**Additional file 2: Four Matrices of Each Study question of the Qualitative Study:**

**Matrix 1**: How the Saudi paramedics and EMTs understand the prehospital geriatric trauma care?

| ***Domains for each objective*** | ***Themes (with interviewees' IDs)*** | ***After examining data for quotes and responses that identify the importance of themes and subthemes.*** |
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| **1.** Age-related changes in the individual patient's anatomy and physiology | *The physiological changes impacts: responding to severe injuries caused by medical conditions or low mechanism of* | A11: "older patients can have a serious injury with no severe pain, while younger patients can have severe pains…"<br><br>A10: "there were no clues of a neck femur fracture with him. As the patient location has no clues and no clear mechanism of injuries. The fracture happened during changing clothes due to osteoporosis caused by malnutrition…". "Older patients with low mechanisms of injuries have higher injuries… *Complications* in older patients happen higher than in younger patients. We see many of this issue in the *field*. So, dealing with older people is usually *tough*" and "deteriorations in older people are higher than in others". "it is difficult to cannulate older patients… This will make a difference in the *quality of care*".<br><br>A8: "sometimes, we respond to *traumas* caused by *medical conditions.* In these situations, our focus on the case only as *traumas*, not as *medical*. Maybe that case was suffering from diabetes or myocardial infarction before the accident". "Always, older people have osteoporosis as simple injury can cause fractures… This is also a challenge". Again, "Always, older people have osteoporosis as simple injury can cause fractures. When we put the patients on a |

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| | *injuries and difficult procedures to older trauma patients* A11, A10, A8, A12, A18, A22, A14, A15, A9, A17, A19, A20 | *backboard*, the *backboard* will be painful for them more than younger patients. this is also a challenge". "sometimes, we do not know older cases' *complaints*. They do not have a degree of *pain* like *younger adult patients*. Older cases have lower pains". "Sometimes they have an *unclear degree of pain*".<br><br>A12: "their injuries are more severe than in younger patients that may happen due to an *underline cause such as stroke, MI or a 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… injuries may happen due to *hypoglycemia*, so in the hospital, ED staff will treat essentially *the underlaying cause* of this issue. These small details can make difference in hospitals' care *as a definitive care* and also, during providing care during transporting patients". "they are different. As younger patients *can compensate for a longer time*. But for older patients, *compensations* are lower, and they can deteriorate rapidly. Because older patients have *comorbidities. They may have previous surgery, chest pains, MI, or congestive heart failure*".<br><br>A18: "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…". "the most difficult procedure in my training was *cannulations* of older patients because for me, *cannulations* for them can fail once or twice until applying it successfully".<br><br>A22: "when *stabilising* the patient with suspected back injury, we should provide *doubled care for geriatric patients* compared to *adult* younger patients. Also, when *transferring* them, we should take more care during ambulance moving to avoid further injuries in the older patients. *Any simple movement could be life-threatening*". "Their *veins are different* from younger *adults*. *You can find veins or not*. This is one of the difficulties we face with the *geriatric* patients… if we needed to use a medication and no IV, this will be problematic, and the case can then deteriorate". |

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| | | A14: "*lifting and moving* older patients is difficult. Because sometimes we deal with *heavyweight* older patients. So, *we lift and move* them from their beds into stretchers and from the stretcher to the *ambulance*".<br><br>A15: "older patients differ from younger patients because older patients usually have osteoporosis. The second reason is any movement to older patients can cause another or complicated injury. In contrast, I can move younger patients and apply *log rolls* for them easily".<br><br>A9: "The third challenge is that I face is *inserting cannulas* in older patients. I always face this issue. In this situation, I am working on the *emotional* and psychological aspects in the patient more than only *healthcare* to intervene… Because a lot of older patients refuse *cannulations*".<br><br>A17: "We have *equipment* but it is difficult to lift and move them into the ground floor because the building have no *lifts* or have *lifts* that do not accommodate *the board size* completely… So, we will be forced to stabilise them by any appropriate way and move them. In these situations, I cannot provide the needed care… I have another point which is that when you have an older patient with *hemorrhage*, 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 inappropriate due to the *osteoporosis*. So, based on the *protocol*, we will try to transport him directly to the hospital… we cannot deal with older people easily because they have pains during movements…".<br><br>A19: "challenge that I face is uncontrolled bleeding in older people and level of consciousness decreases and becomes *weak* rapidly in them compared to younger patients… they use medications such as *aspirin* or have *cardiac or diabetic histories*. So, controlling bleeding in *young* patients is *easier* than in *geriatric* patients". |

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| | | A20: “Usually, there are difficulties in *IV cannulations*. For example, we responded to an older case. When I held his hand, there were no clear veins except one vein. This is one of difficulties we face during opening veins… one of issues we face is responding to some older patients who live in second or third floors. So, the access to them will be difficult especially if we want to transport them to hospitals. We can enter the building, but we cannot move them from their bed to the ambulance… Sometimes, the difficulties in their weights and their buildings’ ladders are narrow… Sometimes there are no *lifts*”. |
| | *Difficult communications with older patients due to hearing issues and mental conditions.* A11, A6, A8, A15, A1, A18, A14 | A11: “the issue of loss of hearing in older people is one of common issues that we should be aware of because he should give older patients different care compared to younger patients that then will give him positive reflections from the older patients”.<br><br>A6: “*dealing* with older patients’ needs to be *emotional,* and honestly. We need communication skills”. “some older cases have mental conditions. So, we take prolonged time durations with these cases in *taking histories, assessments* and identifying the complaints due to the difficulty in communication with them”.<br><br>A8: “the level of fears in older people are higher than others. This is the biggest challenge. Because they become a highly nervous in the field. So, it will be difficult to communicate and examine them”. “These always happen. I suggest using a *system of tags* in Saudi Arabia. Using *tags for diabetes and DNR*. For example, every older person has *a tag or ID* showing that he is *diabetic* and his medical information”.<br><br>A18: “asking a lot of questions by paramedics bother older people. Sometimes older people will not answer them, and they can then say that it is not your business and only transport me. I think these may happened due to *side effects of medications* they use. This can prevent me providing help to them if they did respond to my questions”. “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. Unclear *medical history* can prevent using medications to treat them and then |

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| | | influence providing the service… *Courses for the communication skills* are necessary and very important skills to deal with the older people and enable us to obtain what we need".<br><br>A15: "For the communication with the patient, most of geriatric patients more than 70 years old. They have CVA or old stroke. They cannot talk with you. There is no direct communication with them. You cannot explain the procedure to them. So, you must have one of the family members who can talk with them and explain to them the procedures. The communication is a big challenge with them". "You should try and talk with older patients using the same of their language *accent*… Because you cannot predict their behaviours and they may hit you".<br><br>A1: "some older patients have *chronic diseases* such *CVA*, and they can be *comatose* in homes. So, we will have difficulty in *communication*. Also, their relatives are unaware of their patients' medical issues, *medications*, or any information".<br><br>A14: "I respond to *bedridden older patients* who are unable to talk. For an example, relatives say their patient has a fever but in fact that patient has not a fever. *I then check for vital signs and take an ECG using the monitor.* I then will find the patient with *unclear* issue. The *chief complaints* in older patients are *unclear*". |

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| | *Difficult predictions of adverse outcomes in older trauma patients* A11, A6, A10, A5, A8, A18, A24 | A11: "when I deal with an older trauma patient, the blood volume is not similar to the younger patients' blood volumes. Also, *the medical histories and medications* are very important. Particularly, if older patients use medications for hypertension, BP cannot be a good indicator. Sometimes, *heart rate* also cannot be a good indicator due to *beta blockers*. So, we should deal with older patients differently from younger patients who have better health conditions".<br><br>A6: "sometimes, we cannot recognise *any signs of shock in fall-down cases,* although they can *have internal bleeding*... you cannot then *diagnose or predict* issue".<br><br>A10: "Older persons with shock can have unclear signs of shock because the use beta-agonist, calcium channel blockers, antihypertensives in general. So, the tachycardia can be unclear with them".<br><br>A5: "For cases with *shock*, as we know that *the first sign of shock is the tachycardia*. For *geriatric patients*, most of them use specific *medications* such as *beta blockers* and these cardiac medications mask the *heart rate*. This will make a difference in *internal bleedings or signs of shock*. So, these signs will be unclear. In this situation, I will not depend on *the vital signs* completely during the *shock*. I will depend on *the general impression* of the patient and *amount of bleeding loss*. I will depend in my *examination* completely more than depending on the *vital signs* especially the *tachycardia*".<br><br>A8: "Sometimes older patients use *medications* that make *the shock* difficulty 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*". |

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| | | A18: “we have responded to an older case in *a car accident*. The main cause for the accident was the *hypoglycemia*. We have taken *vital signs, first and secondary surveys,* and loaded him in the ambulance as *a critical patient*. His blood pressure was low (*hypotension*), and *heart rate was normal*, 65 b/m. Here was the difficulty and I then became *confused*. After *13 minutes*, when reached to the hospital, we discovered that the patient uses *beta-blockers* that was a reason for *a compensated response with normal pulse rate*. Because it is supposed to be *tachycardia* due the *hypovolemic shock*, not normal heart rate. This is the difficulty in dealing with older patients… it is unreasonable that the patient was having *a hypovolemic shock and his heart rate was normal*. So, I have taken long time to diagnose *his hypovolemic shock*. But the adult younger patient has a *normal physiology*. As he will be *compensated* and I will then identify his *hypovolemic shock*, directly *open vein, and give him fluids*”<br><br>A24: “if the older case use cardiac medications and he has *a shock*. We cannot determine his *shock* and his blood pressure is normal due to use of cardiac medications and in the fact that the patient needs fluids, and the patient then can deteriorate rapidly or in minutes. This is one of the most important issues”. |

**Matrix 2**: How Saudi paramedics and EMTs acquire and apply their knowledge when attending to scene:

| ***Domains for each objective*** | ***Themes (with interviewees’ IDs)*** | ***After examining data for quotes and responses that identify the importance of themes and subthemes.*** |
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| **2.** Knowledge gaps | *Acquiring insufficient knowledge from multiple sources before and after employment*. A11, A9, A13, A10, A5, A12, A18, A17, A19, A20, A21, A22 | A11: "they have difficulties in dealing with *geriatric patients* rapidly. They have *less knowledge, are* not well-trained, have no *continuing education*, do not take *short courses*, and other factors. Also, they might work in an area that does not have *geriatric patients"*. "We take relevant *knowledge* from the school, but *clinical practice and skills* need working in the field".<br><br>A9: "Honestly, I like looking for any knowledge to benefit myself more and more. I see that I have acquired the relevant *knowledge* from the *textbooks, research, internet* and learning from *experienced* colleagues but still insufficient".<br><br>A13: "the *knowledge* is insufficient. I acquired my *knowledge* from *university study, internship year, work experience and guidelines*". "no one can say my knowledge is sufficient. Anyone always needs develop his experience, skills and knowledge and use different sources of knowledge".<br><br>A10: "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"*.<br><br>A5: "*the geriatric care knowledge* in my university study was insufficient. It did not have a specific *module* like *pediatric and gynecology patients* that have specific *modules*. We were studying limited *geriatric care*… I am satisfied with my current *knowledge* to deal with older patients. I acquired this *knowledge by reading books*".<br><br>A12: "Incorrect and every day I learn new things regarding the *knowledge* from reading and learning from research and experience. Each case differs from another case. We learn from different cases everyday essentially from the Red Crescent Authority's *protocols*". "Regarding the university study, the study did not essentially focus on geriatric patients. It was general and focused on *middle-aged group*s of patients, not on *elderly or pediatrics*. It focused on only *the most common* cases". |

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| | | A18: “the Red Crescent Authority started providing *courses* for *the prehospital care*. They collect *the top ten most common cases* of the special considerations’ cases in Saudi Arabia… They give *courses* about only *the most common top ten cases* that occurred repetitively in the scene with us. These *courses* were given if the *medical directors* noticed weakness among *paramedics* of a specific ambulance station regarding the *geriatric care*…”. “These courses were insufficient because they covered only *the most common* cases”.<br><br>A17: “Not yet. Because every day we learn new information. Especially about the older people who use a lot of *medications* that have a lot of side effects. These *medications* can cause reading *normal vital signs* with older patients… I responded to an older patient who has constipation due to specific *medications*. After identifying these *medications*, I will then take *medications’* names and read about them. because if I responded to another similar case who has similar *medications*, I will be familiar about the medications… also my experience that I gained regarding the differences about *the vital* signs in older and adult younger patients”.<br><br>A19: “I see it is still insufficient. *I can deal with the patient but in a specific period*… unfortunately, the university study did not cover the *geriatric* comprehensively. *The sections of geriatric and pediatric* have not been *covered well*”.<br><br>A20: “But regarding *the knowledge*, I did not reach to a sufficient level of knowledge yet. Some patients give me *medications* that I did not know or hear about them yet. But I have a small booklet I use it and has information of *all medications*. I use it”. When I asked him about the applicability of his current knowledge, his response: “Yes I can apply it in the reality, and I don’t have any issue about that”. |

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| | | A21: “I can say that I acquired it when I started working in this area that have older patients as most cases. After that I felt that I need developing myself in the geriatric care. I obtained an experience in dealing with them. Sometimes, I receive thirteen calls per day for older people… there are *medications* they use I do not know about them… I hope to see specialised *courses* in this in the future”.<br><br>A22: “Usually, *geriatric patients have medical histories*… if an older patient has a specific disease, after finishing caring for them, I will read about his disease… because I will later respond to older patients with the same disease and have information about it”. |

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| | *No related courses available and organisations provide such courses.* A6, A7, A10, A5, A8, A15, A14, A1, A12, A11, A18, A21 | A6: "Honestly, no *courses* available. I have never seen *courses* focusing on *geriatric care in prehospital settings*. I did not hear about that before".<br><br>A7: "in Saudi Arabia, no *courses* available for *geriatric* care. Unlike to *paediatric* patients, there are courses specific for them. I have never heard about or seen any courses for caring for *geriatric* patients".<br><br>A10: "I did not see *courses* specific for *older trauma patients.* I have seen only a part of a book, but it only covers t*he medical cases*". "no *sponsors* or *organisation* provide that knowledge for the *healthcare professionals and public* to raise the *awareness*".<br><br>A5: "no *courses* available for *geriatric care*. This is important point for me because honestly, I did not find" and "We have a lack of courses for geriatric care".<br><br>A8: "it is difficult to find relevant *courses*. I don't remember any relevant *courses and conferences* about".<br><br>A15: "unfortunately, the *prehospital care* has *a shortage of courses*. When we take a course in trauma, we find it covers *pediatric, adult, and geriatric patient*s together. No courses special for geriatric patients. There is a shortage. These courses always have *geriatric patients within the adult patients"*.<br><br>A14: "I have taken *the PHTLS course* and know *the ITLS course* that have sections for the *geriatric care*. But I do not know any *course* special for *geriatric patients*".<br><br>A1: "I have never seen a specific course for them".<br><br>A12: "I remember there was only one *workshop* that introduced by *SASEM* organisation. It covered the *special considerations* in geriatric patients. It lasted one or two days and has been held only once with providing us a reference to read it. But there are no *courses* specific for geriatric patients held regularly |

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| | | and annually". "we need *courses* specific for *geriatric care* either *trauma or medical care*. I see this is very important for paramedics to have high *knowledge or awareness*, then apply them in real cases and have *experience* based on the knowledge".<br><br>A11: "we do not take courses *special* for only *geriatric patients"*. "These *courses* at the end focus on *geriatric, paediatric and pregnant patients* as *special considerations"*.<br><br>Again, A18: "currently, the Red Crescent Authority started providing *courses* for *the prehospital care*. They collect *the top ten most common cases* of the special considerations' cases in Saudi Arabia… They give *courses* about only *the most common top ten cases* that occurred repetitively in the scene with us. These *courses* were given if the *medical directors* noticed weakness among *paramedics* of a specific ambulance station regarding the *geriatric care*… Honestly, there are challenges in finding *courses*. These *courses* are special *designed* for only *hospitals' cases*. 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. Because providing these *courses* is cost-effective". "Also, *courses for the communication skills* are necessary and very important skills to deal with the older people and enable us to obtain what we need… I see the *communication skills* with older people should be high-leveled and very important for paramedics to know how to deal with older people and their mentality, learn about *medications* that influence on their behaviours as side effects and understand them". "These *courses* are special *designed* for only *hospitals' cases*".<br><br>A6: "We need more training because we use only our current knowledge".<br><br>A21: "there is a lack of *training*. For example, in the *bachelor study*, unfortunately, the focus on the *geriatric* care was limited despite older people represent higher rates of patients. In my working area, the older cases represent more than 90% of the received calls and it is rare to respond to younger *adult and* |

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| | | *pediatric* cases… Even after the *bachelor* study, there is a limited focus on the *geriatric* care in the *training courses*. Especially the shortages of information of the common diseases and *morbidities*". |
| | *A lack of prehospital geriatric trauma care research in Saudi Arabia*. A10, A18 | A10: "there is no research about your topic in Saudi Arabia. I did notice any *study or research* regarding the injuries in older people in the *prehospital care*". "I wish your *research* contributes to improve the *quality of care*".<br><br>A18: "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… We need a research department and *teams* specialised in *the geriatric care*". |
| **3.** Applicability of the current knowledge when responding to older trauma patients | *Difficult application of knowledge when responding to and caring for female cases due to the local* | A10: "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" and "*The above two *courses* are *applicable*. The *applicability* of *ITLS* in Saudi Arabia is higher than the *PHTLS* regarding the *prehospital geriatric care"*.<br><br>A12: "the current acquired knowledge is *applicable* but not with all cases. Because each case in the *prehospital* setting differs from another, meaning that with some cases, I should be *creative* by any way in dealing with".<br><br>A18: "honestly, *Mosby and Nancy Caroline* textbooks were helpful. Because it is difficult that *paramedics* talk *to medical directions* or colleagues and say to them that I have lacked knowledge. But not everything in these North American textbooks we can apply in our society. Because these textbooks deal with all males and females equally" … For the skills, I have requested a training in hospital on learning for *cannulating* older patients. Regarding other skills and |

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| | *culture*. A10, A12, A18, A19 A1, A8, A14, A17, A9, A21, A22 | *advanced procedures*, I have learnt them from *simulations* that have become available for us… Yes. This knowledge was *applicable* and effective… if I have acquired *knowledge* about that *beta blockers* impact on *compensatory mechanisms* in older people, this is *applicable* in real cases. I can see these in the scene. Another example, if we responded to a simple car accident and found the patient has *severe chest pain*. We can say that the patient has *MI*. Because we learnt that we may respond to *a trauma* case with *a medical background"*. "I face only one challenge which is *physical examinations with females*. It is difficult to examine the *chest and connect the 12 leads ECG*. I see this is a simple challenge because with a good *communication*, these procedures will be easier… *courses for the communication skills* are necessary and very important skills to deal with the older people and enable us to obtain what we need.<br><br>Again, A19: "I see it is still insufficient. *I can deal with the patient but in a specific period*". When I asked A19 about his university study, his response: "unfortunately, the university study did not cover the *geriatric* comprehensively. *The sections of geriatric and pediatric* have not been *covered well*".<br><br>A1: "I have acquired the current *knowledge* from university study, *protocols*, sometimes responding to *interesting cases* and then *reading* about those cases to gain *knowledge*… This knowledge is difficult to be applicable because some older patients socially do not accept our care, depends on the *culture*… 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 and she was aware of that… Also, relatives refuse the physical examination especially, when we want to check for any injuries, *infections*, or anything else". "raising awareness among patients' relatives. This should be a task of *paramedics'* tasks. Because *paramedic* should not only provide care for older patients, but also raising *awareness* of *relatives* about that how should they care for their patients, how they deal with their patients, if hypoglycemic, what will they do? How they will give *medications* for under the patient's tongue if he has *a cardiac history or weakness* and *relatives* should not put their patients in *supine position*". |

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| | | Again, A8: “female patients have higher fears to examine her. She does not want to touch er or uncover her clothes to examine her due to the *culture*. This is a difficult issue”.<br><br>Again, A14: “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.* Sometimes, it is impossible to apply a *12-lead ECG and physical examination*”.<br><br>Again, A17: “Patients’ relatives must have sufficient knowledge about us in the Red Crescent Authority. They must know that we are qualified as I do not need to say to them that I am qualified. Originally, it is not the relatives’ responsibility, but 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”.<br><br>Again, A9: “there are difficulties in uncovering the *female patients*’ faces, examine *chest or abdomens*. I see this is a social and cultural issue that we cannot change it. But we can reduce this issue by using a *polite* way of *approaching* to the patients or way of convincing them *professionally*… I see this is my solution to this issue”.<br><br>A21: “*females* are more difficult due to a culture matter… For example, examinations and assessment are difficult with them. They refuse the assessment on chest and abdomen that are difficult with them”.<br><br>A22: “due to *the culture*, if the patient is *female*, I will be unable to apply *12-lead ECG*. But *the contact with the patient* can play important role… I don’t always encounter this issue because it will depend on the paramedic himself. How to contact with *relatives*, convince them?”. |

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| | *Confidence or nonconfidence in applying specific skills when responding to older trauma patients.* A7, A9, A5, A8, A6, A11, A13, A15, A14, A1, A12, A18, A17, A19, A20, A21, A24 | A6: "I see that *trauma* cases are easier to deal with than *medical* cases. As in *trauma* cases, we can see the injuries and identify the *mechanism of injuries" and* "issues in trauma cases are clearer while medical cases are complicated".<br><br>A7: "I am highly confident as I try to provide my care with showing my confidence to the patients to make them relax. If they refused my care or transports, I could then advise and convince them to be transported to the doctor to receive better assessment".<br><br>A9: I feel confident when I care for older patients. Because older patients have the same treatments of *the adult and pediatric patients*, except that when we face only the issues of giving *advance interventions* or *medications* to the older patients, refusals of our instructions, nervousness or saying bad things by the older patients. In these situations, we try to calm them".<br><br>A5: "I feel confident. Because I have my mother who has hypertension and diabetes and I always care for her. Also, my grandmother who passed away a while ago. I was caring for her when I always was a university student. So, I never feel unconfident when I care for them. I feel I have a previous experience in dealing with them especially with my family that facilitated dealing with older people. It is correct that I face difficulties sometimes regarding the non-cooperativeness with some patients, but everything goes fine".<br><br>A8: "I feel more confident, and I acquired this confidence from the experience by responding to a lot of calls. Also, I was caring for my parents. Therefore, I have acquired better communication skills".<br><br>A13: "I feel confident in caring for geriatric patient because my study level, capability and work *experience*. By these, you will gain confidence. The most important point is being *calm* when caring for them. this action will make me able to arrange my ideas and think to undertake correct steps. Always, I make |

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| | | the debate with the patient, not with relatives to try to control the debate. I try to talk with the patient on the same level of eyes and make sure the patient understands what I say".<br><br>A15: "I feel confident because I see four years of work is enough, even for an individual who feels less confident. Because in *Riyadh*, you will respond to a lot of different cases such as *multi-trauma, geriatric patients, and all cases* until gaining an experience that will help you to manage and deal with any case in the future". "You should try and talk with older patients using the same of their language *accent*. You should explain to them. Because you cannot predict their behaviours and they may hit you. I see these your actions will facilitate all next actions of care".<br><br>A14: "I don't feel less confidence. As I found my previous experience in the *ICU* useful that has taught me a lot. Because I have dealt with different *specialties* such as *cardiologist* who deals with cardiac issues and *geriatricians* who deal with older patients. for example, there *was a heart failure patient* who had increased blood pressure. I was unable to give him *fluid* that can lead to further issues. So, in this situation, I will search for a better care possible for the older patients lead to my experience that I have learnt in the *ICU* along with my university *study* and work *experience*".<br><br>A1: "I gained my confidence from university study and searching for any new updates in my specialty especially for this group of population that we find in every home… Also, I benefited from my experience and making relationships with hospitals' care professionals after delivering cases ask them about cases we delivered; what happened with our cases, what procedures you will do for them and what are their treatment plans… etc". "I feel confident in providing *medications* for *life savin*g with cautions because we afraid from any *complications* my occur in older people, doing *CPR*, *decision of transports to choose the suitable facility, cannulation, suctioning patients*, and the most important thing that we face is changing the *patient position*. Paramedics do not deal with only patients, but also with *relatives*. As *paramedics* can raise relatives' *awareness*". |

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| | | A12: “I do not have non-confidence as I deal with them as any patients with considering their age that differ from others. So, I give them more considerations more *than middle-aged patients*. I work in an area have a lot of older patients either *medical or trauma* cases that led to obtain more experience in dealing with them more than others and this including dealing with my parents and the grandfather in the home. I have obtained experience in the *tracheostomy, NG tube*, and dealing with older patients compared to *the middle-aged patients*”.<br><br>A18: “at the beginning of my profession, I was unconfident… I needed more time for my skills as 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 while for my *knowledge*, I have spent around five years”. “The most procedures that I am confident in applying them are *chest compressions, ventilations by bag valve masks, and intubations.* But the most difficult procedure in my training was *cannulations* of older patients because for me, *cannulations* for them can fail once or twice until applying it successfully”.<br><br>A17: “my confidence is high. When responding to older people, I assure them based on their mood. I should gain their trust before applying any procedure with them. After that all care steps will be facilitated… I see the beginning of care with them is very necessary and important to gain their trust. After that, all next procedures will be applied easily. The assurance is the key of approaching to the patient…”. “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. Some of them deal with older patients like any trauma case or routine cases until completing the care”.<br><br>A19: “From the beginning of my service, I noticed that there are improvements or gaining confidence in this because I deal with different medical teams that increased the confidence in dealing with patients… the care providers’ *first exposure* to patients can make them *shocked* but if the same injuries repeated, |

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| | | the care providers then will have experience in dealing with these injuries and become familiar to deal with any patient's *reactions*. I see *the experience, exposure to cases, and self-learning* will improve the care".<br><br>A20: "I do not have nonconfidence. I like talking with them as sometimes I found them upset. So, I talk with them… Sometimes, I talk with them loudly to let them hear me and I can then gain information from them… I acquired this skill because I like hearing from experienced colleagues to know what the correct and wrong actions are from the experience they had. Also, I acquired this from the life experience because I deal with older people by using words they like because dealing with them is difficult… I approach to the patients and try to hear them as much as possible until obtaining needed information… For example, my colleague takes the history asking about their diseases and medications and I hear patients' responses and then analyse about what things happened with the patients".<br><br>A21: "after starting to take *board certificates*, honestly, I have gained more confidence… the *experience* in the *geriatric* care was useful as I have said that 80% of the cases I responded to are older cases… Regarding the skills, I have confidence in applying them such as *history-taking and medications care* after taking *the history* completely. But regarding the skills that am unconfident in applying them, *the airway management* such the *RSI* is difficult to be applied with the *geriatric* cases".<br><br>A24: "The experience has helped me because I respond to at least ten calls for older cases including responding to the pilgrims… six months for newly employed paramedics is enough to have better experience… you need to make older cases feel that you care for them… I talk with them by setting down to them at the same level of eyes… the essential skill is the good *communication*. Then, every next action will be OK… the most difficult skill is the *IV*. We try to open *IV* more than once until being successful". |

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| | | A11: “there is *misunderstanding* as *paramedics and EMTs* should deal with older patients differently from younger patients because of their use of polypharmacy and *physiological changes*… They have *less knowledge, are* not well-trained, have no *continuing education*, do not take *short courses*, and many other factors. Also, they might work in an area that does not have *geriatric patients*. For example, some ambulance workers work in industrial areas, and they will deal with only *younger patients*. So, those paramedics will be unfamiliar with seeing and dealing with older patients”. |
| | *Using own knowledge to make arbitrary EMS decisions due to the current guidelines that apply to all trauma patients and a lack of geriatric specific guidelines.* A18, A10, A5, | A18: ““there is *no communication* between the prehospital and in-hospital settings. So, I can only decide which hospital is more appropriate to my older patient…*”*.<br><br>A10: “the patient was transported to hospital with *a trauma unit*, not to *a trauma centre*. The patient was transported to *a nearest hospital* based on the *protocol* and has *a general and orthopaedic surgeries*” and “I would deal with older and younger patients differently but based on the *protocol* and *knowledge*, they are similar”.<br><br>A5: “I see *trauma centers* is the best choice for the older patients. Before transporting an *older trauma patient*, the *decision* will depend on the *patient condition*, and which is the *nearest hospital*. Some hospitals do not have *orthopedics specialty*. So, I will avoid choosing these hospitals, even it is the *nearest hospital* because it does not have specialties that patient needs. So, I will consider *a nearest hospital* that offers specialties that patient needs. *A nearest and appropriate hospital*”.<br><br>A13: “the transport was to a nearest hospital which has a needed specialty such as *a general surgery*. According to the *guidelines*, we should consider the nearest hospital and has the required *specialties*. If we needed a *specialty* that was unavailable in the nearest hospital, we will consider another farther hospital”. |

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| | A13, A11, A7, A6, A1, A12, A15, A14, A8, A9, A21, A22, A23 | A11: "we depend on the following factors: 1) Does the patient need *neurosurgery*? If yes, the patient will be transported to *a trauma centre*. 2) Does the patient need *vertebral column surgery*? If yes, there is a hospital that receives such cases. 3) Does the patient need *vascular surgery*? If yes, some hospitals receive such cases. 4) Does the patient have any other injuries? If yes, go to nearest hospital".<br><br>A6: "If the cases were with a *life-threatening condition*, they would be transported to *the nearest hospital*, regardless of type of facility, 'trauma centre or hospital'".<br><br>A15: "We transport *life-threatening condition* patients to *a nearest hospital* and *stable* patients based on their desires". "That is the *protocol* we follow".<br><br>A14: "I am talking about a *stable* case who has only a *pain*. So, the patient management was giving him the *paracetamol* in the ambulance and transport him to the *hospital* he wants. But if he was a *life-threatening condition* patient, we will transport him to a nearest hospital".<br><br>A7: "We have three tags to triage the patients: red, yellow, and green tags. Red tag means a serious patient, yellow tag for moderate cases, and green tag for mild cases. If the patient has green tag, we can ask him/her which hospital they need to be transported to. If his/her tag is yellow or red, we can transport them to a nearest hospital".<br><br>A1: "if the patient was with *a life-threatening condition*, the transport should be to *nearest hospital* until becoming stable by *stabilising ABC* and he then will be transported to another *hospital* that has the needed specialty by using Ministry of Health's ambulances".<br><br>A18: "If *hospital A* is nearer than *hospital B*. But *hospital A* is unready to receive trauma cases, we will consider *hospital B*. However,if we transported the case to the *hospital A*, they will not refuse receiving our case because there are fears to be accountable legally if they refused the case. So, they will receive |

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| | | our case in *their ED and surgery room*, but at the end, they do not have a *trauma surgeon*… they will use their own *ambulances* to transport the patient to *a trauma centre*. So, the patient will take a longer time to be managed".<br><br>A12: "my role is to assess the case. If the case is severe, I will transport him to a nearest hospital and if he is *critical*, I will transport him to *a level 1 trauma centre*. For example, I responded to case with an amputated leg. The distance to general hospital was 10 minutes and distance to *the level 1 trauma centre* was about 12 minutes. I directly then transported him to the KSMC's *trauma centre* because the patient *needed a vascular surgeon*. I do not focus on the distance to hospitals but also on the needed specialty for the patient". "Until present, nothing is clear regarding that. But it depends on the patient situation".<br><br>A15: "We transport life-threatening condition patients to *a nearest hospital* and *stable* patients based on their desires".<br><br>A8: "based on the current protocol, dealing with older patients does not differ from caring for younger patients. They have the same care steps. But they differ in *the communication skills and emotional care* when dealing with older patients. So, dealing with older patients differently depends on the paramedics themselves based on *the personal and scientific experience*".<br><br>A9: "based on the research that I have read, I have seen that these steps that I applied are the best ways to protect the patient by taking *a general impression, then scene safety, and treatment steps* that I have mentioned. I found my steps are more effective after acquiring them from studies and research".<br><br>A10: "I always inform my colleagues about that older people have *differences* compared to others… they use *medications control blood pressure,* and those patients have unclear *blood pressures* when *compensating in shocks*, they can use *medications to control the heart rate* or use *pacemaker* in their hearts. |

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| | | So, they can have increased pulse. The *protocol* does not show these information or differences. But we give more care for these things". "We do not have protocol for geriatric patients. The current *protocols* used for all adult patients. But we give older people more care based on their differences to others".<br><br>A21: "according to the *protocol* that we use, the transports should be to a nearest hospital if the patient is *vitally unstable*. But if the patient is *vitally stable*, we will not need to transport the patient to the nearest hospital".<br><br>A22: "the current *protocol* is used similarly with older and *adult* younger patients but at the end, it depends on *the paramedic* himself if he provides *doubled caring for older patients* or not. For example, when I respond to older patients, I provide *doubled caring* for them. But… some colleagues deal with them like any adult patient".<br><br>A23: "firstly, if the older patients have *comorbidities*, secondly, if they have more than 65 years old, and thirdly, if they have previous injuries in the same current body part… these three criteria that led us to decide transporting the patient to a nearest hospital… No, this is not the protocol of the Saudi Red Crescent. This is based on my personal decision… honestly because *the current protocol* of transport is not clear. Therefore, it depends on the paramedic's decision". |

**Matrix 3**: What are the barriers to providing improved care for the older trauma patients?

| ***Domains for each objective*** | ***Themes (with interviewees' IDs)*** | ***After examining data for quotes and responses that identify the importance of themes and subthemes.*** |
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| **4.** Organisational barriers | *Lack of necessary equipment or manpower while caring for older trauma patients.* A10, A15, A14, A17, A23 | A10: "there is a lack of *supplies* and e*quipment* that can improve the q*uality of care* for older people such as a*dded back boards, blankets* for older patients, *short cannulas* for older patients. Availability of these supplies will facilitate providing better care for them".<br><br>A15: "we need additional *equipment*. For example, 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. Then, the Red Crescent Authority will not give us alternative equipment. This issue applies to all splints we have. Our organisation gives us splints to be used for one year and then they will give us alternatives. This is an important point".<br>"Sometimes, we are a few members in the scene. For example, we are two persons, one is a driver, and another is a care provider. We have *a heavyweight geriatric patient,* and we cannot move him. I see this is difficult. If we were three people, we could provide something helpful for the patient. This is an important point".<br><br>A14: "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.* I have only two hands".<br><br>A17: "we have shortage of *equipment* such as specific sizes of *cannulas* and *nasal cannulas* that can be unavailable or limited".<br><br>A23: "honestly, the resources and equipment can be insufficient such as insufficient sizes of *c-collars* especially those sizes that are used for older people that sometimes can be unavailable". |

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| | *Restricted on-scene time to caring for older patients by the SRCA while older patients need longer time.* A14, A13, A6 | A14: "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".<br><br>A13: "usually I encounter the issue of time in the scene. As in the Red Crescent services, I should spend a specific duration time (10 minutes) with each patient. Normally, *assessment of patient and application of treatment plan* can take 10 to 15 minutes with any patient, but in older patients they can take longer… the number of paramedics in the scene is important. As there are some procedures that can take normally 4 to 5 minutes by one paramedic but by three paramedics, they can take 2 minutes. This point is important".<br><br>Again, A6: "We take *a long time* with older cases compared to younger *adults*… We take prolonged time durations with these cases in *taking histories, assessments* and identifying the complaints due to the difficulty in communication with them". |
| | *Lack of care guidelines.* A11, A10 | A11: "the current *protocols* in the *tablet* provide general information for *geriatric and paediatric patients*. For example, regarding *the fluid replacement in trauma cases,* the tablet give you steps to be followed and the required amount of *fluid* to be provided for older cases".<br>A10: "We do not have *protocol* for *geriatric patients*. The current *protocols* used for all adult patients. but we care give older people more care based on their *differences* to others". |
| | *No data of older patients' history shared to* | A18: "Currently, 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… Paramedics can send this information to hospitals but cannot obtain any information about the patient… *the past medical history* is rich by information of *polypharmacy and medical events* that if we did not obtain them, it will be difficult *to assess and diagnose* cases in the prehospital setting". |

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| | *paramedics*. A18, A21 | A21: "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… the patient can have *Parkinson syndrome*, osteoporosis, or dealing with patient who has cardiac transplant. In these cases, dealing with medications will differ… *the assessment* will differ as well. It is important to have linked data". |
| **5.** Individual barriers | *Refusals of paramedics' care by older patients or relatives and difficulties in convincing them*. A8, A9, A10, A5, A13, A14, A15, A20, A21 | A8: "The most difficult action is convincing older patients to be transported to the hospital. A lot of them refuse transport to the hospital. They like only transports to the hospitals that they always visit. So, they always refuse to go to a nearest hospital if they are sick and in a critical situation".<br><br>A9: "I always face that older patients refuse my instructions such as applying *the C-collar or backboard*. Most of them refuse these actions by saying they are painful or saying that you are not a doctor to give that *order*". "she was refusing our examination as she wanted to be assured about her sons who were involved in the *accident*. She asked us to examine her sons instead of her". "I needed to transport her to the hospital as soon as possible rather than losing the time. Because she needs examinations in the hospitals such X-rays, labs tests before she *deteriorates*, to be then intervened in the appropriate time". "Some *relatives* hide some information. When we asked them about kind of *medications* that are used by their older patient, they refuse to give us this information and the patient himself can also refuse giving us this information".<br><br>A10: "older people's resistance to transports are higher than in younger patients".<br><br>A5: "Sometimes I face difficulties in dealing with refusals of care by *older patients*. For example, *relatives* can call us for their older *patient*. In that time, they are worried about their patient because they noticed alterations in his situation and their patient does not want the *emergency medical ambulance services*. He refuses our care and will be noncooperative with us".<br><br>A13: "I encounter difficulties in dealing with older patient. Especially if I want to apply a *specific procedure* with them or change a current *procedure* to another better *procedure*. They can refuse do that. Then, I will need to explain to them the *procedures* calmly. For example, most of them refuse the |

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| | | *examination* and they may have *fractures*. At the same time, they can be in a specific body position that can complicate their injuries or lead to further injuries. They refuse to change their *position* because they have fears of *pain*. This is important point because examinations can lead to *correct treatment plan and correct applications of procedures"*.<br><br>A14: "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*. They do not want *hospitals*".<br><br>A15: "*Most of geriatric patients refuse the emergency services. They don't want to go to the hospital. They don't want to do anything with them*... I always face this issue. Even they may have fractures, they say: I don't want to go to the hospital and leave me in my home. I die in my home better than dying in the hospital... Also, moving older patients with trauma from a place to another or changing their positions that we found to another position are *challenges*. They refuse moving them because fears of increasing pains with them. Also, these happen in the ambulance during enroute to the hospitals due to circumstances of the roads. Their pains increase when moving".<br><br>A21: "the biggest challenge I always face is they do not give us information of their diseases and medications. We always suddenly then discover new things while treating them... In some cases, we should intervene rapidly, but we take long durations of time to identify this information: what are their diseases? What medications do they use? So, we will be enforced to search for this information by ourselves by opining drawers to know what the medications they use... because we need to determine their pain management". "As I said in the beginning that there are difficulties in convincing relatives or their older patients about that we are to provide treatments for patients. Yes, it is difficult to apply what I have learned".<br><br>A20: "They refuse. For example, we say to them that you should go to the hospital. He replies I am OK. When we try to convince him, but he refuses. They refuse the care or transports or both". "If we could not convince them, we cannot then do anything for them. some of them say unsuitable words. |

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| | | Our roles then will be that talking with their relatives because their patients refuse transports to the ED and hospitals. Sometimes, their relatives refuse transporting their patients even they should be transported. for example, their older patients always go to specific hospitals regularly, but the hospital does not receive any new patients now. So, refusals can happen here because the relatives want that hospital and they do not want to consider another hospital". |
| | *Older people or relatives' unawareness of the medical conditions and medications*. A11, A5, A15, A18, A20 | A11: "this issue can lead to difficulties in obtaining of the older patients' histories in the scene". "in our culture, usually, older patients have their sons, daughters, grandsons, and granddaughters around them. So, it is rare to face this issue".<br><br>A5: "the most challenges that I face is responding to older patients who are *unaware* of their medical problems… I can respond to older patient who have hyperglycemia and at the same time, he has incompliance in taking his prescribed medications. This can cause issues *on his kidneys or heart* or lead to injuries in extremities. Some of them are *unaware* about these issues or are negligent.<br><br>A20: "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. But sometimes I respond to some relatives who know very thing about their patients. Once you entered the rooms of their patients, you know these families are careful with their patients".<br><br>A15: *"if there are no relatives or bystanders with older patients, it will be difficult to take the medical history". "We will not know anything about the patient. So, taking the past medical history will be a challenge for me". "Sometimes you can ask the geriatric patient. Most of them will be bedridden. They may have CVA they cannot talk with you. So, you can ask the relative. What happened with him? What is the difference?".* "Taking *history* is important because I do not want to apply a procedure that can harm the patient". |

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| | | A18: “sometimes, when we reach to an older patient with no relatives in home, the difficulty is in prolonged durations of time from the injury time to the call. This means that it will be prolonged time to identify the injury”. |
| | *Responding to aggressive, nervous, fearful, or non-cooperative older patients or relatives*. A7, A5, A8, A12, A17, A24, A13, A14, A19, A10, A23 | A7: “Relatives prevent me to provide care for their older patients and usually they want from me to rush. This prevents me concentrating on providing the needed care for their patients”.<br><br>A5: “the most difficulties that I encounter when I deal with older people is the non-cooperative older patients. That is only thing that influence on providing my ambulance and treatment services to the patient”. “I always encounter is some of older cases with Alzheimer. Those patients are noncooperative with me during taking their vital signs because in that time, they are fearful. They are unaware of my roles and services that I will provide for them”.<br><br>A8: “non-cooperativeness of relatives will not help you to providing improved *geriatric care*. For example, when we respond to an older patient, his relatives can ask you why you did not come earlier and why did you come late! These behaviours can agitate their older patient rather than making their patient comfortable to facilitate the care”. “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. These are the biggest challenges”. “Always *female* older patients try to deny any injury due to fears of going to the hospital. Older people do not like hospitals. They think if they went to the hospital, they will die there, or they will not be discharged. A lot of them deny the injury. They try as much as possible to avoid transports to the hospital. In these situations, we try to convince them”. |

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| | | A12: “the most important thing is responding to non-cooperative older patient who prevents us to do anything to him. He only wants transports to hospitals. Here he prevents you providing the *care*. Sometimes we respond to such cases and the refusals can be usually by the patients and sometimes by relatives”.<br><br>A17: “Patient’s relatives can shout, behave aggressively, and consider as only a transporter. They also may refuse our care. They are non-cooperative with us. Sometimes, the older patients can be nervous, and we cannot gain their trusts to deal with them. Even if we tried to convince them. We cannot control the patients’ relatives. Some of them are unaware of that we are *qualified and trained* and we can provide good service, but we need a space to serve the patients. I think the reason for this issue is that they have a previous incident with paramedics who dealt with them negatively”.<br><br>A24: “in some noncooperative families, they neglect their patients and ask us: why did you come late… or ask us only carry their patients and transport them directly”.<br><br>A13: “some older patients are illiterate. So, we face difficulties in caring for them by finding them noncooperative. We face this issue with them”. “I always encounter the issues of denials of pains or injuries by older patients, despite they may have severe injuries, or they are sick”.<br><br>A14: “some relatives are not polite or *irritable* with us. They put us under pressure despite we want to serve the patient and we know they are worried about their patients”.<br><br>A19: “I notice in older people or their relatives that they overestimate in showing older patients’ complaints or injuries and then the patients say that ‘do not do that’, ‘I cannot stand up’, ‘do not lift me or move me, leave me’. Some of the older patients do not trust us”.<br><br>A10: “denials of pains, tolerance of pains in older people are higher than in younger patients”. |

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| | | A23: “relatives in the scene can be agitated and they can request from us to intervene rapidly or transport their patients directly because they are emotionally nervous that can prevent us providing better or high-quality care. Honestly, *the bystanders* can be barriers… So, we will be enforced to lift and move the patients and complete our care in the ambulance”. “if the patients are alone in the home and there are no bystanders or relatives around them. This is one of the difficulties that we encounter especially with older people who live alone and no one around them. Therefore, we encounter difficulties in reaching to older patients’ homes and if we arrived, 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. So, we will suppose the worst”. |
| | *Older patients and relatives’ lack of confidence in paramedic care*. A1, A9, A19, A21 | A1: “Nonconfidence of care by relatives. They do not trust *paramedic* roles. This happens with every *paramedic*. For example, when I ask relatives: let me know what happened with your patient? They reply: patient’s awareness altered. Then, I ask them: when? They reply: two hours ago. I then ask: what is his *history*? They reply: he has *diabetes, hypertension, and old CVA*. Then I say: let me see his medications. They reply: do you investigate with us? I called you to transport us to the hospital”.<br><br>A9: “Always we face the issue of contempt of the *paramedic’s* roles from patient and relatives. This is important point. This issue happens when they say that you are not *doctor*, you are just transporter. This issue happens for reasons: the *paramedics* themselves who built this reputation about us. Some of them say to patients that I came to you only to transport you to hospitals, or they transported *patients* using wrong manners”. “This issue needs longer time to be solved. I see this issue is multifactorial between *patients, relatives*, or the *paramedics* themselves”.<br><br>A19: “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 anxiety or fears for their older patients, non-confidence in the paramedic roles, or both. I blame some paramedics in the issue of |

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| | | non-confidence in paramedic roles. Because their *attitudes* should be better in *the scene*. They must *trust themselves* because if the *paramedic* trust himself, dealing with the patients will be better. The paramedic's *attitude* is important".<br><br>A21: "the society public should trust us. Especially, if the relatives refuse the care because they do not trust us… You will then become as a transporter. The training is required because it is important to remove fears from the paramedics when dealing with older people. Because usually, the practitioners do not trust themselves when providing care especially in urgent calls". "there is no education about the ambulance roles. Because the majority of older people have the old perception which is they think that the ambulance is only for transport… they do not realise that we are the first point of treatment, not the hospital. They do not know that we can provide treatment for them. So, they will not give us information of their diseases or medications". |
| | *Relatives neglect older patients' needs.* A9, A5, A1 | Again, A9: "Always, I face the nervousness, aggression, and patient negligence by relatives. For example, if I asked relatives about why blood sugar is decreased in their older patient, they say: this the fifth or sixth time happens through a week. If I then asked their older patient about that, he replies it is not your business. You are not my son! Then, I will say: OK. I always face these issues.<br><br>Again, A5: "I can respond to older patient who have hyperglycemia and at the same time, he has incompliance in taking his prescribed medications. This can cause issues *on his kidneys or heart* or lead to injuries in extremities. Some of them are *unaware* about these issues or are negligent.<br><br>A1: "most older patients that we responded to are *bedridden and careless*. I mean they are *negligent*. This happens in some districts due to their financial circumstances. Because *negligent* patients can have unclean clothes and bad odors that influence on us during *transports*. But with rich |

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| | | people, we can find their patients have *a nurse or two nurse*s in the home, medical mattresses, and some devices such as *ventilators and suction units*". |
| | *Language barriers*.<br><br>A5, A18 | A5: "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",<br><br>A18: "Normally, we take the *history* from the *family*, or from the patient's nurse who receives us in home and sometimes we have a language barrier with them who serve the older patient at home. In this situation, it will be difficult to take the *past medical history* which is important to decide the *patient's trauma management*". |

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| **6.** Cultural barriers | *Difficulties treating female patients.* A10, A9, A5, A8, A15, A17, A14, A1, A20, A21, A22 | A9: "Regarding the *female* patients, dealing with them is a sensitive issue. They refuse our *examination* as I should provide *a clear patient report* to the *doctor*. The *female* patients and their *relatives* also refuse doing my *examination*…". "there are difficulties in uncovering the *female patients*' faces, examine *chest or abdomens*. I see this is a social and cultural issue that we cannot change it. But we can reduce this issue by using a *polite* way of *approaching* to the patients or way of convincing them *professionally*. If you did not apply these, we will not blame relatives if they *refused* the care".<br><br>A8: "female patients have higher fears to examine them. They do not want to touch er or uncover their clothes to examine them due to the *culture*".<br><br>A10: "Regarding the *culture* or local traditions, *female patients* accept *females' care* more than *males' care*. This can be solved by employing f*emale paramedics to deal with female geriatric patients*".<br><br>A5: "there are clear barriers when caring for *female patients*. These always happen with me. Some of them accept after many times of trying to convince them and some refuse… Usually, they refuse *treatment and interventions*" and "this is one of issues that I mostly face regarding the gender. Some relatives are strict, even if I tried to convince them. If I want to take ECG, he says no, take her to the hospital for a female nurse to take ECG from my female patient".<br><br>A15: "Some female older patients do not accept anything from us. They want *females* to provide services for them. They refuse *the physical examination and taking an ECG*. For example, they refuse examining fractures and leg injuries…". "The solution for this issue is employing female paramedics".<br><br>A14: "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.* Sometimes, it is impossible to apply a *12-lead ECG and physical examination*". |

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| | | A1: “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 and she was aware of that. She said: no, I do not want. Because the issue of different genders. Also, relatives refuse the physical examination especially, when we want to check for any injuries, *infections*, or anything else”.<br><br>A20: “In our society, relatives try to cover female older patients’ faces during examining her. For example, I have done *CPR* for an *arrested older female patient* has 80 years old. Her relatives were covering her head during the resuscitation because she was outside the home”. “This delays the care. You can see the male older patients’ faces but in females, we may have delays in see their faces”.<br><br>A21: “*females* are more difficult due to a culture matter… For example, examinations and assessment are difficult with them. They refuse the assessment on chest and abdomen that are difficult with them”.<br><br>Again, A22: “due to *the culture*, if the patient is *female*, I will be unable to apply *12-lead ECG*. But *the contact with the patient* can play important role… I don’t always encounter this issue because it will depend on the paramedic himself”.<br><br>A17: “Originally, it is not the relatives’ responsibility, but 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”. |

**Matrix 4**: What are the facilitators to providing improved care for the older trauma patients?

| ***Domains for each objective*** | ***Themes (with interviewees' IDs)*** | ***After examining data for quotes and responses that identify the importance of themes and subthemes.*** |
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| **7.** Organisational facilitators | *Developing geriatric-specific care protocols*. A10, A22 | A10: "it is possible to add a part in the current *protocol* specific for *medical and trauma older patients* in order to improve the service".<br><br>A22: "I think that adding international *protocols* specific for treating the older people will facilitate the care. This is very excellent and important thing for trauma and *medical* patients". |
| | *Availability of adequate equipment and manpower*. A12, A19 | A12: "Presence of *the right equipment* to provide *a high quality of patient care*. For example, I need *vacuum mattresses* to facilitate lifting and moving the patient especially if the patients in first or second levels. At the beginning, 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*".<br><br>A19: "as I have said, *the self-preparation*. *You have to be prepared to deal with any patient* by equipment that facilitate providing the care such as ready bags, stretcher, *equipment*. Also, *the team* should be ready". |
| | *Raising older patients and relatives' awareness of consequences of* | A5: "The awareness is a thing that can facilitate providing care for older people. Educating older people and their relatives is important. Because some relatives refuse the patient care. Sometimes, older patients themselves refuse *the treatments and interventions*".<br><br>A1: "raising awareness among patients' relatives. This should be a task of *paramedics'* tasks. Because *paramedic* should not only provide care for older patients, but also raising *awareness* of *relatives* about that how should they care for their patients, how they deal with their patients, if hypoglycemic, |

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| | *care refusals and roles of paramedics.* A5, A1, A12 | what will they do? How they will give *medications* for under the patient's tongue if he has *a cardiac history or weakness* and *relatives* should not put their patients in *supine position*. This is the most important point to raise the awareness for patients' relatives or nurses".<br><br>A17: "Patients' relatives must have sufficient knowledge about us in the Red Crescent Authority. They must know that we are qualified as I do not need to say to them that I am qualified. Originally, it is not the relatives' responsibility, but 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". |
| **8.** Individual facilitators | *Improved communication skills.* A6, A10, A9, A15, A24 | A6: "older cases seek *emotional and social* care more than *healthcare*. This is the most important challenge we deal with". "I always try to build links with them before starting the *assessment,* which will facilitate giving us *important information*, before they become cooperative with us, and make it easier *to deal* with them".<br><br>A10: "I feel kind and emotional with them more than just healthcare, giving them respect and care more than others". "So, their acceptance to the care will be higher".<br><br>A9: "my intervention to her was *emotional* more than a healthcare because she was refusing our examination as she wanted to be assured about her sons who were involved in the *accident*. She asked us to examine her sons instead of her. So, after we tried to convince her, we have taken her sons with us in the ambulance, despite this action is not acceptable!! We try to the patient satisfied and at least we provide humanitarian and healthcare service".<br><br>A15: "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".<br><br>A24: "Older cases need better care and respect. I deal with them emotionally". |

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| | *Working in partnership with cooperative older patients and relatives to facilitate providing improved care*. A1, A9, A13, A15, A20, A22 | A15: "the most important point in the care is *relatives*. Because they facilitate explaining the *procedure* to the patient and take the medical history as well. These will then facilitate the care".<br><br>A1: "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. for example, if I discovered the patient's *hypoglycemia*, they would let me provide *D50* for their patient because they are aware and cooperative".<br><br>A9: "if *relatives* and their older patients were cooperative, this will give me a high confidence and facilitate providing my care especially if they gave me accurate correct information".<br><br>A13: "some older patients have clear information of their *complaint* and *mechanism of injury*. Because if I have clear information about the *mechanism of injury*, I will directly identify injured parts and shorten the time and intervene directly".<br><br>A20: "When I respond to case, enter the home, find his *printed report shows his conditions and medications* completely and read it *directly*. Honestly, I find this in each home and given by hospitals that older people visit. I found a lot of them have similar *reports*. This facilitates providing their care… I see the point of report is the most important because it will show you that when the patient has visited the hospital and why he has been discharged".<br><br>A22: "if the patients are *oriented*, not *confused*, I will ask them to get more information by taking *the SAMPLE history*. Because asking questions will lead to identify their exact issues". |
| | *Relatives' awareness of* | A6: "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*… because this is the most important point… As *relatives* facilitate our care for their patients". |

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| | *patients' conditions.* A6, A21 | A21: "when we respond to patients who have educated relatives. For example, they can provide a paper which has the patient's *medical history and medications* that patient uses with their doses too. This facilitates our care because they are aware that we will provide emergency care and they don't interfere in our care. Also, they are aware of all information about their patient such as diseases and medications used… educated relatives is one of the most important things". |
| | *Sufficient training and knowledge*. A8, A10, A11 | A8: "*Well-training* with sufficient experience will facilitate providing improved *geriatric care* because anyone who has no experience, he will deal with older patients like any patient. This is a mistake because older patients are different".<br>A10: "by the continuing education to raise the *awareness* among *healthcare professionals* and others".<br>A11: "we should *update or refresh our knowledge"*. |