



A simple quality-of-care intervention targeting nurses for improving care of older patients in the emergency department: a Western European multicenter study

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Key summary points

Aim To use a Plan-Do-Study-Act (PDSA) framework to identify nurses' barriers in the care for older ED patients and to develop a specific intervention targeting these barriers.

Findings Across eight western European ED settings, nurses identified time pressure, behavioral disorders, and communication difficulties as the main barriers to delivering optimal geriatric care. Through three iterative PDSA cycles, we developed and implemented a family-engagement poster that was well received. Yet, we found only a limited measurable impact on nurses' time use, likely due to the relatively small number of PDSA cycles completed to date.

Message Our findings highlight the value of PDSA cycles for designing and adapting quality improvement interventions in geriatric emergency care, and underscore the need to actively engage all key stakeholders, including frontline nurses and caregiver representatives, as partners in these efforts.

Abstract

Purpose Emergency departments (EDs) face significant challenges in delivering high-quality care for older patients. Identifying barriers and developing stakeholder-informed interventions are essential to improve ED care. This study aimed to identify nurses' perceived barriers to caring for older ED patients and to develop and evaluate a targeted intervention to improve care quality.

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Methods This multicenter quality improvement project (QIP) was conducted across EDs in four western European countries (2024–2025) using three iterative Plan-Do-Study-Act (PDSA) cycles. *Cycle 1* involved a needs assessment among nurses to identify barriers. *Cycle 2* focused on developing and evaluating the perceived helpfulness and feasibility of three proposed interventions. *Cycle 3* implemented and evaluated the selected intervention. Nurses provided feedback throughout all PDSA cycles.

Results In *Cycle 1*, 82 nurses from eight EDs in Belgium ($n=22$), Germany ($n=20$), Switzerland ($n=30$), and Iceland ($n=10$) identified time constraints ($n=92$; 39%), behavioral disorders ($n=30$; 13%), and communication difficulties ($n=25$; 11%) as key barriers. In *Cycle 2*, three interventions were proposed: (1) a QR-code leaflet to facilitate geriatric anamnesis through relatives, (2) educational sessions for nurses, and (3) an informative poster promoting family involvement. The QR-code and poster were evaluated as most helpful and feasible. In *Cycle 3*, a combined poster-QR-code intervention was developed and implemented across all sites and was well received, though with no measurable effect at this stage.

Conclusion Iterative PDSA cycles provided a structured framework to identify barriers, co-develop, and refine a context-specific intervention for geriatric ED care. The absence of an immediate effect underscores that continuous iteration and stakeholder engagement are essential to further enhance geriatric care within the complex ED setting.

Keywords Geriatric care · PDSA cycle · Emergency department · Quality improvement · Family involvement · Nurses

Introduction

Emergency departments (EDs) are a crucial interface for acute care of older adults, whose numbers and complexity are increasing globally [1, 2]. Older patients, often characterized by multimorbidity, frailty, and cognitive impairments, require longer treatment times in the ED, face higher risks of adverse events, more unplanned readmissions, prolonged hospital stays and functional decline [3]. Addressing these challenges demands geriatric-focused, age-appropriate approaches, including tailored workflows, interprofessional collaboration, and holistic care that integrates medical, social, and psychological needs to improve outcomes and support ED staff in delivering person-centered care [2, 4–7].

Improving healthcare settings requires approaches that can effectively test and refine changes within complex systems. The Institute for Healthcare Improvement (IHI)'s Model for Improvement (MFI) is a widely recognized framework used to accelerate continuous improvement, particularly in healthcare settings [8]. The MFI applies an iterative, real-world approach that allows teams to test small-scale changes, learn from the outcomes, and adapt interventions accordingly. It is built around three fundamental questions that guide the improvement process, followed by Plan-Do-Act Study (PDSA) cycles, allowing teams to test changes in structured and iterative ways to achieve sustainable improvements (Figure S1). Together, these elements help healthcare teams achieve meaningful and measurable improvements through continuous learning and adaptation.

Considering this, our study aimed to apply a PDSA approach within the emergency department context to improve geriatric care for older ED patients. Specifically, we aimed to identify nursing-perceived barriers to the care of older ED patients and to develop, refine, and evaluate a

tailored intervention using three iterative PDSA cycles to improve geriatric ED care.

Methods

Study design and study population

This Quality Improvement Project (QIP) was conducted as part of a 2-year European Academy for Medicine of Ageing (EAMA) course running from 2024 to 2025. The EAMA is an international postgraduate training program for geriatricians consisting of four structured contact sessions [9]. The predefined timeframe of the program explains the limited number of the PDSA cycles that could be completed (i.e., three cycles). Moreover, the composition of countries and EDs involved in this QIP is a reflection of the EAMA course participants.

Within this context, this QIP was conducted between February 2024 and May 2025 among nurses working in eight EDs across four countries: Belgium (two university hospitals), Germany (one university hospital and one regional hospital), Switzerland (three university hospitals), and Iceland (one university hospital). Participation was voluntary, with no exclusion criteria, and included both experienced and less experienced ED nurses. Some nurses may have received prior geriatric training, but this was not standard nor required. All local ED heads approved the project, which was considered part of routine quality improvement; participants therefore consented by responding to the different questionnaires. All responses were anonymized, and data processing was conducted in accordance with the General Data Protection Regulation (EU) 2016/679 (GDPR) [10].

Procedure and data collection

The project was divided into three different PDSA cycles. Each cycle corresponded to a distinct phase of the project: Phase 1—needs assessment (problem identification), Phase 2—proposed interventions, and Phase 3—development, implementation, and evaluation of the selected intervention. This structured, phased approach enabled progressive refinement of the intervention based on real-time feedback from participating EDs. An overview of the methodology, including the structure of each PDSA cycle, is provided in Fig. 1.

Phase 1: needs assessment

An initial qualitative needs assessment was carried out in each participating ED. Ten nurses per site were invited to complete a structured, paper-based survey (Addendum 1: need assessment),

asking them to identify and prioritize the three main barriers they encountered when caring for older patients, as well as to propose and rank potential solutions (open responses). Survey responses were thematically categorized into eight barrier domains (i.e., time constraints, communication difficulties, behavioral disorder-related challenges, infrastructure issues, patient flow inefficiencies, medical issues, training needs, and others) (Table 1) and nine solution domains (i.e., need for additional staffing, need for more time, need for better infrastructure, improve patient flow, need for enhanced training, policy changes, multidisciplinary approaches, and others).

Phase 2: proposed interventions and feasibility assessment

Based on the findings of Phase 1, three targeted interventions were designed by the authors (all geriatricians),

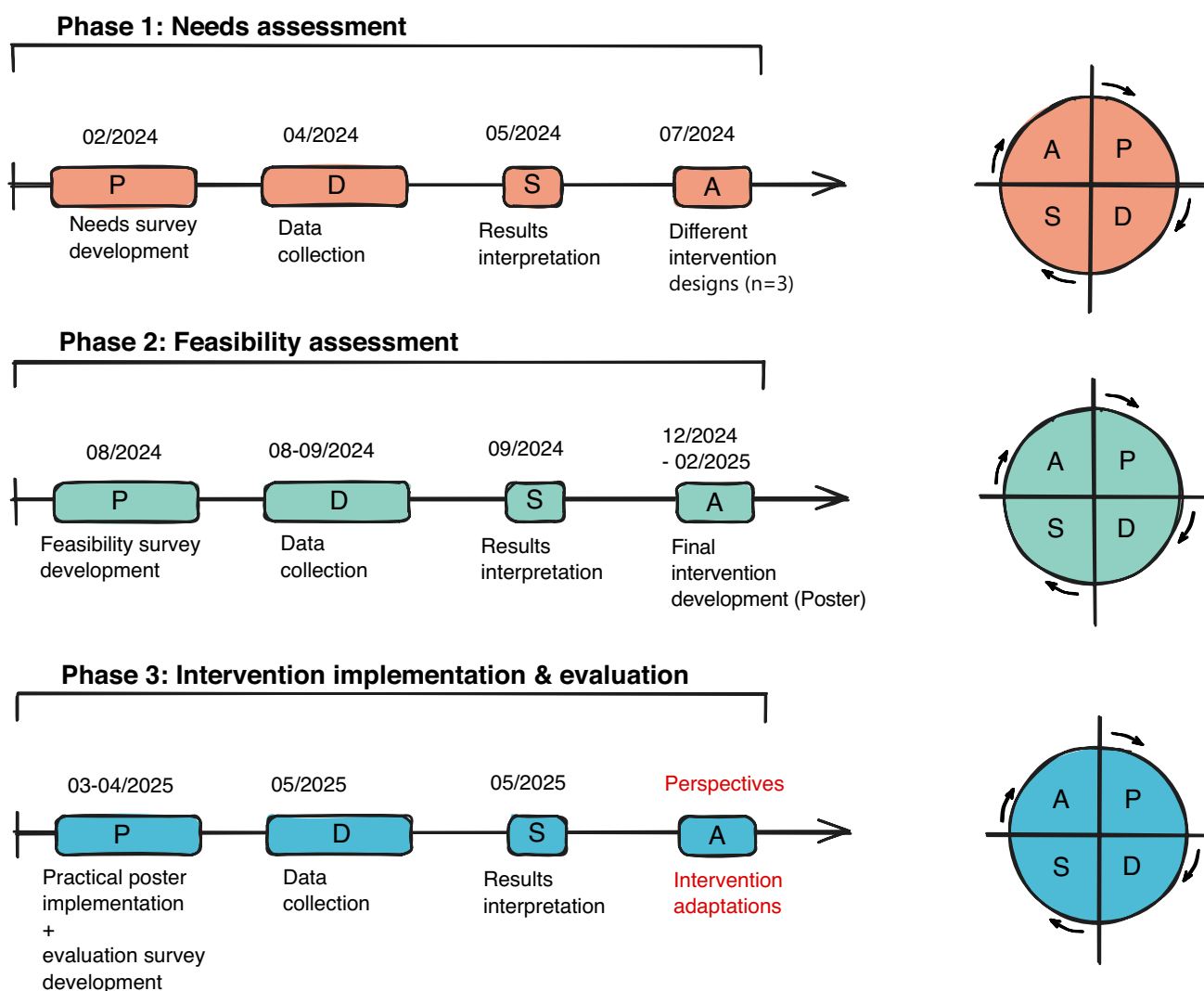


Fig. 1 Plan-Do-Study-Act framework throughout the project

Table 1 Barriers experienced by nurses in caring for older patients in the emergency department, classified by category

<i>Barrier category</i>	<i>Examples of barriers cited by nurses</i>
<i>Time</i>	Stress to get things done Listen and give attention Hurry to accomplish basic nursery tasks (bathroom/feed/ respond to calls, etc.) Too many patients per nurse Increased workload for very sick older patients with high dependency, dementia, altered cognitive state
<i>Communication</i>	Sensory problems (hearing, expressing) Assess functional status of patients with confusion Understand older patients: verbal expression altered
<i>Behavioral</i>	Management of confused patients Management of depression states Management of aggressive states, agitation, deambulation Management of patients tired of life or end of life
<i>Infrastructural</i>	Inadequate hard stretchers with risk of pressure sores Too small rooms Inadequate environment: lightning, noise Insufficient protocols to prevent (risk of) falls Inadequate environment and material for patients with dementia, i.e., separation of other patients Difficulties monitoring patients with dementia (for security) Unadapted meals for patients with dental problems, dysphagia, ... Shift changes and multiplicity of care providers at the ED can induce confusion
<i>Patient flow</i>	Waiting times too long for older patients Transfer time to ward too long in ED (length of stay at ED)
<i>Training</i>	Need training in pain relief Lack of trained geriatric personnel in ED Lack of sensibilization to geriatric care/ syndromes in ED Lack of training to work or communicate with patients suffering dementia Prioritizing of problems (especially when poly morbid/ poly sick)
<i>Medical</i>	Difficulties managing polypharmacy Differentiate acute from chronic problems
<i>Other</i>	Lack of advanced care plans Absent families/caregivers Intrusive families/caregivers Lack of information from nursing homes/treating physician/ motive of hospitalization

informed by the barriers identified by the nurses (Addendum 2). These interventions were subsequently presented to the nurses in a structured, paper-based survey (Addendum 3) to obtain feedback on the perceived helpfulness and feasibility, using five-point Likert scales.

The proposed interventions were as follows:

Intervention 1: Introduction of a QR code or paper leaflet in ED waiting areas to collect essential patient information from family members (e.g., functional, cognitive, and social status), aimed at reducing time spent on collecting information by nursing staff.

Intervention 2: Implementation of monthly case-based learning sessions for ED nurses, led by a geriatrician,

focusing on managing behavioral challenges in older patients.

Intervention 3: Deployment of posters in ED waiting areas encouraging family members to remain present during the ED visit, to be involved in basic care (e.g., helping with drinking, repositioning, emotional support), and to communicate key information to staff.

Phase 3: development, implementation, and evaluation of the selected intervention

Based on nurses' helpfulness and feasibility feedback from Phase 2 and cross-site input, the third proposed intervention—i.e., a family involvement poster—was selected for

development and implementation. The intervention included the development of a poster and a QR-code directing users to a web-based digital leaflet, highlighting three key messages for caregivers of older ED patients: (1) the importance of remaining present during the ED visit, (2) the need to provide essential information (e.g., current medications, cognitive status) and bringing necessary aids (e.g., glasses, hearing devices), and (3) offering practical support during the ED visit (e.g., helping with transfers). The intervention aimed to improve communication, reduce nurses' information-gathering time, and enhance overall staff satisfaction. The poster and web-based digital leaflet were initially developed in English and translated into local languages by native-speakers, with cultural and linguistic adaptations as appropriate (Addenda 4 and 5). Posters were displayed for 4–6 weeks in ED waiting rooms (2–5 posters per site, depending on department size), either mounted on walls and/or displayed on digital screens. After the implementation period, an online evaluation survey (7 items; Addendum 6) was distributed by e-mail to all emergency nurses rather than only previous participants from phase 1 and 2, to minimize potential bias. This survey assessed the perceived effectiveness, appropriateness, and practical utility of the implemented intervention.

Data analysis

To ensure a representative sample from each ED, 10 nurses per site (approximately 10–20% of total ED nursing staff) were targeted per phase in the project.

Phase 1 survey responses were categorized into predefined thematic domains. Frequencies and percentages were calculated across all participating countries. Descriptive statistics were used to analyze Likert-scale data from Phases 2 and 3. Response pattern data were visualized through bar

plots and heatmaps. The selected intervention's effectiveness was assessed using the same analytical approach.

Results

Phase 1: need assessment

A total of 82 nurses from eight EDs across Belgium ($n=22$), Germany ($n=20$), Switzerland ($n=30$), and Iceland ($n=10$) participated in the initial needs assessment survey.

Across all sites, the most frequently reported barrier to providing quality care for older patients was time constraints ($n=92$; 39%), followed by challenges related to behavioral disorders ($n=30$; 13%), inefficiencies in patient flow ($n=29$; 12%), and communication difficulties ($n=25$; 11%) (Fig. 2A). Country-specific barriers are detailed in supplemental material (Figure S2). Similar trends were observed across countries, with time constraints representing the most frequently reported barrier in all four countries. Interestingly, the lack of dedicated infrastructure for older patients was more commonly reported in Iceland and Belgium, whereas in Switzerland, challenges were more related to patient flow management, and in Germany more often to medical issues (e.g., differentiating acute from chronic illnesses, pain management). Regarding potential solutions, most nurses overall suggested increased staffing ($n=71$; 31%), including the addition of ED nurses or geriatric specialists. Other frequently reported solutions included allocating more time for individualized care ($n=42$; 18%), improving patient flow logistics ($n=33$; 14%) and enhancing ED infrastructure ($n=30$; 13%) (Fig. 2B). Some variation between countries was observed in the proposed solutions. Increased staffing and time allocation were most commonly suggested in Belgium and Germany, accounting together for 57% and 63% of responses, respectively. In contrast, these

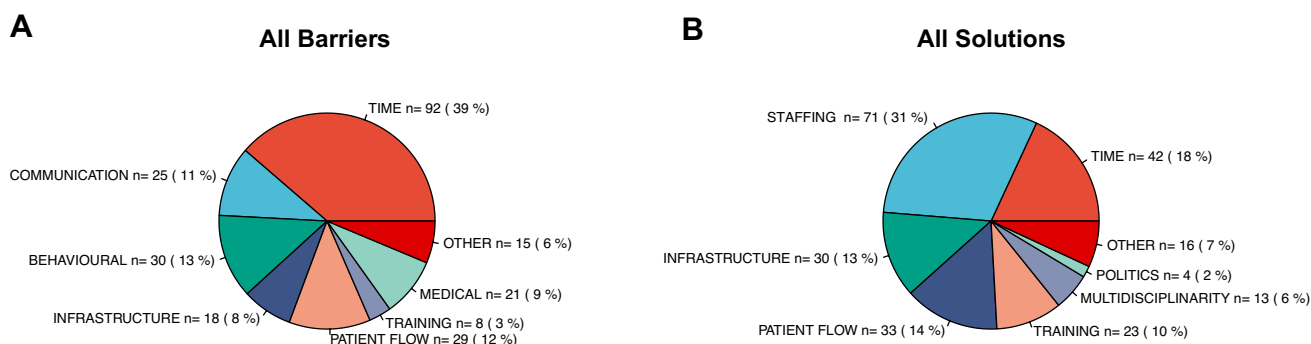


Fig. 2 **A** Barrier categories experienced by nurses in caring for older patients in the emergency department. Time constraints, challenges with behavioral problems, and communication with older patients were the barriers most frequently reported by nurses. **B** Solutions to

barriers proposed by nurses. Allocating more time and staff, improve patient flow, and dedicated infrastructure were the most reported solutions to address barriers

solutions were less frequently reported in Iceland and Switzerland (33% and 35%, respectively). Conversely, improvements in infrastructure and better patient flow logistics were more frequently proposed in Iceland (43%). Differences were also observed regarding the need for enhanced multidisciplinary collaboration, which was most frequently reported in Iceland (15%), followed by Germany (7%) and Switzerland (6%), whereas in Belgium, this solution did not seem to emerge. The need for specialized geriatric training was most commonly reported in Switzerland (19%), but less frequently in Belgium or Germany (5%), and not proposed by Icelandic nurses (Figure S3).

Findings from this phase directly impacted on the design of the three contextually relevant proposed interventions in Phase 2, tailored to address the most frequently reported barriers and suggested solutions.

Phase 2: proposed interventions helpfulness and feasibility assessment

A total of 82 nurses rated the helpfulness and feasibility of the three proposed interventions: (1) QR-code/paper leaflet to facilitate information-gathering by nursing staff, (2) monthly learning sessions for nurses, and (3) the family involvement poster; using a 5-point Likert scale (1 = very helpful/feasible, 5 = not helpful/not feasible). Overall, nurses perceived that the QR-code leaflet and family poster would be more helpful and feasible than the learning session if implemented.

As shown in the heatmap (Fig. 3) and Likert response bar chart (Figure S4), 89% of participants rated both the QR code and the family poster as helpful (responses 1 or 2), with mean helpfulness scores of 1.60 (SD=0.86) and 1.62

(SD=0.86), respectively. In terms of feasibility, 78% found the QR code feasible (mean = 1.99, SD = 0.90), and 90% rated the family poster as feasible (mean = 1.59, SD = 0.77).

In contrast, the monthly learning session intervention received lower ratings, with only 70% finding it helpful (mean = 2.06, SD = 1.18), and only 52% considering it feasible (mean = 2.58, SD = 1.34). The heatmaps (Fig. 3) further reveal a broader spread of responses for the learning session, particularly along the feasibility dimension, suggesting more varied opinions and potentially greater implementation challenges.

These findings suggest that while all three proposed interventions may have merit, the QR code and family poster were generally preferred by nurses due to their higher perceived helpfulness and ease of implementation.

Based on these results, the family poster was selected as the preferred intervention for further development and real-world implementation in Phase 3.

Phase 3: development, implementation, and evaluation of selected intervention

A total of 79 nurses (not necessarily the same participants as in Phase 1 and 2) completed the evaluation survey following the 4–6-week poster intervention period. Of these, 38 (48.1%) reported having noticed the poster. Among those who noticed the poster, 34 (89.5%) respondents considered the idea of displaying a poster to raise caregiver awareness of their role in supporting older ED patients to be relevant (responded 4 = agree or 5 = strongly agree), with the majority ($n=24$, 63%) strongly agreeing about the relevance.

Importantly, 34 (89.5%) respondents who noticed the poster felt the posters should remain in place (responded 4 = agree or 5 = strongly agree), and none indicated that



Fig. 3 Graphical representation of helpfulness and feasibility of the 3 proposed interventions (1 = most agree, 5 = less agree). A QR code for facilitating geriatric anamnesis by relatives and an informative

poster promoting family involvement were the interventions that were most perceived as both helpful and feasible by nurses in the emergency department

they should be removed. Additionally, 30 (79%) nurses believed that the posters' content did not require any changes (responded 4 = agree or 5 = strongly agree).

However, engagement with the posters during the intervention period was limited. Most nurses ($n = 30$, 79%) reported never referring to the posters in their communication with caregivers, and only 5 (13.2%) actively referred to them. Furthermore, most nurses ($n = 37$, 97.5%) stated that they were never approached by caregivers regarding the posters.

In terms of impact on workflow, 6 (15.8%) nurses reported saving time due to the intervention (responded 4 = agree or 5 = strongly agree), 31.6% ($n = 12$) experienced no change in time (responded 1 = not at all, responded 2 = indifferent), and 19 (50%) reported a slight increase in time spent (response 3 = slightly agree).

Discussion

Our international QIP aimed to improve nursing care for older patients in EDs in Belgium, Germany, Iceland, and Switzerland. This study showed that a systematic PDSA approach provides a pragmatic and useful framework to support reflection and action when implementing improvements in complex clinical environments such as the ED. Across the three completed PDSA cycles, key barriers experienced by ED nurses in caring for older patients were identified, including time constraints, behavioral issues, patient flow issues, and communication difficulties. In parallel, potential solutions, such as increasing staffing capacity, allowing more time for individualized care, and improving patient flow and infrastructure, were identified. Furthermore, the structured PDSA approach supported the co-development and evaluation of the selected intervention for implementation, i.e., the family involvement poster. The absence of an immediate effect on nurses' time savings after three PDSA cycles should not be interpreted as evidence to discontinue the intervention. Instead, it underscores the iterative nature of quality improvement, where ongoing refinement, adaptation, and stakeholder involvement are essential to shape interventions until they achieve clinically meaningful impact.

On a national level, a previous qualitative study explored factors influencing the quality of care for older patients in the ED of a Belgian university hospital [11]. This study identified several key challenges, including the absence of a specific geriatric flow routine, an increased risk of discontinuity of care, unmet basic needs, and shortcomings in patient-centered care. Collectively, these factors contributed to the perception that complex older patients are unwelcome in EDs. Likewise, the present study extends these Belgian findings from a national to an international level. Indeed, our study further highlights the complexity of caring for older

patients in the ED. This increased complexity translates into higher care demands, with unsurprisingly, time constraints, being the most frequently reported barrier among nurses across all four countries. Although some variation between countries was observed, with Belgium and Germany reaching nearly 50% of nurses complaining of a lack of time to adequately care for their older patients. Absence of a specific geriatric patient flow routine was also reflected in the present study, particularly in Switzerland, where 21% of nurses reported this issue. Our study also identified a lack of dedicated infrastructure for older patients, especially in Iceland (25%) and Belgium (10%), as main barrier. This aligns with the previous findings of De Brauwert et al., that appropriate infrastructure is essential to meet basic needs and to support an efficient geriatric flow routine in ED's. An additional significant barrier reported consistently in Belgium, Iceland, and Switzerland involved managing behavioral challenges and communicating effectively with older patients in the acute setting. Indeed, behavioral disturbances represent a substantial burden in the emergency care for older patients. Previous studies have shown that approximately 18% of seniors aged 69 years and older exhibit behavioral disorders during their ED visit, increasing to 25% among those with cognitive impairment [12]. These situations are particularly demanding for nursing staff, as they often require additional staffing to avoid the use of restrictive measures [12]. Beyond the associated workload, managing acute behavioral disorders in older patients adds clinical complexity, requiring tailored de-escalation strategies and specific geriatric competencies.

Interestingly, according to the solutions proposed by the nursing staff in the present study to overcome the reported barriers, the need for training was not at the forefront, except in Switzerland. The main solutions differed across countries in accordance with the most important barriers in the respective countries: increasing personnel and allowing more time for care in Belgium and Germany, improving infrastructure in Iceland, and enhancing training in Switzerland. Concerns that training would be even more time-consuming were reflected in the second PDSA cycle, in which a learning session intervention was perceived as not feasible by 30% of respondents. These cross-country differences can largely be explained by variations in local staffing policies and the infrastructure of participating hospitals. Notably, nurse staffing guidelines in EDs are nearly nonexistent across much of Europe, with considerable variation in patient-to-nurse ratios even within countries [13–15]. A German study noted that "to date, there are no valid statistics regarding the number of full time staff necessary for nursing care in emergency departments in Europe," while Swedish EDs reported patient-per-registered nurse ratios ranging from 0.3 to 8.8 patients (mean 3.2) [13, 14]. This absence of standardized staffing frameworks in countries, such as Belgium, Iceland,

and Germany, exposes their ED settings to understaffing risks. From this perspective, the solutions proposed by nurses appear to follow a hierarchy of urgency, which does not exclude the importance of training. Rather, it suggests that training should be implemented once fundamental staffing and infrastructure deficits have been addressed. Evidence demonstrates that geriatric education programs for ED professionals—ranging from 1-day workshops to comprehensive curricula combining didactic lectures with experiential learning—can significantly improve knowledge acquisition and clinical practice, particularly when embedded in existing curricula and supported by collaboration between emergency and geriatric medicine faculties [16].

Altogether, these findings underscore the importance of addressing nurses' needs in the design of geriatric emergency care interventions. As Hunt et al. emphasize, nurses play a key role in developing and sustaining Geriatric ED Interventions (GEDI) tailored to the specific challenges and needs of older patients [17].

Hence, in the second PDSA cycle, three potential interventions were designed based on the identified barriers and proposed solutions and subsequently proposed to the nurses for feedback. Their input allowed further refinement and the development of a more specific and tailored intervention: a poster designed to inform and involve caregivers or family members in the care trajectory of their kin in the ED. This intervention builds on the previous research highlighting that caregivers and family members could be valuable assets when appropriately engaged [18, 19]. They can assist with basic care needs, provide relevant clinical information to staff (such as medication use and medical history), and support communication and reassurance, particularly if they are confused or closed off. Thereby, the poster aimed to tackle several reported barriers across the different participating countries, including time constraints for care and basic needs, communication challenges, and behavioral disorders.

In our third and last PDSA cycle, follow-up evaluation indicated that the poster was perceived as appropriate and relevant by nursing staff, yet its practical impact was still limited. Engagement with the content of the poster was low, as few nurses referred to the poster during their interactions with patients' families, and caregivers rarely initiated discussions about it. Consequently, the anticipated reduction in nurses' time pressure through increased caregiver involvement did not materialize. Reported effects on workflow were mixed: some nurses reported time savings, while others experienced no change or a slight increase in workload. Overall, the intervention was feasible and minimally disruptive but yielded limited observable time savings. Future iterations should focus on enhancing the visibility and active promotion of the poster by staff, as well as involving front-line nurses more directly in its design and implementation to improve contextual fit and engagement.

Transnational quality improvement initiatives focusing on the care of older patients in EDs remain limited. This scarcity is largely attributable to the complexity of their implementation, including heterogeneity across healthcare systems, regulatory constraints, data governance issues, and the need for coordination among multiple institutional and national stakeholders [20].

This study demonstrated that the use of a structured PDSA framework facilitated this international QIP. The iterative nature of the cycle allowed each stage of the intervention development to build on the findings of the previous step, for example, by refining the poster content according to nursing staff feedback. Furthermore, the PDSA cycle proved to be flexible and adaptable to the different contexts of the participating countries and individual healthcare facilities. However, the overall impact of the intervention remained limited at this stage, as only three PDSA cycles were completed. Moreover, implementing changes within a PDSA cycle may encounter resistance. In our project, although nurses generally viewed the poster intervention favorably, challenges emerged in practice. As reflected in the responses to question 6 ("How often did patients or caregivers contact you about the information on the poster?") and question 7 ("To what extent did this intervention help you to save time in your care for older ED patients?") of the final survey, there was skepticism regarding its effectiveness. Importantly, it should be noted that physicians were primarily involved in the original design of the PDSA cycle itself. However, early and sustained stakeholder engagement is known to enhance the acceptability, adoption, and sustainability of interventions [21, 22]. While nurses provided valuable input throughout each PDSA cycle in the present project, their involvement in the design and implementation phases was limited. This negative result to date only underscores the importance of involving key stakeholders from the very beginning of project design and throughout implementation to enhance adoption and sustainability. Ongoing facilitation and support by project leaders and key stakeholders during the implementation process is also crucial to success, even if this requires considerable human resources.

Finally, although the intervention aimed to encourage family involvement in the care of older ED patients through the poster, this may have been perceived as an additional burden, with potential unintended effects. Future quality improvement projects should, therefore, involve family members as stakeholders in both the design and evaluation of interventions.

Several limitations should be considered when interpreting the results. First, the PDSA cycle is inherently subjective; although results were discussed with all project coordinators to minimize bias, unconscious biases may have influenced data interpretation. Second, generalizability may be limited, as the PDSA cycle is tailored

to specific contexts and the results reflect the particular conditions and challenges in the participating EDs, which may not be readily transferable to other institutions or countries. Third, the inclusion of nurses from EDs with heterogeneous resources, working conditions, and professional backgrounds introduces potential selection bias and limits external validity. Fourth, implementation heterogeneity across centers—including variations in poster format (printed versus digital), duration of display, and positioning within the ED—may have influenced staff exposure and engagement, limiting comparability across sites, though these discrepancies also reflect real-world differences in resources and local practices. Finally, minimal discrepancies may have occurred during translation of materials into the respective national languages (Icelandic, Dutch, German, and French).

Conclusion

Improving nurses' care for older patients in the ED is essential to enhancing overall patient outcomes. This international QIP showed that the PDSA cycle framework is a valuable method for identifying barriers, generating solutions, developing interventions, and supporting their implementation and evaluation. Our findings indicate that to increase the effectiveness and impact of such interventions, all key stakeholders, including nurses and caregiver representatives, should be involved throughout the entire design and implementation process. As PDSA cycles are iterative, interventions may require refinement based on prior results, and lack of immediate positive outcomes does not diminish the value of the process for continuous learning and improvement.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s41999-026-01543-6>.

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Data availability The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Declarations

Conflict of interest The authors have no conflicts of interest to disclose.

Ethical approval This project was undertaken as a quality improvement initiative aimed at enhancing routine clinical care; therefore, ethical committee review was not deemed necessary. Data collection followed the General Data Protection Regulation: all involved nursing staff voluntarily provided information to our study, and no individually identifiable data were collected. No individual patients were approached, nor direct patient information retrieved.

Informed consent Participants were informed about the study before completing the questionnaires or getting involved in interviews. Completion and submission of the questionnaires constituted informed consent to participate.

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