, of which 1,061 completed the questionnaire. Their mean age was 77.1 years (SD
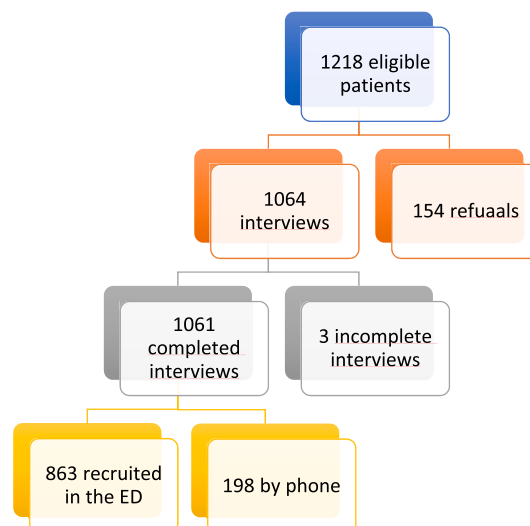
Fig. 1. Flow diagram of included patients

7.6), 55.4 % were female, 42.7 % lived alone, and 29.1 % reported needing support from a caregiver, defined as a relative or family member helping with their activities of daily living. Most patients (79.6 %) lived in their own house or apartment. Pain was the most frequent presenting complaint (19.5 %), followed by neurological (11.4 %) and cardiovascular-related complaints (8.4 %). Seventy-four patients (7.0 %) attended the ED following a fall. CTAS was 2 (2.5 %), 3 (43.9 %), 4 (46.4 %) or 5 (4.6 %) (Table 1).

Frequent pre-morbid conditions included mental health-related issues (33.3 %), pulmonary conditions (23.1 %) and a history of stroke (12.9 %). Three hundred (28.3 %) patients were hospitalized at least once in the prior year. Chronic pain limiting daily activities was reported by 521 (49.1 %) patients. Most older adults (86.5 %) reported having a primary care physician with whom the yearly estimated number of contacts (by phone or in person) was 2.5 (SD 2.6) and the anticipated delay for an appointment was 13.0 days (SD 20.3). Finally, 212 (20.0 %) older adults reported having access to a community-based service providing help for their daily activities.

Overall, interviews were conducted in the ED for 863 patients compared to 198 by phone after ED discharge. Most interviews conducted by phone originated from the same site (90.9 %). Compared to those who completed the interview while in the ED, older adults contacted by phone were slightly younger (75.8 years old (SD 6.7) vs 77.1 years old (SD 7.7), p = 0.01), but the proportion of females was similar in both groups (55.1 % of patients recruited by phone vs 55.5 % of patients recruited in person, p = 0.90).

3.2. Prevalence of nonmedical problems

A total of 704 (66.4 %) participants reported at least one nonmedical problem (Table 2). The most frequent was mobility issues outside the house, affecting 362 (41.4 %) participants. Approximately one third of participants reported difficulty accessing dental care and mobility issues inside their house. Loneliness was reported by 313 (29.5 %) older adults, of which 197 (62.9 %) were aware of potentially available community resources. Among participants, 43 (4.1 %) reported living in an unsafe physical environment. Finally, 36 (3.4 %) and 35 (3.3 %) participants self-identified as victims of psychological or physical violence or of abuse or neglect respectively. Only 33.0 % of older adults who reported violence and/or abuse were aware of available relevant community-based resources.

Table 1
Characteristics of participants included.

	Nb of answers received	All	No nonmedical problems	≥1 nonmedical problems	p value
Age, mean (SD)	1060	77.1 (7.6)	75.7 (6.7)	77.8 (7.9)	<0.001
Sex	1061				<0.01
Females		588 (55.4)	178 (49.9)	410 (58.2)	
Males		473 (44.6)	179 (50.1)	294 (41.8)	
Polypharmacy	992	645 (65.0)	199 (59.2)	446 (68.0)	<0.01
Primary care physician	1061	918 (86.5)	322 (90.2)	596 (84.7)	0.01
At least one specialist physician	879	500 (56.9)	124 (56.9)	376 (56.9)	0.99
Categories of complaints	1060				<0.001
Neurologic		121 (11.4)	51 (14.3)	70 (10.0)	
Physiologic		28 (2.6)	9 (2.5)	19 (2.7)	
Fall		74 (7.0)	8 (2.2)	66 (9.4)	
Complication of an existing condition		56 (5.3)	16 (4.5)	40 (5.7)	
Psychological/social		9 (0.9)	3 (0.8)	6 (0.8)	
Cardiovascular		89 (8.4)	39 (10.9)	50 (7.1)	
Urinary		70 (6.6)	28 (7.8)	42 (6.0)	
Gastrointestinal		77 (7.2)	27 (7.6)	50 (7.1)	
Decrease in general condition		68 (6.4)	13 (3.6)	55 (7.8)	
Pain		207 (19.5)	70 (19.6)	137 (19.5)	
Trauma/wound		72 (6.8)	33 (9.2)	39 (5.6)	
Dermatological		20 (1.9)	4 (1.1)	16 (2.3)	
Otorhinolaryngological		24 (2.3)	12 (3.4)	12 (1.7)	
Respiratory		57 (5.4)	25 (7.0)	32 (4.6)	
Follow-up and reference		88 (8.3)	19 (5.3)	69 (9.8)	
Living alone	1033	441 (42.7)	90 (26.5)	351 (50.7)	<0.001
Past medical history					
Mental health condition	1057	352 (33.3)	59 (16.6)	293 (41.8)	<0.001
Pulmonary condition	915	211 (23.1)	56 (23.1)	155 (23.1)	0.99
Stroke	1058	136 (12.9)	36 (10.1)	100 (14.3)	0.05
Cardiovascular condition	1058	314 (29.7)	76 (21.3)	238 (34.4)	<0.001
Abnormal blood pressure	1058	711 (67.2)	224 (62.8)	487 (69.5)	0.03
Renal disease	889	122 (13.7)	24 (10.6)	98 (14.8)	0.11
Drug/alcohol misuse	1056	68 (6.4)	10 (2.8)	58 (8.3)	<0.001
Memory problem	1058	240 (22.7)	34 (9.5)	206 (29.4)	<0.001
Cancer	1058	172 (16.3)	59 (16.5)	113 (16.1)	0.87
Neurologic condition	1058	45 (4.3)	10 (2.8)	35 (5.0)	0.09
Surgery in the past year	1058	187 (17.7)	50 (14.0)	137 (19.5)	0.03
Fracture in the past year	1056	93 (8.8)	20 (5.6)	73 (10.4)	0.01
Hospitalized in the past year	1057	300 (28.4)	74 (20.7)	226 (32.3)	<0.001

Table 2
Prevalence of nonmedical problems.

	Proportions (%)
Difficulty moving around outside	41.1
Difficult access to dental care	35.1
Difficulty moving around indoors	30.2
Loneliness	29.5
Food insecurity	10.3
Concerns about their financial situation	9.5
Difficulty of access to their medication	5.4
No access to transport for appointments	4.1
Unsafe living environment	4.1
Physical or psychological violence	3.4
Abuse or neglect	3.3

3.3. Predictors of nonmedical problems

The univariate analysis showed that participants with at least one nonmedical problem were older, more likely to be female, to live alone and to take $\geq$5 daily medications. Participants attending the ED following a fall or an acute functional decline were more likely to report nonmedical problems, while those attending with neurological or respiratory complaints were less likely to report such problems. Participants with pre-existing mental-health conditions and a history of stroke were also more likely to report at least one nonmedical problem (Table 1).

In the multiple logistic regression, we initially considered 20 variables of which we selected 13 for the initial multiple logistic regression model. Eight variables were selected after the backwards procedure, with minimal loss of predictive power (initial model: AUC = 0.77 vs. final model: AUC = 0.76, p = 0.48). The odds ratios associated with each selected predictor are presented in Table 3. The most important predictors of nonmedical problems were advanced age, living alone, recent memory decline, pre-existing mental health condition, known heart failure, surgery or hospitalization in the previous 12 months, attending the ED for a fall or an acute functional decline and not having a primary care physician. Hence, participants followed by a primary care physician seemed to report less nonmedical problems.

4. Discussion

This is a unique study examining the nonmedical problems of older adults visiting the ED. Approximately two thirds of older adults attending the ED for low acuity conditions reported at least one nonmedical problem. Mobility issues, difficult access to dental care and loneliness were especially prevalent. Advancing age, living alone, attending the ED following a fall or for acute functional decline, and having a history of pre-existing mental health conditions should raise physician awareness to the possible presence of nonmedical problems. Despite their potentially important impact on patients' quality of life and outcomes, ED-based literature examining nonmedical problems among older adults is scarce.

In the only other ED-based study on nonmedical problems, Stevens et al. found that 47 % of older adults with nonmedical problems reported difficulty walking, which is similar to our results [5]. In their cohort, older adults also frequently reported having mobility issues such as difficulty walking, changing position or lifting/carrying objects [5]. The prevalence of loneliness was however higher in our cohort (29.5 % vs 14 %) [5]. The COVID-19 pandemic could have contributed to this difference [26]. Participants recruited in our study identified the pandemic as a contributing factor to loneliness. High incidence of loneliness among community-dwelling older adults was consistently reported across studies included a recent scoping review [27]. Competing conditions such as functional impairment and frailty can make it more difficult for older adults to sustain meaningful relationships with relatives and can also exacerbate feelings of loneliness [27]. A scoping review reported the potential negative impacts of loneliness and social isolation on frailty and health outcomes [28]. Frailty and functional limitations increase the risk of poor outcomes, but were not directly questioned in our study [12]. In the ED, frailty better predicts the need for hospitalization and acute care than triage [29]. Another strong predictor of nonmedical problems was the presence of a pre-existing mental health condition. Associations between psychiatric disorders and worsening physical health have been also extensively described [30]. Unfortunately, the care provided to older adults with mental

Table 3
Odds ratio of factors associated with nonmedical problems.

	Odds ratio estimates (95 % CI)	P-value
Age (per 1-year increase)	1.04 (1.01–1.06)	<0.001
Pre-existing cardiovascular condition	1.47 (1.05–2.05)	0.02
Not having a primary care physician	1.92 (1.21–3.05)	0.03
Surgery/hospitalization in the last year	1.82 (1.23–2.70)	0.04
Living alone	2.38 (1.75–3.23)	<0.0001
Attending the ED for a fall or acute functional decline	2.48 (1.46–4.20)	0.001
Recent memory decline	3.02 (1.99–4.58)	<0.0001
Pre-existing mental health condition	3.06 (2.16–4.33)	<0.0001

health-related disorders in the ED has been insufficiently studied [31]. We know that older adults are more likely to use the ED for non-urgent mental health issues [32]. Exploring nonmedical problems in older adults with a pre-existing mental health condition could potentially improve their quality of life and might prevent subsequent ED visits [33]. Lack of a primary care physician was also identified as a predictor of the presence of nonmedical problems in our participants. Longitudinal care and management of chronic illnesses is an ongoing issue in these patients and raise questions regarding how to refer these patients after an ED visit. Research projects are necessary to develop care pathways for this specific patient population. Finally, a study from the Canadian Institute for Health information showed that ED visits decreased during the COVID-19 pandemic [34]. The profile of patients attending the ED also changed. Notably, some patients tried to minimize their contact with healthcare services during the pandemic. Furthermore, access to community-based resources was reduced during the pandemic, likely influencing the prevalence of some medical and nonmedical problems.

Our study highlights the importance of robust interdisciplinary assessments, standardized approaches to common geriatric presentations and transitions of care, which have all been discussed in recent position statements on ED care of older patients [35,36]. In our cohort, participants presenting with geriatric-specific presentations such as falls from standing height or acute functional decline were more likely to report nonmedical problems. Providing holistic care in the ED for patients with geriatric-specific presentations reduces subsequent ED visits, use of other health care services and increases physician satisfaction and ED efficiency [37]. Efficient linkage between out-of-hospital and in-hospital resources can be highly beneficial to prevent ED revisits. In our cohort, knowledge on available community-based resources was limited, especially for psychological and physical abuse, as only 33.0 % of participants reporting this issue were aware of available resources. Approximately 20.0 % of participants had access to community-based services while 29.1 % reported needing a caregiver to assist with activities of daily living. Access to information about services available in the community has been reported as a challenge for older people [27]. Hence, identifying nonmedical problems throughout ED assessments and facilitating referral to relevant community-based resources could reduce subsequent ED visits and improve quality of life.

5. Limitations

Our study provides novel information on nonmedical problems from multiple hospital sites in Canada. However, our study has some limitations. The prevalence of nonmedical problems was examined in cognitively intact older adults, which limits the generalization of our conclusions to elders with cognitive impairments, who are more likely to present some nonmedical problems such as elder abuse and neglect [24]. Our sample was recruited in EDs located in urban settings, which impacts the applicability of our conclusions to more rural and potentially more isolated populations. Existing literature is equivocal with respect to the impact of rurality on nonmedical problems [38,39], but rurality has been shown to be associated with more challenges when accessing health care services [40,41]. Information about health issues was collected through a self-reported questionnaire and no confirmation using medical records or collateral history was done, which could affect the reliability of the information obtained. As the data we collected was not correlated with medical records or relatives' perception, there is a risk that participants could have under-reported or over-reported their nonmedical problems. In fact, some participants may under-evaluate their needs in fear of losing autonomy (e.g., losing their drivers' licence), while others may over-evaluate them in the hope of being prioritized for additional resources. The self-reported nature of the questionnaire could therefore induce a recall bias. Other potentially interesting socioeconomic predictors were not assessed. Another limitation is the use of direct questions to inquire about nonmedical problems rather than completing longer, but validated questionnaires. The use of such validated tools, specific to each nonmedical problem, could have an impact on the measured prevalence of nonmedical problems. We preferred the pragmatic use of direct questions, aiming to limit the burden of longer questionnaires for participants, an approach similar to previous authors [5].

6. Conclusion

In summary, nonmedical problems are frequent in older adults visiting the ED for low acuity conditions, with mobility issues and loneliness being especially prevalent. Advanced age, not having a primary care physician, living alone, a recent hospital admission or surgery, consulting for a fall or an acute functional decline and having a pre-existing mental health condition should raise awareness to the potential presence of nonmedical problems in older patients. Knowledge of available community-based resources was low. Designing and implementing ED models of care that consider nonmedical problems and their integration into ED care processes is an opportunity to improve patient-important outcomes.

Funding

Ethics statement

The Research Ethic Board of the CHU de Québec – Université Laval approved this study (project no. MP-20-2021-5195).

Data availability statement

Data will be made available upon reasonable request.

CRediT authorship contribution statement

Katherine Tanguay: Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Alexandra Nadeau:** Writing – original draft, Project administration, Methodology, Formal analysis, Data curation, Conceptualization. **Audrey-Anne Brousseau:** Writing – review & editing, Supervision, Methodology. **Patrick M. Archambault:** Writing – review & editing, Supervision, Methodology. **Pierre-Hugues Carmichael:** Writing – review & editing, Methodology, Formal analysis. **Marcel Emond:** Writing – review & editing, Methodology. **Jean-Francois Deshaies:** Writing – review & editing, Supervision, Methodology. **Marie-Josée Sirois:** Writing – review & editing, Methodology. **Fabrice I. Mowbray:** Writing – review & editing, Methodology. **Pierre-Gilles Blanchard:** Writing – review & editing, Methodology. **Eric Mercier:** Writing – original draft, Supervision, Methodology, Funding acquisition, Formal analysis, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgement

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.heliyon.2024.e35352.

References

[1] WHO, Ageing and health: key facts who.int. https://www.who.int/news-room/fact-sheets/detail/ageing-and-health, 2022.
[2] Côté JG SS, Scarfone S. Le vieillissement de la population et l'économie du Québec [Available from: https://www1.fccq.ca/wp-content/uploads/2017/11/201711vieillissement.pdf.
[3] J.M. Legramante, L. Morciano, F. Lucaroni, F. Gilardi, E. Caredda, A. Pesaresi, et al., Frequent use of emergency departments by the elderly population when continuing care is not well established, PLoS One 11 (12) (2016) e0165939.
[4] F.I. Mowbray, K. Aryal, E. Mercier, G. Heckman, A.P. Costa, Older emergency department patients: does baseline care status matter? Can Geriatr J 23 (4) (2020) 289–296.
[5] T.B. Stevens, N.L. Richmond, G.F. Pereira, C.L. Shenvi, T.F. Platts-Mills, Prevalence of nonmedical problems among older adults presenting to the emergency department, Acad. Emerg. Med. 21 (6) (2014) 651–658.
[6] Y. Choi, K. Nam, C.Y. Kim, Association between convenience of transportation and unmet healthcare needs of rural elderly in Korea, J Prev Med Public Health 52 (6) (2019) 355–365.
[7] J. Shafrin, J. Sullivan, D.P. Goldman, T.M. Gill, The association between observed mobility and quality of life in the near elderly, PLoS One 12 (8) (2017) e0182920.
[8] N. Samaras, T. Chevalley, D. Samaras, G. Gold, Older patients in the emergency department: a review, Ann. Emerg. Med. 56 (3) (2010) 261–269.
[9] B.M. Singal, J.R. Hedges, E.W. Rousseau, A.B. Sanders, E. Berstein, R.M. McNamara, et al., Geriatric patient emergency visits. Part I: comparison of visits by geriatric and younger patients, Ann. Emerg. Med. 21 (7) (1992) 802–807.
[10] S.R. Lowenstein, C.A. Crescenzi, D.C. Kern, K. Steel, Care of the elderly in the emergency department, Ann. Emerg. Med. 15 (5) (1986) 528–535.
[11] J.L. Wofford, E. Schwartz, J.E. Byrum, The role of emergency services in health care for the elderly: a review, J. Emerg. Med. 11 (3) (1993) 317–326.
[12] F. Aminzadeh, W.B. Dalziel, Older adults in the emergency department: a systematic review of patterns of use, adverse outcomes, and effectiveness of interventions, Ann. Emerg. Med. 39 (3) (2002) 238–247.
[13] D.E. Holland, P. Mistiaen, K.H. Bowles, Problems and unmet needs of patients discharged "home to self-care", Prof. Case Manag. 16 (5) (2011) 240–250, quiz 51-2.
[14] S.K. Sinha, E.S. Bessman, N. Flomenbaum, B. Leff, A systematic review and qualitative analysis to inform the development of a new emergency department-based geriatric case management model, Ann. Emerg. Med. 57 (6) (2011) 672–682.
[15] A. Hendin, D. Eagles, V. Myers, I.G. Stiell, Characteristics and outcomes of older emergency department patients assigned a low acuity triage score, Cjem 20 (5) (2018) 762–769.
[16] M.T. Do, V.C. Chang, N. Kuran, W. Thompson, Fall-related injuries among Canadian seniors, 2005-2013: an analysis of the Canadian Community Health Survey, Health Promot Chronic Dis Prev Can 35 (7) (2015) 99–108.
[17] D. Bäckström, R. Larsen, I. Steinvall, M. Fredrikson, R. Gedeborg, F. Sjöberg, Deaths caused by injury among people of working age (18-64) are decreasing, while those among older people (64+) are increasing, Eur. J. Trauma Emerg. Surg. 44 (4) (2018) 589–596.
[18] S. Azami-Aghdash, M.H. Aghaei, H. Sadeghi-Bazarghani, Epidemiology of road traffic injuries among elderly people; A systematic review and meta-analysis, Bull Emerg Trauma 6 (4) (2018) 279–291.
[19] K. Fiscella, P. Franks, M.R. Gold, C.M. Clancy, Inequality in quality: addressing socioeconomic, racial, and ethnic disparities in health care, JAMA 283 (19) (2000) 2579–2584.
[20] E. von Elm, D.G. Altman, M. Egger, S.J. Pocock, P.C. Gøtzsche, J.P. Vandenbroucke, Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies, Bmj 335 (7624) (2007) 806–808.
[21] M.J. Bullard, E. Musgrave, D. Warren, B. Unger, T. Skeldon, R. Grierson, et al., Revisions to the Canadian emergency department triage and acuity Scale (CTAS) guidelines 2016, Cjem 19 (S2) (2017) S18–s27.
[22] P.M. Archambault, J. Rivard, P.Y. Smith, S. Sinha, M. Morin, A. LeBlanc, et al., Learning integrated health system to mobilize context-adapted knowledge with a wiki platform to improve the transitions of frail seniors from hospitals and emergency departments to the community (LEARNING WISDOM): protocol for a mixed-methods implementation study, JMIR Res Protoc 9 (8) (2020) e17363.

[23] L.J. Morrison, R. Allan, A. Grunfeld, Improving the emergency department detection rate of domestic violence using direct questioning, J. Emerg. Med. 19 (2) (2000) 117–124.

[24] É. Mercier, A. Nadeau, A.A. Brousseau, M. Émond, J. Lowthian, S. Berthelot, et al., Elder abuse in the out-of-hospital and emergency department settings: a scoping review, Ann. Emerg. Med. 75 (2) (2020) 181–191.

[25] D.W. Hosmer, T. Hosmer, S. Le Cessie, S. Lemeshow, A comparison of goodness-of-fit tests for the logistic regression model, Stat. Med. 16 (9) (1997) 965–980.

[26] S.Y.S. Wong, D. Zhang, R.W.S. Sit, B.H.K. Yip, R.Y. Chung, C.K.M. Wong, et al., Impact of COVID-19 on loneliness, mental health, and health service utilisation: a prospective cohort study of older adults with multimorbidity in primary care, Br. J. Gen. Pract. 70 (700) (2020) e817–e824.

[27] S. Abdi, A. Spann, J. Borilovic, L. de Witte, M. Hawley, Understanding the care and support needs of older people: a scoping review and categorisation using the WHO international classification of functioning, disability and health framework (ICF), BMC Geriatr. 19 (1) (2019) 195.

[28] F. Mehrabi, F. Béland, Effects of social isolation, loneliness and frailty on health outcomes and their possible mediators and moderators in community-dwelling older adults: a scoping review, Arch. Gerontol. Geriatr. 90 (2020) 104119.

[29] F. Mowbray, A.A. Brousseau, E. Mercier, D. Melady, M. Émond, A.P. Costa, Examining the relationship between triage acuity and frailty to inform the care of older emergency department patients: findings from a large Canadian multisite cohort study, Cjem 22 (1) (2020) 74–81.

[30] R. Mushtaq, S. Shoib, T. Shah, S. Mushtaq, Relationship between loneliness, psychiatric disorders and physical health ? A review on the psychological aspects of loneliness, J. Clin. Diagn. Res. 8 (9) (2014) We01–4.

[31] S.G.A. Boulet, A. Nadeau, et al., Characteristics of Older Adults Attending the Emergency Department for Suicidal Thoughts or Voluntary Intoxication: A Multicenter Retrospective Cohort Study, 2022.

[32] F.I. Mowbray, A.E. Omar, K. Pfaff, M.M. El-Masri, Exploring the factors associated with non-urgent emergency department utilisation for mental health care, J. Res. Nurs. 24 (8) (2019) 663–674.

[33] B. Sporinova, B. Manns, M. Tonelli, B. Hemmelgarn, F. MacMaster, N. Mitchell, et al., Association of mental health disorders with health care utilization and costs among adults with chronic disease, JAMA Netw. Open 2 (8) (2019) e199910.

[34] Information CIfH, COVID-19's Impact on Emergency Departments, 2021.

[35] B. Ellis, A.A. Brousseau, D. Eagles, D. Sinclair, D. Melady, Canadian Association of Emergency Physicians position statement on care of older people in Canadian Emergency Departments: executive summary, Cjem 24 (4) (2022) 376–381.

[36] B. Ellis, J.A. Lowthian, D. Melady, IFEM White Paper on the care of older people with acute illness and injury in the emergency department, Cjem 23 (4) (2021) 425–426.

[37] A. Perry, J. Macias Tejada, D. Melady, An approach to the older patient in the emergency department, Clin. Geriatr. Med. 34 (3) (2018) 299–311.

[38] C.E.A. Henning-Smith, K. Kozhimannil, RURAL-URBAN differences in social isolation and its relationship to, HEALTH Innovation in aging 2 (1) (2018) 770.

[39] L. Lynch, T.J. Mielenz, G. Li, D.W. Eby, L.J. Molnar, M.E. Betz, et al., Rate of social isolation by geographic location among older adults: AAA LongROAD study, Front. Public Health 9 (2021).

[40] T. Abe, A. Kitamura, S. Seino, Y. Yokoyama, H. Amano, Y. Taniguchi, et al., Frailty status and transport disadvantage: comparison of older adults' travel behaviours between metropolitan, suburban, and rural areas of Japan, Int. J. Environ. Res. Publ. Health 17 (17) (2020).

[41] R. Fleet, S. Bussières, F.K. Tounkara, S. Turcotte, F. Légaré, J. Plant, et al., Rural versus urban academic hospital mortality following stroke in Canada, PLoS One 13 (1) (2018) e0191151.