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Patient, caregiver and professional views on preventable emergency admissions of older patients, a multi-method study in three Dutch hospitals

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Abstract

Background Older adults are too often hospitalized from the emergency department (ED) without needing hospital care. Knowledge about rates and causes of these preventable emergency admissions (PEAs) is limited. This study aimed to assess the proportion of PEAs, the level of agreement on perceived preventability between physicians and patients, and to explore their underlying causes as perceived by patients, their relatives, and the admitting physician.

Methods A multi-center multi-method study at the ED of one academic and two regional hospitals in the Netherlands was performed. All patients aged > 70 years and hospitalized from the ED were consecutively sampled during a six-week period. Quantitative data regarding patient and clinical characteristics and perceived preventability of the admission were prospectively collected from the electronical medical record and analyzed using descriptive statistics. Agreement on preventability between patient, caregivers and physicians was assessed by using the Cohen's kappa. Underlying causes of a PEA were subsequently collected by semi-structured interviews with patients and caregivers. Physician's perceived causes of a PEA were collected by telephone interviews and by open-ended questions sent by email. Thematic content analysis was used to analyze the interview transcripts and email narratives.

Results Out of 773 admissions, 56 (7.2%) were deemed preventable by patients or their caregivers. Admitting physicians regarded 75 (9.7%) admissions as preventable. The level of agreement between these two groups was low with a Cohen's kappa score of 0.10 ($p = 0.003$). Perceived causes for PEAs related to six themes: (1) insufficient support at home, (2) suboptimal care in the community setting, (3) errors in hospital care, (4) time of presentation to ED and availability of resources, (5) delayed help seeking behavior, and (6) errors made by patients.

Conclusions Our findings contribute to the existing evidence that a substantial part (almost one out of ten) of the older adults visiting the ED is perceived as unnecessary hospital care by patients, caregivers and health care providers. Findings also provide valuable insight into the causes for PEAs from a patient perspective. Further research is needed to understand why the perspectives of those responsible for hospital admission and those being admitted vary considerably.

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Strengths and limitations of this study

•To our knowledge, this is the first study that structurally explored perceived causes from a patient, caregiver and physician's perspective. All patients who were eligible were included during a six-week period.
•The study was performed in three different hospitals.
•Including the patient and caregiver perspective provided a better understanding of PEAs.
•Including general practitioner perspectives would have contributed to a more comprehensive and reliable understanding of causes for PEAs.

Keywords Emergency department, Hospital admission, Older adults, Preventable admission

Introduction

As the worldwide population ages, the healthcare systems are facing significant challenges to meet the needs of an aging population. The average proportion of patients of 65 years or older in the European population is forecast to increase to 25% in 2050. Already, 38% of all Emergency Department (ED) presentations are of people aged 65 years and older. [1–3] Older patients may suffer from multimorbidity, polypharmacy and cognitive problems. Furthermore, they often attend the ED with atypical presentations and serious illnesses, frequently resulting in hospital admission. [1]

A substantial amount of these emergency admissions are considered as preventable [4–6], especially among frail older adults [7–9]. Reducing the number of preventable emergency admissions has gained increasing attention from policy-makers and healthcare providers in efforts to keep healthcare accessible and sustainable in the long term [10–12]. Apart from financial and service provision reasons, these admissions can also be harmful, especially for frail older adults who are at risk for loss of daily functioning and facing complications – after or during hospitalization – such as delirium, malnutrition, dehydration, infections and falling [13–16].

Preventable emergency admissions (PEA) are hospital admissions after ED visit that could be prevented through timely and effective primary care or outpatient clinic care and are often estimated by the amount of admissions caused by ambulatory care-sensitive conditions (ACSCs).

However, current literature suggests that numbers of PEAs may be over- or underestimated due to insensitive measurements and lack of a robust definition of PEAs. Despite the high prevalence (up to 17,5%) of PEA of older adults [4–6], little is known about the underlying causes that contribute to PEAs. Previous quantitative studies found associations between PEAs and demographic, clinical and care process factors [6, 17, 18]. One study has identified several causes for PEAs as perceived by admitting physicians. However,, there is a lack of comprehensive insight into all factors causing PEAs, from the perspective of care providers and recipients. To this date, no prior studies have explored patient and caregiver perspectives on the preventability of emergency admissions for older adults. Several single-center studies explored causes for preventable ED (re)visits from the perspective of care providers and visitors, [19–21] and these identified factors could also apply for those who are hospitalized following an ED visit. However, many other factors may influence the physician's decision to hospitalize the patient from the ED.

Better understanding of the causal factors for PEAs of older adults from the perspective of both care providers and receivers could help identify strategies to reduce the number of high-risk and costly admissions from the ED. Therefore, the aim of this study was to explore the factors causing PEAs of older adults as perceived by patient's, relatives' and their physician's perspectives. Furthermore, we assessed the proportion of PEAs as perceived by patients, caregivers and physicians and determined the level of agreement on perceived preventability.

Methods

Design and setting

A multi-method study was conducted using both qualitative and quantitative methods. Quantitative methods were employed to assess the proportion of emergency admissions perceived as preventable by patients, relatives and their physicians, and qualitative methods to explore the underlying causes they address for emergency admissions seen as preventable. Data were collected prospectively in one academic (Radboudumc, 22.000 annual ED visits of which 26% older adults) and two regional hospitals (CWZ, 28.000 annual ED visits of which 30% older adults, and VieCuri 25.000 annual ED visits of which 33% older adults) in the mid-east of the Netherlands in the period from March 2022 to June 2022. This study is reported in accordance with the Standards for Reporting Qualitative Research (SRQR). The local ethics commission (CMO Arnhem- Nijmegen region) approved the study protocol (registration number: 2021–13323).

Study population and recruitment

All patients aged 70 years or older and hospitalized after an ED visit were eligible for inclusion. Patients were excluded if they were admitted to the ICU or unable to give written informed consent due to a language barrier or cognitive impairment. In each hospital a medical

student (TK, SH and ST) in the final year of their Master in Medicine screened patients on eligibility on site under the supervision of a local ED physician (SB, OS, DB) for a period of six consecutive weeks on a daily basis (Monday – Friday). All patients admitted from the ED during the weekend were scanned on Monday. If patients fulfilled our criteria, they (or their caregiver) were approached within three days post-admission and were given information on this study. Candidates were approached face-to-face on the ward or by telephone in case of hospital discharge. Data collection started if written or verbal (audio recorded) informed consent by participants was obtained.

Data collection

Per site one medical student was responsible for the data collection. Quantitative data was collected from the electronical medical record (EMR). All eligible patients and their admitting physicians were contacted to declare if they found the current admission preventable or not ('Do you think that this current admission to the hospital could have been prevented by anyone or in any way?'). Answers were categorized into 'yes', 'no' or 'don't know' and documented. Only in case of a yes-answer, a semi-structured interview was conducted to gain insight into the perceived root-cause(s). The interviews were held with a pilot-tested guide and lasted between 10 and 30 min. The guide contained questions as 'What was the main reason for this hospital admission?' and 'What was needed to prevent this admission and go back home?'. The full interview guide is provided in supplement 1. Participants were asked for a short explanation (if possible) in case they answered 'no' or 'don't know' guided by one initial question 'Why could this admission have not been prevented?'. Basic demographic (age, gender) and clinical characteristics (recorded reason for ED visit, urgency level, medical diagnosis, ED length of stay, time of admission and reasons for admission) were collected from the patient's electronic medical record. All interviews took place within the first week following admission from the ED. All researchers received interview training by a postdoc with expertise in the field of qualitative research (GH). All medical students were supervised during data collection by one ED physician (SB).

Subsequently, physicians were questioned about the reason of hospital admission and if the admission could have been prevented. Physicians were recruited if they were involved/responsible for admitting one of the study participants. They were interviewed on site or contacted by email within three days after admission following a similar approach as was used with patients and caregivers. Supplement 2 shows the structured approach in which all providers were contacted by email. Non-responders (no reaction within 5 days) were subsequently contacted by telephone. Notes were made of the telephone conversations and relevant quotes were transcribed verbatim. All interviews with patients and caregivers were audio recorded and recordings were transcribed verbatim. Quantitative and qualitative data were anonymized and stored in secured database files that are only accessible by members of the research team.

Data analysis

Quantitative data (demographic, clinical characteristics and perceived preventability) were analyzed using descriptive statistics in SPSS (version 28). Cohen's kappa score was calculated to assess the overall agreement on preventability between patient/caregivers and physicians. Interview transcripts were systematically analyzed according to the principles of thematic content analysis (Braun and Clarke, 2006) [22]. Transcripts were analyzed by one of the three students who coded relevant text fragments regarding perceived causes for PEAs The analysis started with becoming familiar with and gaining an overall sense of the content. Subsequently, initial codes were generated by providing conceptual labels to relevant text passages representing a cause for PEA. This resulted in the development of an initial list of unique and relevant codes that, after being discussed and revised by the students and SB, acted as a blueprint for the coding of new transcripts. Codes that referred to the same underlying concept were grouped into categories and then placed in overarching themes. In several rounds, codes, categories and themes were discussed by the three students, SB and a health science researcher (GH) to reach agreement on structure, wording and relevance. Data collection and analysis stopped after no new findings emerged and data saturation was reached. Illustrative quotes were selected to support the main findings. Data analysis was supported by using a qualitative data analysis software program (Atlas.ti Version 22).

Patient and public involvement

A patient panel consisting of three older adults was involved in the development and testing of the interview guide.

Results

Study sample

After a six-week study period at each site a total of 1102 patients were eligible. Three hundred twenty-nine patients were eligible but excluded due to various reasons: unwilling to participate ($n=224$), unable to contact after admission ($n=51$), or died in the hospital ($n=54$). This resulted in 773 participants (70.3% inclusion rate). Table 1 shows the characteristics of the participants. An overview of the inclusion process is visualized in Fig. 1.

Table 1 Characteristics of all included patients

Characteristics		Patients who found admission not preventable (*n* = 717)	Patient who found admission preventable (*n* = 56)	p-value
Age, mean years (sd)		79.9 (0.5)	78.8 (6.1)	0.21
Sex	*Male, n (%)*	357 (50.1)	35 (62.5)	0.07
	Female, n (%)	356(49.9)	21 (37.5)	
Urgency classification*	*U1,n (%)*	5 (0.7)	0 (0)	0.77
	U2, n (%)	222 (31.1)	21 (37.5)	
	U3, n (%)	323 (45.3)	22 (39.3)	
	U4, n (%)	159 (22.3)	12 (21.4)	
	U5, n (%)	3 (0.4)	1 (1.8)	
Day of ED arrival	*Monday, n (%)*	101 (14.2)	7 (12.5)	0.89
	Tuesday, n (%)	107 (15.0)	7 (12.5)	
	Wednesday, n (%)	109 (15.3)	8 (14.3)	
	Thursday, n (%)	105 (14.7)	14 (25.0)	
	Friday, n (%)	111 (15.6)	10 (17.9)	
	Saturday, n (%)	83 (11.6)	4 (7.1)	
	Sunday, n (%)	96 (13.5)	6 (10.7)	
Admitting specialty	*Internal medicine**, *n (%)*	189 (26.5)	20 (35.7)	0.53
	Surgery, n (%)	133 (18.7)	9 (16.1)	
	Gastro-enterology, n (%)	70 (9.8)	9 (16.1)	
	Neurology, n (%)	79 (11.1)	4 (7.1)	
	Orthopedics, n (%)	28 (3.9)	0 (0)	
	Cardiology, n (%)	33 (4.6)	1 (1.8)	
	Otolaryngology, n (%)	4 (0.6)	0 (0)	
	Pulmonology, n (%)	130 (18.2)	9 (16.1)	
	Urology, n (%)	38 (5.3)	3(5.4)	
	Geriatrics, n (%)	9 (1.3)	1 (1.8)	
Duration of admission, mean days (sd)		7.2 (6.6)	6.2 (5.2)	0.26
Time of ED presentation***	*Out of office hours, n (%)*	351 (49.2)	27 (48.2)	0.88
	Office hours, n (%)	362 (50.8)	29 (51.8)	

* Urgency levels of the Netherlands Triage System (NTS): levels 1 (Life threatening), 2 (Emergent), 3 (Urgent), 4 (Non-urgent) and 5 (Advice).

**combining all subspecialties of Internal Medicine (e.g. Oncology, Nefrology etc.)

***Office hours where defined as between 08.30 am and 17.30 pm on weekdays

Prevalence of PEA

Overall, 56 of 773 admissions (7.2%) were deemed preventable by patients and/or their caregivers. In the academic hospital 8 out of 100 (8%) admissions were deemed preventable by patients versus 29 out of 318 (9.1%) and 19 out of 355 (5.4%) at the regional hospitals. In comparison, admitting physicians deemed a total of 75 out of 773 (9.7%) admissions potentially preventable. In the academic hospital 10 out of 100 (10%) admissions were regarded as preventable versus 30 out of 318 (9.4%) and 35 out of 355 (9.8%) in the regional hospitals. There was little to no overlap in agreement between patients/caregivers and physicians. In 11 cases (19.6%) both patient or caregiver and admitting physician agreed on the preventability of this admission, resulting in a Cohen's kappa score of 0.10 (p value 0.003).

Perceived causes of PEA

Six themes emerged from the qualitative data analysis describing perceived root-causes for the PEA: (1) Insufficient support at home, (2) Suboptimal care for health complaints in the community setting, (3) Errors in hospital care, (4) Time of presentation to the ED and available resources in community care, (5) Delayed help seeking behavior and, (6) Patient personal errors.

Theme 1. Insufficient support at home

Many interviewed patients argued that the lack of sufficient help and/or care at home contributed to being hospitalized after visiting the ED. Lack of support varied from no available support at all at home to some available help, but the help was insufficient for meeting the increased support needs of the patient with a deteriorating health. Patients voiced that if there had been sufficient help at home before their situation worsened, their admission could have been prevented.

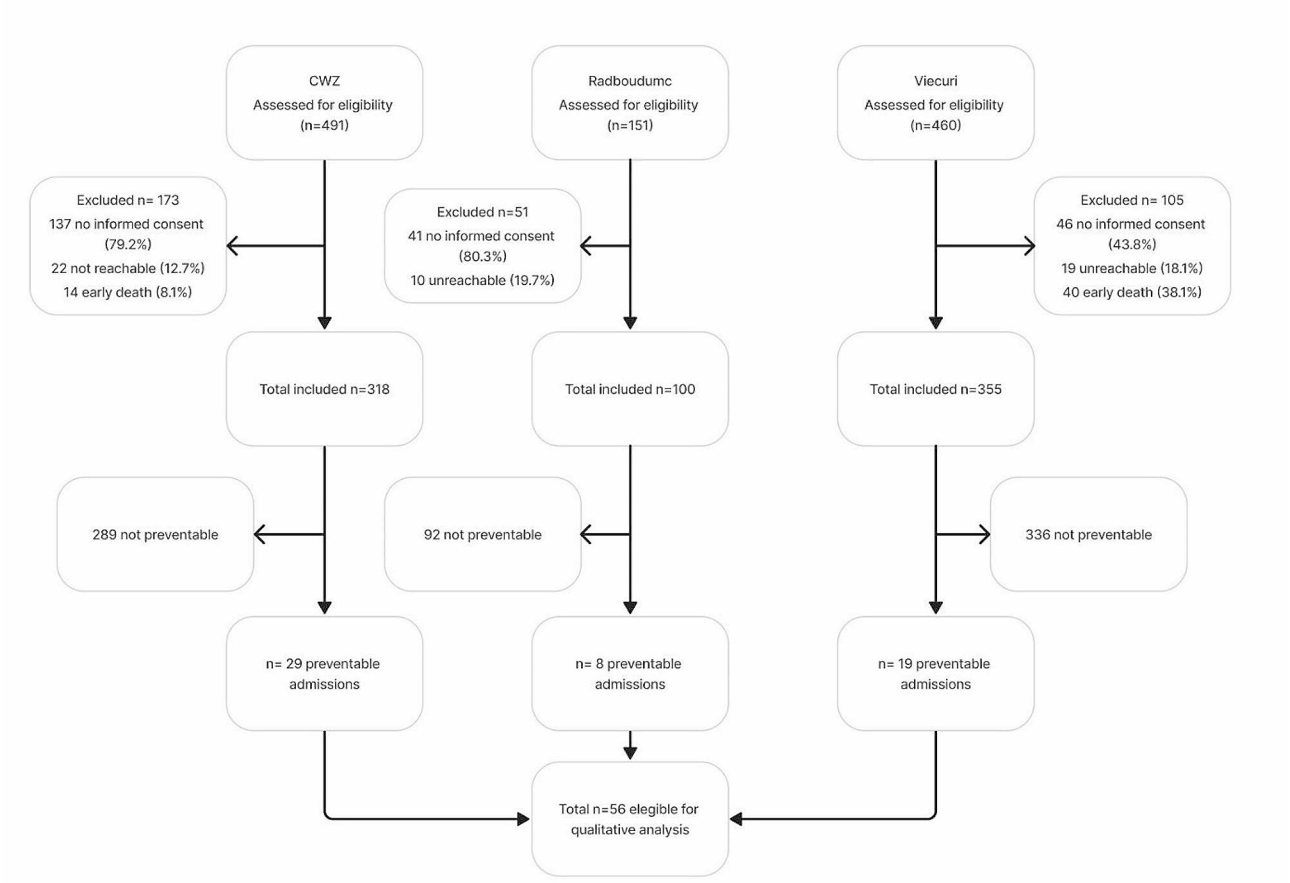

Fig. 1 Flow chart of inclusion process

Physician's expressed similar opinions as most of them worried about the moral implications of admitting or not admitting patients with an unsustainable situation at home. Social status was the most important factor supporting this argument, with numerous patients adding that they lived alone and/or were recently widowed. This resulted in a lack of independence and support network that could have been addressed. Physicians at the ED mentioned that if care could have been arranged in appropriate timing some admissions can be prevented. However, especially during out of office hours, timely recognition and arranging community care was often not possible in the ED.

"Yes, admission could have been prevented as it concerned a care problem. There was no adequate care at home, patient could not safely mobilize themselves to the bathroom as it was too small for their walker. More frequent help at home would have allowed this patient to go home, but it was too late to arrange this on a short-term basis". – Admitting physician 3, VieCuri

"The only thing I could do was go to the bathroom, I couldn't even cook. Interviewer: And if you would have had more help around the home, could your admission then have been prevented? Yes, I believe so. However, I am incredibly stubborn and wanted to remain independent". – Patient 3, CWZ

Theme 2. Suboptimal care for health complaints in the community setting

Patients described that their hospitalization originated from suboptimal care for their health problem(s) in the community setting. According to interviewees, their hospitalization could have been prevented if primary care providers would have anticipated sooner on their ongoing health complaints and problems. Moreover, they had the feeling their problems were dismissed as non-urgent by the GP or other professionals such as ambulance nurses. Not being able to get an appointment with the GP on time was mentioned by interviewees as well.

ED physicians raised the point of better agreements and communication between the GPs and the patients and their families as an important factor that could prevent admissions. Some admissions were deemed preventable

if better understanding and/or agreements were made regarding advance care planning. These agreements were also not communicated sufficiently between the GP, substitute GPs, GP centre, ambulance services and the admitting hospital. Caregivers and family also mentioned sometimes they were not involved in these decisions, resulting in hospital presentation and admission when this was not wanted in a terminal patient setting.

> *"Admission could have been prevented if the GP had made agreements with the family of the patient beforehand whether the patient should be appointed to hospital or not, since the patient is really frail". – Admitting Physician 2, VieCuri*
> *"They did not consult us in the decision making process to send my father to the hospital, they just called an ambulance. If they asked us (the family) we would have said there was no intention to send him to the hospital, just to get him more comfortable in the last days". – Caregiver 3, Radboudumc*

Theme 3. Errors in hospital care

Patients also mentioned errors made during their ED visit or previous hospitalization as a cause for their admissions. Premature discharge from a previous admission was mentioned as the most common cause for a second, preventable, admission. Patients described unclear discharge instructions as the main problem, often resulting in overdue contact between patient and the hospital. Admitting physicians argued that sometimes patients got unclear instructions on discharge or did not understand the specific instructions when to contact the hospital. Professional errors, like errors in medication or overlooking patient problems, were mentioned as causes as well.

Suboptimal communication within the hospital and between hospitals was deemed a cause for admissions as well. Sometimes patients had to be transferred to other care facilities from the ED, but due to lack of communication they were admitted pending their transfer. ED crowding and prolonged ED visit were regarded as preventable factors as well by patients.

> *"Well if they had looked at my blood-level the first time I was here and had given me a few bags, then I wouldn't have had to come back the second time". – Patient 13, CWZ*
> *"The care professional told me to stop using these medicines, so I did. […]. But not taking these medicines eventually resulted in your readmission in this hospital? Yes, because of this rash I get I had to come back". – Patient 2, Radboudumc*

Theme 4. Time of presentation to the ED and available resources in community care

Physicians and patients experienced the time of presentation on the ED as an important factor that causes PEAs. Both groups described that more admissions were preventable when they happened during the out-of-office hours. Arranging sufficient help in the outpatient setting during these out-of-office hours was often difficult and resulted in not being able to safely discharge patients to home. Moreover, both patients and physicians felt it was more humane to admit patients when they presented late at night, although medically there was no medical reason to admit them.

> *"There was a small care problem but this could maybe have prevented by other measures however, this was no longer possible at this time of the day. Discharge home was possible but felt wrong at the time" – Admitting Physician 9, VieCuri*
> *"I actually was quite glad they let me stay, when I came late at night, because I didn't feel entirely safe at home anymore". – Patient 2, CWZ*

Theme 5. Delayed help seeking behaviour

Patients regarded the delayed access to healthcare as one of the most important causes of PEAs. This delay was split into pre-hospital setting regarding earlier intervention and recognition and a hospital setting in which limited access to diagnostic resources was the main complaint. Patients blamed themselves for being stubborn to accept or seek help but also the lack of regular check-ups in primary care. Limited access to diagnostics, mostly during out-of-office hours, resulted into long waiting times for tests and their results, leading to preventable admissions.

> *"My husband does not quickly go to the doctor and also thought that these symptoms would go away quickly this time. So yes, I think he maybe waited too long before looking for help, that could be the cause". – Caregiver 10, CWZ*

Theme 6. Errors made by patients

Some admissions where found preventable by patients in which they thought a fault was made by themselves. For example, stopping their medication without permission of their doctor or just simply falling due to not putting brakes on their walker. Some patients told us that they were hesitant to tell their doctor about their concerns, in which they not explained the full extent of their health complaints. This ultimately led to progression of their symptoms and needing admission.

"It was my own fault, I didn't put the brakes on my walker and fell". – Patient 18, CWZ
"I should have said something to my GP about checking my blood levels. But I didn't so we found out to late about my low blood levels" – Patient 5, Viecuri

Discussion

To our knowledge, this is the first study exploring both patient, caregiver and physicians' perspectives on preventable emergency hospital admissions (PEA) of older patients, as well as their level of agreement. A considerable amount (7.2%) of patients and/or caregivers considered their hospital admission from the ED preventable. In contrast, admitting physicians deemed 75 (9.7%) admissions as preventable. Explored causes for PEAs, derived from patients, caregivers and physicians were classified into six themes.

The perspectives of patient and caregiver add valuable insights into the perceived causes of PEAs and underline already known causes for PEAs. The 7% of patients and/or caregivers in our sample that considered their admission preventable is lower than the percentages found in previous studies regarding preventability of ED (re-)visits with rates ranging from 10–17%[19–21]. A hospital admission has more drastic impact on a person's life than an ED attendance, which could possibly explain why the found percentages on admission preventability are lower than ED attendance from a patient or caregiver perspective. When comparing preventability rates of admission from a physician's point of view, our previous study reported that 17.5% of admissions was deemed preventable [6]. In this study, we found a considerably lower preventability rate, as perceived by physicians, of 9.7%. In the prior study two independent ED physicians determined if an admission was preventable, while this study report preventability rates from an admitting physician's point of view. The admitting physician had more insight on the specific patient's case, which could explain the found differences. Furthermore, as the Dutch older adult population lives longer at home due to limited capacity of nursing homes and home care, ED presentations are often more complex. This could result in a lower perceived preventability rate.

While the identified rates of preventability in this study were lower compared to previous literature, ranging from 7 to 10%, may be perceived as a considerable and unacceptable proportion. The implications at both the individual patient level, such as the risk of functional decline and the potential for complications during admission [13–16], and the broader financial and service provision level, including ED crowding and the significant costs associated with a one-day admission (estimated to be at least €476− [23]), emphasize the importance of efforts to reduce potential PEAs.

The level of agreement between patients and/or caregivers and physicians on preventability of admissions was found to be low, as indicated by a Cohen's kappa coefficient of 0.10. This is finding is consistent with results from previous studies on preventability of ED (re-visits) and hospital readmissions, which show poor agreement among patients and physicians as well [19–21, 24]. However, it is noteworthy that in one out of every five cases, both patient or family and physicians shared the same perspective on the preventability of the specific admission. Clarification of these different views on preventability of hospital admissions from the ED could lower utilization of emergency care services. Better communication on patient self-care and independence, and shared-decision making on admission could be important strategies to clarify these different views and lower ED and hospital utilization.

This study adds previously unexplored patient and hospital specific factors as factors contributing to PEAs and also causes that were described in previous studies. Suboptimal care in the community setting, poor availability of resources in community care and insufficient support at home were perceived causes by patients, caregivers and physicians and have previously been recognized as contributors of PEAs [1, 6, 25–27]. A study reporting on preventability of ED visits from patient, caregiver and physician perspectives found similar causes. The most important causes reported in this study were patients blaming themselves, premature discharge, earlier intervention from the GP and suboptimal communication between primary care and the hospital [19]. Earlier intervention from the GP and suboptimal communication between primary care and the hospital were found causes from patient and physician's perspectives for unplanned ED revisits as well [21]. When comparing our findings to previous literature, this study confirms that suboptimal care in the community setting, poor availability of community care resources and insufficient care at home are important factors for PEAs, while also adding premature discharge or unclear discharge instructions and patient specific errors as factors contributing to PEAs. Most of these causes are also important factors in preventability of ED (re-) visits.

This study is the first to assess the perspectives on PEAs of those responsible for hospital admission and those being admitted. A systematic and 24/7 approach during the inclusion period resulted in a large number of eligible patients and a 70% inclusion rate. By approaching every single eligible patient, a realistic and in-depth inquiry on patient, caregiver and physician perspectives of admission without selection bias was achieved. This was a multi-center study in three different hospitals (one

academic and two regional teaching hospitals) with different facilities for older adults, which improves the generalizability of our findings. Furthermore, there were no statistically significant baseline differences between patients who found their admission preventable and those who didn't, which further improves the credibility of the findings.

Our study had several limitations. First, we chose to recruit eligible patients consecutively to determine the proportion of patient reported preventability of admissions and limit the risk of selection bias. Underlying causes were addressed by cases that considered their admissions as preventable. Consequently, these cases were not purposively sampled and important perspectives on preventability and underlying causes may therefore have been missed. However, because a relatively large number of participants were interviewed across different sites, we believe that these findings are most likely representative for other ED settings as well. Second, the perspective of the general practitioner (GP) of each patient would have been valuable in this study. However, because of the way the Dutch out-of-office general practice service is designed (daily changing GPs in each region) it was not possible to structurally interview every referring GP. Moreover, out-of-office GPs commonly do not know the patients as well as their family practitioner, which in our opinion limits the added value of interviewing these GPs on their perceived causes of preventability of emergency admissions. Third, the differences in available older adult care services between the study sites may have impacted our results. Different programs or resources were available on each site to deal with acute care problems of older adults. For example, transitional care nurses were available at the ED (or on call) of all sites but each with different working hours. Another example would be the availability of a geriatrician at the ED and geriatric admission capacity on each site. Only in the Radboudumc patients were primarily referred to the geriatrician and only there the geriatrician had its own ward. In both study settings geriatricians work as consultants without their own admission capacity. The low amount of eligible inclusions at the Radboudumc, compared to CWZ and VieCuri hospital, can be explained by a lower number of ED attendances at an academic ED. This subsequently results in a lower amount of admissions from the ED. However, we believe that by combining these three different research sites and interviewing every single eligible patient on each of these sites, we achieved an in-depth inquiry on perceived causes by patients and caregivers, negating these site-specific differences and ultimately improving overall generalizability. Lastly, patient and caregiver were not separated during the interview and could have influenced each other's responses. However, perspectives specifically mentioned by caregivers were derived from the audio-data illustrating their perspectives.

Despite these limitations, we believe that this study adds valuable knowledge to the existing literature on preventable emergency admissions. Perceived causes by patients and caregivers add new opportunities for improvements and emphasize well known problems in healthcare for older adults. The findings in this study could guide providers and policy-makers in developing strategies to lower preventable emergency admissions. Suboptimal care in the community setting, availability of community care resources and insufficient support at home are well known causes for preventable emergency admissions and are all acknowledged by patients, caregivers, and physicians alike. It is reasonable that these causes should be the first ones to be addressed. Examples of interventions at the ED that could improve these causes could be the introduction of an ED-based liaison service for exploring and organizing outpatient care, transmural protocols for timely organization and 24/7 availability of community rehabilitation care, teach back interventions to improve discharge instructions and educational programs in geriatric emergency medicine or community care. Patients or family-initiated interventions could be preemptive engagement in advanced care planning talks with their GP. These interventions need further investigation of their effect and feasibility [28–30].

Conclusion

In conclusion, the findings in this study contribute to the current body of knowledge by indicating that a significant proportion of admissions from the ED of older adults are perceived as preventable by patients, caregivers and physicians. This indicates a possible source of potentially harmful, inappropriate and expensive hospital care. However, further research is warranted to establish a clear concept and definition of preventable admissions from the ED and to generate a robust model on determining emergency admission preventability. Furthermore, investigating the effectiveness of interventions targeting the reduction of PEAs among older adults remains essential.

Abbreviations

ACSC Ambulatory care	Sensitive conditions
ED	Emergency Department
EMR	Electronical medical record
PEAs	Preventable emergency admissions

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12877-024-05267-9.

Supplementary Material 1

Supplementary Material 2

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Author contributions
SB, GH and YS designed the study. Three medical students acquired the data (Thom Kiers, Sam Heijs and Sam Teulings). Thematic analysis of the data was performed by SB, TK, SH and ST. SB provided local supervision on study site CWZ. OS and DB provided local supervision in RUMC and Viecuri. All authors (SB, OS, DB, GW, GH and YS) were involved in interpretation of data. SB wrote the first draft of the manuscript. All authors (SB, OS, DB, GW, GH and YS) were involved in revisions and approving the final manuscript for publication. SB is guarantor for the manuscript. All authors gave consent for publication.

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Data availability
The data that support the findings of this study (included full text studies, full risk of bias assessment) are available from the corresponding author, upon reasonable request.

Declarations

Ethics approval and consent to participate
Our research has been performed in accordance with the Declaration of Helsinki and has been approved by the local medical ethical committee "CMO Arnhem-Nijmegen" (identification number: 2021–13332). Data collection started if written or verbal (audio recorded) informed consent by participants was obtained.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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References

1. Samaras N, Chevalley T, Samaras D, et al. Older patients in the emergency department: a review. Ann Emerg Med. 2010;56:261–9.
2. Dufour I, Chiu Y, Courteau J, et al. Frequent emergency department use by older adults with ambulatory care sensitive conditions: a population-based cohort study. Geriatr Gerontol Int. 2020;20:317–23.
3. World Health Organization. Data. 2012. Available: https://www.who.int/data
4. Torjesen I. Almost 1.5m emergency hospital admissions could have been avoided last year. BMJ. 2018;361:k2542.
5. Steventon A, Deeny S, Friebel R et al. Briefing: Emergency hospital admissions in England: which may be avoidable and how? London, UK: The Health Foundation, 2018. http://reader.health.org.uk/emergency-admissions
6. van den Broek S, et al. Preventable emergency admissions of older adults: an observational mixed-methods study of rates, associative factors and underlying causes in two Dutch hospitals. BMJ Open. 2020;10:e040431.
7. Wolf D, Rhein C, Geschke K, Fellgiebel A. Preventable hospitalizations among older patients with cognitive impairments and dementia. Int Psychogeriatr. 2019;31(3):383–91. https://doi.org/10.1017/S1041610218000960.
8. Lin PJ, Zhong Y, Fillit HM, et al. Hospitalizations for ambulatory care sensitive conditions and unplanned readmissions among Medicare beneficiaries with Alzheimer's disease. Alzheimers Dement. 2017;13:1174–78. https://doi.org/10.1016/j.jalz.2017.08.010.
9. Wolters A, Santos F, Lloyd T, et al. Emergency admissions to hospital from care homes: how often and what for? London, UK: The Health Foundation; 2019.
10. Blunt I. Oct. Focus on preventable admissions: trends in emergency admissions for ambulatory care sensitive conditions, 2001 to 2013. QualityWatch. 10 2013.
11. Morganti KG, Bauhoff S, Blanchard JC, et al. The Evolving Role of Emergency Departments in the United States. Rand Health Q. 2013;3(2):3.
12. Moy E, Chang E, Barret M. Centers for Disease Control and Prevention (CDC). Potentially preventable hospitalizations - United States, 2001–2009. MMWR Suppl. 2013;62(3):139–43.
13. Vivanti AP, McDonald CK, Palmer MA, et al. Malnutrition associated with increased risk of frail mechanical falls among older people presenting to an emergency department. Emerg Med Australas. 2009;21(5):386–94. https://doi.org/10.1111/j.1742-6723.2009.01223.x.
14. Joseph B, Phelan H, Hassan A, et al. The impact of frailty on failure-to-rescue in geriatric trauma patients: a prospective study. J Trauma Acute Care Surg. 2016;81(6):1150–55.
15. Ouslander JG, Maslow K. Geriatrics and the Triple Aim: defining preventable hospitalizations in the Long-Term Care Population. J Am Geriatr Soc. 2012;60(12):2313–18.
16. Covinsky KE, Palmer RM, Fortinsky RH, et al. Loss of independence in activities of daily living in older adults hospitalized with medical illnesses: increased vulnerability with age. J Am Geriatr Soc. 2003;51(4):451–58.
17. Daniels LM, Sorita A, Kashiwagi DT, et al. Characterizing potentially preventable admissions: a mixed methods study of rates, associated factors, outcomes, and physician decision-making. J Gen Intern Med. 2018;33(5):737–44. https://doi.org/10.1007/s11606-017-4285-6.
18. Chan T, Arendts G, Stevens M. Variables that predict admission to hospital from an emergency department observation unit. Emerg Med Australas. 2008;20(3):216–20.
19. Verhaegh MTH, Snijders F, Janssen L, Peters NALR, Mol Y, Kamerman-Celie F, van Galen LS, Nanayakkara PWB, Barten DG. Perspectives on the preventability of emergency department visits by older patients. Neth J Med. 2019;77(9):330–7.
20. Driesen B, Merten H, Barendregt R, Bonjer HJ, Wagner C, Nanayakkara PWB. Root causes and preventability of emergency department presentations of older patients: a prospective observational study. BMJ Open. 2021;11(8):e049543.
21. Driesen BEJM, Merten H, Wagner C, Bonjer HJ, Nanayakkara PWB. Unplanned return presentations of older patients to the emergency department: a root cause analysis. BMC Geriatr. 2020;20(1):365.
22. Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol. 2006;3:77–101.
23. Hakkaart-van Roijen L, van der Linden N, Bouwmans C, et al. Kostenhandleiding: Methodologie Van kostenonderzoek en referentieprijzen voor economische evaluaties in de gezondheidszorg. Zorginstituut Nederland: Institute for Medical Technology Assessment Erasmus Universiteit Rotterdam; 2016.
24. van Galen LS, Brabrand M, Cooksley T, et al. Patients' and providers' perceptions of the preventability of hospital readmission: a prospective, observational study in four European countries. BMJ Qual Saf. 2017;26(12):958–69.
25. O'Cathain A, Knowles E, Maheswaran R, et al. A system-wide approach to explaining variation in potentially avoidable emergency admissions: national ecological study. BMJ Qual Saf. 2014;23(1):47–55. https://doi.org/10.1136/bmjqs-2013-002003.
26. Solberg LI, Ohnsorg KA, Parker ED, et al. Potentially preventable hospital and emergency department events: lessons from a large innovation project. Perm J. 2018;22:17–102. https://doi.org/10.7812/TPP/.
27. Pope I, Burn H, Ismail SA, et al. A qualitative study exploring the factors influencing admission to hospital from the emergency department. BMJ Open. 2017;7(8):e011543. https://doi.org/10.1136/bmjopen-2016-011543.
28. Hesselink G, Sir Ö, Koster N, et al. Teach-back of discharge instructions in the emergency department: a pre–post pilot evaluation. Emerg Med J. 2022;39:139–46.
29. Mahajan M, Hogewoning JA, Zewald JJA, et al. The impact of teach-back on patient recall and understanding of discharge information in the emergency department: the emergency teach-back (EM-TeBa) study. Int J Emerg Med. 2020;13:49.

30. van den Broek S, Westert GP, Hesselink G, et al. Effect of ED-based transitional care interventions by healthcare professionals providing ransitional care in the emergency department on clinical, process and service use outcomes: a systematic review. BMJ open. 2023;13:e066030.

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