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# Paramedics and emergency medical technicians' perceptions of geriatric trauma care in Saudi Arabia

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## Abstract

**Background** Saudi ambulance clinicians face unique challenges in providing prehospital care to older trauma patients. Limited geriatric-specific training and complex needs of this population hinder effective management, leading to adverse outcomes. This study explores the perceptions of Saudi ambulance clinicians regarding geriatric trauma care and identify facilitators and barriers to improved care.

**Methods** A qualitative study was conducted using a purposive sample of Saudi paramedics and ambulance technicians from Riyadh and Makkah using online semi-structured interviews and analysed using the framework method.

**Results** The qualitative study recruited twenty participants and identified that they reported age-related challenges including physiological changes, polypharmacy, and communication difficulties. They all wanted training and guidelines to improve their knowledge. They reported struggling with communication difficulties, inaccurate adverse outcomes predictions, difficult intravenous cannulations, and cultural restrictions affecting care provision for female patients. We identified organisational barriers (e.g. lack of shared patient records and lack of guidelines) and cultural barriers (e.g. barriers to assessing women, attitudes towards older people, and attitudes towards paramedics) that influenced implementation of knowledge.

**Conclusion** Ambulance clinicians in Saudi Arabia want guidelines and training in managing older trauma patients but these need to take into account the organisational and cultural barriers that we identified to facilitate implementing knowledge and changing practice to providing improved care.

**Keywords** Older patients, Trauma, Prehospital care, Perceptions

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## Background

The demand for prehospital care for older patients is increasing, placing greater demands on ambulance services [1, 2]. Ambulance workers aim to provide effective assessment and management for injured older adults [2]. However, current prehospital education offers limited training in geriatric care, despite the unique needs of this population, resulting in suboptimal care [3–5]. Specific challenges include insufficient awareness of the impact of pre-injury polypharmacy, such as antiplatelet and anti-coagulant use, which complicates the treatment of head injuries in older patients [6, 7]. Field-triage unfamiliarity and lack of experience in managing injured older patients further contribute to undertriage [8–11]. This gap in knowledge is largely attributed to inadequate training and a limited focus on ageing-related care complexities [8, 9, 12].

The need to address these issues highlights the importance of understanding paramedics' decision-making, their knowledge of geriatric trauma care, and the impact of ageing on patient outcomes [13]. Qualitative research is particularly valuable in this context, as it allows for an in-depth exploration of the lived experiences, perceptions, and challenges faced by clinicians [14]. Qualitative methods also provide a nuanced understanding of barriers and facilitators to effective care, providing insights to inform tailored care standards and training interventions [15–17]. There is a lack of qualitative research on key geriatric syndromes and care challenges faced by ambulance clinicians [13]. Qualitative methods, such as interviews with paramedics and geriatric trauma experts, can help identify critical uncertainties in practice [13]. Increasing paramedics' awareness of age-related changes, comorbidities, and polypharmacy may reduce undertriage, delays in care, and preventable mortality [13]. This study addresses the following questions:

1. How do Saudi paramedics and emergency medical technicians EMTs understand geriatric trauma care?
2. How do they acquire and apply their knowledge?
3. What are the barriers to providing improved care?
4. What are the facilitators to providing improved care?

## Methods

### Design and setting

This qualitative study, utilising the framework method, was conducted to explore the perceptions and experiences of Saudi paramedics and EMTs in geriatric trauma care. Participants were recruited from the Saudi Red Crescent Authority's (SRCA) ambulance services in Makkah and Riyadh. Established in 1934, the SRCA provides public and humanitarian services free of charge [18].

### Participants

Participants included Saudi frontline paramedics (bachelor holders) and EMTs (diploma holders). Purposive sampling was used to select participants from multiple ambulance stations across Makkah and Riyadh, ensuring diversity in location, clinical level, and years of service. The initial recruitment plan involved distributing Expression of Interest (EOI) forms through ambulance station managers, with interested paramedics and EMTs contacting the researcher directly. However, due to COVID-19 restrictions limiting access to ambulance stations, participants were instead recruited through social groups on Telegram and WhatsApp that connect the EMS community in Saudi Arabia. This approach allowed for broad recruitment despite restrictions, capturing diverse perspectives. Participants were contacted via phone and email, provided with an information sheet and consent forms, and asked to share demographic details before scheduling interviews. While variation in the sample was sought, only two EMTs participated, as many had transitioned to paramedic roles through bridge programmes.

### Data collection

Online semi-structured interviews were conducted via Google Meet, lasting 45–60 min, between May and September 2022. This format was chosen due to COVID-19 restrictions, ensuring safety and accessibility for participants. Prior to each interview, the purpose and importance of the study were explained to build trust and ensure informed consent. Three pilot interviews were undertaken to refine the interview guide and improve the interviewing technique.

The initial interview questions were developed based on NH's professional experience with ambulance workers providing care for older trauma patients, ensuring relevance to real-world practice. The questions were then refined through consultations with academics in Saudi paramedic science programmes and feedback from participants after each interview, resulting in three versions of the interview guide (Supplementary File 1). Reflective notes were taken after each interview to track effective questions and monitor data saturation. Data collection continued until no new themes emerged, ensuring a comprehensive exploration of the participants' experiences [19].

The interviews were conducted and transcribed in Arabic, then coded and analysed in English. Key quotations were translated from Arabic to English, and then sorted under each theme or subtheme. A forward and back-translation process was conducted to ensure accuracy, with a bilingual checker MB verifying translations [20–22]. Key documents were also translated, and transliteration was used to maintain the exact meaning of words when replacing terms between languages [20].

Additionally, participants were able to respond using English words where relevant, which were identified in transcripts and quotations using *italics* writing style.

### Data analysis

Data were analysed using the framework analysis approach, involving five stages: familiarisation, thematic framework identification, indexing, charting, and interpretation [23–25]. Initial interviews guided the development of the framework, which was refined as new themes emerged during further interviews. These actions contributed to ensuring visibility of the thematic charts, a transparent audit trail, use of reflexivity, and clarity of interpretation of the data to ensure results' rigor and trustworthiness [26, 27]. MAXQDA was used for analysis due to its compatibility with Arabic [28], unlike NVivo, which lacks this support [29].

### Rigour and trustworthiness criteria

Lincoln and Guba's trustworthiness criteria [27], were applied to ensure the rigour and quality of this study. Credibility was enhanced through established methods, including online interviews recognised as credible alternatives to face-to-face methods, particularly during pandemics. The interview schedule was developed based on professional experience with ambulance clinicians providing care to older trauma patients and was refined through stakeholder input and piloting with three participants. This process ensured that data collection captured relevant experiences effectively.

Dependability was achieved by thoroughly describing the methods and findings, enabling replication by other researchers [30], while acknowledging potential variations in data interpretation. Confirmability was addressed by detailing the methodology to allow verification of results. Transferability was considered by representing the experiences of clinicians from Makkah and Riyadh, whose consistent reports of challenges suggest applicability to other Saudi regions. Additionally, forward and back-translation verified by a bilingual checker and

reflexivity minimised researcher bias, further enhancing trustworthiness.

### Ethical considerations

The study was approved by the Saudi Ministry of Health. Participants were recruited via phone and email, provided informed consent, and scheduled for interviews. To protect privacy, participant identities and station information were anonymised, and data was securely stored on the University of Sheffield's encrypted system with restricted access. Informed consent procedures detailed measures to ensure confidentiality.

### Results

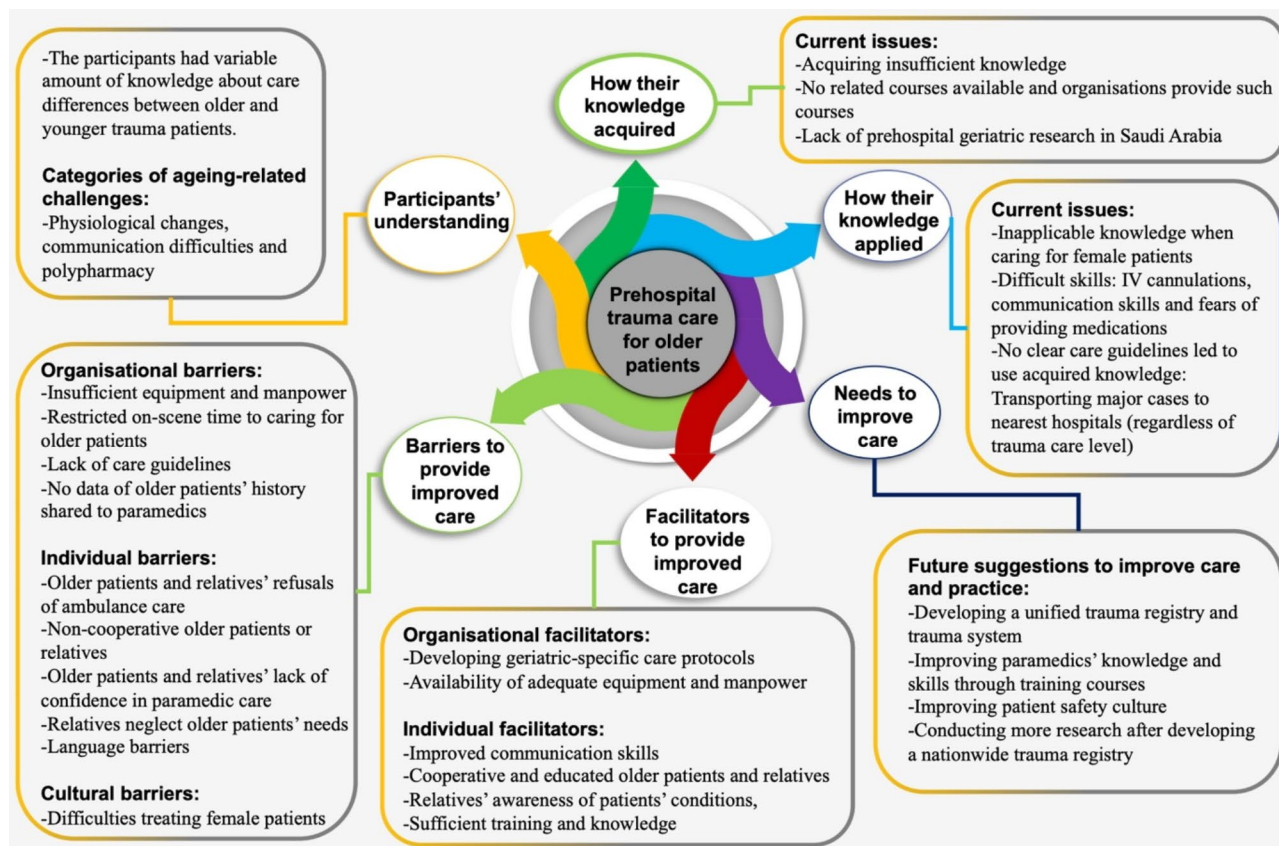
A total of 20 interviews were conducted, including 9 paramedics and 1 EMT from Riyadh, and 9 paramedics and 1 EMT from Makkah. All participants were male, reflecting the male-dominated nature of the paramedic profession in Saudi Arabia [31, 32]. Table 1 provides demographic details for each participant.

Participants demonstrated their understanding of prehospital geriatric trauma care, including knowledge acquisition and application, and identified barriers and facilitators to improved care. Figure 1 illustrates the thematic framework used to summarise and interpret each domain's themes and subthemes (or only themes) while also presenting recommendations for improving care and practice. The figure outlines various domains under each study question, named to reflect interviewees' perceptions, such as 'organisational,' 'cultural,' and 'individual' [26].

Supplementary file 2 further presents the thematic framework using a matrix for each question and includes relevant quotations aligned with each theme or sub-theme. The insights in this supplementary file are summarised in the results sections, addressing each study question:

**Table 1** The participants' criteria of the qualitative study

No.	ID	Demographics (position, city, and experience years)	No.	ID	Demographics (position, city, and experience years)
1	A11	EMT, Makkah, 11 years	11	A1	Paramedic, Makkah, 7 years
2	A7	Paramedic, Riyadh, 9 years	12	A12	Paramedic, Riyadh, 2 years
3	A10	Paramedic, Makkah, 12 years	13	A18	Paramedic, Riyadh, 14 years
4	A6	Paramedic, Makkah, 1 year – 2 months	14	A17	Paramedic, Makkah, 7 years
5	A9	Paramedic, Riyadh, 1 year – 8 months	15	A19	Paramedic, Makkah, 7 years
6	A5	Paramedic, Makkah, 2 years	16	A20	Paramedic, Riyadh, 1 year
7	A8	EMT, Riyadh, 12 years	17	A21	Paramedic, Riyadh, 1 year – 6 months
8	A13	Paramedic, Riyadh, 4 months	18	A22	Paramedic, Riyadh, 8 months
9	A15	Paramedic, Riyadh, 4 years	19	A23	Paramedic, Makkah, 1 year – 6 months
10	A14	Paramedic, Makkah, 1 year – 10 months	20	A24	Paramedic, Makkah, 13 years



**Fig. 1** A summary of the main findings for the results sections

### How do Saudi paramedics and EMTs understand the prehospital geriatric trauma care?

Participants highlighted areas of prehospital care that are more challenging for older patients compared to younger ones, including age-related anatomical and physiological changes, communication barriers, and polypharmacy.

#### Age-related changes in the individual patient's anatomy and physiology

Participants reported difficulties in responding to older patients with severe injuries related to underlying medical conditions. These challenges included obtaining medical history and medication information, which are crucial for determining appropriate treatment plans. Additionally, older patients may be less sensitive to pain, making it harder to identify severe injuries. Major injuries often resulted from low-mechanism incidents, such as falls due to osteoporosis, and these injuries tended to be more severe, with higher complications and deterioration compared to younger patients.

*Their injuries are more severe than in younger patients that may happen due to an underline cause such as stroke or MI, shock which happened due to an accident. This is an important point because*

*we should extract information for an issue in older patients in detail because in hospitals, we should describe how injuries happened with the patient... (Interviewee A12, paramedic, Riyadh)*

*From my experience, most of older cases had low falls in homes, not high falls. These low falls can lead to risky injuries. Most of these injuries were minor and some of them were critical. Some minor injuries lead to death. (Interviewee A13, paramedic, Riyadh)*

Participants reported that physiological changes in older patients complicate care procedures. These include difficult intravenous (IV) cannulations due to unclear or tortuous veins, and the unsuitability of the intraosseous (IO) route due to osteoporosis. Moving or lifting frail bodies or those with osteoporosis, particularly in buildings lacking lifts or wide stairs, can lead to further injuries. The use of rigid backboards adds to the challenge. Controlling bleeding is difficult for older patients on anticoagulants, especially those with cardiac or diabetic histories.

*When you have an older patient with haemorrhage, and you must give him fluids and you have only one solution which is opening an IV. But opening the IV can be unsuccessful and difficult due to unclear or tortuous veins. Also, the IO route is inappropri-*

ate due to the osteoporosis. (Interviewee A17, paramedic, Makkah)

One of the challenges that I face is uncontrolled bleeding in older people ... in older people who have 65 years and over, they use medications such as aspirin or have cardiac or diabetic histories. So, controlling bleeding in young patients is easier than in geriatric patients. (Interviewee A19, paramedic, Makkah)

Additionally, conditions like hearing loss and dementia create communication difficulties, affecting history-taking, explaining procedures, or identifying injuries. One participant suggested using tags or IDs for older patients with diabetes or do-not-resuscitate (DNR) directives to ease communication. Participants also reported challenges in predicting adverse outcomes for older trauma patients on polypharmacy, as some medications mask shock signs like heart rate and blood pressure. Experienced paramedics rely on general impressions, blood loss, and physical exams to anticipate deterioration in these patients.

Due to the ageing impacts that occur in older people such weak hearing, I will need to be closer to their ears and speak loudly to hear me. This is one of circumstances that I encounter in the scene that can impact on taking medical history. If I could not take the medical history clearly, this will impact on the care provision for older people. (Interviewee A18, paramedic, Riyadh)

Sometimes older patients use medications that make the shock difficult to be identified clearly. Some patients use aspirin that can make the bleeding higher. Some of them use beta blockers or calcium channel blockers and this can lead to unclear vital signs such as inaccurate blood pressures or heart rates. These are challenges. (Interviewee A8, EMT, Riyadh)

### **How do Saudi paramedics and EMTs acquire and apply their knowledge?**

Participants gained knowledge from various sources but felt it was insufficient, particularly as these sources do not take into account differences between cultures and genders in acceptance of care. Most struggled to apply knowledge to older female patients and noted that current guidelines do not account for age-related factors. Consequently, they relied on post-employment knowledge to provide appropriate care.

### **Knowledge gaps**

Both inexperienced and experienced participants reported insufficient theoretical knowledge, with the former also highlighting a lack of clinical skills due to inadequate training. Before employment, they gained knowledge from university studies, internships, textbooks, and research. However, their education did not adequately cover geriatric care, unlike paediatrics and gynaecology, which have dedicated modules. After employment, they addressed knowledge gaps using various sources, including US EMS textbooks available in Saudi Arabia, international guidelines, consultations with experienced colleagues, relevant research, short courses like ITLS and PHTLS, and experience from treating older patients.

*Honestly, the geriatric care knowledge in my university study was insufficient. It did not have a specific module like paediatric and gynaecology patients that have specific modules. We were studying limited geriatric care. Currently, I am satisfied with my current knowledge to deal with older patients. I acquired this knowledge by reading books. (Interviewee A5, paramedic, Makkah)*

Participants highlighted a lack of specific prehospital geriatric care courses in Saudi Arabia. Currently, ambulance clinicians rely on trauma care courses like ITLS, which includes a section on geriatric care, and PHTLS, which covers geriatric care within special considerations. Most participants expressed a need for further training but noted the lack of organisations offering relevant courses or funding. Some hospitals provide training, but these are focused on hospital-based care rather than prehospital scenarios.

*Unfortunately, the prehospital care has a shortage of courses. When we take a course in trauma, we find it covers paediatric, adult, and geriatric patients together. No courses special for geriatric patients. There is a shortage. (Interviewee A15, paramedic, Riyadh)*

*Our issue is that the centres that provide prehospital care-related courses are so limited. Additionally, regarding the budget and funds, we cannot compare the Ministry of Health or military hospitals' funds with the Red Crescent Authority's funds. (Interviewee A18, paramedic, Riyadh)*

Respondents also identified a lack of specific geriatric trauma care research in Saudi Arabia as contributing to lack of knowledge. One respondent reported a lack of research teams conducting relevant research to improve prehospital geriatric care.

*Honestly, we have a weakness in the EMS research that focus on elderly patients. If you want to improve this, we should have a research centre, research administration or research team working on the geriatric care in EMS. If you want to do that, you need data, and the data is available, but we do not have research teams work on the geriatric care. (Interviewee A18, paramedic, Riyadh)*

#### **Applicability of the current knowledge when responding to older trauma patients**

Participants compared the ITLS and PHTLS courses, finding the ITLS more applicable because it includes a section dedicated to geriatric care, while the PHTLS covers both paediatric and geriatric patients with special considerations. They also recommended using North American Mosby and Nancy Caroline textbooks, clinical simulations, and hospital-based training for mastering difficult clinical skills.

*The ITLS provides the relevant knowledge better than the PHTLS course because the ITLS has section for geriatric care and the PHTLS has a section for special considerations including geriatric and paediatric patients... (Interviewee A10, paramedic, Makkah)*

Most participants noted cultural barriers in applying knowledge when treating older female patients, as some patients or their relatives may refuse examinations or ECGs. One experienced participant mentioned learning from US-based curricula and textbooks, which do not account for cultural or gender differences in care acceptance. Participants also noted that the SRCA launched media campaigns and distributed leaflets to raise public awareness about paramedic roles and the consequences of refusing care to address these barriers. However, one participant suggested that improved communication skills could help convince female patients and their families to accept care.

*I responded to a female older patient who has 70 years old with a chest pain, hypertension, and diabetes. We decided to apply ECG for her, but her relatives refused. She also refused... relatives refuse the physical examination especially, when we want to check for any injuries, infections, or anything else. (Interviewee A1, paramedic, Makkah)*

Ambulance clinicians reported varying levels of confidence in applying knowledge, often influenced by experience. Experienced participants gained confidence from self-learning, working with knowledgeable colleagues, and previous work in hospitals (ED, ICU, or clinics) or

ambulance services. They felt confident in applying skills such as communication with older patients and relatives, identifying hidden injuries, administering medications, performing IV cannulations, and making better transport decisions. In contrast, less experienced participants struggled with these skills. While some mentioned their colleagues' lack of knowledge, none admitted to lacking knowledge themselves. All participants expressed a desire for more training and guidance.

*I remember that I have requested a special training on cannulations of older patients in a hospital which has a department of internal medicine caring for the older people. It is correct that I was feeling fears and non-confidence but with the experience, I have become better after spending one to two years to become capable in my skills. (Interviewee A18, paramedic, Riyadh)*

*I see a lot of colleagues deal with older people inappropriately. They do not know how to deal with them. I see it differs from a paramedic to another... (Interviewee A17, paramedic, Makkah)*

Due to the absence of specific guidelines for geriatric trauma patients, most participants followed general SRCA protocols, applying the same procedures for both younger and older adults. Some felt confident in making similar decisions for all age groups, while others preferred using UK or US guidelines, acknowledging the need for age-appropriate protocols. According to the participants, the SRCA guidelines recommend transporting major trauma cases, including older patients, to the nearest hospital with neurosurgery, orthopaedics, and trauma surgeons. If these specialties are unavailable, a farther hospital is considered. Patients are initially stabilised for airway, breathing, and circulation (ABC), with further transfers arranged if specialised care is required. In non-trauma hospitals, major trauma cases are admitted due to concerns from ED staff over legal liability. Minor trauma patients, however, are transported to facilities chosen by the patient or their relatives. Additionally, the triage system, using red, yellow, and green tags, is employed only during mass casualty incidents. Serious and moderate cases are directed to the nearest hospital, while mild cases go to the patient's preferred facility. There is also a noted lack of coordination between ambulance teams and hospitals in deciding appropriate destinations for trauma patients.

*If the patient was with a life-threatening condition, the transport should be to a nearest hospital until becoming stable by stabilising ABC and he then will be transported to another hospital that has the*

*needed specialty by using the Ministry of Health's ambulances. (Interviewee A1, paramedic, Makkah)*

*We transport life-threatening condition patients to a nearest hospital and stable patients based on their desires... That is the protocol we follow. (Interviewee A15, paramedic, Riyadh)*

*So, dealing with older patients differently depends on the paramedics themselves based on the personal and scientific experience. (Interviewee A8, EMT, Riyadh)*

### **What are the barriers to providing improved care to older patients with injuries?**

The interviewees reported organisational, individual, and cultural categories of barriers influencing providing improved care for older trauma patients:

#### **Organisational barriers**

Participants reported challenges with equipment and manpower shortages. Limited equipment, such as padded backboards, blankets, and cannulas, hindered care. One participant noted that ED staff often failed to return splints for reuse, requiring up to a year before new equipment could be ordered. Manpower shortages were also highlighted, with only two paramedics per ambulance—one driving while the other handled tasks like splinting fractures and administering fluids or painkillers. Heavier older patients necessitated additional staff.

*We have splints used for femur fractures. When we use them, you will not then see them again because they will go with the patients to hospitals... Our organisation gives us splints to be used for one year and then they will give us alternatives. (Interviewee A15, paramedic, Riyadh)*

*There is a shortage of manpower. We are only two persons in the ambulance. For example, one of us is driving and I will be busy in splinting extremities, opening a vein, preparing fluids and painkillers. (Interviewee A14, paramedic, Makkah)*

The SRCA recommends a care duration of 10 to 15 min per case. However, participants noted that older patients often require more time due to communication difficulties, refusal of care, and certain procedures needing more time when performed by a single paramedic. They also highlighted the lack of geriatric-specific guidelines for treatment and transport, with current guidelines only addressing general fluid replacement for both geriatric and paediatric patients. Some participants reported relying on international guidelines found online for better geriatric care, rather than using the existing guidelines.

*The Red Crescent Authority restricts our time of stay in the field which each patient. They expect we stay 10 to 15 min in the field. Spending more than that can cause some issues and lead to investigation with us by our organisation. Spending time in convincing the patient for transports, then moving them from bed to stretchers to ambulance from second or third levels to ambulance can take 20 to 25 min. (Interviewee A14, paramedic, Makkah)*

Some participants noted that ambulance clinicians lack access to trauma patients' medical history, including medications, which is a significant barrier to care. This issue is particularly problematic for older patients with polypharmacy, communication difficulties, memory problems, or without relatives. Although Saudi ambulance clinicians use tablets to send patients' reports electronically, they cannot retrieve the necessary information, hindering the provision of appropriate care.

*When we go to the scene, we record our patient's report electronically via an iPad application we use... paramedics record the patient's information such as vital signs, provided interventions and others, and then send them to the targeted hospital... but cannot obtain any information about the patient. (Interviewee A18, paramedic, Riyadh)*

*There should be a linkage of data in our devices such as information of medical histories. Especially, when we respond to older cases, we should know their information. (Interviewee A21, paramedic, Riyadh)*

#### **Individual barriers**

Ambulance clinicians reported difficulties with older patients or their relatives who refuse trauma assessments, care, or transport. Older patients may decline care instructions due to fears of increased pain from movement or concerns about dying in hospitals. Participants also noted that some patients and relatives did not provide important medical history or medication information without clear reasons.

*The biggest challenge is convincing older patients to transport to hospitals. They refuse the transport even we relied on their relatives to try convincing their patients. Older patients want to be treated in home rather than treating them in the hospital. (Interviewee A14, paramedic, Makkah)*

*When we asked them about kind of medications that are used by their older patients, they refuse to give us this information and the patient himself can also refuse giving us this information. (Interviewee A9, paramedic, Riyadh)*



Ambulance clinicians faced challenges with older patients or relatives who were unaware of medical conditions, medications, or DNR information, complicating the process of obtaining necessary details. This issue becomes more severe when dealing with older trauma patients without relatives. The absence of relatives during injury incidents can delay information gathering, prolonging the time between the injury and paramedics' arrival. Such delays can result in difficulties obtaining patient history, potentially leading to adverse outcomes.

*Some relatives do not know the conditions of their older patients completely especially their diseases and DNR information. I have noticed a lot of these issues in some calls. (Interviewee A20, paramedic, Riyadh)*

*If there are no relatives or bystanders with older patients, it will be difficult to take the medical history... Taking history is important because I do not want to apply a procedure that can harm the patient. (Interviewee A15, paramedic, Riyadh)*

Most participants encountered older patients who were aggressive, nervous, fearful, or uncooperative. They also reported that older patients who lacked knowledge or mistrusted paramedics due to limited education often displayed fear and reluctance, complicating communication and physical examinations. These challenges were frequently noted among older female patients who refused care or transport due to fears of injury or pain. Participants also mentioned that relatives, often agitated or impolite, hindered care by either demanding transport without care or behaving aggressively, blaming paramedics for delays, which can upset the patients and paramedics.

*Always, we should be aware of that older people have levels of fears or nervousness higher than in younger patients. So, it is difficult to communicate with them or examine them... non-cooperativeness of relatives will not help you to providing improved geriatric care. (Interviewee A8, EMT, Riyadh)*

*This is one of the difficulties that we encounter especially with older people who live alone and no one around them... it will be difficult to obtain sufficient information about the case such as mechanisms of injuries, how the injury happened because the patient is disoriented. (Interviewee A23, paramedic, Makkah)*

Some participants noted that some older patients or relatives show a lack of respect for paramedics' care and request direct transport to hospitals without prehospital treatment. This may stem from a lack of confidence or

understanding of paramedics' roles, possibly influenced by older technicians with lower qualifications who acted as transporters or mistreated older patients. This behaviour has negatively impacted the reputation of highly trained Saudi paramedics. Participants suggested that paramedics improve their attitude and undergo training to boost confidence when dealing with older patients.

*Sometimes, relatives request from us only 'load and go' rapidly to hospitals without providing any care to their patients. The reasons for this issue can be presence of worries or fears for their older patients, non-confidence in the paramedic roles, or both... The paramedic's attitude is important. (Interviewee A19, paramedic, Makkah)*

*There is no education about the ambulance roles... they think that the ambulance is only for transport. (Interviewee A21, paramedic, Riyadh)*

Some participants noted that relatives contribute to older patients' difficulties in taking prescribed medications, hindering proper care. These challenges were seen more frequently in low-income families who cannot afford all the equipment and facilities needed for caring for bedridden older patients in homes. Older patients from high-income families can benefit from home nurses caring for and high-quality medical equipment. As reported, relatives neglecting older people who live in deprived locations can affect the ability to provide better care than those who have better living and care arrangements.

*I can respond to older patient who have hyperglycemia and at the same time, he has incomppliance in taking his prescribed medications... Some of them are unaware about these issues or are negligent. (Interviewee A5, paramedic, Makkah)*

Lastly, a participant highlighted that non-Arabic speaking older patients pose a barrier to obtaining medical history. This issue can be sustained by pilgrims from multiple nationalities who come during annual Islamic events in Makkah or when dealing with confused older patients who have non-Arabic speaking nurses or caregivers at home hindering providing improved care.

*I always face the language barrier. Some older patients do not understand me who are from different nationalities. I have difficulties in giving information to them. (Interviewee A5, paramedic, Makkah).*

#### **Cultural barriers**

Participants highlighted barriers to applying knowledge and the difficulty of providing care for older female

patients due to cultural factors. They attributed this to a knowledge gap in the Saudi Universities' US curriculum, which doesn't consider cultural differences. Participants discussed the need for organisational interventions and public awareness campaigns to improve care. Many interviewees noted that older female patients or their relatives refuse assessments like ECGs, vital signs, or physical examinations unless attended by female nurses, or only accept care after significant persuasion. They suggested that the SRCA should employ female paramedics and launch public awareness campaigns to address the consequences of refusing care.

*We feel that there is a distance between us and female patients. We face difficulties due to the culture in applying ECGs, checking vital signs and clinical examination. (Interviewee A14, paramedic, Makkah)*

*Female patients accept females' care more than males' care. This can be solved by employing female paramedics to deal with female geriatric patients. (Interviewee A10, paramedic, Makkah)*

### **What are the facilitators to providing improved care to older patients with injuries?**

A number of themes to providing improved care were identified and then sorted into organisational and individual facilitators:

#### **Organisational facilitators**

Some participants suggested the need to develop pre-hospital protocols for geriatric care, as there are no clear geriatric-specific guidelines currently in place. They also recommended that the SRCA should help improve care by providing appropriate equipment, such as vacuum mattresses and stretchers, alongside sufficient manpower to assist in lifting and moving frail patients from difficult locations.

*It is possible to add a part in the current protocol specific for medical and trauma older patients in order to improve the service. (Interviewee A10, paramedic, Makkah)*

*I need vacuum mattresses to facilitate lifting and moving the patient especially if the patients in first or second levels... I need manpower to move the patient safely towards the ground floor and then use the vacuum mattress to move the patient to the ambulance. (Interviewee A12, paramedic, Riyadh)*

Participants suggested increasing awareness among older patients and their relatives about the consequences of refusing care. Education on these matters could be part

of paramedics' duties and broader health organisation efforts. They also recommended raising public awareness of paramedics' roles through media, educational courses, and leaflets.

*The awareness is a thing that can facilitate providing care for older people. Educating older people and their relatives is important. (Interviewee A5, paramedic, Makkah)*

*Patients' relatives must have sufficient knowledge about us in the Red Crescent Authority... it is the responsibility of the Red Crescent Authority or the organisation that provide the care. The Red Crescent Authority should start working on the media, distribute educational courses and leaflets everywhere for public. (Interviewee A17, paramedic, Makkah)*

#### **Individual facilitators**

We identified four categories of facilitators led by older patients, relatives, or ambulance clinicians to improve care. One participant suggested paramedics should focus on building respectful relationships with older patients to encourage quicker acceptance of care. Others emphasised the need for improved communication skills, especially for managing dementia patients and avoiding potential aggression.

*Older cases seek emotional and social care more than healthcare... I always try to build links with them before starting the assessment, which will facilitate giving us important information, they become cooperative with us, and make it easier to deal with them. (Interviewee A6, paramedic, Makkah)*

*You should try and talk with older patients using the same of their language accent. You should explain to them. I see these actions will facilitate all next actions of care. (Interviewee A15, paramedic, Riyadh)*

Participants suggested that improved care depends on older patients and relatives cooperating with paramedics. This includes providing clear information on complaints, injury mechanisms, and medical histories, and trusting paramedics' explanations of procedures. This cooperation helps identify injuries more easily, shortens response times, and boosts paramedics' confidence. One participant noted that some hospitals issue printed reports detailing older patients' medical conditions, medications, and previous admissions, which was considered helpful.

*Aware and cooperative relatives when we respond to their patients, and they trust our care. They should be aware of their patients' situation. Also, they*

*approve what procedures that I want to do for their patients. (Interviewee A1, paramedic, Makkah)*

*If relatives and their older patients were cooperative, this will give me a high confidence and facilitate providing my care. (Interviewee A9, paramedic, Riyadh)*

Moreover, few participants noted that it would be easier if relatives better understood their patients' conditions, medications, and injury details, helping paramedics obtain critical information for care. Additionally, it was reported that sufficient training, knowledge, experience, and using continuing education programmes are critical to providing improved care for ambulance clinicians who deal with older patients as they deal with younger patients due to inexperience or lack of knowledge.

*If relatives know the patient's medical conditions and medications. For example, if the patient has an injury, they could see the patient's mechanism of injury... As relatives facilitate our care for their patients. (Interviewee A6, paramedic, Makkah)*

*Well-training with sufficient experience will facilitate providing improved geriatric care. (Interviewee A8, EMT, Riyadh)*

## Discussion

We explored four key questions by recruiting Saudi paramedics and EMTs from Makkah and Riyadh, the two largest cities in Saudi Arabia with the most ambulance stations and clinicians. Participants in both cities identified similar ageing-related challenges when responding to older trauma patients, as well as barriers and facilitators to improved care. They also reported organisational, individual, and cultural issues impacting their understanding and provision of prehospital geriatric trauma care.

The participants highlighted ageing-related challenges, such as physiological changes, communication difficulties, and polypharmacy, that impact prehospital care for older patients compared to younger patients. They emphasised the need for training and guidelines to better apply their knowledge. These findings align with a previous study assessing ambulance service providers' and stakeholders' perceptions of geriatric care [4], two reviews [33, 34], and an EMS education-related study indicating that paramedics face challenges such as comorbidities, polypharmacy, and communication difficulties [5]. The ability to distinguish fit from frail individuals is an initial step in geriatric issues that influence care needs and outcomes [35].

Some participants noted that their colleagues lacked knowledge, but none acknowledged a lack of their own. However, all expressed a desire for training and guidance, suggesting a work culture that discourages admitting

uncertainty. This behaviour may compromise patient safety, increasing the risk of errors and harm during treatment [36, 37]. Establishing a patient safety culture is critical for ensuring a safe patient experience and positive outcomes [38, 39]. It is also possible that a culture of fear from punishment causes people to identify a lack of understanding in others rather than in themselves. Aggressive disciplinary practices and fault-finding can foster a culture of fear within ambulance services, negatively impacting the reporting of adverse events [40]. Some paramedics are reluctant to admit mistakes due to potential consequences and may face challenges knowing whom to inform even when willing to do so [41].

Ambulance clinicians reported a lack of knowledge due to insufficient geriatric care education during their university studies and a shortage of relevant training courses after employment at SRCA. This gap hindered the application of critical skills, such as effective communication, predicting adverse outcomes, and IV cannulations. Similar challenges have been observed internationally; paramedics in Canada and the US acquire limited geriatric-specific knowledge, necessitating further education to provide better care and make informed decisions [2]. A US study found prehospital providers are less aware of age-related challenges compared to in-hospital professionals [42]. A UK qualitative study highlighted paramedics' limited understanding of frailty and ageing, despite their role in geriatric care [43]. This study reported paramedics' desire for more geriatric training, echoing our participants' concerns about knowledge gaps and cultural factors impacting communication [43].

Participants noted the absence of geriatric-specific guidelines, relying instead on general trauma protocols that do not account for age. They reported using only a simple triage tool during disasters and mass casualties. A Saudi study similarly found that paramedics and EMTs rely on the Simple Triage and Rapid Treatment (START) tool during such events to manage patient distribution and prevent overloading nearby hospitals [44]. Current prehospital guidelines mandate transporting major trauma patients to the nearest hospital, regardless of the level of care provided [18]. A Dutch review highlighted that most EMS protocols fail to accurately identify severely injured patients, contributing to undertriage [45]. Due to a lack of clear guidelines, some participants use their own knowledge instead of following current guidelines leading to arbitrary transport decisions.

We identified a lack of communication between ambulance services and hospitals for coordinating trauma patient pathways. Two studies on the Saudi trauma system confirm insufficient collaboration between prehospital services and hospitals [18, 46]. In other systems, ambulance teams provide in-field care, transport trauma patients, and communicate critical patient information

to ED staff to facilitate preparations for diagnosis and treatment upon arrival [47]. Effective communication between ambulance and ED teams is essential for rapid, coordinated patient care [48]. The participants reported the lack of necessary equipment and personnel on scene as organisational barriers to providing improved care. Manpower and equipment shortages are reported globally, affecting both developed and developing countries. A Thai study highlighted limited healthcare access for older patients due to resource and budget constraints [49], while a recent Israeli mixed-methods study found paramedics facing increased calls without proportional resource growth [50].

Additionally, older patients or their relatives, unfamiliar with paramedic roles, may refuse care or demand direct hospital transport. A Saudi study highlighted limited public awareness of EMS services [32], while another study found that mistrust from patients and ED clinicians hinders paramedics' ability to provide quality care [51]. Misconceptions about paramedic roles contribute to this lack of trust [52]. Further, some older patients refuse transport to the nearest hospitals, preferring transport to farther hospitals, which can mean that older patients deteriorate before arrival to the ED, as highlighted in a recent Saudi study [52]. Moafa et al. (2022) noted that the reasons for this issue are unclear and warrant further research [53]. Convincing uncooperative patients or relatives can extend on-scene times, which has been linked to adverse outcomes, including mortality [54, 55]. In contrast, cooperation from knowledgeable patients and families facilitates better care. Participants reported that working with informed older patients and relatives who understand their medical history and the role of paramedics is preferable. Reasons for refusing transport may include past negative experiences, ED wait time concerns, or a desire for reassurance [56, 57]. Such refusals can delay responses to other patients awaiting dispatch, highlighting the potential role of relatives in providing medical histories and supporting patient care.

Culturally, relatives often influence whether female patients accept prehospital care or transport in Saudi Arabia. A Saudi study found that men often make transportation decisions for older patients, as some female patients prefer having a male relative present when discussing their health or future plans [53]. Female patients may refuse ambulance transport due to family restrictions leading to a higher refusal rate compared to male patients [58]. As a result, ambulance crews may spend more time negotiating transport with female patients [53]. A Saudi qualitative study suggested employing female paramedics to address this issue [52]. However, due to a lack of female staff, on-scene emergency care is often limited, and female patients may resist male EMS treatment [52]. Another Saudi qualitative study argued

that cultural norms in Saudi Arabia could limit the integration of female paramedics into EMS [52].

Saudi Arabia currently has no female paramedics in the prehospital setting, despite a growing number of qualified female graduates, many of whom remain unemployed [31]. Contributing factors fall into three categories: personal, social, and employment-related [31]. Personal factors include family separation, single status, family responsibility guilt, financial struggles, marriage, childcare, and pregnancy-related mental health challenges [31]. Social factors encompass societal discrimination and restrictions on responding to cases in private residences, conflicting with cultural norms [31]. Employment-related barriers include gender, perceived physical limitations, night shifts, long hours, and exposure to verbal and physical assault [31]. Alobaid et al. (2022) found female paramedics employed as nurses within hospitals rather than ambulance services [31], with employment limited to public and private hospitals or female-only environments [59]. Alobaid et al. (2022) recommended discussing female paramedic employment with SRCA officials, engaging the Ministry of Human Resources to address gender-based hiring issues, and improving physical fitness through gym participation and sports-integrated curricula for female undergraduates [31].

Furthermore, participants highlighted that improving communication skills with older patients requires kindness and respect. A qualitative study from three EDs in England found that frail individuals over 75 valued care delivered with dignity and respect [60]. Our findings indicate that participants view relatives primarily as barriers to care, not facilitators. As Regen et al. (2022) emphasised, providing clear and honest communication to patients and relatives can empower patients in treatment decisions [60]. Training to enhance communication with relatives could transform them into facilitators of better care. Further, participants also reported that non-Arabic speaking older patients and relatives present a communication barrier, particularly during Islamic seasons in Saudi Arabia, when diverse languages are spoken by large crowds during Hajj [61]. Locating interpreters can be challenging, and ambulance staff could benefit from training in advanced communication technology, such as audio translator devices or mobile applications, to aid in translation during these periods [61, 62].

Lastly, participants noted that ambulance clinicians lack access to patients' medical records, hindering their ability to gather critical information. While they can use a tablet application to send patient reports, it does not provide access to patients' medical histories or poly-pharmacy data. In contrast, tablet applications in developed countries like the UK enable clinicians to retrieve needed patient information. The study found that Saudi ambulance clinicians lack research on prehospital care

for older people. One participant noted the absence of research teams or funding for this, although the SRCA has teams for trauma, stroke, and cardiac care research. Similarly, a US study found that limited funding, research capacity, and methodological challenges constrain EMS research, including randomisation, blinding, and outcome assessments [63].

### Strengths and limitations

In terms of strengths, this study was conducted in two Saudi cities with similar themes and subthemes, reflecting consistent response and care guidelines, organisational, individual, and cultural challenges. Both experienced and non-experienced participants were included, allowing us to address relevant challenges and barriers to better healthcare. The interviews and analyses, conducted in Arabic, were back-translated by a bilingual checker with a qualitative and paramedic background to verify accuracy.

In terms of limitations, firstly, the study focused on the interviewees' perspectives and did not include older patients or relatives, which could have provided additional insights into prehospital trauma care. Due to Saudi Arabia's unique healthcare system, cultural norms, and regulatory considerations, gaining consent from patients or relatives was challenging, which limited direct engagement. Second, other methods such as patient interviews or direct observation of practice, might reveal different findings, as interviews reflect perceptions rather than actual occurrences. While we incorporated a question regarding participants' recent experiences with older trauma patients, direct observation would have offered more comprehensive insights. Thirdly, the study only included male participants, as males still dominate the paramedic profession in Saudi Arabia, with females constrained from participation due to culture and tradition [31, 32]. Fourth, efforts to balance participation between paramedics and EMTs were limited, as many EMTs have transitioned to paramedic roles through EMS bridge programmes. This resulted in only two EMT participants, which affected the diversity of the sample. Lastly, the study may be subject to participant selection bias, with those more interested in the topic or having stronger opinions being more willing to participate. This could result in missing important perspectives, particularly from those with limited knowledge or interest in trauma care or the management of older people.

### Implications for policy and practice and future research priorities

The study identified the need to improve Saudi paramedics' and EMTs' knowledge and provide appropriate training. Clear guidelines for geriatric trauma care and strategies for addressing cultural challenges are

necessary to facilitate knowledge implementation. Multifaceted efforts are needed to establish a clear trauma care pathway, as Saudi Arabia lacks an organised trauma system [46]. Participants' responses highlighted organisational barriers, necessitating further research to identify gaps in trauma care, especially in the pre-hospital setting. Developing care guidelines to distinguish major from minor trauma older patients and determining appropriate levels of care is essential. The use of technology should be explored to enable data transfer between hospitals and ambulances for better prehospital care [64].

Geriatric care training is crucial to reduce delayed injury identification, unconscious biases, and cultural challenges, as well as to improve care for older patients [42, 65, 66]. Educating Saudi ambulance staff should focus on improving their attitudes toward older patients and relatives [67], fostering a safety culture, and encouraging openness and learning from mistakes [68, 69]. Further research is needed to examine paramedics' attitudes, the influence of workplace culture on patient safety, and the public's understanding of EMS services [52, 57]. Research on prehospital fall assessments and interventions [70], as well as involving older patients and relatives for insights into trauma care, is also needed. Additionally, recruiting female paramedics should be explored to overcome cultural barriers in providing care to female patients.

### Conclusion

Few studies have addressed the challenges of managing older trauma patients. This study demonstrates that Saudi paramedics and EMTs face significant challenges in providing trauma care to older patients, including managing age-related physiological changes, communication barriers, polypharmacy, and cultural influences, particularly concerning older female patients.

The lack of geriatric-specific training and guidelines, along with organisational constraints like limited equipment and restricted access to patient records, further complicates effective care delivery. Targeted training, culturally relevant protocols, and public awareness initiatives to build trust and cooperation with patients and their families are essential to overcoming these barriers. Integrating female paramedics into the workforce and addressing gender-specific cultural obstacles could also enhance patient outcomes.

Future research should investigate strategies for incorporating female paramedics into the workforce and their impact on overcoming cultural barriers. Additionally, innovative training interventions tailored to the needs of Saudi paramedics should be examined for their effects on patient care, focusing on systemic, organisational, and cultural challenges. By addressing these issues,

emergency medical services in Saudi Arabia can better serve its ageing population, enhancing care quality, patient safety, and outcomes.

#### Abbreviations

ABC	Airway, breathing and circulation acronym
EMS	Emergency medical services
EMT	Emergency medical technicians
GEMS	Geriatric education for emergency medical services course
IO	Intraosseous Access
ITLS	International trauma life support
IV	Intravenous access
PHTLS	Prehospital trauma life support
SRCA	The Saudi Red Crescent Authority
UK	United Kingdom
US	United States of America

#### Supplementary Information

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Supplementary Material 1

Supplementary Material 2

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#### Author contributions

NH conceived the study, recruited participants, conducted interviews, analysed data, translated to English, and drafted the paper. MB who acted as a bilingual checker, assisted with back-translation, and revised the paper. SG and FS contributed to developing the paper's idea, provided methodological advice, and revised the work. AA helped to follow up the SRCA's ethical approval process and helped in obtaining the SRCA agreement to start collecting data. All authors approved the final manuscript and are accountable for its accuracy and integrity.

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#### Data availability

Data generated and analysed during this study (audio files and transcripts) are not publicly available due to ethical reasons and reasonable data requests should be addressed to the corresponding author. The corresponding author only has access to data, and findings are presented in an anonymous manner as part of the informed consent form.

#### Declarations

##### Ethics approval and consent to participate

The study was approved by the Saudi Ministry of Health's ethics committee (no. 21–73E) and the SRCA, Riyadh, granted permission to collect data. The study followed local legislation and institutional requirements. Participants provided signed informed consent after reviewing the information sheet.

##### Consent for publication

Not applicable.

##### Competing interests

The authors declare no competing interests.

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