

Combat injured veterans' perceptions of their physical and mental healthcare: a short report from the **ADVANCE-INVEST** study

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Foreword



Combat trauma often leaves two legacies: the physical and psychological injury, and the system's response to it. This report is concerned with the second, and does so with the academic rigour this subject deserves. Drawing on quantitative data from over 500 ADVANCE-INVEST participants and 28 in-depth qualitative interviews, it provides one of the most granular accounts to date of how combat-injured veterans who deployed to Afghanistan with and without limb loss, experienced physical and mental healthcare during their military-to-civilian transition.

I read these findings from two vantage points. As Director and Consultant Clinical Lead of Veterans' NHS Wales and 14 years overseeing veterans' mental health provision within NHS Wales's devolved healthcare system. I have experienced the interface between MOD, DMRC, and four separate

NHS systems and the frustration this can create for veterans and their clinicians. One where continuity of care depends on trusting relationships and referral pathways that can too easily fracture. Secondly, as an Army reservist who deployed to Afghanistan on Herrick 19 as part of a two-person field mental health team in 2013.

Both perspectives are borne out in these findings. The exemplary standard of acute physical trauma care is well established, and these findings confirm it. Less well established, but clinically significant, is the divergence in outcomes for those without visible injury. The report's account of inconsistent continuity of mental health care, and of care pathways perceived as inflexible, reflects known structural weaknesses at the military-civilian interface. The tension it identifies between acute pain management

and longer-term misuse risk is one this field must take seriously, alongside the evidence for structured pain management programmes as an effective intervention for our patients.

Devolution adds a further layer of complexity this report does not set out to examine in detail, but which practitioners employed in our devolved nations will recognise. Policy, commissioning and service design for veterans' healthcare differ across the four nations, which makes equity of provision difficult. Recommendation two: "Ensure equity of healthcare pathways for those injured irrespective of the type of injury sustained" within this report is a genuinely important undertaking for the field to take forward. Addressing it will require deliberate coordination and, in places, significant changes to the current system.

This report does not offer easy answers. What it offers is evidence, specific and actionable from those it concerns most directly.

I commend it to clinicians, commissioners and researchers working across this interface of military healthcare, and I hope it contributes to closing the gaps it identifies, so the veterans we serve can be helped to achieve the best outcomes for themselves and their families.

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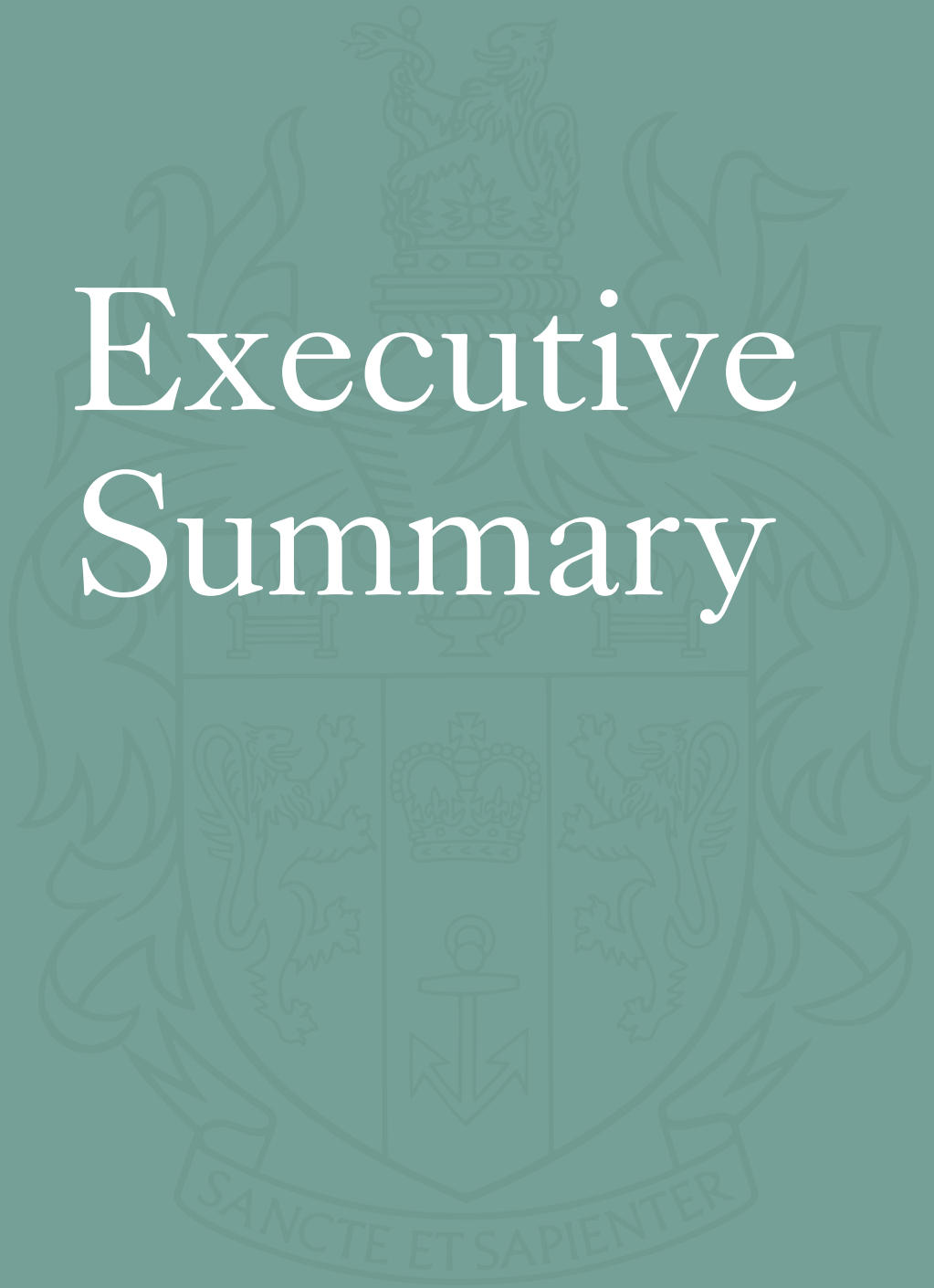
We wish to thank all the staff at both Headley Court and Stanford Hall who helped with the ADVANCE study. Your contribution has been invaluable. A full list of staff, past and present, can be found here: <https://www.advancestudydmrc.org.uk/staff-acknowledgements/>

We would also like to acknowledge our participants, who were open to sharing their experiences and stories with us. Our work would not be possible without them. Nor would our work be possible without the guidance, mentorship, supervision, and kindness provided by Professor Nicola T. Fear CBE (1969 – 2026).

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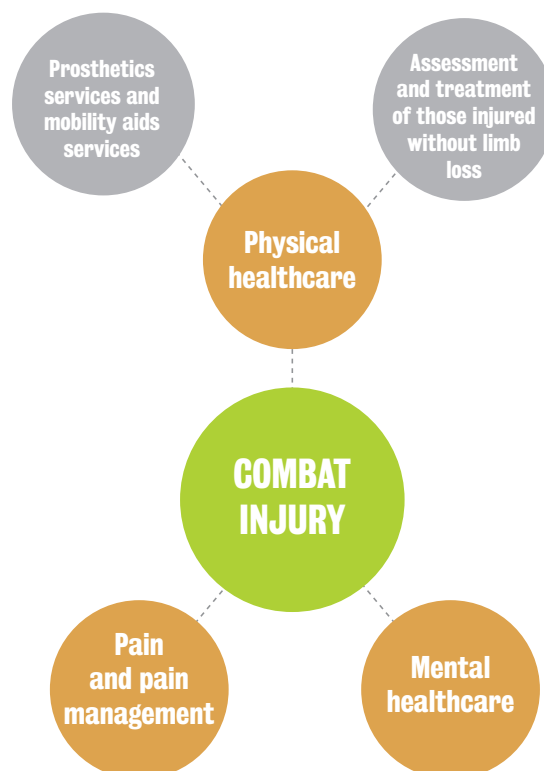
Executive Summary



The conflict in Afghanistan (2002-2014) resulted in hundreds of physical injuries to UK Armed Forces (UKAF) personnel, necessitating their aeromedical evacuation [1]. Some personnel sustained injuries which resulted in limb loss and others sustained injuries that did not result in limb loss. Using both quantitative and qualitative data from the main ADVANCE¹ study and the ADVANCE-INVEST study, this report investigates the physical and mental healthcare needs and experiences of combat injured veterans with and without limb loss.

The ADVANCE-INVEST study, a subsidiary of the ADVANCE study, is a mixed-methods investigation of transition experiences and outcomes for those with combat injuries arising from the conflict in Afghanistan, funded by Forces in Mind Trust. The study used questionnaire data from over 500 ex-Service personnel who had sustained combat injuries, as well as 28 in-depth interviews² regarding their perceptions and experiences of transition in the context of their injuries. Domains examined in this report are summarised in Figure 1.

Figure 1 Summary of domains in this report



¹The Armed Services Trauma and Rehabilitation Outcome (ADVANCE) study is a prospective cohort study examining the long-term health impact of sustaining a serious physical combat injury during deployment to Afghanistan (2002-2014; Operation HERRICK). For more information, please see the introduction.

²The Injured Veterans' Experiences of Transition (INVEST) study is a subsidiary of the core ADVANCE Study. It is a long-term project investigating the transitional experiences and outcomes of combat casualties transitioning from military to civilian life, comparing them with other transitioning personnel.

³Interviews were conducted with 12 participants injured with limb loss, 12 participants injured without limb loss and four participants medically discharged from the comparison group.

Our findings suggest that physical healthcare following physical combat injury was largely perceived to be excellent. However, those injured without limb loss raised concerns that a more thorough, ongoing assessment of their injuries and their longer-term consequences might have prevented delays in treatment and unnecessary worsening of their conditions. Those injured with limb loss reported that prosthetic services in civilian settings were sometimes less responsive than military services, resulting in a negative impact on wellbeing and social activities.

Some participants (including those with and without limb loss) reported ongoing issues with pain, which impacted their wellbeing. Furthermore, participants experienced different attitudes towards provision of pain relief medication between military and civilian healthcare providers. Participants suggested that provision of strong pain relief medication in military healthcare settings created risks of misuse

in the longer-term, whilst more conservative approaches in civilian healthcare settings could result in unresolved pain. Those participants who took part in pain management programmes in civilian settings found them to be an effective means of reducing the impact of chronic pain.

Participants reported concerns that mental health support service provision following physical injury was mixed. For those who did receive mental health support, continuity of care across military and civilian settings could be inconsistent and care pathways were sometimes perceived as inflexible. In civilian healthcare, participants sometimes reported long waiting times and services which was not well-tailored to their needs. Nonetheless, those who were able to access mental health care support (e.g. long-term talking therapy) found it to be valuable.

Based upon our findings, a summary of our recommendations and the primary audience they are aimed at is provided in Table 1.



Table 1 - Summary of recommendations

Recommendation	Primary audience
1 Use the frameworks of care provided by military physical healthcare providers following traumatic injury to enhance care in other contexts, such as civilian trauma care	Military and civilian healthcare service providers
2 Ensure equity of healthcare pathways for those injured irrespective of the type of injury sustained; particular care should be taken to ensure that those who sustain injuries which do not result in limb loss are as comprehensively assessed and treated as those who do	MOD/DMRC
3 Ensure consistent referral to, and rapid responses from, prosthetic and mobility aid services within civilian healthcare systems for those with mobility issues	Military and civilian prosthetics service providers
4 Generate evidence about the most effective treatments and management techniques for chronic pain in this population	Researchers
5 Promote pain management programmes for injured personnel with chronic pain	MOD, NHS and third sector support service providers
6 Identify those veterans with severe pain, assess their needs and ensure pain is managed effectively to enable them into appropriate employment	Third sector support service providers
7 Review how military mental healthcare support services can best support those with physical combat injuries, particularly regarding effective communication with personnel and continuity of care	Military healthcare service providers and researchers
8 Ensure continued engagement with injured Service leavers to facilitate continuity and consistency of mental healthcare upon leaving DMRC into civilian healthcare systems; and ensure they receive care in an appropriate setting	Military and civilian healthcare service providers
9 Investigate long-term mental health outcomes, interplay between neurological and psychological health, and mental health support service use by the injured veteran population	Researchers



Report



Introduction

The conflict in Afghanistan (2001-2014) resulted in unprecedented levels of UKAF personnel returning from combat with injuries that would previously have been unsurvivable [2]. These individuals required both substantial and immediate medical support for their traumatic injuries, as well as continuing care in the longer-term. The Armed Forces Covenant is a promise by the nation ensuring that those who serve or have served in the UKAF, and their families, are treated fairly. This includes ensuring that they face no disadvantage compared to other citizens in the provision of public services, and are given special consideration in some cases, particularly for those who have given the most, such as those injured in service. The Armed Forces Covenant Legal Duty is a legal obligation, introduced in November 2022, requiring specified public bodies to consider the principles of the Armed Forces Covenant when carrying out certain functions in healthcare, education, and housing [3]. The Armed Forces Covenant Legal Duty is being expanded through the Armed Forces Bill 2026 to legally bind all UK Government departments and devolved administrations, extending beyond the previous local-level requirements and increasing the scope to include social care, employment and welfare benefits [4]. This means that, when organisations providing these functions make decisions or develop policies in these areas, they must consciously consider the unique circumstances and potential disadvantages faced by the UKAF community [5]. Support is

provided by a myriad of providers, including the National Health Service (NHS) and charities. Over 100 Armed Forces charities have been identified as providing physical health support [6] and 76 Armed Forces charities have been identified as providing mental health support (of which fewer than 20 provide clinical mental health services) [7]. There is a general lack of research regarding the post-Service outcomes for Armed Forces leavers with physical combat injuries which is something the ArmeD serVices trAuma rehabilitatioN outCome (ADVANCE) study seeks to address [8].

The ADVANCE study is a prospective cohort study examining the long-term health consequences of sustaining a physical combat injury during deployment to Afghanistan (2002-2014) [8]. The study is a collaboration between King's College London, Imperial College London and the UK Ministry of Defence (MOD). The aims of the study are to identify adverse medical and psychosocial outcomes among combat casualties and to use the evidence generated to influence future care.

The ADVANCE-INVEST (ArmeD serVices trAuma rehabilitatioN outCome – Injured Veterans' ExperienceS of Transition) study was formed to investigate the transition from military to civilian life among participants in the ADVANCE study with a focus on employment, physical and mental health and wellbeing. The project comprises a statistical data analysis to examine transition outcomes and their potential

risk and protective factors, and a qualitative data analysis to understand how the experience of transition is affected by combat injury. It synthesises the data collected by the ADVANCE study and additionally collected qualitative data, in combination with a systematic review [9] to make holistic recommendations on how injured veterans and their family members manage these transition experiences.

This short report aims to provide an overview of how participants of the ADVANCE-INVEST study reflect on the specific physical and mental health needs and experiences of being combat injured veterans from the UKAF, drawing from quantitative and qualitative data generated by the study. Our findings are presented in four domains: physical healthcare; prosthetics and mobility aid services; pain and pain management; and mental healthcare.



Methods

The ADVANCE cohort was established to investigate the long-term physical and psychosocial outcomes of UKAF personnel who sustained a physical combat injury while on deployment in Afghanistan. The ADVANCE cohort comprises of an injured group and an uninjured comparison group. For additional details on the composition of the ADVANCE and ADVANCE-INVEST participant groups, derivation of quantitative variables, and qualitative methodology, please see the protocol [8] and

Appendix of this document. In brief, the injured group consists of 579 participants who sustained an injury whilst on deployment to Afghanistan (the “injured group”) and 566 frequency-matched participants who deployed to Afghanistan but did not sustain such injuries (the “comparison group”) [2]. Baseline data collection for the ADVANCE study began in 2015 and ended in 2020; the first wave of follow-up data was collected between May 2019 and August 2023, comprising 526 in the injured group and 527 in the comparison group.

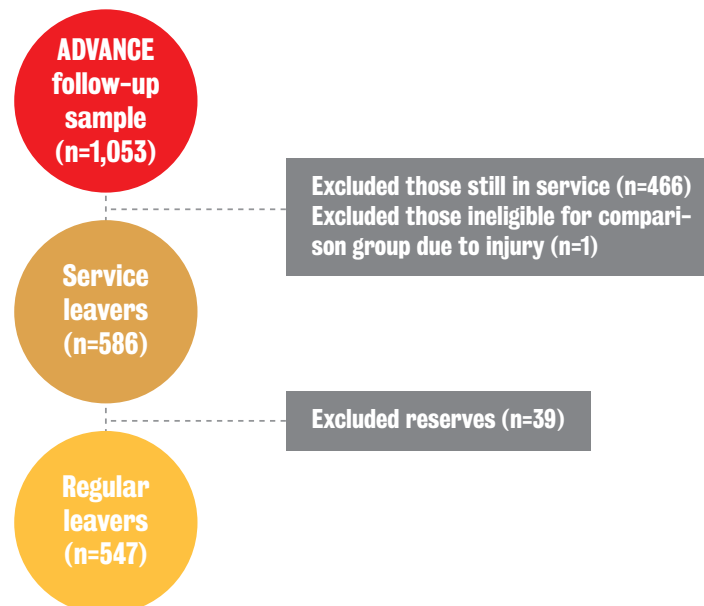


The ADVANCE-INVEST study commenced in 2022, to examine transition from military service to civilian life. The ADVANCE-INVEST sample included in this report comprises 547 ADVANCE participants who had left the UKAF (excluding those who served as a reserve⁷) at the point of follow-up data collection (Figure 2). One hundred and fifty-one of the ADVANCE-INVEST sample were from the comparison group, while 396 were from the injured group.

One key outcome of interest from a transition perspective was whether participants were in

paid employment in the civilian sector. Those who were in paid work were categorised as “employed”; and all other responses (seeking work, unable to work due to ill health, in full-time education, etc.) were categorised as “not economically engaged”. We excluded those who had retired from paid employment as the key outcome was re-employment in the civilian labour market and retirees have left the labour market. The final quantitative sub-sample used specifically for the employment-related analysis comprised 534 individuals.

Figure 2 – Deriving the sample used in this report

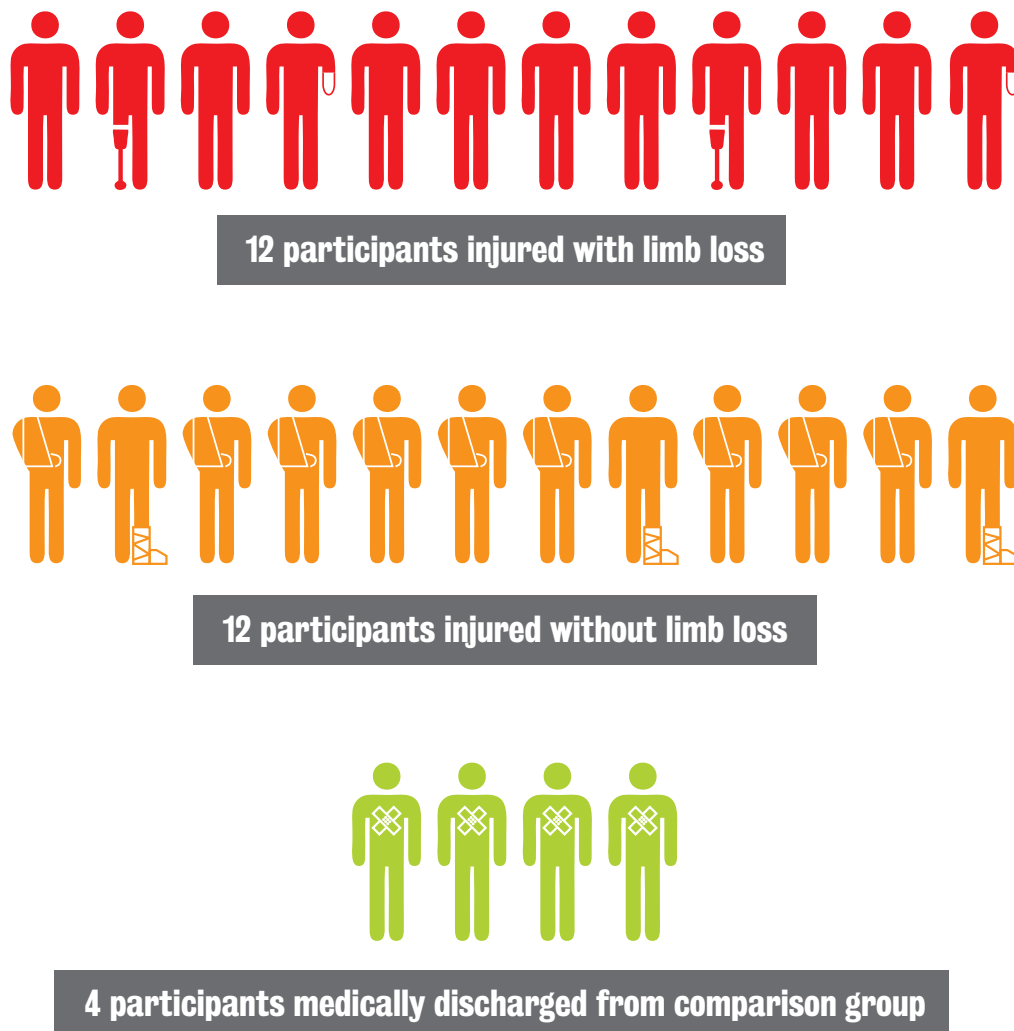


⁷Reserves were excluded as they will still be part of civilian culture and labour market during service and hence do not experience transition in the same way as those who served as regulars

To provide a holistic understanding of the transition experiences of this sample, a subset of ADVANCE-INVEST participants was randomly selected for in-depth, semi-structured qualitative interviews. Online interviews were conducted with 28 ADVANCE-INVEST participants: twelve ADVANCE-INVEST participants who

were injured and sustained limb loss; twelve ADVANCE-INVEST participants who were injured but did not sustain limb loss; and four ADVANCE-INVEST participants from the comparison group who were medically discharged (Figure 3).

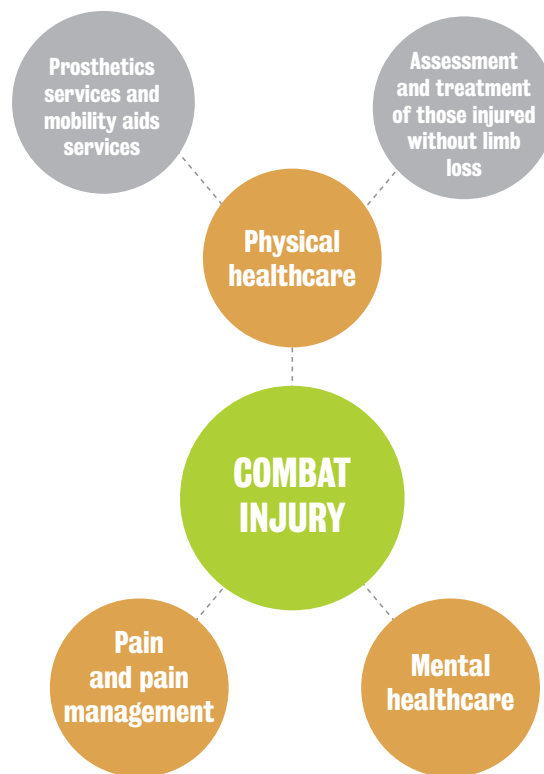
Figure 3 – Qualitative interview participant sample (n=28)



Interviews with participants were conducted between 3rd November 2022 and 21st February 2024, audio recordings were transcribed, redacted and pseudonyms were applied to all transcripts.

For more details on this sample, its recruitment, and methods used please see the Appendix. For an reminder of the domains examined in this report, please see Figure 4.

Figure 4 - Summary of domains in this report



Results

In this section, we draw attention to aspects of physical and mental healthcare support that participants experienced both when they were receiving care from within the military and after they had left, at the point they rejoined civilian society.

Physical healthcare

Perceptions of physical healthcare

Physical healthcare provided by the military was largely perceived in a very positive light. Many participants expressed gratitude for the speed, competence and efficacy of medical professionals from the point their injury occurred and during their treatment in field hospitals:

"[The care received in camp] was really good. I thought everything really from the very first moments of being wounded through to effectively being stabilised in camp, I thought everybody did a good job in testing circumstances." (James, injured without limb loss)

Participants treated in the UK in military wards of civilian hospitals, such as Queen Elizabeth Hospital Birmingham (QE) and Selly Oak Hospital, similarly expressed positive regard for the standard of care afforded to them:

"QE again, I remember everybody being really good. There was obviously a mixture of military and civilian nurses, doctors, staff etc. but I remember everybody going above and beyond." (George, injured without limb loss)

Furthermore, participants spoke of the high-quality care they received when they were patients in the Defence Medical Rehabilitation Centre (DMRC). It was felt that the efforts made by DMRC staff to restore participants' physical function were exemplary:

"In rehab they were fantastic. They couldn't do enough for you ... I don't think there is anything they could do differently, everything they did was perfect. If someone said to me, 'Right, you've got to stay in rehab for the rest of your life' I would have loved it. Rehab was fantastic! All my care in hospital and all my care in rehab was out of this world." (Grant, injured with limb loss)

Participants praised the multi-disciplinary teams who supported different aspects of their recovery at the DMRC in which they were treated:

"It's a brilliant level of care, really good people, they didn't seem to scrimp on anything. Everyone seemed to know what they were doing. Everyone was nice ... The physios and what-not, PTs, everybody is capable and competent. All the resources that you need, or that are possible to give you, they had them so, if you are willing to put the time and effort in, you can get out." (Henry, injured with limb loss)

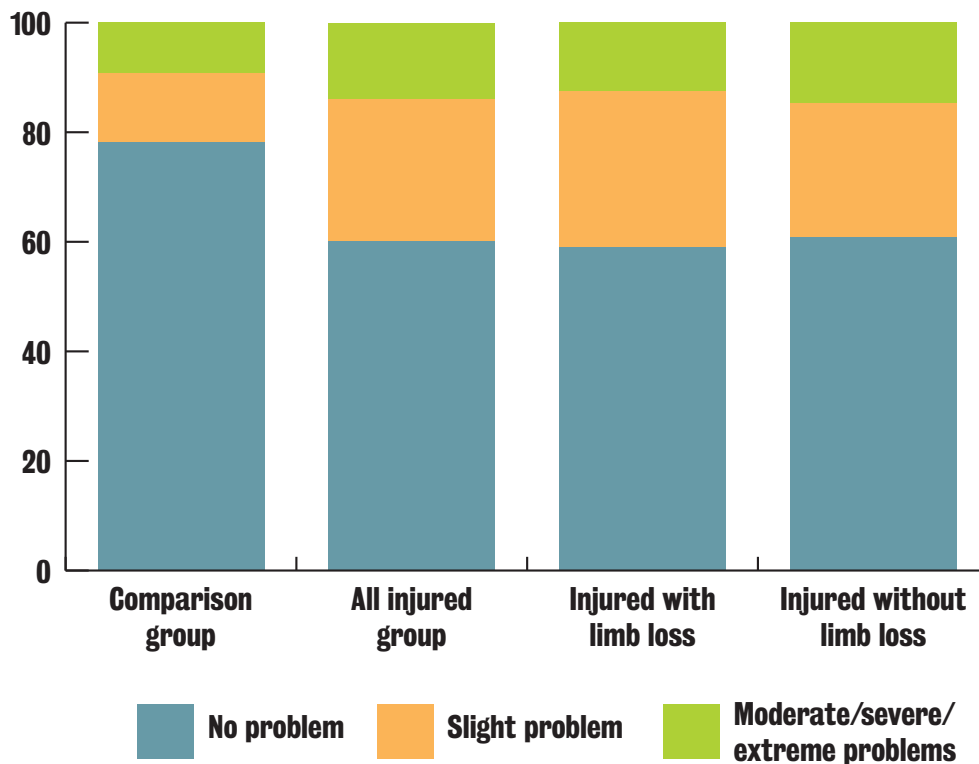
An additional benefit for participants rehabilitating at a DMRC was the fact that participants found it encouraging and sometimes inspirational to rehabilitate alongside their peers, who were also overcoming combat injuries:

“The one thing about rehab was the fact that you were surrounded by lots of other people that were in different stages of their own treatment and seeing people up and about on their legs was a real inspiration and almost a quiet inspiration and motivation ... and I suppose where they were in that recovery phase it helps you realise that things weren’t as bad as they looked really.” (Terry, injured with limb loss)

Assessment and treatment of those injured without limb loss

Despite excellent physical healthcare immediately following injury, some of those injured (both with and without limb loss) encountered challenges due to longer-term consequences of their injuries. This was reflected in the quantitative data which showed that those in the injured group reported higher levels of difficulties in usual activities than the uninjured comparison group, whether or not the participant had sustained limb loss (Figure 5), reflecting longer-term consequences and demands for physical healthcare.

Figure 5 – Difficulty in performing usual activities (from EuroQoL-5D-5L usual activity item) by injury group (n=543; four participants excluded due to missing data)



For some participants injured without limb loss, both the nature of their injuries and the exemplary physical healthcare they received could result in near total recovery following treatment:

"I woke up after the operation in hospital and I had a claw hand then I was worried. I thought, 'Oh God! Is it going to be like that forever?' but I was quite quickly reassured by the medical staff that as long as you do the exercises it will return, you will get mobility back in it. And they were right. I followed their instructions and it was OK. So, the system worked ... It had kind of recovered ... There was the odd twinge and things but it hadn't affected me." (Oliver, injured without limb loss)

However, some participants injured without limb loss felt they had not been comprehensively medically assessed, diagnosed or treated at the point they were injured and therefore they did not receive the appropriate treatment for their injuries thereafter:

"Initially, I was diagnosed with just a fractured wrist even though I kept telling them that I had neck pain, back pain and headaches. The end result, skipping forward a couple of years after I kept going to see the doctor to tell him there was something wrong with me and they told me there was nothing wrong with me ... Now I am having spine surgery to have ruptured vertebrae removed out of my neck ... I mean nobody sits on ... an 80kg bomb and walks away with no injuries do they!" (Harry, injured without limb loss)

In some cases, participants injured without limb loss felt that the seriousness of their injuries went unacknowledged by the military medical professionals from whom they had sought help:

"I remember seeing one physio who told me it was all in my head: a military one ... There's no way, I just think, yes, it doesn't sit right with me. It can't be in my head because otherwise ... I would still be able to walk." (Simon, injured without limb loss)

Some participants felt that such delays meant that too much time had elapsed for them to be effectively treated:

"They actually flew a doctor, a Professor, over ... I was so excited because I was told that, 'he is the best in the world, best neurosurgeon in the world'. He examined me, did all he had to do and he said, 'Look had you have come and seen me a year ago I could have fixed you but now I can't do much for you and you are probably going to be in this pain forever so, it's a case of managing it'. I was so angry because I had been going back and forth the doctor for well over a year at that point and had they listened to me in the beginning potentially I could have been sorted." (Harry, injured without limb loss)

Furthermore, some participants from those injured without limb loss who felt they had not been comprehensively assessed, diagnosed or treated expressed frustration that they were not prioritised by medical professionals to the same degree as those who had sustained limb loss:

"I've got a friend of mine who lost both his legs and he says, 'It's the best thing that ever happened to me was losing my legs' ... It's all the support; everything is laid on a plate for all of them but those with lesser injuries or those that don't want to speak up and say, 'I'm having a problem here' or whatever, they're just left as if it's just a normal, 'Well, right go and see your GP'." (Eddie, injured without limb loss)

Summary

The medical care received in response to participants' physical injuries was widely considered excellent by participants. From the point of injury, to treatment in field hospitals, to rehabilitative centres in the UK, participants largely expressed positive regard and enthusiasm for the high standard of care from military

medical providers. However, some personnel injured without limb loss perceived that they were not properly assessed, diagnosed or treated following injury; as a result, they perceived that their injuries remained unresolved, leading to chronic pain.

Recommendations

1. Military and civilian healthcare service providers: use the frameworks of care provided by military physical healthcare providers following traumatic injury to enhance care in other contexts, such as civilian trauma care.
2. MOD/DMRC: ensure equity of healthcare pathways for those injured irrespective of the type of injury sustained; particular care should be taken to ensure that those who sustain injuries which do not result in limb loss are as comprehensively assessed and treated as those who do.

Prosthetics services and mobility aids services

Perceptions of prosthetics services and mobility aids services

From the perspective of the affected participants, it was essential that prostheses were comfortable, functioned well and that the prosthetics services which adjusted their fittings were efficient and competent. Participants injured with limb loss spoke highly of the prosthetic services they had access to within military healthcare systems, as they were timely and effective:

"They are really, really quick to get you on to 'stubbies', get you onto the microprocessor knees... and then just get out and about on the programme that they've got to learn to walk on stairs and slopes and rough terrain and all that sort of stuff... My whole process was really quick because I think

it was only two years give or take from when I went from to rehab to when I got discharged."
(Joel, injured with limb loss)

Participants found that efficient support service provision was typically delivered by NHS providers who had a remit to deliver care specifically to veterans within civilian healthcare systems:

"It's like a veteran centre, it's still obviously a civvy hospital but it's got like extra funding for veterans and they have like a couple of staff members there that are just like sort of primarily focused on veterans care as well ... I still go there now, it's a really good system actually ... Honestly, if I rang up tomorrow morning and said I had a problem I'd have an appointment the same day. I've never had to wait for an appointment in my life with them ... they're really good, can't complain about it at all." (Ronan, injured with limb loss)

Some participants who engaged with civilian prosthetics services from facilities without specific veteran support reported that their needs were not met in a rapid or satisfactory way, which could result in a reduction in their physical function. This could negatively impact upon multiple aspects of post-Service life, such as their employment and parenting duties:

"The prosthetics process in a civilian setting is really slow and pretty rubbish, compare it to the military one ... I spent about nine months trying to get one socket made that fitted comfortably in... at the end of that nine months it was still rubbish, I couldn't use it at all ... The route through the NHS is completely inadequate for me ... Each time I have to go for an appointment it's at least half a day gone ... That's like seven or eight half days which I've had to take off work or make sure it's when kids are in nursery and stuff and I just don't have that kind of time to give up." (Gareth, injured with limb loss)

Participants experienced a variety of demands on returning home, such as partners needing support for medical conditions and parenting young children. In addition, participants had to find employment compatible with their changed bodies (or that they could fulfil despite the pain they were experiencing), and whilst finding new employment, they felt their resources (e.g. time) were stretched as they had to attend prosthetics or mobility aid appointments:

“There still needs to be a far better job around enduring supply of good maintaining people’s mobility effectively. It’s a little bit more of a slight bureaucracy to it really. At a clinical level I think they do as well as they can but it’s a pain to get there. The nearest centre for me is [location 1] and that’s with me living in [town]. There’s actually a clinic in [location 2] which I use because I combine it with visiting my family but either way really it takes at least a day to go there to get fittings, come back so it’s one of those things I think you’ve just got to, I’ve just got to suck up really despite the fact it being a frustration.” (James, injured without limb loss⁵)

For those with limb loss, stump health was crucial, as the interconnected systems (e.g. work and family commitments) within a participant’s life could be brought down by the pain and discomfort of a single ingrown hair. If limb loss-related conditions were not attended to quickly and effectively, then the delicately balanced demands in participants’ lives could quickly become unmanageable, resulting in negative consequences for all those involved:

“That’s one of the things that I’ve had a problem with since I’ve left is prosthetics. The prosthetics process in a civilian setting is really slow and pretty rubbish, yeah, compare it to the military one, so I had to at one point fight to be sent back

to, it had moved from [military rehabilitation unit] to ... [civilian rehabilitation unit], so I had to argue with my prosthetics centre that I needed to go back, I needed to be referred back to [military rehabilitation unit] because I needed my leg sorting out quickly because at the time I was working three different jobs and I had young children and, you know, I couldn’t be waiting six months for a new leg.” (Gareth, injured with limb loss)

Thus, well-fitting prostheses, and efficient prosthetic and mobility services which had quick turnaround, were critical in supporting participants’ wellbeing, aims and aspirations.

Motivational factors

Participants who had the potential (and the desire) to stand and walk were motivated to work hard to recover as fully as possible during their rehabilitation. There were certain life events, particularly those which involved feelings of pride (e.g. being able to walk down the aisle in marriage), which catalysed their intention to master their prostheses:

“That was one of my goals that, because we were planning to get married anyway, so I just got injured in between, so one of the goals was to walk down the aisle with no wheelchair or anything like that.” (Jack, injured with limb loss)

Fulfilment of the role of a father was a reoccurring motivation for participants to recover as fully as possible and accelerate the speed at which they could walk again. For example, Grant expressed how much the imagined future with his son spurred him on to embody a physical state that matched his ideas of parenthood:

“All I was thinking, is, ‘I’m doing this for my son’, I didn’t want him growing up thinking, ‘Oh, my dad, he can’t do nothing with me, he never does

⁵Although this participant was injured without limb loss, their injuries had resulted on loss of function in a lower limb

things with me'. I don't want to get older and then get back into my wheelchair. I'd like to be on my feet all the time, not sat down being a boring parent." (Grant, injured with limb loss)

Being able to walk represented a return to the body, life and freedom participants had enjoyed before they had sustained their injury, while wheelchairs by contrast were perceived by participants as symbolising a state of demise, which participants wanted to avoid:

"When I was in the wheelchair, I couldn't wait to get out of it. All I wanted was to get out of the chair... It was heaven getting out of the wheelchair... I don't want to get older and then get back into my wheelchair, I want to be on my feet all the time." (Grant, injured with limb loss)

Participants' views towards wheelchair use had, in some cases, changed from the period of their initial recovery. Some participants came to view the use of wheelchairs more pragmatically, as something which could provide occasional pockets of rest to maintain the stamina needed to live their busy lives and meet the demands of their new careers:

"I do know other lads who go, 'Oh no! I'm successful because I don't use a wheelchair.' OK. But then I'd ask how much you actually do in a day because really living to your full potential I could tell you now, you are going to want to take those legs off and you are going to want to sit in a wheelchair at the end of the day... All those tools again I think have played their part in getting into this rhythm and routine that I'm in now." (Joel, injured with limb loss)

For those participants who had no option but to use a wheelchair, wheelchairs lost their negative value and were seen as a helpful tool not a barrier to taking part in life:

"My wheelchair is a nifty wee wheelchair, really lightweight so I can get about in it really well... I used to do a lot of cross country and a lot of boxing before I got injured. So obviously I can't do that but there's also other sports you can do. Just because you are stuck in a wheelchair doesn't mean to say you can't do archery and you can't be on a bike. There's no need to say you can't do other stuff." (Luke, injured with limb loss)

Summary

Well-fitting prostheses and efficient prosthetic and mobility services, whether military- or civilian-provided, were critical in achieving participants' aims, aspirations and obligations at work and at home.

Recommendations

3. Military and civilian prosthetics and mobility aid service providers: ensure consistent referral to, and rapid responses from, prosthetic and mobility aid services within civilian healthcare systems for those with mobility issues.

Pain and pain management

Perceived differences in approaches to pain relief

Those injured with and without limb loss both reported higher levels of pain compared to the uninjured group (Figure 6).

Military healthcare systems provided acute pain relief which was perceived as appropriate in the short-term but participants reported concerns about risk of long-term use of medications. In the acute phase following injury, whilst in military healthcare systems, participants appreciated receiving ample pain relief:

“I had a cocktail to help me sleep and the nurses would quite often have to come in and pull a Fentanyl lollypop out of my mouth because I’d fallen asleep with it but I was really grateful for that.” (Gareth, injured with limb loss)

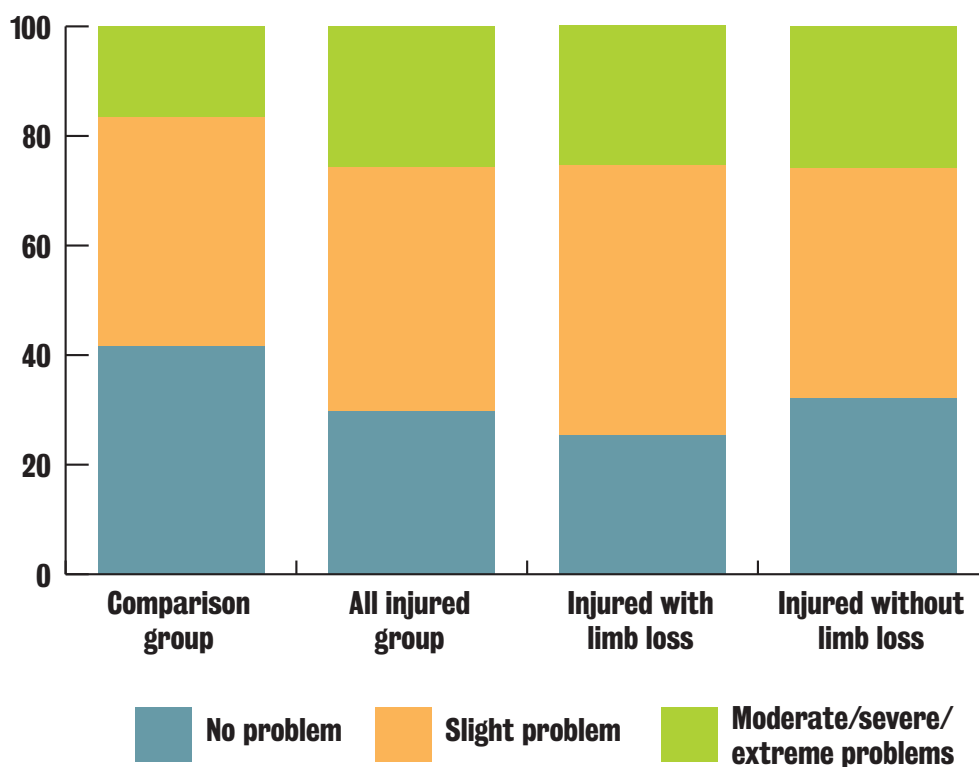
Some participants expressed concerns to rehabilitative staff about the consequences of long-term, high dosages of pain relief medication:

“I was at Headley Court on and off for six years and they’d left me on Tramadol for that long I was self-medicating and I was basically like a crack addict. I was taking ten to 12 tablets a day just to take the edge off the pain. I told them about it but they told me if it was working, to keep going.” (Harry, injured without limb loss)

Administration of pain-relief medication in military healthcare settings aided participants when they were in acute, severe pain; however, for some medications, such as opioids, this could create a risk of misuse when used to relieve chronic pain:

“I got quite hooked on Tramadol... for a few years... I guess when I started realising that when I was

Figure 6 – Problems with pain and discomfort (from EuroQoL-5D-5L pain/discomfort item) by injury group (n=543; four participants excluded due to missing data)



taking the meds I was sort of numbing m'self and I wasn't actually really there ... that's when I realised I needed to start coming off them, so I weaned off the Tramadol like quite quick actually, I just cold turkey'd it." (Damien, injured with limb loss)

The availability of pain relief medication in the acute phase of military healthcare differed to that which was prescribed within civilian healthcare settings. Some participants experienced discomfort as a result of the approach to pain relief within the NHS:

"Something I found since my injury is that when you go into hospital as a civilian on a civilian ward they're really conservative with the painkillers and just they will, you'll have to get a doctor to review it, it will take hours for you to get pain relief, whereas on that military ward you could have whatever you wanted and they would bring it to you straightaway ... The difference

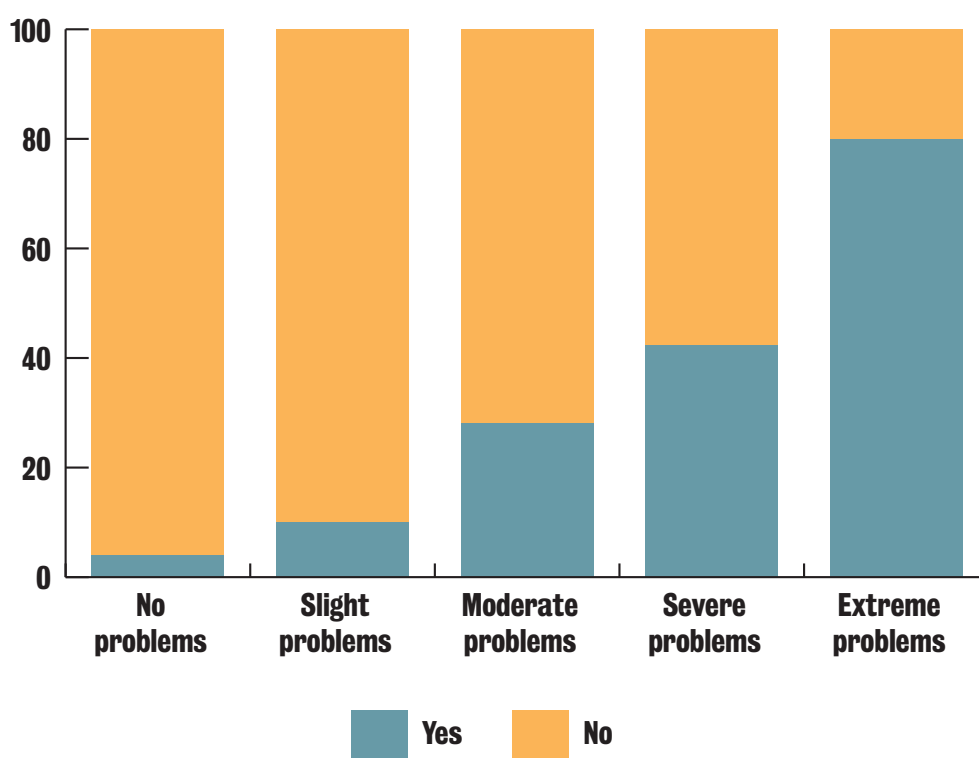
that makes to your comfort while you're in an uncomfortable position is enormous." (Gareth, injured with limb loss)

Participants used different coping strategies to manage their pain. Some participants expressed a preference for avoiding use of pharmaceuticals at all, for example:

"Over the last three years ... I was at the point where I didn't want to take painkillers, I wanted to be without it, tough it out." (Andy, injured with limb loss)

A preference for independence from pharmaceuticals is shown in Figure 7; among those with slight, moderate and severe pain (at an average of eight years post-injury) only a minority of participants were receiving pain relief medication or treatment for pain.

Figure 7 - Proportion of participants self-reporting being on pain medication/treatment by severity of problems related to pain (n=543; four participants excluded due to missing data)



Psychosocial consequences of chronic pain

Experiencing chronic pain negatively impacted participants' mood, relationships and engagement with their social networks:

"Socialising I can't go and do, yes, it is hard ... I think when I'm going through the pain during the day I am probably a bit more closed off just because I'm on my feet and it's just so painful and that's when I think we [he and his partner] spoke about me having this guard up because I'm just fighting this pain." (Simon, injured without limb loss)

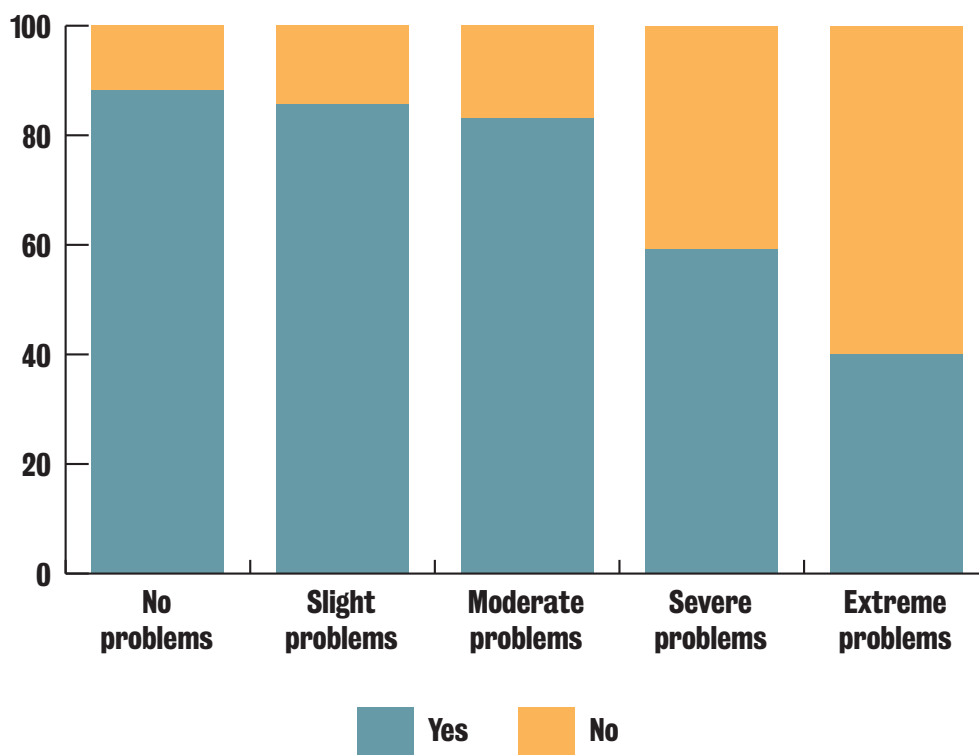
Participants reported that ongoing pain interfered with their capacity to work. Despite their young age and fitness prior to injury, the physical condition some participants found themselves in affected their occupational performance and led them to feel insecure about their future employment prospects:

"I will be sat with my legs crossed or with my arms crossed or I'll be sat on one bum cheek with it raised up and I'll have to turn away from you, so people think I'm guarded... But it's not me, I'm just uncomfortable or in pain or I'm fidgeting because I can't sit for long periods, my legs are filling up with blood ... I'll start grimacing a little bit ... That can sometimes have an effect or an impact especially in meetings or interviews where people pick up and take that as a negative." (Eddie, injured without limb loss)

The fact that participants experienced ongoing pain as interfering with their professional lives is reflected in the decreasing percentage in paid employment as participants reported higher levels of pain (Figure 8).

Some participants indicated that pain management programmes may be effective in mitigating the impact of chronic pain:

Figure 8 – Percentage in paid employment by pain level within the quantitative employment sample (n = 534)





"I did a pain course actually which actually really helped me understand my pain a lot more... It's all about management of that pain because ultimately, because your body is compensating for the amount of injuries you've got, there's no getting away from it... For me it gave me a much better ability to be able to live with it and at least live your life and do stuff." (Andy, injured with limb loss)

Summary

Provision of strong pain relief medication provided in the acute phase in military healthcare settings was appreciated by participants initially. In the long-term, prolonged use of pain relief medication could create a risk of over-dependency. In civilian healthcare, approaches to pain relief were reported as being more conservative. This led some participants to make use of their own coping strategies when dealing with chronic pain.

Recommendations

4. Researchers: generate evidence about the most effective treatments and management techniques for chronic pain in this population.
5. MOD, NHS and third sector support service providers: promote pain management programmes for injured personnel with chronic pain.
6. Third sector support service providers: identify those veterans with severe pain, assess their needs and ensure pain is managed effectively to enable them into appropriate employment.

Mental healthcare

Perceptions of military mental healthcare

While military physical healthcare was largely reported to be excellent, participants had mixed feelings about mental healthcare provided within military settings:

“I think the rehab that I went through was fantastic! Just the mental health, that’s the biggest issue with my whole journey for me.” (Damien, injured with limb loss)

Some participants felt that there was sufficient support for mental health concerns available within military settings, specifically within DMRCs:

“There were two mental health nurses always there just in case. So, if I had a problem mental health wise, they would have been jumping all over it.” (Luke, injured with limb loss)

Other participants indicated that their mental health received only superficial assessment in the initial stages of their rehabilitation, at which point they may not have been well-positioned to give accurate responses:

“My mental health assessment there was I spoke to a doctor once, he was a military doctor, maybe even a mental health nurse, what couldn’t have been a 10 minute conversation with him about how I was feeling, whilst I was full of testosterone and bravado and told him, ‘I was fine’ and then never had a conversation with anybody about mental health again until much further sort of down the line, when I was out of the Army... I think if I was to, to sort of sum up what I think could be better then, I think that the mental health aftercare, I think that that is insufficient.” (Ronan, injured with limb loss)

Some participants perceived issues regarding the lack of continuity of mental health support service provision within military settings. Staff turnover or absence meant that the therapeutic relationship

had difficulty being established and participants felt frustrated by having to repeat their experiences to new practitioners:

“A couple of years later I was then sent back with PTSD but it was to DCMH [town]. It initially started off very well, did the eight-week PTSD stabilisation course which was brilliant. They diagnosed me with complex PTSD but the treatment didn’t go anywhere because the mental health nurse that I had was constantly on compassionate leave. So, every time I thought I was getting somewhere I got passed to a different nurse, be it a civilian contractor or military and I’d have to go all the way back to the beginning and start again. So, I didn’t get anywhere.” (Harry, injured without limb loss)

Such a lack of continuity was felt by participants to be detrimental to the therapeutic bond and made them reluctant to seek further support for their mental ill health:

“I got put in with whoever I was seeing, m’ therapist, whoever I was going to go and see, I would see them, I would talk to them, we would start off, then they would leave and I would have to go and do it all over again with somebody else... I think I seen about three or four therapists within about six months. It’s quite hard talking about your issues and your problems and you find it really difficult to open up to someone, then when you open up to someone and then they go... it’s like reopening a wound constantly and this went on for years. It came to a point where I just stopped seeing everyone altogether.” (Damien, injured with limb loss)

Another issue identified with mental health support pathways was perceived inflexibility of the mental healthcare system. Some participants experienced linear provision of treatments which gave rise to an impression that military mental healthcare systems did not take into account the needs of the individual:

“‘They said you are not allowed to do EMDR until you’ve done CBT. You are not allowed to start CBT until you’ve done a trauma stabilisation course. You are not allowed to attend a trauma stabilisation course until ... It’s just like this step-by-step thing. You think, ‘Alright but what if CBT doesn’t work for me? Why can’t I just go straight to this one?’ And it’s very prescriptive... If you break your leg there’s a treatment process for it, if you’ve got an infection there’s a treatment for it ... It’s not the same for your head.” (George, injured without limb loss)

Mental health diagnoses were not always delivered or explained thoroughly which could give rise to negative feeling, potentially exacerbating symptoms:

“I didn’t realise I had PTSD and then I was just told, ‘Oh, by the way you’ve got PTSD’ and it was, ‘Have I?’ And it made us think about it more and I thought about it more and the more I thought about it the worse I got ... I didn’t think I had it until I was told I had it and then ... I sort of put m’self in this little shell and I got m’self into a darker, darker like place.” (Damien, injured with limb loss)



In some cases, participants perceived the mental health diagnoses that they had been given to be inappropriate:

"I don't have PTSD, I've never suffered from it, I don't have those blackouts, I don't have any of that. But it did feel to me at one point like it's almost like they think you are lying about what you are saying... and that you are trying to cover it up. I found that really frustrating." (Joel, injured with limb loss)

For some participants, the intersection between neurological and psychological injuries appeared to them to be overlooked by military healthcare professionals. This could reinforce the perception that visible injuries were seemingly prioritised by military healthcare professionals over invisible ones:

"I think it [rehabilitation] was very much focused on the physical trauma only and even though I'd had a significant head trauma I don't think much was dealt with regards to that, it was very much the physical... I don't remember there being anything to do with psychological and neurological assessment done at hospital. I think it's purely and simply focused on the physical trauma at that point, the obvious physical trauma at that stage." (Gaz, injured without limb loss)

Such issues relating to mental health support service provision should be considered in the context that some participants showed a propensity not to engage with mental healthcare, possibly due to stigmatised attitudes within the military:

"I think the biggest issue for the military is no-one really wants, when you are serving no-one really wants people to know [about mental health]. It sounds really weird doesn't it. But obviously you've got macho blokes in there, hard as nails, done this, done that. I know it's shifting more to not being not frowned upon but... People look at you different and all that sort of stuff. It's obviously getting away from that which is good." (Tom, injured with limb loss)

By contrast, a minority of participants felt that there was sufficient support for mental health concerns available within military settings, specifically within DMRCs:

"There were two mental health nurses always there just in case. So, if I had a problem mental health wise, they would have been jumping all over it." (Luke, injured with limb loss)

Perceptions of civilian mental healthcare

Some participants were able to receive specialised mental health care once they were veterans; as a consequence, they reported good mental health support provision within civilian systems, which was sometimes facilitated by appropriate referral from the Departments of Community Mental Health (DCMH):

"So, I see an NHS veterans' mental health team practitioner... he is phenomenal... I was referred to him by DCMH, that's the only good thing they've done." (Harry, injured without limb loss)

Some participants felt that the mental health support provision they had received via the NHS was beneficial, in particular because it gave them an opportunity to air their experiences with a practitioner who did not have a military background:

"Once you got the referral through it was quite fast. And then I was in there all the time. They [the NHS] did a couple of things like EMDR therapy and then they did a speaking therapy one as well. What I found was just talking to someone that doesn't know you, is not ex-Forces, that helped, rather than all the therapy. Just getting all your problems out there... Still there now... I mean my mental health is great, it's been great for years. So, it's not I'm there all the time it's just where I go in for a chat and stuff like that every couple of months." (John, medically discharged from the comparison group)

By contrast, some participants who sought mental healthcare from the NHS reported long wait times, care which was not tailored to their experiences and needs, and sub-optimal therapeutic settings due to a perceived inappropriate mix of members within the therapeutic group:

“Every time you go and you say, you go to the GP and you say, ‘Right! I’m struggling with this’ and they’re like, ‘Yes we’ll get on it’ ... Then they don’t do nowt for months ... They tried putting me in a group one first which was ridiculous ... it’s a difficult environment to put somebody like me in a group session with your 17-year-old with pink hair who has got agoraphobia ... I’m not saying that they don’t need help I’m just saying that putting me in the group is the wrong environment ... So obviously that fails, that gets your back up, then you are sat around waiting another three months doing nothing for another appointment ... Seven months later somebody rings you and says you’ve got an appointment - it’s ridiculous ... I got put on this EMDR waiting list again, still waiting, still not started it.” (George, injured without limb loss)

Summary

Military mental healthcare was sometimes perceived as being unavailable, inflexible in terms of treatment pathways and not providing continuity of care to patients, particularly regarding the rotation of military therapists. Some participants reported good mental healthcare within civilian systems, though others suggested the therapeutic settings on the NHS were not suitable for their needs.

Recommendations

7. Military healthcare service providers and researchers: review how military mental healthcare support services can best support those with physical combat injuries, particularly regarding effective communication with personnel and continuity of care.
8. Military and civilian healthcare service providers: ensure continued engagement with injured Service leavers to facilitate continuity and consistency of mental healthcare upon leaving DMRC into civilian healthcare systems; and ensure they receive care in an appropriate setting.
9. Researchers: investigate long-term mental health outcomes, interplay between neurological and psychological health, and mental health support service use by the injured veteran population.

Discussion

Prior research on the topic of health and wellbeing outcomes for Service leavers is sparse, with a lack of evidence regarding healthcare provision following discharge for this population [8]. This study found that those injured in combat perceived the physical healthcare provided by the military to be exemplary in the initial stages post-injury. However, as they progressed through the care pathway and their transition to civilian life, needs and issues diverged for those with and without limb loss.

Some of those injured without limb loss were concerned that they may not have been fully assessed and, in some cases, felt that the health issues they presented with were not taken seriously or were met with scepticism by those responsible for their medical care. A more thorough, ongoing assessment of those

injured without limb loss and their longer-term consequences might prevent delays in treatment and unnecessary worsening of their conditions. The fact that these personnel had less visible injuries than those with limb loss may have contributed to why their healthcare pathways were less established.

Those with limb loss faced a different issue. The prostheses they received played a substantial role in their recovery, but some ran into difficulties once they were reliant on prosthetic support provided by civilian healthcare systems. Those who leave the Armed Forces with a need for prosthetic support are transferred to civilian centres, with the individual having the option to choose which provider to use (whether a centre of excellence or a closer, more convenient provider).



Furthermore, they have the option to change providers as they wish at any point. Nonetheless, some participants found that prosthetic services were less responsive in civilian settings, which negatively impacted on degree of mobility, wellbeing, family and work life.

Both those injured with and without limb loss reported ongoing issues with pain, which impacted their psychological and social wellbeing. While they had timely access to strong pain relief medication in the acute period following injury, they found pain relief medication less easy to access in civilian healthcare settings, which some perceived as insufficient for their needs. Similarly, they felt civilian healthcare systems needed to be more proactive in cases where individuals may need to be helped to wean themselves off a strong prior regimen. As a result, we recommend that both military and civilian healthcare practitioners need to be cognisant of the different approaches they have to pain relief and to proactively mitigate risk of dependency amongst their beneficiaries.

Those who undertook pain management programmes found them to be an effective means of reducing the impact of chronic pain (for example, those run by King Edward VII's Hospital [10] and Help for Heroes [11]). It should be noted that in recent years there have been changes in pain management to take into account physiological and psychological factors; for example, the National Institute for Health and Care Excellence (NICE) guidelines for chronic pain were updated in 2021 to take a person-centric approach to care for chronic pain, specifically including discussing physical and psychological wellbeing and employment difficulties [12]. Thus, some changes in policy and practice may not be reflected in the evidence presented in this report.

Mental health support was identified as an issue in both military and civilian healthcare systems.

Whilst participants were receiving excellent support for their injuries from military physical healthcare services, and participants acknowledged the availability of mental health support, concerns were expressed regarding how and when mental health care was provided. For those who received military mental healthcare support, some reported issues with continuity of care and the need to keep repeating their story, to the point that they started to disengage. Another concern was that their care pathway appeared to them to be inflexible, or their diagnosis did not align with their perceptions or expectations. These findings suggest that clearer communication regarding recommended treatments, how continuity of care is managed, and management of expectations during care, could be beneficial. Once in civilian healthcare systems, participants sometimes reported long wait times and services or therapeutic settings which were not well-tailored to their needs; nonetheless, those who were able to receive specialised mental health care found it valuable.

Overall, we found that those injured with and without limb loss faced different challenges to resolving their injuries as effectively as could be expected (depending on the nature of those injuries). However, both groups ultimately had issues regarding ongoing pain and daily functioning. In some cases, differing perceptions of the quality of healthcare reflected the differences that exist between military and civilian healthcare systems (e.g. in terms of approach to medical philosophy). This may be mitigated by aligning medical and civilian healthcare pathways and approaches and ensuring adequate communication when patients transition from one to the other. With the National Rehabilitation Centre⁶ to operate alongside DMRC Stanford Hall, hopefully the dovetailing of best practices can be pursued.

⁶<https://nationalrehabilitationcentre.nhs.uk>

Summary

- The medical care received in response to participants' physical injuries was widely considered excellent by participants. From the point of injury, to treatment in field hospitals, to rehabilitative centres in the UK, participants largely expressed positive regard for the high standard of care from military medical responders.
- Some personnel injured without limb loss perceived that they were not fully assessed and treated following injury. Consequently, such participants felt their experiences were not validated, and at worst met with scepticism, and as a result their injuries remained unresolved, leading to chronic pain.
- Well-fitting prostheses, mobility aids and efficient prosthetic and mobility aid services, were critical in achieving participants' aims, aspirations and obligations at work and at home. Stump health care was similarly essential in ensuring unnecessary deterioration.
- Timely provision of strong pain relief medication provided in the acute phase in military healthcare settings was appreciated by participants initially. In the long-term, prolonged use of strong pain relief medication could create a risk of dependency.
- In civilian healthcare settings, pain relief approaches were perceived as more conservative with regard to pain relief medication. This led some participants to make use of their own coping strategies when dealing with chronic pain.
- Healthcare services following injury, particularly those in military healthcare settings, may not be providing mental health support in the most optimal way. Services were sometimes criticised for being superficial with assessments, inflexible in treatment pathways, and not providing continuity of care (especially regarding rotation of therapists, to avoid continual retelling of patients' stories). Better communication and management of expectations could improve mental healthcare; sensitivity to the potentially negative impact of applying mental health diagnoses is warranted.
- Appropriate referral pathways regarding mental health from military healthcare to civilian specialist veterans' services could maximise benefit to those in need.

Recommendations

Table 1 - Summary of recommendations

Recommendation	Primary audience
1 Use the frameworks of care provided by military physical healthcare providers following traumatic injury to enhance care in other contexts, such as civilian trauma care	Military and civilian healthcare service providers
2 Ensure equity of healthcare pathways for those injured irrespective of the type of injury sustained; particular care should be taken to ensure that those who sustain injuries which do not result in limb loss are as comprehensively assessed and treated as those who do	MOD/DMRC
3 Ensure consistent referral to, and rapid responses from, prosthetic and mobility aid services within civilian healthcare systems for those with mobility issues	Military and civilian prosthetics service providers
4 Generate evidence about the most effective treatments and management techniques for chronic pain in this population	Researchers
5 Promote pain management programmes for injured personnel with chronic pain	MOD, NHS and third sector support service providers
6 Identify those veterans with severe pain, assess their needs and ensure pain is managed effectively to enable them into appropriate employment	Third sector support service providers
7 Review how military mental healthcare support services can best support those with physical combat injuries, particularly regarding effective communication with personnel and continuity of care	Military healthcare service providers and researchers
8 Ensure continued engagement with injured Service leavers to facilitate continuity and consistency of mental healthcare upon leaving DMRC into civilian healthcare systems; and ensure they receive care in an appropriate setting	Military and civilian healthcare service providers
9 Investigate long-term mental health outcomes, interplay between neurological and psychological health, and mental health support service use by the injured veteran population	Researchers

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Appendix

Methodology in detail

This report uses data from the ADVANCE cohort combined with a series of semi-structured interviews. This Appendix outlines the ADVANCE cohort, the ADVANCE-INVEST substudy, and the methodology applied to the findings in this

report; this methodological Appendix is specific and limited to the topic of this report and hence restricted to the population and methods used in this context (as opposed to the broader ADVANCE or ADVANCE-INVEST studies).

The ADVANCE cohort

The ADVANCE cohort was established to investigate the long-term physical and psychosocial outcomes of UKAF personnel who sustained physical combat injury while on deployment in Afghanistan, and an uninjured comparison group. Injured For full details, please see the ADVANCE cohort profile paper [8].

Study population

The ADVANCE cohort comprises of an injured cohort who sustained their injury in Afghanistan. Individuals were recruited from a sample of UKAF personnel who were deployed to Afghanistan between 2002 and 2014 and had physical combat injuries, on the basis of records provided by the UK Ministry of Defence. Eligibility criteria for the injured group were: sustaining a physical combat injury while on deployment to Afghanistan; aeromedical evacuation as a result of the injury, resulting in admission to a UK hospital; and no history of cardiovascular, liver, or renal disease before injury.

Uninjured personnel were recruited as a comparison group, consisting of individuals who were frequency-matched to the injured cohort on their age, rank, regiment, deployment during specific deployment periods (based on

frequency of deployment periods from which the injured group sustained their injuries), and role on deployment. Eligibility criteria for the uninjured group were deployment to Afghanistan and sustaining no physical combat injuries while on deployment; and no history of cardiovascular, liver, or renal disease before deployment. All participants are male, due to the small number of UKAF women sustaining combat injuries (women were only allowed to take on front-line combat roles from 2018 [13], at which point most combat action had ended for the UKAF in Afghanistan). The sample size was based on a sample size calculation for the primary hypothesis of the ADVANCE study using a primary composite cardiovascular disease endpoint.

Details of potential participants from both groups and sampling characteristics were extracted from a combination of data sources, including the initial Notification of Casualty System (NOTICAS), the Defence Patient Tracking System, the Defence Medical Information Capability Programme, the Complex Trauma Database of the Defence Medical Rehabilitation Centre, the DRMC Prosthetic database, the UK Joint Theatre Trauma Registry, and the Joint Personnel Administration database.

Recruitment and data collection

Between 5th August 2015, and 28th August 2020, participants were recruited to the ADVANCE study through postal, email, and telephone invitations. For those who had left the military, efforts to trace them were made through electoral roll data, social media, and advertising through military charities.

Two thousand, three hundred and twenty-nine participants (1163 injured and 1166 uninjured) were invited to a study day at the DMRC Headley Court (Surrey, UK) (between 5th August 2015 and 30th August 2018) or at DMRC Stanford Hall (Leicestershire, UK; from 9th October 2018 onwards).

The study day involved trained researchers carrying out a comprehensive health investigation, including assessment of objective health measures (cardiovascular, respiratory, audiological, and musculoskeletal tests), a clinical interview with

a research nurse (sociodemographic information and personal and family medical histories), and self-completion of participant questionnaires (musculoskeletal functioning, mental health, occupational history, and drug use). Participants provided informed consent prior to participation. Data were stored securely by the ADVANCE data team, and an anonymised subset was provided to individual researchers following a data access request process, providing only those variables necessary for their individual analysis.

Response rate

Adjusted response rates at baseline (excluding those who had died or had no available contact details) were 59.6% and 56.3% for the injured and the uninjured groups, respectively; the final sample consisted of 579 participants in the injured group and 566 participants in the comparison group [2].

The ADVANCE-INVEST substudy

The ADVANCE-INVEST substudy commenced in 2022, to examine transition from military service to civilian life for those in the ADVANCE study. This substudy aimed to identify factors facilitate good transition outcomes (in terms of health, well-being, and economic stability) as well as identifying factors associated with poor outcomes. These factors include the initial situation of the transitioning individual (including demographics, military and deployment-related experiences, service-related injury, and other health factors). By utilising a mixed-methods approach and considering both the situation of the individual and the resettlement, health-related, and other support services provided to them, recommendations will be made to best support for transitioning individuals (particularly battlefield casualties and those with service-

related disability) from the perspectives of policy, practice, and service delivery.

Study population

Participants from the main ADVANCE study were included in the ADVANCE-INVEST study if they had left the military (in order to be eligible for employment in the civilian sector), thus excluding 610 of the original sample who were still serving in the UKAF at baseline. The ADVANCE-INVEST sample included in this report comprises 547 ADVANCE participants who had left the UKAF (excluding those who served as a reserve⁷) at the point of follow-up data collection (Figure 2): one hundred and fifty-one of the ADVANCE-INVEST sample were from the comparison group, while 396 were from the injured group.

⁷Reserves were excluded as they will still be part of civilian culture and labour market during service, and hence do not experience transition in the same way as those who served as regulars.

ADVANCE-INVEST participant demographics

Within the ADVANCE-INVEST sample, most participants were from the Army (82%), held a lower rank when in Service (45% Private and Lance Corporal and equivalents), had a combat role (86%), and had sustained a blast injury. The mean age at time of baseline data collection was 34 years; on average, participants were sampled 8 years post-injury for the injured group) (Figure 3). There were no significant differences with regard to rank, Service arm, role, or age between the comparison group, those injured with limb loss, and those injured without limb loss; the only exception was that those injured with limb loss were slightly younger (an average of 2.2 years younger than the comparison group).

Military factors

Rank was determined from data at time of sampling, coded as a proxy for socioeconomic status, and categorised as Junior Non-commissioned Officer/Other rank (NATO OR2-OR4), Senior Non-Commissioned Officer rank (NATO OR5- OR9), and Officer rank (NATO OF1-OF6) [14]. Service arm was divided into Naval Services (including Royal Marines), Army, and Royal Air Force (RAF).

“Limb loss” was defined as having an amputation above, below, or through the knee for one or more lower limbs, or above or below the elbow for one or more upper limbs. Isolated partial amputations (e.g. partial foot, partial hand, finger, or toe) were not included in the limb loss group but instead placed in the injured without limb loss group; this is because the original hypotheses of the ADVANCE study were based on risk of cardiovascular disease (CVD); and partial amputations are less likely to impact CVD compared to limb amputations.

Outcome measures

Pain and mobility: These measures were taken from the five-level EuroQol EQ-5D questionnaire (EQ-5D-5L), a standardised measure of health

status [15, 16]. The measure assesses health-related quality of life across dimensions of mobility, self-care, usual activities, pain/discomfort and anxiety/depression symptoms. The EQ-5D-5L has been recommended in the UK NHS as a patient-reported outcome measure to act as an indicator of HRQOL/successful outcome following major trauma [17].

The measure asks respondents to endorse the response which best described their health that day. Pain responses were “I have no pain or discomfort”, “I have slight pain or discomfort”, “I have moderate pain or discomfort”, “I have severe pain or discomfort” and “I have extreme pain or discomfort”. These were combined into two categories: no/slight discomfort and moderate-extreme discomfort. Mobility responses were “I have no problems in walking about”, “I have slight problems in walking about”, “I have moderate problems in walking about”, “I have severe problems walking about” and “I am unable to walk about”. These were combined into two categories: no problems and slight problems-unable to walk about. Due to the distribution of these variables in this sample, we used “no problems” compared with any problems for mobility, but no/light pain compared with moderate or worse pain when categorising the pain measure due to small numbers.

Employment status: We used self-reported data from the baseline questionnaire undertaken by participants, who were asked the stem question “Are you currently:”, with a range of possible responses. Those who were in paid work were categorised as “employed”; and all other responses (seeking work, unable to work due to ill health, in full-time education, etc.) were categorised as “not economically engaged”. We excluded those who had retired from paid employment as the key outcome was re-employment in the civilian labour market and retirees have left the labour market. The final quantitative sample used specifically for the employment-related analysis comprised 534 individuals.

Missing data

Data were processed using the statistical software package Stata version 17.0 (25). Missing values for variables included in these analyses were uncommon; less than 1.5% for any variable (n=0

for injury status, n=1 (0.2%) for employment status, n=6 (1.3%) for mobility, and n=4 (0.8%) for pain); hence data are presented on a complete case basis.

The ADVANCE-INVEST qualitative component

Research questions

The qualitative inquiry had one overarching research question: how is the experience of transition – the manoeuvre from military to civilian systems and supports – affected by battlefield injury?

There were three further questions which shaped data collection and analysis:

- 1) How have participants' injuries affected their sense of self? [Participants' internal world]
- 2) How have participants' injuries impacted their transition and their ability to engage with, and adapt to, the external world? [Participants' external world]
- 3) What helped and hindered participants' experiences of transition whilst being injured? [Recommendations and solutions]

Qualitative sampling and recruitment procedures

The sample to be interviewed for qualitative analysis was formed by randomly selecting a subset of ADVANCE-INVEST participants from each injury group (injured with limb loss; injured without limb loss) and from those medically discharged from the comparison group⁸. Random selection was performed by providing the data team with the numbers of participants desired in each of three groups of participants; potential interviewees were then randomly selected from those within each group.

Initially, participants were invited to take part by telephone by a member of the main

ADVANCE study. If they could not be reached by telephone, subsequent attempts were made by email, or by post if we did not hold a valid personal email address. This invitation was delivered by the main ADVANCE study team, so that personal data was not shared with ADVANCE-INVEST. Unless participants indicated that they do not wish to participate, up to two reminder invitations were sent to non-responders. Those who were interested in participating were provided with full written details (i.e. a consent form and participant information sheet). This process was performed iteratively by batches of five to 10 within each group, until the desired total within each group was reached.

Interview schedule

The interview schedule was drafted by a member of the ADVANCE-INVEST research team (AV), with additional discussion among the team members (NTF, LP and HB), based on the research question and pre-existing knowledge regarding this population. The interview schedule was piloted with other members of the wider research team and the study PPIE group (including serving personnel of the UKAF) and amended accordingly.

For participants who had sustained injuries, the interview schedule was designed to understand the role that their injury played in their life since leaving the military. In order to generate a holistic

⁸Some ADVANCE participants who formed part of the comparison group were medically discharged from the military for other reasons (e.g. mental health difficulties); this group was selected for qualitative interview primarily to obtain data regarding the medical discharge process, which was the subject of the first short report in this series

understanding, and to align with the timeline participants provided, the interview schedule started by asking participants about their injury and how it was sustained. It proceeded to ask about the participant's experience of the military's rehabilitative systems; the medical discharge process; post-service life and employment; mental health and associated support; coping strategies; home life; relational changes; COVID-19; the withdrawal from Afghanistan; their future; and support recommendations.

For participants who had been medically discharged for other reasons, the interview schedule followed the same format as that used for participants who had sustained injuries but omitted topics that were relevant to those who had sustained injuries, such as the point of injury.

Interview procedure

Interviews were conducted with 28 ADVANCE-INVEST participants: twelve ADVANCE-INVEST participants who were injured and sustained limb loss; twelve ADVANCE-INVEST participants who were injured but did not sustain limb loss; and four ADVANCE-INVEST participants from the comparison group who were medically discharged. Individual interviews with participants were conducted online using Microsoft Teams between 3rd November 2022 and 21st February 2024, by AV.

Qualitative analysis

Audio files were sent to an independent transcriber (who had signed a contract of confidentiality) who returned redacted transcripts to the research team. Audio files were relistened to in order for the researcher (AV) to re-familiarise themselves with the data. Interview data were analysed using Reflexive Thematic Analysis [18, 19], a common method for qualitative analysis. Reflexive Thematic Analysis was used due to its accessibility and systematic procedures for generating codes and

themes from qualitative data; NVIVO software was used to facilitate the analysis process. Interview transcripts were imported to NVIVO, read and reread, with codes noted throughout the interview dataset (AV). This process was carried out iteratively, with codes being grouped into themes, and themes being structured and restructured as the analysis progressed (AV). The researcher kept reflective notes to enable consideration of how their own experiences and preconceptions might influence their interpretation of the data (AV). This report presents participants' quotes that are indicative of the themes identified.

Limitations

Participants were drawn from those who were physically injured in combat and aeromedically evacuated from the conflict in Afghanistan, and a matched uninjured comparison group. Therefore, the participants in this study are not necessarily representative of the general injured population of the UKAF, nor other populations with physical injuries or limb loss. Due to a small number of participants with upper limb loss, most of whom also had lower-limb loss, these analyses did not discriminate between upper and lower limb loss.

We lacked have any quantitative variables directly related to the topics of this study (i.e. participant's views of physical and mental healthcare needs) and thus took a conservative approach to the quantitative strategy by reporting only descriptive statistics rather than undertaking more complex analysis.

Ethical approval

Full ethical approval for the ADVANCE study was granted from the UK Ministry of Defence Research Ethics Committee (MODREC; protocol No:357/PPE/12).

