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Factors affecting the implementation of a vocational rehabilitation intervention following major trauma: understanding the context for delivery

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1 **Factors affecting the implementation of a vocational rehabilitation intervention**

2 **following major trauma: understanding the context for delivery**

3

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1

1 **Factors affecting the implementation of a vocational rehabilitation intervention**

2 **following major trauma: Understanding the context for delivery**

3

4 **Objectives:** This study aimed to: 1) understand the context for delivering a trauma vocational

5 rehabilitation (VR) intervention; 2) identify potential barriers and enablers to the

6 implementation of a VR intervention post-trauma.

7 **Design:** Qualitative study. Data were collected in person or via phone using different

8 methods: 38 semi-structured interviews, 11 informal 'walk-through care pathways' interviews,

9 5 focus groups (n=25), 5 co-design workshops (n=43). Data were thematically analysed

10 using the framework approach, informed by the Consolidated Framework for Implementation

11 Research (CFIR).

12 **Setting:** Stakeholders recruited across 5 UK major trauma networks.

13 **Participants:** A variety of stakeholders were recruited (n=117) including trauma survivors,

14 rehabilitation physicians, therapists, psychologists, trauma coordinators and general

15 practitioners. We recruited 32 service users (trauma survivors or carers) and 85 service

16 providers.

17 **Results:** There were several issues associated with implementing a trauma VR intervention

18 including: culture within healthcare/employing organisations; extent to which healthcare

19 systems were networked with other organisations; poor transition between different

20 organisations; failure to recognise VR as a priority; external policies and funding. Some

21 barriers were typical implementation issues (e.g., funding, policies, openness to change).

22 This study further highlighted the challenges associated with implementing a complex

23 intervention like VR (e.g. inadequate networking/communication, poor service provision,

24 perceived VR priority). Our intervention was developed to overcome these barriers through

25 adapting a therapist training package, and by providing early contact with patient/employer,

26 a psychological component alongside occupational therapy, case coordination/central point

27 of contact, and support crossing sector boundaries (e.g., between

28 health/employment/welfare).

29 **Conclusions:** Findings informed the implementation of our VR intervention within the

30 complex trauma pathway. Although we understand how to embed it within this context, the

31 success of its implementation needs to be measured as part of a process evaluation in a

32 future trial.

33

34

35

2

1 **Strengths and limitations of this study**

2 • This study provides new evidence to support the implementation of a vocational

3 rehabilitation intervention in the trauma population, presenting the views of 117 key

4 stakeholders.

5 • Recruitment of a diverse sample of service users and providers across different NHS

6 sites and areas of the UK, providing a broad perspective on the factors affecting

7 implementation.

8 • Use of a range of methodologies enabling in-depth discussion with key stakeholders.

9 • Unable to recruit employers to interviews or focus groups, thus the employer

10 perspective is not presented.

11

3

1   **1. Introduction**

2   Traumatic injuries are particularly problematic in working age adults, with road traffic injuries

3   being one of the highest causes of death among 15-49 year olds[1]. Survival rates for traumatic

4   injuries have improved[2], increasing the number of working age adults living with the long-

5   term effects of injuries. These include physical and psychological problems, mental health

6   conditions or hidden disabilities (e.g., urological/cognitive problems), which affect ability to

7   return-to-work (RTW)[3-10]. Injured patients may benefit from RTW support addressing physical

8   and psychological needs. However, provision of RTW support, known as vocational

9   rehabilitation (VR), is inconsistent across the UK[11-13] and known issues (e.g., poor

10   communication between acute/community care, long waiting lists) in the major trauma

11   pathway make access to VR and psychological support challenging[11].

12

13   VR is a complex intervention[14], and requires the coordination of multiple systems, across

14   health, social care, and employers. Complex interventions are difficult to evaluate in clinical

15   trials because they may not be delivered consistently and are context-specific. The UK

16   Medical Research Council advocates developing complex interventions systematically, by

17   involving stakeholders, using evidence-based theory, and testing them in a phased

18   approach.[14] to ensure successful delivery in clinical practice[15]. The intervention context is

19   essential [16], and researchers are encouraged to consider how an intervention is expected to

20   work (i.e., the internal intervention logic), and the overall systems, including which parts of

21   the system could influence the intervention, and how the intervention could lead to wider

22   system change[16],

23

24   Current research evaluating the delivery of VR interventions tends to focus on one health

25   condition or one location[17-19], but this limited evidence does not account for the complexity

26   of trauma or the National Health Service (NHS) trauma rehabilitation pathway, thus limiting

27   the identification of barriers and facilitators to VR delivery.

28

4

1 As part of a research programme to develop and evaluate a VR intervention for major trauma

2 patients[20], we set out to explore the potential implementation issues associated with the

3 delivery of this intervention across five UK major trauma centres. It was important that we

4 understood how the intervention could be implemented across different injury types and NHS

5 Trusts to ensure our intervention design was robust ahead of a definitive trial.

6

7 ROWTATE (www.ROWTATE.org.uk) is an individually-tailored job retention intervention,

8 delivered by an occupational therapist (OT; acting in case-coordinator role) and clinical

9 psychologist, to people with at least 'moderate trauma' (defined as an Injury Severity Score

10 (ISS) of 9 or greater). It commences within 12 weeks post-injury and lasts up to one year. It

11 involves assessing the impact of the injury on the person and job role, rehabilitation to

12 prepare the patient for work, plan and monitor a phased RTW liaising with employers and

13 the healthcare team, educating patients/employers about injury impact, and early

14 identification, monitoring and support for psychological problems.

15

16 The aims of this study were to: 1) understand the context for delivering the ROWTATE VR

17 intervention and 2) identify potential barriers and enablers to the implementation of VR

18 following major trauma in a diverse trauma injury population.

5

1 **2. Methods**

2 This study was part of a larger programme of work funded by the National Institute for

3 Health Research (RP-PG-0617-20001).

4 *2.1. Participants*

5 We recruited key stakeholders (individuals that provide, deliver, or receive

6 trauma/vocational rehabilitation, or work/care for trauma survivors) including trauma

7 service users, carers, NHS service providers, private rehabilitation providers, third

8 sector services and the insurance industry. NHS service providers worked across

9 different settings: acute, community and primary care, and included general

10 practitioners, trauma rehabilitation specialists and psychologists.

11

12 Stakeholders were recruited in five UK major trauma centres in 2019-2020 using

13 purposive sampling (to recruit people with a range of injury types, socioeconomic

14 backgrounds, geographical locations, and healthcare provider expertise).

15 *2.2. Data collection*

16 Data were collected using semi-structured interviews, focus groups, co-design

17 workshops and informal 'walk-through care pathways' interviews (i.e., walking

18 interviews conducted in a major trauma centre or repatriating site with an appropriate

19 individual to better understand the context for delivery in that site). Written informed

20 consent was obtained from all interviews and focus groups. For co-design workshops

21 and walk-through care pathways, consent was assumed if participants did not opt out.

22 Data collection took place in participants' places of work (including patient participants

23 if necessary) or university premisses. Topic guides for each method of data collection

24 were developed following analysis of previous research with VR and trauma patients

25 conducted by the authors and in discussion with 10 patient and public involvement

26 (PPI) members. Table 1 provides a summary and examples of each topic guide.

27

28 Focus groups were conducted by JK and KB with 15 trauma survivors, 1 carer and 9

29 service providers. We (JK, KB, PP) conducted 38 semi-structured interviews with 10

6

1   trauma survivors, 1 carer and 27 service providers, and 11 'walk-through care

2   pathways' interviews with service providers from three Major Trauma Centres. We (JK,

3   ST) undertook five co-design workshops with 5 trauma survivors and 38 service

4   providers at five major trauma centres. See table 2 for recruitment summary and topics

5   covered by each activity. A summary of participant characteristics is shown in Table 3.

6   A summary of researcher characteristics can be found in Table 4. Researchers did not

7   know participants prior to conducting research activities.

8   **2.3. Data analysis**

9   All semi-structured interviews and focus groups were audio-recorded and transcribed.

10   For informal interviews and workshops, notes were taken. All data were thematically

11   analysed using the framework appproach[21] and coded using NVivo (by JK & PP),

12   informed by the Consolidated Framework for Implementation Research (CFIR)[22].

13   Themes were agreed by discussion with other authors (KR, ST) and further discussed

14   with a PPI member (TJ). Barriers and enablers to implementation were identified

15   across the interviews, focus groups and co-design workshops, then mapped, where

16   possible, onto CFIR constructs. The consolidated criteria for reporting qualitative

17   research (COREQ) checklist has been used to ensure comprehensive reporting of our

18   study (see appendix 1).

19   **2.4. Patient and public involvement**

20   Patient and public involvement (PPI) representatives were involved throughout this study. A

21   patient representative (TJ) contributed to the development of this study proposal (and overall

22   programme grant). A larger group of patient representatives (who form the ROWTATE PPI

23   group) were involved in developing patient facing documents, including patient information

24   sheets. Topic guides were developed alongside 10 trauma survivors. PPI representative (TJ)

25   was involved in data analysis.

7

1 **3. Results**

2 A visual summary in Figure 1, provides an overview of factors that may affect the

3 implementation of ROWTATE. Key barriers and facilitators are presented in the next section.

4 Table 5 summarises findings specific to co-design workshops.

5

6 *3.1. Outer Setting*

7 *3.1.1. Cosmopolitanism*

8 This theme refers to the degree to which an organisation is networked with other external

9 organisations[22]. We also considered transition between different organisations. Barriers

10 identified by stakeholders were: inconsistent service provision across the major trauma

11 pathway and poor communication between organisations when patients left the hospital.

12 Many stakeholders spoke about the importance of supported transition across the healthcare

13 pathway; however, some patients were often left with little or no support, especially on

14 discharge from the acute setting:

15   *'Once I left the hospital to go home, I had no support. I used to sit in my chair and*

16   *just let my leg hopefully slowly mend which is what it did. Everything I was taught*

17   *worked, but I had no support' (Trauma survivor, orthopaedic injury)*

18

19 Trauma survivors often left hospital with long-term problems requiring rehabilitation.

20 Therapists referring patients onto other services were often left not knowing whether that

21 individual had received support, thus making it difficult to ensure continuity of care. There

22 appears to be a lack of communication and networking across services:

23   *'You feel responsible, and you want it to be right but, you do just sometimes have to*

24   *say, "Right, I've passed on to that service." And you want that service to be perfect,*

25   *but they are no longer your patient and it's not your right to know what happens to*

26   *them.' (Trauma physiotherapist)*

27

28 Developing stronger links between organisations facilitates implementation. One stakeholder

29 highlighted the need for healthcare providers to communicate with a patient's employer to

8

1   ensure awareness of their employee's injury and limitations. Crossing boundaries between

2   organisations may be necessary to ensure patients are supported:

3   *'There should be good communication between the healthcare providers…if that*

4   *means a letter from the consultant [physician] to this person's employer saying, this*

5   *is this person's injury… this is the extent of the difficulties this person is going to*

6   *endure.' (Trauma psychotherapist)*

7

8   Stakeholders also suggested the need for early contact with employers to explain the impact

9   of their employee's injury and recovery trajectory, facilitating job retention:

10   *'Therapists feeling confident to talk about work and quite early on. Even if you're not*

11   *necessarily doing something about it, but asking the question, finding out what their*

12   *job involves. … having that contact to say, this is kind of the estimated length of time*

13   *and just keeping them [employer] in the loop so that they don't lose their job as a*

14   *result.' (Vocational OT)*

15 *3.1.2. Structural characteristics*

16 This theme refers to how an organisation works; its social architecture, age, maturity, and

17 size.[22]. The ability for an individual to successfully RTW may be related to the type and size

18 of their employing organisation. Stakeholders stated it is often difficult to get patients back to

19 their pre-injury role (e.g. physical jobs), or that the company is too small to make reasonable

20 adjustments for the injured person:

21   *'Some of our companies will support people over months, but other companies who*

22   *are much smaller or have very specific, very physical jobs, it's very hard for them to*

23   *accommodate a large number of adjustments.' (Occupational physician)*

24

25 *3.1.3. External Policy and Funding*

26 This theme refers to external strategies to spread interventions, which included policy,

27 regulations, recommendations, and guidelines.[22, 23] Service providers discussed issues when

28 having no central point of contact within the trauma pathway and how constantly changing

29 services posed a barrier for effective rehabilitation. Service providers were frustrated with

9

1 decommissioning of services, low prioritisation of rehabilitation services and lack of clarity on

2 what funding is available, particularly for trauma survivors with mental health problems:

3   *'It's [rehabilitation] the first thing to get axed when budget cuts come in.' (Trauma*

4   *rehabilitation consultant)*

5   *'Commissioning's stagnant at the moment…There's no money for mental health.'*

6   *(Trauma psychotherapist)*

7

8 Service providers and trauma survivors frequently mentioned the lack of rehabilitation

9 services across areas of the UK, mainly in areas located further from major trauma centres:

10   *'It is quite postcode lottery-type thing. Some places have generic outpatient*

11   *departments, so there is no specific neuro or amputee or spinal expertise and that's*

12   *the same for community rehab.' (Case manager)*

13

14 Therapy teams were overstretched with long waiting lists, so introducing new interventions

15 was a concern, particularly for therapy managers. Other issues related to how external

16 policies allowed for cross-boundary working, (e.g., therapists accessing clinical notes from

17 other NHS Trusts, or liaison with the Department for Work and Pensions (DWP) or

18 employers).

19   *'If your substantive role is on the acute sector then crossing boundaries to the*

20   *community and out to the employers…or vice versa.' (Vocational OT)*

21

22 **3.2. Inner Setting**

23 *3.2.1. Culture*

24 This theme refers to the norms, values, and basic assumptions of an organisation,[24] either

25 healthcare or employing organisations. Healthcare professionals and employers may

26 consider that the long-term effects of some injuries (e.g., brain injury) are too severe for

27 patients to RTW, preventing VR access:

1   *'I suspect that some people [healthcare providers] think there's nothing you can do*

2   *about a brain injury, so what's the point in referring [for VR].' (Trauma clinical*

3   *psychologist)*

4

5   Participants argued that there is a culture within acute care units to discharge patients when

6   they are medically fit for discharge, which may lead to individuals being discharged without

7   the necessary vocational and psychological support:

8   *'An acute hospital will never be geared up for those [vocational and psychological]*

9   *needs. Because their priority is, getting people through the medical system, assess,*

10   *treat, [and] discharge.' (Consultant neuropsychologist)*

11   Healthcare professionals within the acute setting were concerned about identifying potential

12   problems that an individual was experiencing because of lack of services to which to refer:

13   *'There's just not really the [vocational or psychological] services out there to then*

14   *signpost people on to. So, you almost feel like you're opening a Pandora's box where*

15   *you can't actually then put those pieces back in.' (Trauma OT)*

16

17   Consequently, trauma patients may be sent home with a rehabilitation plan that did not reflect

18   their needs. Participants also discussed longstanding barriers of hierarchy and a lack of

19   understanding about allied health professional roles. One therapist stated that healthcare

20   providers other than doctors were often ignored by employers, making an OT-led intervention

21   difficult to implement:

22   *'Sometimes they [employers] will not take the views of OTs, physios, speech and*

23   *languages, as seriously as they should, and sometimes they want to see doctor after*

24   *their name.' (Consultant neuropsychologist)*

25

26   Stakeholders also recognised potential facilitators, such as the need for changing the 'norm'

27   within the NHS and ensuring therapists and managers were committed to the intervention.

28   One therapist highlighted the need to translate research into the real-life context of the

29   healthcare system:

1

1   *'It's not just the development or the intervention itself, it's actually the integration of it*

2   *into the culture so that it changes the practice of what people think of as the norm…*

3   *and getting a lot of people to buy into it.' (Senior trauma physiotherapist)*

4

5   *3.2.2. Implementation Climate*

6   This refers to the capacity for change and the extent to which use of that intervention would

7   be rewarded, supported and expected within their organisation.[25, 26] Stakeholders could see

8   the need for change and were supportive of the intervention, as current services provided

9   limited vocational support. However, organisations both inside and outside the hospital did

10 not see VR as a priority relative to other services.

11

12 Major trauma centres lacked awareness and knowledge that RTW or education might be an

13 important part of long-term recovery. Healthcare providers in the acute setting were not

14 routinely asking about RTW, so patients were discharged without being offered the early

15 support they may benefit from:

16 *'Some people have gone out [of hospital] before four weeks, and they would maybe*

17 *be people who would benefit from some vocational input…they've got cages on their*

18 *legs, they've got to have skin grafts, so their return-to-work could be six to twelve*

19 *months, but they need to have that question [what is your job?] asked.' (Vocational*

20 *OT)*

21

22 Sometimes referral to specialist VR services did not happen as healthcare professionals did

23 not feel RTW was going to be problematic. Again, this related to a lack of knowledge in the

24 acute setting about the impact of injury on ability to RTW.

25 *'I think it was very surprising how few people were referred to this [VR] clinic…it*

26 *seems to be me that there was a kind of, yes return-to-work is important, but a*

27 *complete lack of understanding of, 'there's going to be a problem'. (Consultant*

28 *neuropsychologist)*

1   Employers and patients also lacked knowledge and awareness about the importance of

2   vocational support:

3   *'There may be massive difficulties or concerns around going back to work, those*

4   *don't come to light until they've become an outpatient…they haven't had contact with*

5   *their employers and their job may have already come to an end. Whereas if you'd*

6   *had an intervention earlier that could have been saved.' (Vocational OT)*

7   There is a known stigma about mental health[27-30] and patients are sometimes concerned

8   about disclosing psychological problems to employers, which can prevent them receiving

9   support. Therapists highlighted concerns over patients declaring non-visible conditions to

10   employers (e.g., anxiety, depression, pain). However, such non-disclosure may prevent

11   individuals receiving the RTW support they needed:

12   *'There's a stigma about talking about mental health. Is there any chance that by*

13   *encouraging somebody to discuss their mental health you are actually harming their*

14   *future employment?' (Trauma psychologist)*

15

16

17   *3.2.3. Readiness for implementation*

18   This theme is defined as tangible and immediate indicators of organisational commitment to

19   its decision to implement an intervention.[22] Service providers discussed their difficulties in

20   working flexibly and outside their normal area of expertise, including working across areas of

21   healthcare they were less familiar with, or having to liaise with employers:

22   *'There are some people who just cannot escape their programming from their*

23   *training… But in this kind of working the OT needs to do a bit of psychology and the*

24   *psychologist needs to do a bit of OT. And if the psychologist's too precious to do OT*

25   *then that's not going to work very well.' (Clinical psychologist)*

26

27   **3.3. Characteristics of Individuals**

28   *3.3.1. Self-efficacy*

1   This theme refers to an individual's belief in their own capabilities to execute courses of

2   action to achieve implementation goals.[31] For the delivery of a VR intervention to be

3   successful, the patients needed to believe in their ability to RTW, and the employer needed

4   to believe that they could support them. Service providers and patients talked about the

5   importance of changing employer attitudes towards traumatic injury:

6   *'Part of the difficulty is trying to work out how you can change work and getting the*

7   *employers to think differently about why they should support somebody going back*

8   *to work, particularly in high demand and highly technical jobs or very physical jobs.'*

9   *(Occupational physician)*

10

11 An employer's desire to act on the advice of a therapist or make reasonable adjustments to

12 support RTW could become of barrier to VR intervention implementation:

13   *'There wasn't really an option to sit down, so I asked why I couldn't have a chair, they*

14   *[employer] said, well you can't obstruct the walkway…they weren't that*

15   *understanding really.' (Trauma survivor, brain injury)*

16 Feedback from stakeholders suggested that most employers were willing to accept advice

17 and improve understanding about injury to better support their employee. This facilitated VR

18 delivery, as good employers were invested in the RTW process:

19   *'The good employers will make the reasonable adjustments, they will understand the*

20   *situations, they will go and ask the necessary questions and do the best to support*

21   *them.' (Disability employment advisor)*

22

23 Some patients felt they were 'damaged' and lost confidence in their abilities, which impacted

24 motivation to RTW, or ability to push themselves:

25   *'I am not pushing myself forward [within work] as well because I think I am damaged*

26   *goods.' (Trauma survivor, spinal cord injury)*

27 This posed an issue for the implementation of VR because patients needed to have the

28 desire to RTW and to believe that they could. Therapists needed to work with patients to

29 encourage them to work towards rehabilitation goals.

A key facilitator to delivering a successful VR intervention was ensuring patients understand the impact of their injury and how this would affect work, including the importance of not returning-to-work too soon:

> *'I think I should have taken on some reduced duties or something first. That was my choice. They [employer] offered that and I said I'd be fine and then it turned out pretty bad for me.' (Trauma survivor, orthopaedic injury)*

3.3.2. Knowledge and Beliefs about VR

This theme refers to individuals' attitudes toward, and value placed, on the intervention.[22] When discussing the content of ROWTATE, stakeholders felt it was appropriate and could see the value in providing combined vocational and psychological support to trauma survivors.

One stakeholder highlighted the importance of providing a VR intervention to ensure patients do not RTW before they have fully recovered:

> *'I've got many, many patients who ignore our [rehabilitation team] advice and go to work earlier and they go a step backwards…within a week will say they are back to work, and I am surprised how on earth they did that and what risk they are taking.' (Rehabilitation physician)*

There also appeared to be a gap in therapist knowledge about how to provide VR and/or a lack of confidence in asking questions about RTW. This posed an issue for delivering a VR intervention in practice, as therapists are not routinely trained to ask patients work-specific questions:

> *'A lot of OTs aren't feeling confident about asking that [RTW] question, they find it quite scary.' (OT)*

1   Stakeholders mentioned that some employers have little understanding of injury, especially

2   if they had never been faced with this situation, leading to anxieties about supporting an

3   employee's RTW:

4   *'Sometimes employers are frightened about taking on something that they don't*

5   *understand.' (Case manager)*

6

7   **4. Discussion**

8   Doing implementation research in advance of the design of the intervention has meant that

9   not only have we identified barriers to implementation, but we have also been able to actively

10   address them. The key barriers were: cultural norms within healthcare and employing

11   organisations, the extent to which healthcare systems were networked with other

12   organisations, poor transition between different organisations, and failure to recognise VR

13   as a priority, often as a result of policies and funding. Although some of these findings are

14   more relevant within the UK context (e.g., policies and funding), certain implementation

15   barriers are applicable to global healthcare setting (e.g., culture within the healthcare and

16   employment sectors, cosmopolitanism, and VR knowledge).

17

18   Though many of the issues that we have presented are classic implementation issues,[32] they

19   represent substantial challenges for ROWTATE, which we have attempted to modify before

20   it is implemented as part of a feasibility study[20].

21

22   One substantial barrier was deep-seated cultural practices among a wide variety of

23   stakeholders and beliefs about the need for early VR in the trauma population. Similar to

24   Mannion and Davies,[33] we view culture as a complex and dynamic phenomenon which is not

25   amenable to simplistic interventions. Our study highlighted the negative impact that certain

26   cultural norms can have on the implementation of a complex intervention like VR. This issue

27   of culture is consistently reported in the literature[32, 34, 35] as a barrier to implementation, with

28   studies indicating that improving service providers' attitudes towards change[36, 37],

29   encouraging flexibility in their way of thinking[38] and identifying champions[39, 40] can facilitate

1 intervention delivery. We have sought to address cultural issues within the intervention

2 design by increasing therapist knowledge about VR and providing in-depth training to explain

3 the importance of (and evidence to support[41-44]) early intervention in the trauma population.

4

5 Another key barrier was inadequacy of organisational networking, and the subsequent lack

6 of communication and continuity of care across the trauma pathway. Often, trauma patients

7 were discharged from the acute setting without any vocational or psychological support,[45]

8 and when referred, therapists could not be confident that their patient would receive the

9 support they needed. This lack of communication is well documented,[12, 46-48] posing a barrier

10 for VR implementation. Facilitating the link between health, employment, and others involved

11 in the RTW process (e.g., insurance industry, solicitors, case managers) may overcome

12 some of these issues enabling a sustainable RTW. To address this issue, training for the

13 OTs and psychologists who deliver our VR intervention positively encourages boundary-

14 crossing. The ROWTATE training and intervention are predicated on a model where the OT

15 acts as a case manager, facilitating communication between different stakeholders.

16

17 Findings from this study informed the programme theory and training package for the

18 ROWTATE intervention feasibility study and trial. Patients need a central point of contact

19 when discharged from the major trauma centre or acute setting, to improve transition into the

20 community, but also to communicate with key stakeholders involved in supporting RTW. A

21 case coordinator, who also delivers the VR (e.g., OT) is essential to supporting its

22 implementation. Findings also suggested that early contact with an employer enables

23 increased awareness of the impact of injuries on employees and their ability to work and to

24 facilitate job retention. For a VR intervention to be implemented, the therapist should contact

25 the patient within the acute setting (where possible), or soon after discharge. Crossing

26 boundaries across different sectors is an essential part of a VR intervention, thus buy-in from

27 healthcare professionals across the trauma pathway and from employers is necessary.

28

1   Therapists need to be able to adapt to different circumstances and be flexible in intervention

2   delivery for VR to be successful, as every trauma patient is different. To support

3   implementation, a training package has been developed to train therapists to deliver the VR

4   intervention, along with ongoing mentoring. Finally, findings identified a lack of psychological

5   support for trauma patients. Thus, a VR intervention should include a psychological

6   component, to ensure both physical and mental health issues are considered during RTW.

7

8   Our study had several strengths, providing new evidence to support the implementation of a

9   VR intervention in the trauma population. We recruited a diverse sample of service users and

10   providers across different NHS sites and areas of the UK, thus providing a broad perspective

11   on the factors affecting implementation. Our findings triangulate information from different

12   perspectives, using a range of methodologies, which enabled in-depth discussion and

13   complex stories to be heard and understood. Our research team is comprised practitioners

14   (OT, CPs, MDs) and multidisciplinary academics. However, we were unable to recruit any

15   employers to participate in the interviews or focus groups.

16

17   **5. Conclusion**

18   Most implementation research continues to focus on one health condition and/or one context,

19   limiting empirical understanding of the complex networks through which much contemporary

20   health care is delivered. We addressed this gap by exploring issues across multiple trauma

21   networks and conditions to enhance understanding of how the intervention could be

22   implemented in different contexts and to ensure our intervention design and trial processes

23   were appropriate. Identification of key barriers and facilitators to implementation has

24   informed the development of ROWATE intervention, which is ready to be tested in a trial

25   across five UK major trauma pathways. Although we understand how best to embed the

26   intervention within these complex systems, the success of its implementation will need to be

27   measured as part of a process evaluation. This will lead to a greater understanding of how

28   the intervention might impact wider system change and factors affecting future widescale

29   clinical implementation.

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Table 1: Summary of topic guides

	Topic guide	Focus of activity	Example of questions
1.	Interview and focus group topic guide for service providers ★	• Discussing experiences and opinions of current services • Identifying any service gaps that exist. • Describing proposed return to work intervention/programme called ROWTATE and ask for feedback. • Identifying any potential barriers to delivery within the NHS.	• Does your organisation currently provide return to work services/support for people after trauma? • Thinking about the needs of people after trauma, where do you think there are service gaps? • Is there an unmet need for vocational support after injury? • Which trauma related problem(s) (e.g. physical health, mental health, other) should our return to work programme focus on? *Thinking more specifically about the proposed ROWTATE programme...* • What things need to be in place to allow the programme to begin (resources) • Who should provide the programme and what training will they require? • Does the implementing organisation have the capacity to implement this programme? • Will the clients face any barriers to receiving the programmes? • What outcomes will be achieved by the intervention/programme? • What environmental factors might work to support or act against implementation of the programme?

2.	Interview and focus group topic guides for service users (trauma and carer participants)	• Discussing the impact of injury
		• Experiences and opinions of current services
		• Discussing gaps in services that were (or were not) available post-injury.
		• Discussing return to work services, their purpose and why support isn't always provided/barriers to delivery.
		• Presenting/describing the proposed return to work programme called ROWTATE and asking for feedback about content and potential barriers to delivery.
			• In your experience what services are available to support people who have major injuries?
			
			• What are the issues people who have major injuries face in returning to and remaining in work?
			
			• Thinking about people of working age who have major injuries, is there a need for services that support people in a return to work?
			If so, what should this service look like?
			
			Thinking more specifically about the proposed ROWTATE programme...
			
			• How does this programme fit with your ideas of what is needed? Will it address the problem?
			• Can you think of anything that might prevent this programme from working?
			• Can you think of any barriers to engaging in the ROWTATE programme?
			• Do you think there may be any negative consequences
			   → *For the injured person?*
			   → *For the employer?*
			   → *For the health service?*

2

Table 2: Summary of participant recruitment by activity

Activity	Purpose/topics covered	Average length of activity	Participant type	n	Total per activity (n=117)
Focus groups (n=5)	Psychosocial context of trauma survivors, essential resources needed for, and barriers to the implementation of a VR intervention.	90 minutes	Trauma survivor	15	25
			Service provider	9	
			Carer	1	
Semi-structured interviews	Experiences of receiving or providing rehabilitation, understanding usual care and local unmet need, specific service gaps and lack of support, contextual factors affecting the implementation of a VR intervention.	60 minutes	Trauma survivor	10	38
			Service provider	27	
			Carer	1	
Walk through care pathways		20 minutes	Service provider	11	11
Workshops (n=5)	Discussions about the VR intervention logic model, the local context for delivery and other factors that may affect its implementation.	120 minutes	Trauma survivor	5	43
			Service provider	38	

Table 3: Characteristics of participants

Participant type	Professional role or injury type	Total (n=117)
Service user (n=32)	Amputation	1
	Brain injury and poly-trauma	13
	Carer	2
	Orthopaedic injury	13
	Spinal injury	3
Service provider (n=85)	Case manager	3
	Clinical psychologist	10
	Disability employment advisor	3
	Doctor/physician	16
	General Practitioner	4
	Occupational physician	1
	Occupational psychologist	1
	Occupational therapist	27
	Physiotherapist	5
	Psychiatrist	1
	Solicitor	2
	Speech and language therapist	1
	Trauma charity coordinator	2
	Trauma practitioner	5
	Trauma rehabilitation coordinator	1
	Trauma psychologist/psychotherapist	3

Table 4: Summary of researcher characteristics

Characteristic	Researcher 1 (JK)	Researcher 2 (PP)	Researcher 3 (KB)	Researcher 4 (ST)
Gender	Female	Female	Female	Male
Education	MSc, PhD	MSc	MSc	MSc, PhD
Ethnicity	White British	Asian British	White British	White British
Research role/title	Research Fellow	Research Assistant	Research Assistant	Professor
Experience	Traumatic injury research, rehabilitation psychology and implementation	Developmental and neuro-psychology	Trauma psychology	Health services management, implementation
Research activity	Interviews Focus groups Co-design workshops Walk-through care pathways	Interviews	Interviews Focus groups	Co-design workshops

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Table 5: Summary of findings from co-design workshops mapped onto CFIR headings

	CFIR constructs	Definition of construct	Key points made during co-design workshops
Outer Setting	Patient Needs and Resources	The extent to which patient needs, as well as barriers and facilitators to meet those needs, are accurately known and prioritised by the organisation.	Some community rehabilitation teams were already providing VR and/or psychological support, however waiting lists are long meaning patients' needs are not always addressed in a timely manner. Additional resources and therapists would increase capacity, thus supportive of out intervention.
	Cosmopolitanism	The degree to which an organisation is networked with other external organisations.	Major trauma centres had good links with repatriating hospitals and community teams, however stakeholders highlighted the gap in communication between acute and community care. This was highlighted as a potential barrier to implementation.
	Peer Pressure	Do organisations feel peer pressure to adopt the intervention.	All participants were open to implementing the intervention in their NHS sites, however as services and processes are influenced by funding/commissioning, stakeholders felt this might be a barrier to long-term implementation.
	External Policy and Incentives	External strategies to spread interventions including policy and regulations, external mandates, recommendations and guidelines.	Stakeholders stated that policies may be a barrier to long-term implementation, but not a barrier in terms of study delivery.
Inner Setting	Structural Characteristics	How the organisation works. The social architecture, age, maturity, and size of an organisation.	Stakeholders were open to change and felt our intervention would work well within their organisation if barriers addressed.
	Networks and Communications	The nature and quality of formal and informal communications within an organisation.	Communication between healthcare professionals within the organisation and multi-disciplinary working would facilitate intervention delivery.
	Culture	Norms, values, and basic assumptions of a given organisation.	Rehabilitation stakeholders appeared open to the implementation of a vocational intervention and felt it was an important intervention.
	Implementation Climate	Absorptive capacity for change, shared receptivity of involved individuals to an intervention and the extent to which use of that intervention will be rewarded, supported and expected within their organisation.	Stakeholders agreed intervention was important for people after trauma and supported its implementation, with the hope that their organisation would encourage its delivery long-term.
	Readiness for Implementation	Tangible and immediate indicators of organisational commitment to its decision to implement an intervention.	NHS sites ready to implement the intervention for the trial.
Characteristics of individuals	Knowledge and Beliefs About the Intervention	How much do stakeholders know about the intervention and what do they think about it.	Stakeholders agreed that the components of the intervention were appropriate and would be feasible to deliver if service specific barriers addressed.
	Self-Efficacy	Individual belief in their own capabilities to execute courses of action to achieve implementation goals.	Stakeholders believe intervention is important and wanted to support its implementation in their NHS sites.
	Individual Stage of Change	Characterisation of the phase an individual is in, as he or she progresses toward skilled, enthusiastic, and sustained use of the intervention.	Stakeholders enthusiastic about the intervention and keen to be involved.
	Other Personal Attributes	A broad construct to include other personal traits such as tolerance of ambiguity, intellectual ability, motivation, values, competence, capacity, and learning style.	Stakeholders seemed motivated to implement the intervention in their different NHS sites.

Figure legends

Figure 1: Summary of barriers and facilitators to the implementation of a vocational rehabilitation intervention, mapped onto CFIR.

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Contributorship statement

JK: methodology, formal analysis, writing, data collection, review and editing; KR: conceptualisation, funding acquisition, project administration, methodology, formal analysis and review; DK: conceptualisation, funding acquisition, project administration, methodology, writing, review and editing; PP: methodology, formal analysis, data collection, review and editing; KB: methodology, formal analysis, data collection, review and editing; BK: funding acquisition, project administration, methodology, formal analysis, review and editing; RdN: funding acquisition, methodology, writing, review and editing; TJ: funding acquisition, methodology, formal analysis and review; ST: funding acquisition, methodology, data collection, formal analysis, writing, review and editing; All authors have read and agreed to the published version of the manuscript.

Data sharing

The data that participants have consented to share will become available to potential researchers at the end of this study. Requests detailing the research aims and use of the data should be sent to the research team via email: ROWTATE@nottingham.ac.uk.

Ethical Approval

Ethical approval was obtained from the University of Nottingham Faculty of Medicine and Health Sciences Research Ethics Committee (Ref: FMHS 150-1811) and Leicester South NHS Research Ethics Committee (Ref 19/EM/0114).

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Declaration of Conflicting Interests

The authors declare that there is no conflict of interest.

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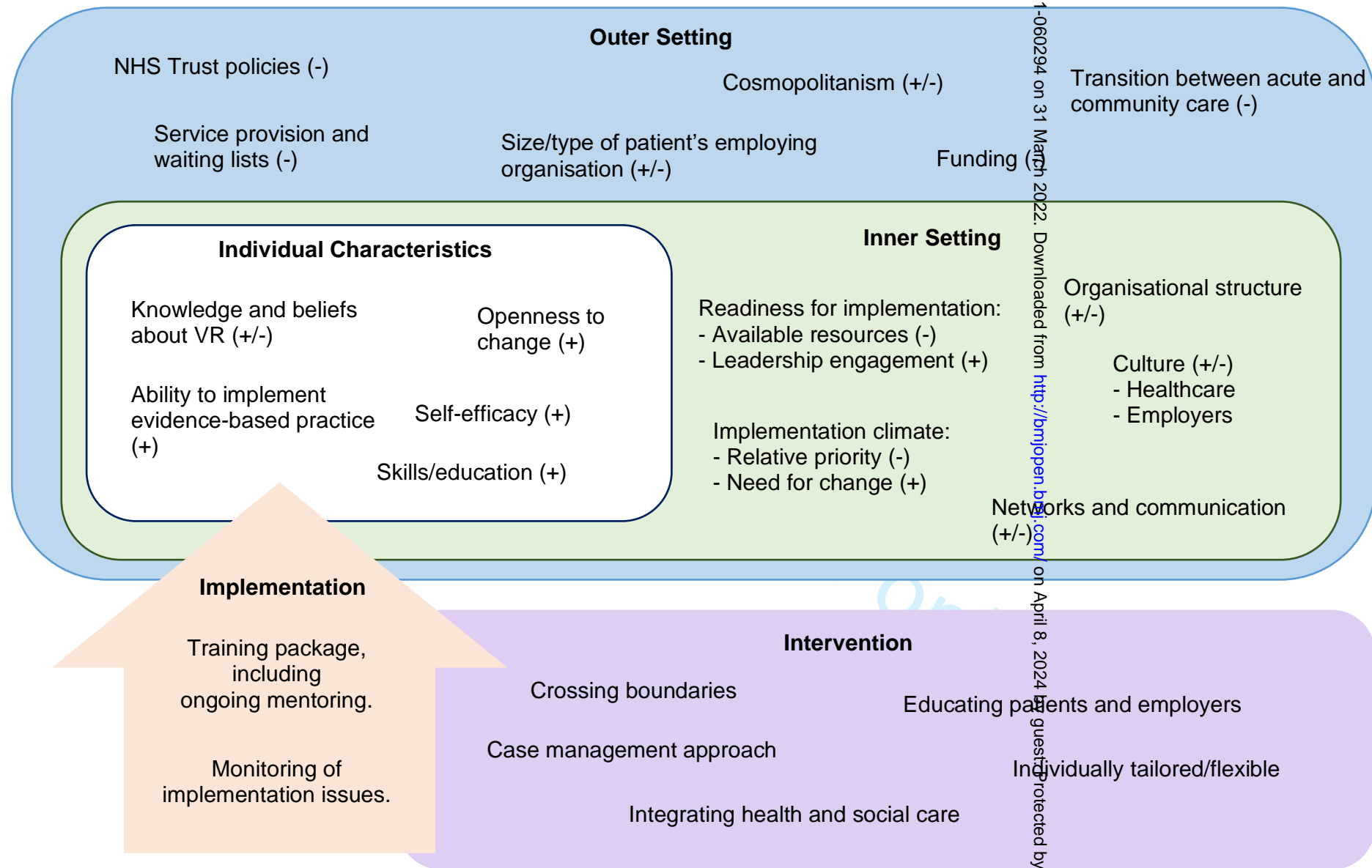
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Outer Setting

NHS Trust policies (-)

Cosmopolitanism (+/-)

Transition between acute and community care (-)

Service provision and waiting lists (-)

Size/type of patient's employing organisation (+/-)

Funding (-)

Inner Setting

Individual Characteristics

Knowledge and beliefs about VR (+/-)

Openness to change (+)

Ability to implement evidence-based practice (+)

Self-efficacy (+)

Skills/education (+)

Readiness for implementation:
- Available resources (-)
- Leadership engagement (+)

Implementation climate:
- Relative priority (-)
- Need for change (+)

Organisational structure (+/-)

Culture (+/-)
- Healthcare
- Employers

Networks and communication (+/-)

Implementation

Training package, including ongoing mentoring.

Monitoring of implementation issues.

Intervention

Crossing boundaries

Educating patients and employers

Case management approach

Individually tailored/flexible

Integrating health and social care

(+) indicates facilitator   (-) indicates barrier

Figure 1: Summary of barriers and facilitators to the implementation of a vocational rehabilitation intervention, mapped onto CFIR.

COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
Personal characteristics			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	
Occupation	3	What was their occupation at the time of the study?	
Gender	4	Was the researcher male or female?	
Experience and training	5	What experience or training did the researcher have?	
Relationship with participants			
Relationship established	6	Was a relationship established prior to study commencement?	
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: Study design			
Theoretical framework			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	
Sample size	12	How many participants were in the study?	
Non-participation	13	How many people refused to participate or dropped out? Reasons?	
Setting			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	
Data collection			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	
Field notes	20	Were field notes made during and/or after the inter view or focus group?	
Duration	21	What was the duration of the inter views or focus group?	
Data saturation	22	Was data saturation discussed?	
Transcripts returned	23	Were transcripts returned to participants for comment and/or	

Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			
Data analysis			
Number of data coders	24	How many data coders coded the data?	
Description of the coding tree	25	Did authors provide a description of the coding tree?	
Derivation of themes	26	Were themes identified in advance or derived from the data?	
Software	27	What software, if applicable, was used to manage the data?	
Participant checking	28	Did participants provide feedback on the findings?	
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	
Data and findings consistent	30	Was there consistency between the data presented and the findings?	
Clarity of major themes	31	Were major themes clearly presented in the findings?	
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

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A qualitative study exploring factors affecting the implementation of a vocational rehabilitation intervention in the UK major trauma pathway

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BMJ

1 **A qualitative study exploring factors affecting the implementation of a vocational**

2 **rehabilitation intervention in the UK major trauma pathway**

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44 *On behalf of the ROWTATE team*

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47 Running head: Implementing vocational rehabilitation post-trauma
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1

1   **A qualitative study exploring factors affecting the implementation of a vocational**

2   **rehabilitation intervention in the UK major trauma pathway**

3   **Objectives:** This study aimed to: 1) understand the context for delivering a trauma vocational

4   rehabilitation (VR) intervention; 2) identify potential barriers and enablers to the

5   implementation of a VR intervention post-trauma.

6   **Design:** Qualitative study**.** Data were collected in person or via phone using different

7   methods: 38 semi-structured interviews, 11 informal 'walk-through care pathways' interviews,

8   5 focus groups (n=25), 5 co-design workshops (n=43). Data were thematically analysed

9   using the framework approach, informed by the Consolidated Framework for Implementation

10 Research (CFIR).

11 **Setting:** Stakeholders recruited across 5 UK major trauma networks.

12 **Participants:** A variety of stakeholders were recruited (n=117) including trauma survivors,

13 rehabilitation physicians, therapists, psychologists, trauma coordinators and general

14 practitioners. We recruited 32 service users (trauma survivors or carers) and 85 service

15 providers.

16 **Results:** There were several issues associated with implementing a trauma VR intervention

17 including: culture within healthcare/employing organisations; extent to which healthcare

18 systems were networked with other organisations; poor transition between different

19 organisations; failure to recognise VR as a priority; external policies and funding. Some

20 barriers were typical implementation issues (e.g., funding, policies, openness to change).

21 This study further highlighted the challenges associated with implementing a complex

22 intervention like VR (e.g., inadequate networking/communication, poor service provision,

23 perceived VR priority). Our intervention was developed to overcome these barriers through

24 adapting a therapist training package, and by providing early contact with patient/employer,

25 a psychological component alongside occupational therapy, case coordination/central point

26 of   contact,   and   support   crossing   sector   boundaries   (e.g.,   between

27 health/employment/welfare).

28 **Conclusions:** Findings informed the implementation of our VR intervention within the

29 complex trauma pathway. Although we understand how to embed it within this context, the

30 success of its implementation needs to be measured as part of a process evaluation in a

31 future trial.

32

33

34

2

1   **Strengths and limitations of this study**

2   • This study provides new evidence to support the implementation of a vocational

3   rehabilitation intervention in the trauma population, presenting the views of 117 key

4   stakeholders.

5   • Recruitment of a diverse sample of service users and providers across different NHS

6   sites and areas of the UK, providing a broad perspective on the factors affecting

7   implementation.

8   • Use of a range of methodologies enabling in-depth discussion with key stakeholders.

9   • Unable to recruit employers to interviews or focus groups, thus the employer

10   perspective is not presented.

11

3

1   **1. Introduction**

2   Traumatic injuries are particularly problematic in working age adults, with road traffic injuries

3   being one of the highest causes of death among 15-49 year olds[1]. Survival rates for traumatic

4   injuries have improved[2], increasing the number of working age adults living with the long-

5   term effects of injuries. These include physical and psychological problems, mental health

6   conditions or hidden disabilities (e.g., urological/cognitive problems), which affect ability to

7   return-to-work (RTW)[3-10]. Injured patients may benefit from RTW support addressing physical

8   and psychological needs. However, provision of RTW support, known as vocational

9   rehabilitation (VR), is inconsistent across the UK[11-13] and known issues (e.g., poor

10   communication between acute/community care, long waiting lists) in the major trauma

11   pathway make access to VR and psychological support challenging[11].

12

13   VR is a complex intervention[14], and requires the coordination of multiple systems, across

14   health, social care, and employing organisations. Complex interventions are difficult to

15   evaluate in clinical trials because they may not be delivered consistently and are context-

16   specific. The UK Medical Research Council advocates developing complex interventions

17   systematically, by involving stakeholders, using evidence-based theory, and testing them in

18   a phased approach[14] to ensure successful delivery in clinical practice[15]. Understanding

19   intervention context is essential[16], and researchers are encouraged to consider how an

20   intervention is expected to work (i.e. the internal intervention logic). Overall systems,

21   including which parts of the system could influence the intervention, and how the intervention

22   could lead to wider system change[16], should be considered.

23

24   Current research evaluating the delivery of VR interventions tends to focus on one health

25   condition or one location[17-19], but this limited evidence does not account for the complexity

26   of trauma or the National Health Service (NHS) trauma rehabilitation pathway, thus limiting

27   the identification of barriers and facilitators to VR delivery.

28

4

1   As part of a research programme to develop and evaluate a VR intervention for major trauma

2   patients[20], we set out to explore the potential implementation issues associated with the

3   delivery of this intervention across five UK major trauma centres. It was important that we

4   understood how the intervention could be implemented across different injury types and NHS

5   Trusts to ensure our intervention design was robust ahead of a definitive trial.

6

7   ROWTATE (www.ROWTATE.org.uk) is an individually-tailored job retention intervention,

8   delivered by an occupational therapist (OT; acting in case-coordinator role) and clinical

9   psychologist, to people with at least 'moderate trauma' (defined as an Injury Severity Score

10   (ISS) of 9 or greater[21]). It commences within 12 weeks post-injury and lasts up to one year.

11   It involves assessing the impact of the injury on the person and job role, rehabilitation to

12   prepare the patient for work, plan/monitor a phased RTW by liaising with employers and the

13   healthcare team, educating patients/employers about injury impact, and early identification,

14   monitoring and support for psychological problems.

15

16   The aims of this study were to: 1) understand the context for delivering the ROWTATE VR

17   intervention and 2) identify potential barriers and enablers to the implementation of VR

18   following major trauma in a diverse trauma injury population. The findings of this study

19   informed the development of the ROWTATE intervention and considerations for

20   implementation ahead of a future trial.

21   **2. Methods**

22   This multiple-methods qualitative study was part of a larger programme of work funded

23   by the National Institute for Health Research (RP-PG-0617-20001).

24   *2.1. Participants*

25   We recruited key stakeholders (individuals that provide, deliver, or receive

26   trauma/vocational rehabilitation, or work/care for trauma survivors) including trauma

27   service users, carers, NHS service providers, private rehabilitation providers, third

28   sector services and the insurance industry. NHS service providers worked across

5

1   different settings: acute, community and primary care, and included general

2   practitioners, trauma rehabilitation specialists and psychologists.

3

4   Stakeholders were recruited in five UK major trauma centres in 2019-2020 using

5   purposive sampling. We chose this method to ensure we recruited key stakeholders

6   within each major trauma centre that had a clear understanding of the rehabilitation

7   pathways (based on a priori knowledge of clinical expertise in each site), and to ensure

8   different injury types, pre-injury occupations (including self-employed), socioeconomic

9   backgrounds, geographical locations, and different professionals (including

10   employers) were represented in our sample. Potential participants were identified via

11   known contacts of the authors at the different major trauma centres, who were asked

12   to share the email invitation with relevant colleagues or trauma patients (i.e. snowball

13   sampling). Service users were identified via trauma Patient and Public Involvement

14   (PPI) groups at the University of Nottingham and via a database of previous patient

15   participants (from other studies) that had agreed to be contacted about future research.

16   Trauma participants and carers were offered a £20 gift voucher for their time, plus

17   travel expenses where necessary.

18   **2.2. Data collection**

19   Data were collected using semi-structured interviews, focus groups, co-design

20   workshops and informal 'walk-through care pathways' interviews (i.e., walking

21   interviews conducted in a major trauma centre or repatriating site with an appropriate

22   individual to better understand the context for delivery in that site). We aimed to recruit

23   up to 195 participants (focus groups n≤40; interviews n≤20; walk-through care

24   pathways n≤60, up to 12 per site; workshops n≤75, up to 15 per site), however stopped

25   recruitment when we reached theoretical sufficiency[22]. Due to the COVID-19

26   pandemic, we were unable to conduct as many walk-through care pathways interviews

27   as proposed, thus conducted additional semi-structured interviews.

28

6

1   All participants were informed about the aim of the study and their right to withdraw.

2   Written informed consent was obtained from all interviews and focus groups. For co-

3   design workshops and walk-through care pathways, consent was assumed if

4   participants did not opt out. Data collection took place in participants' places of work

5   (including patient participants if necessary) or university premises. Topic guides for

6   each method of data collection were developed following analysis of previous research

7   with VR and trauma patients conducted by the authors and in discussion with ten

8   patient and public involvement (PPI) members. Table 1 provides a summary and

9   examples of each topic guide.

10

11   Focus groups were conducted by JK and KB with 15 trauma survivors, one carer and

12   nine service providers. We (JK, KB, PP) conducted 38 semi-structured interviews with

13   ten trauma survivors, one carer and 27 service providers, and 11 'walk-through care

14   pathways' interviews with service providers from three Major Trauma Centres. We (JK,

15   ST) undertook five co-design workshops with five trauma survivors and 38 service

16   providers at five major trauma centres. See table 2 for recruitment summary and topics

17   covered by each activity. A summary of participant characteristics is shown in Table 3.

18   A summary of researcher characteristics can be found in Table 4. Researchers did not

19   know participants prior to conducting research activities.

20

21   ***2.3. Data analysis***

22   All semi-structured interviews and focus groups were audio-recorded and transcribed.

23   For informal interviews and workshops, notes were taken. All data were thematically

24   analysed using the framework approach[23] and coded using NVivo (by JK & PP),

25   informed by the Consolidated Framework for Implementation Research (CFIR)[24]. The

26   main domains of CFIR were used for coding, and key themes were agreed by

27   discussion with other authors (KR, ST) and further discussed with a PPI member (TJ).

28   Barriers and enablers to implementation were identified across the interviews, focus

29   groups and co-design workshops, then mapped, where possible, onto CFIR

7

1 constructs. The consolidated criteria for reporting qualitative research (COREQ)

2 checklist has been used to ensure comprehensive reporting of our study (see

3 supplementary material 1).

4

5 **2.4. Patient and public involvement**

6 Patient and public involvement (PPI) representatives were involved throughout this study. A

7 patient representative (TJ) contributed to the development of this study proposal (and overall

8 programme grant). A larger group of patient representatives (who form the ROWTATE PPI

9 group) were involved in developing patient facing documents, including patient information

10 sheets. Topic guides were developed alongside 11 trauma survivors (diverse group including

11 7 males, 4 females; self-reported injury: spinal cord injury (n=2,) traumatic brain injury (n=8),

12 multiple fractures (n=5), polytrauma (n=1); pre-injury occupation: professional (n=6),

13 managerial (n=2), student (n=1), military (n=1). PPI representative (TJ) was involved in data

14 analysis.

15 **3. Results**

16 A visual summary in Figure 1, provides an overview of factors that may affect the

17 implementation of ROWTATE. Key barriers and facilitators are presented in the next section.

18 Table 5 summarises findings specific to co-design workshops.

19

20 **3.1. Outer Setting**

21 *3.1.1. Cosmopolitanism*

22 This theme refers to the degree to which an organisation is networked with other external

23 organisations[24]. We also considered transition between different organisations. Barriers

24 identified by stakeholders were: inconsistent service provision across the major trauma

25 pathway and poor communication between organisations when patients left the hospital.

26 Many stakeholders spoke about the importance of supported transition across the healthcare

27 pathway; however, some patients were often left with little or no support, especially on

28 discharge from the acute setting:

8

1   *'Once I left the hospital to go home, I had no support. I used to sit in my chair and*

2   *just let my leg hopefully slowly mend which is what it did. Everything I was taught*

3   *worked, but I had no support' (Trauma survivor, orthopaedic injury)*

4

5   Trauma survivors often left hospital with long-term problems requiring rehabilitation.

6   Therapists referring patients onto other services were often left not knowing whether that

7   individual had received support, thus making it difficult to ensure continuity of care. There

8   appears to be a lack of communication and networking across services:

9   *'You feel responsible, and you want it to be right but, you do just sometimes have to*

10   *say, "Right, I've passed on to that service." And you want that service to be perfect,*

11   *but they are no longer your patient and it's not your right to know what happens to*

12   *them.' (Trauma physiotherapist)*

13

14   Developing stronger links between organisations facilitates implementation. One stakeholder

15   highlighted the need for healthcare providers to communicate with a patient's employer to

16   ensure awareness of their employee's injury and limitations. Crossing boundaries between

17   organisations may be necessary to ensure patients are supported:

18   *'There should be good communication between the healthcare providers…if that*

19   *means a letter from the consultant [physician] to this person's employer saying, this*

20   *is this person's injury… this is the extent of the difficulties this person is going to*

21   *endure.' (Trauma psychotherapist)*

22

23   Stakeholders also suggested the need for early contact with employers to explain the impact

24   of their employee's injury and recovery trajectory, facilitating job retention:

25   *'Therapists feeling confident to talk about work and quite early on. Even if you're not*

26   *necessarily doing something about it, but asking the question, finding out what their*

27   *job involves. … having that contact to say, this is kind of the estimated length of time*

28   *and just keeping them [employer] in the loop so that they don't lose their job as a*

29   *result.' (Vocational OT)*

9

1   *3.1.2. Structural characteristics*

2   This theme refers to how the employing organisation works; its social architecture, age,

3   maturity, and size[24]. The ability for an individual to successfully RTW may be related to the

4   type and size of their employing organisation. Stakeholders stated it is often difficult to get

5   patients back to their pre-injury role (e.g., physical jobs), or that the company is too small to

6   make reasonable adjustments for the injured person:

7   *'Some of our companies will support people over months, but other companies who*

8   *are much smaller or have very specific, very physical jobs, it's very hard for them to*

9   *accommodate a large number of adjustments.' (Occupational physician)*

10

11   *3.1.3. External Policy and Funding*

12   This theme refers to external strategies to spread interventions, which included policy,

13   regulations, recommendations, and guidelines[24, 25]. Service providers discussed issues when

14   having no central point of contact within the trauma pathway and how constantly changing

15   services posed a barrier for effective rehabilitation. Service providers were frustrated with

16   decommissioning of services, low prioritisation of rehabilitation services and lack of clarity on

17   what funding is available, particularly for trauma survivors with mental health problems:

18   *'It's [rehabilitation] the first thing to get axed when budget cuts come in.' (Trauma*

19   *rehabilitation consultant)*

20   *'Commissioning's stagnant at the moment…There's no money for mental health.'*

21   *(Trauma psychotherapist)*

22

23   Service providers and trauma survivors frequently mentioned the lack of rehabilitation

24   services across areas of the UK, mainly in areas located further from major trauma centres:

25   *'It is quite postcode lottery-type thing. Some places have generic outpatient*

26   *departments, so there is no specific neuro or amputee or spinal expertise and that's*

27   *the same for community rehab.' (Case manager)*

28

10

1 Therapy teams were overstretched with long waiting lists, so introducing new interventions

2 was a concern, particularly for therapy managers. Other issues related to how external

3 policies allowed for cross-boundary working, (e.g., therapists accessing clinical notes from

4 other NHS Trusts, or liaison with the Department for Work and Pensions (DWP) or

5 employers):

6 *'If your substantive role is on the acute sector then crossing boundaries to the*

7 *community and out to the employers…or vice versa.' (Vocational OT)*

8

9 **3.2. Inner Setting**

10 *3.2.1. Culture*

11 This theme refers to the norms, values, and basic assumptions of an organisation[26], either

12 healthcare or employing organisations. Healthcare professionals and employers may

13 consider that the long-term effects of some injuries (e.g., brain injury) are too severe for

14 patients to RTW, preventing VR access:

15 *'I suspect that some people [healthcare providers] think there's nothing you can do*

16 *about a brain injury, so what's the point in referring [for VR].' (Trauma clinical*

17 *psychologist)*

18

19 Participants argued that there is a culture within acute care units to discharge patients when

20 they are medically fit for discharge, which may lead to individuals being discharged without

21 the necessary vocational and psychological support:

22 *'An acute hospital will never be geared up for those [vocational and psychological]*

23 *needs. Because their priority is, getting people through the medical system, assess,*

24 *treat, [and] discharge.' (Consultant neuropsychologist)*

25 Healthcare professionals within the acute setting were concerned about identifying potential

26 problems that an individual was experiencing because of lack of services to which to refer:

27 *'There's just not really the [vocational or psychological] services out there to then*

28 *signpost people on to. So, you almost feel like you're opening a Pandora's box where*

29 *you can't actually then put those pieces back in.' (Trauma OT)*

11

1

2 Consequently, trauma patients may be sent home with a rehabilitation plan that did not reflect

3 their needs. Participants also discussed longstanding barriers of hierarchy and a lack of

4 understanding about allied health professional roles. One therapist stated that healthcare

5 providers other than doctors were often ignored by employers, making an OT-led intervention

6 difficult to implement:

7 *'Sometimes they [employers] will not take the views of OTs, physios, speech and*

8 *languages, as seriously as they should, and sometimes they want to see doctor after*

9 *their name.' (Consultant neuropsychologist)*

10

11 Stakeholders also recognised potential facilitators, such as the need for changing the 'norm'

12 within the NHS and ensuring therapists and managers were committed to the intervention.

13 One therapist highlighted the need to translate research into the real-life context of the

14 healthcare system:

15 *'It's not just the development or the intervention itself, it's actually the integration of it*

16 *into the culture so that it changes the practice of what people think of as the norm…*

17 *and getting a lot of people to buy into it.' (Senior trauma physiotherapist)*

18

19 *3.2.2. Implementation Climate*

20 This refers to the capacity for change and the extent to which use of that intervention would

21 be rewarded, supported and expected within their organisation[27, 28]. Stakeholders could see

22 the need for change and were supportive of the intervention, as current services provided

23 limited vocational support. However, organisations both inside and outside the hospital did

24 not see VR as a priority relative to other services.

25

26 Major trauma centres lacked awareness and knowledge that RTW or education might be an

27 important part of long-term recovery. Healthcare providers in the acute setting were not

28 routinely asking about RTW, so patients were discharged without being offered the early

29 support they may benefit from:

12

1   *'Some people have gone out [of hospital] before four weeks, and they would maybe*

2   *be people who would benefit from some vocational input…they've got cages on their*

3   *legs, they've got to have skin grafts, so their return-to-work could be six to twelve*

4   *months, but they need to have that question [what is your job?] asked.' (Vocational*

5   *OT)*

6

7   Sometimes referral to specialist VR services did not happen as healthcare professionals did

8   not feel RTW was going to be problematic. Again, this related to a lack of knowledge in the

9   acute setting about the impact of injury on ability to RTW.

10   *'I think it was very surprising how few people were referred to this [VR] clinic…it*

11   *seems to be me that there was a kind of, yes return-to-work is important, but a*

12   *complete lack of understanding of, 'there's going to be a problem'. (Consultant*

13   *neuropsychologist)*

14   Employers and patients also lacked knowledge and awareness about the importance of

15   vocational support:

16   *'There may be massive difficulties or concerns around going back to work, those*

17   *don't come to light until they've become an outpatient…they haven't had contact with*

18   *their employers and their job may have already come to an end. Whereas if you'd*

19   *had an intervention earlier that could have been saved.' (Vocational OT)*

20   There is a known stigma about mental health[29-32] and patients are sometimes concerned

21   about disclosing psychological problems to employers, which can prevent them receiving

22   support. Therapists highlighted concerns over patients declaring non-visible conditions to

23   employers (e.g., anxiety, depression, pain). However, such non-disclosure may prevent

24   individuals receiving the RTW support they needed:

25   *'There's a stigma about talking about mental health. Is there any chance that by*

26   *encouraging somebody to discuss their mental health you are actually harming their*

27   *future employment?' (Trauma psychologist)*

28

29   *3.2.3. Readiness for implementation*

13

1   This theme is defined as tangible and immediate indicators of organisational commitment to

2   its decision to implement an intervention[24]. Service providers discussed their difficulties in

3   working flexibly and outside their normal area of expertise, including working across areas of

4   healthcare they were less familiar with, or having to liaise with employers:

5   *'There are some people who just cannot escape their programming from their*

6   *training… But in this kind of working the OT needs to do a bit of psychology and the*

7   *psychologist needs to do a bit of OT. And if the psychologist's too precious to do OT*

8   *then that's not going to work very well.' (Clinical psychologist)*

9

10   **3.3. Characteristics of Individuals**

11   *3.3.1. Self-efficacy*

12   This theme refers to an individual's belief in their own capabilities to execute courses of

13   action to achieve implementation goals[33]. For the delivery of a VR intervention to be

14   successful, the patients needed to believe in their ability to RTW, and the employer needed

15   to believe that they could support them. Service providers and patients talked about the

16   importance of changing employer attitudes towards traumatic injury:

17   *'Part of the difficulty is trying to work out how you can change work and getting the*

18   *employers to think differently about why they should support somebody going back*

19   *to work, particularly in high demand and highly technical jobs or very physical jobs.'*

20   *(Occupational physician)*

21

22   An employer's desire to act on the advice of a therapist or make reasonable adjustments to

23   support a RTW could become a barrier to VR intervention implementation:

24   *'There wasn't really an option to sit down, so I asked why I couldn't have a chair, they*

25   *[employer] said, well you can't obstruct the walkway…they weren't that*

26   *understanding really.' (Trauma survivor, brain injury)*

27   Feedback from stakeholders suggested that most employers were willing to accept advice

28   and improve understanding about injury to better support their employee. This facilitated VR

29   delivery, as supportive employers were invested in the RTW process:

14

1   *'The good employers will make the reasonable adjustments, they will understand the*

2   *situations, they will go and ask the necessary questions and do the best to support*

3   *them.' (Disability employment advisor)*

4

5   Some patients felt they were 'damaged' and lost confidence in their abilities, which impacted

6   motivation to RTW, or ability to push themselves:

7   *'I am not pushing myself forward [within work] as well because I think I am damaged*

8   *goods.' (Trauma survivor, spinal cord injury)*

9   This posed an issue for the implementation of VR because patients needed to have the

10 desire to RTW and to believe that they could. Therapists needed to work with patients to

11 encourage them to work towards rehabilitation goals.

12

13 A key facilitator to delivering a successful VR intervention was ensuring patients understand

14 the impact of their injury and how this would affect work, including the importance of not

15 returning-to-work too soon:

16 *'I think I should have taken on some reduced duties or something first. That was my*

17 *choice. They [employer] offered that and I said I'd be fine and then it turned out pretty*

18 *bad for me.' (Trauma survivor, orthopaedic injury)*

19

20 *3.3.2. Knowledge and Beliefs about VR*

21 This theme refers to individuals' attitudes toward, and value placed, on the intervention[24].

22 When discussing the content of ROWTATE, stakeholders felt it was appropriate and could

23 see the value in providing combined vocational and psychological support to trauma

24 survivors.

25

26 One stakeholder highlighted the importance of providing a VR intervention to ensure patients

27 do not RTW before they have fully recovered:

28 *'I've got many, many patients who ignore our [rehabilitation team] advice and go to*

29 *work earlier and they go a step backwards…within a week will say they are back to*

15

1   *work, and I am surprised how on earth they did that and what risk they are taking.'*

2   *(Rehabilitation physician)*

3

4   There also appeared to be a gap in therapist knowledge about how to provide VR and/or a

5   lack of confidence in asking questions about RTW. This posed an issue for delivering a VR

6   intervention in practice, as therapists are not routinely trained to ask patients work-specific

7   questions:

8   *'A lot of OTs aren't feeling confident about asking that [RTW] question, they find it*

9   *quite scary.' (OT)*

10

11   Stakeholders mentioned that some employers have little understanding of injury, especially

12   if they had never been faced with this situation, leading to anxieties about supporting an

13   employee's RTW:

14   *'Sometimes employers are frightened about taking on something that they don't*

15   *understand.' (Case manager)*

16

17   **4. Discussion**

18   Conducting implementation research in advance of the design of the intervention has meant

19   that not only have we identified barriers to implementation, but we have also been able to

20   actively address them. The key barriers were: cultural norms within healthcare and employing

21   organisations, the extent to which healthcare systems were networked with other

22   organisations, poor transition between different organisations, and failure to recognise VR

23   as a priority, often as a result of policies and funding. Although some of these findings are

24   more relevant within the UK context (e.g., policies and funding), certain implementation

25   barriers are applicable to global healthcare setting (e.g., culture within the healthcare and

26   employment sectors, cosmopolitanism, and VR knowledge).

27

16

1 Though many of the issues that we have presented are classic implementation issues[34], they

2 represent substantial challenges for ROWTATE, which we have attempted to modify before

3 it is implemented as part of a feasibility study[20].

4

5 One substantial barrier was deep-seated cultural practices among a wide variety of

6 stakeholders and beliefs about the need for early VR in the trauma population. Similar to

7 Mannion and Davies[35], we view culture as a complex and dynamic phenomenon which is not

8 amenable to simplistic interventions. Our study highlighted the negative impact that certain

9 cultural norms can have on the implementation of a complex intervention like VR. This issue

10 of culture is consistently reported in the literature[34, 36, 37] as a barrier to implementation, with

11 studies indicating that improving service providers' attitudes towards change[38, 39],

12 encouraging flexibility in their way of thinking[40] and identifying champions[41, 42] can facilitate

13 intervention delivery. We have sought to address cultural issues within the intervention

14 design by developing an in-depth training and mentoring package to explain and provide

15 evidence for the importance of a VR early intervention in the trauma population[43-46] and

16 increase therapist knowledge of VR. This training and mentoring package will be used for

17 OTs and clinical psychologists providing the intervention in the definitive trial.

18

19 Another key barrier was inadequacy of organisational networking, and the subsequent lack

20 of communication and continuity of care across the trauma pathway. Often, trauma patients

21 were discharged from the acute setting without any vocational or psychological support[47],

22 and when referred, therapists could not be confident that their patient would receive the

23 support they needed. This lack of communication is well documented[12, 48-50], posing a barrier

24 for VR implementation. Facilitating the link between health, employment, and others involved

25 in the RTW process (e.g., insurance industry, solicitors, case managers) may overcome

26 some of these issues enabling a sustainable RTW. To address this issue, training for the

27 OTs and psychologists who deliver our VR intervention positively encourages boundary-

28 crossing. The ROWTATE training and intervention are predicated on a model where the OT

29 acts as a case manager, facilitating communication between different stakeholders.

17

1

2   Findings from this study informed the programme theory and training package for the

3   ROWTATE intervention feasibility study[20] and trial. Patients need a central point of contact

4   when discharged from the major trauma centre or acute setting, to improve transition into the

5   community, but also to communicate with key stakeholders involved in supporting RTW. A

6   case coordinator, who also delivers the VR (e.g., OT), is essential to supporting its

7   implementation. Findings also suggested that early contact with an employer enables

8   increased awareness of the impact of injuries on employees and their ability to work and to

9   facilitate job retention. For a VR intervention to be implemented, the therapist should contact

10   the patient within the acute setting (where possible), or soon after discharge. Crossing

11   boundaries across different sectors is an essential part of a VR intervention, thus buy-in from

12   healthcare professionals across the trauma pathway and from employers is necessary.

13

14   We drew on existing evidence to develop the employer engagement component of our

15   intervention[51, 52]. Previous research in acquired brain injury and spinal cord injury indicates

16   that patients who understand the impact of their injuries are more able to discuss their

17   limitations with employers[17, 53]Understand their employee's injury and limitations is essential

18   in facilitating a successful RTW[17, 53, 54]. In general, employers feel they lack the necessary

19   experience and knowledge to support a RTW for someone post-injury[17, 53]. Further evidence

20   suggests that employers require functional advice (e.g. planning phased RTW, reasonable

21   adjustments) as well as psychological support to understand and address the needs of their

22   employee[53, 54]. Providing a central point of contact to liaise with, educate and support the

23   employer and patient, negotiating RTW plans, and providing advice and emotional support

24   (via OT and clinical psychologist), are key components our intervention.

25   Therapists need to be able to adapt to different circumstances and be flexible in intervention

26   delivery for VR to be successful, as every trauma patient is different. To support

27   implementation, a training package has been developed to train therapists to deliver the VR

28   intervention, along with ongoing mentoring. Finally, findings identified a lack of psychological

29   support for trauma patients. Thus, a VR intervention should include a psychological

18

1   component, to ensure both physical and mental health issues are considered during RTW.

2   For the definitive trial, where trauma services do not have access to psychological support,

3   we will explore options for provision of psychological support from other NHS Trusts or from

4   private practitioners.

5

6   We addressed as many issues as possible with the adaptations of the intervention (e.g.

7   improving communication by including a central point of contact/case manager), however

8   some implementation issues are not easily overcome (e.g. culture, organisational structure).

9   Such barriers require long-term improvements, not only to change professional behaviours

10   and cultural norms, but also to make small-step system changes to enhance coordination

11   across the trauma pathway. Whilst we adapted our intervention to overcome known barriers,

12   we anticipate new implementation issues arising when the intervention is delivered as part

13   of a trial (i.e. real-world testing).

14

15   Our study had several strengths, providing new evidence to support the implementation of a

16   VR intervention in the trauma population. We recruited a diverse sample of service users

17   (including self-employed patient participants) and providers across different NHS sites and

18   areas of the UK, thus presenting a broad perspective on the factors affecting implementation.

19   Our findings triangulate information from different perspectives, using a range of

20   methodologies, which enabled in-depth discussion and complex stories to be heard and

21   understood. Our research team is comprised practitioners (OTs, CPs, doctors) and

22   multidisciplinary academics. However, we were unable to recruit any employers to participate

23   in the interviews or focus groups, due to the COVID-19 pandemic and difficulty contacting

24   employing organisations. This meant the views of these stakeholders were not explored in

25   this context, and further work is required to understand their important perspectives on RTW

26   post-trauma. Although we aimed to engage with as many different stakeholders as possible,

27   we do feel some professions were underrepresented in our sample, including nurses,

28   prosthetists, orthotists and trauma surgeons.

29

19

1   **5. Conclusion**

2   Most implementation research continues to focus on one health condition and/or one context,

3   limiting empirical understanding of the complex networks through which much contemporary

4   health care is delivered. We addressed this gap by exploring issues across multiple trauma

5   networks and conditions to enhance understanding of how the intervention could be

6   implemented in different contexts and to ensure our intervention design and trial processes

7   were appropriate. Identification of key barriers and facilitators to implementation has

8   informed the development of the ROWATE intervention, which is ready to be tested in a trial

9   across five UK major trauma pathways. Although we understand how best to embed the

10   intervention within these complex systems, the success of its implementation will need to be

11   measured as part of a process evaluation. This will lead to a greater understanding of how

12   the intervention might impact wider system change and factors affecting future widescale

13   clinical implementation. Findings could illuminate similar barriers in other complex healthcare

14   pathways outside of major trauma (e.g., cultural norms, poor communication), and may

15   inform intervention implementation within other conditions.

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Table 1: Summary of topic guides

	Topic guide	Focus of activity	Example of questions
1.	Interview and focus group topic guide for service providers ★	• Discussing experiences and opinions of current services • Identifying any service gaps that exist. • Describing proposed return to work intervention/programme called ROWTATE and ask for feedback. • Identifying any potential barriers to delivery within the NHS.	• Does your organisation currently provide return to work services/support for people after trauma? • Thinking about the needs of people after trauma, where do you think there are service gaps? • Is there an unmet need for vocational support after injury? • Which trauma related problem(s) (e.g., physical health, mental health, other) should our return to work programme focus on? *Thinking more specifically about the proposed ROWTATE programme...* • What things need to be in place to allow the programme to begin (resources) • Who should provide the programme and what training will they require? • Does the implementing organisation have the capacity to implement this programme? • Will the clients face any barriers to receiving the programmes? • What outcomes will be achieved by the intervention/programme? • What environmental factors might work to support or act against implementation of the programme?

2.	Interview and focus group topic guides for service users (trauma and carer participants)	• Discussing the impact of injury
		• Experiences and opinions of current services
		• Discussing gaps in services that were (or were not) available post-injury.
		• Discussing return to work services, their purpose and why support isn't always provided/barriers to delivery.
		• Presenting/describing the proposed return to work programme called ROWTATE and asking for feedback about content and potential barriers to delivery.
			• In your experience what services are available to support people who have major injuries?
			
			• What are the issues people who have major injuries face in returning to and remaining in work?
			• Thinking about people of working age who have major injuries, is there a need for services that support people in a return to work?
			If so, what should this service look like?
			
			Thinking more specifically about the proposed ROWTATE programme...
			
			• How does this programme fit with your ideas of what is needed? Will it address the problem?
			• Can you think of anything that might prevent this programme from working?
			• Can you think of any barriers to engaging in the ROWTATE programme?
			• Do you think there may be any negative consequences?
			    → *For the injured person?*
			    → *For the employer?*
			    → *For the health service?*

21

Table 2: Summary of participant recruitment by activity

Activity	Purpose/topics covered	Average length of activity	Participant type	n	Total per activity (n=117)
Focus groups (n=5)	Psychosocial context of trauma survivors, essential resources needed for, and barriers to the implementation of a VR intervention.	90 minutes	Trauma survivor	15	25
			Service provider	9	
			Carer	1	
Semi-structured interviews	Experiences of receiving or providing rehabilitation, understanding usual care and local unmet need, specific service gaps and lack of support, contextual factors affecting the implementation of a VR intervention.	60 minutes	Trauma survivor	10	38
			Service provider	27	
			Carer	1	
Walk through care pathways		20 minutes	Service provider	11	11
Workshops (n=5)	Discussions about the VR intervention logic model, the local context for delivery and other factors that may affect its implementation.	120 minutes	Trauma survivor	5	43
			Service provider	38	

22

Table 3: Characteristics of participants

Participant type	Professional role or injury type	Total (n=117)	Other demographic information
Service user (n=32)	Amputation	1	*Gender:* Male (n=15, 47%); Female (n=17, 53%)
	Brain injury and poly-trauma	13	*Pre-injury occupation:* Self-employed (n=5, 16%); Employed (n=25, 78%); Student (n=2, 6%)
	Carer	2	
	Orthopaedic injury	13	*Ethnicity:* White British (n=30, 94%); Asian (n=1, 3%); Black British (n=1, 3%)
	Spinal injury	3	
Service provider (n=85)	Case manager	3	*Gender:* Male (n=29, 34%); Female (n=56, 66%)
	Clinical psychologist	10	
	Disability employment advisor	3	
	Doctor/physician	16	
	General Practitioner	4	
	Occupational physician	1	
	Occupational psychologist	1	
	Occupational therapist	27	
	Physiotherapist	5	
	Psychiatrist	1	
	Solicitor	2	
	Speech and language therapist	1	
	Trauma charity coordinator	2	
	Trauma practitioner	5	
	Trauma rehabilitation coordinator	1	
	Trauma psychologist/psychotherapist	3	

23

Table 4: Summary of researcher characteristics

Characteristic	Researcher 1 (JK)	Researcher 2 (PP)	Researcher 3 (KB)	Researcher 4 (ST)
Gender	Female	Female	Female	Male
Education	MSc, PhD	MSc	MSc	MSc, PhD
Ethnicity	White British	Asian British	White British	White British
Research role/title	Research Fellow	Research Assistant	Research Assistant	Professor
Experience	Traumatic injury research, rehabilitation psychology and implementation	Developmental and neuro-psychology	Trauma psychology	Health services management, implementation
Research activity	Interviews Focus groups Co-design workshops Walk-through care pathways	Interviews	Interviews Focus groups	Co-design workshops

24

Table 5: Summary of findings from co-design workshops mapped onto CFIR headings

	CFIR constructs	Definition of construct	Key points made during co-design workshops
Outer Setting	Patient Needs and Resources	The extent to which patient needs, as well as barriers and facilitators to meet those needs, are accurately known and prioritised by the organisation.	Some community rehabilitation teams were already providing VR and/or psychological support, however waiting lists are long meaning patients' needs are not always addressed in a timely manner. Additional resources and therapists would increase capacity, thus supportive of out intervention.
	Cosmopolitanism	The degree to which an organisation is networked with other external organisations.	Major trauma centres had good links with repatriating hospitals and community teams, however stakeholders highlighted the gap in communication between acute and community care. This was highlighted as a potential barrier to implementation.
	Peer Pressure	Do organisations feel peer pressure to adopt the intervention?	All participants were open to implementing the intervention in their NHS sites, however as services and processes are influenced by funding/commissioning, stakeholders felt this might be a barrier to long-term implementation.
	External Policy and Incentives	External strategies to spread interventions including policy and regulations, external mandates, recommendations and guidelines.	Stakeholders stated that policies may be a barrier to long-term implementation, but not a barrier in terms of study delivery.
Inner Setting	Structural Characteristics	How the organisation works. The social architecture, age, maturity, and size of an organisation.	Stakeholders were open to change and felt our intervention would work well within their organisation if barriers addressed.
	Networks and Communications	The nature and quality of formal and informal communications within an organisation.	Communication between healthcare professionals within the organisation and multi-disciplinary working would facilitate intervention delivery.
	Culture	Norms, values, and basic assumptions of a given organisation.	Rehabilitation stakeholders appeared open to the implementation of a vocational intervention and felt it was an important intervention.
	Implementation Climate	Absorptive capacity for change, shared receptivity of involved individuals to an intervention and the extent to which use of that intervention will be rewarded, supported and expected within their organisation.	Stakeholders agreed intervention was important for people after trauma and supported its implementation, with the hope that their organisation would encourage its delivery long-term.
	Readiness for Implementation	Tangible and immediate indicators of organisational commitment to its decision to implement an intervention.	NHS sites ready to implement the intervention for the trial.
Characteristics of individuals	Knowledge and Beliefs About the Intervention	How much do stakeholders know about the intervention and what do they think about it.	Stakeholders agreed that the components of the intervention were appropriate and would be feasible to deliver if service specific barriers addressed.
	Self-Efficacy	Individual belief in their own capabilities to execute courses of action to achieve implementation goals.	Stakeholders believe intervention is important and wanted to support its implementation in their NHS sites.
	Individual Stage of Change	Characterisation of the phase an individual is in, as he or she progresses toward skilled, enthusiastic, and sustained use of the intervention.	Stakeholders enthusiastic about the intervention and keen to be involved.
	Other Personal Attributes	A broad construct to include other personal traits such as tolerance of ambiguity, intellectual ability, motivation, values, competence, capacity, and learning style.	Stakeholders seemed motivated to implement the intervention in their different NHS sites.

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Figure legends

Figure 1: Summary of barriers and facilitators to the implementation of a vocational

rehabilitation intervention, mapped onto CFIR.

26

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Contributorship statement

JK: methodology, formal analysis, writing, data collection, review and editing; KR: conceptualisation, funding acquisition, project administration, methodology, formal analysis and review; DK: conceptualisation, funding acquisition, project administration, methodology, writing, review and editing; PP: methodology, formal analysis, data collection, review and editing; KB: methodology, formal analysis, data collection, review and editing; BK: funding acquisition, project administration, methodology, formal analysis, review and editing; RdN: funding acquisition, methodology, writing, review and editing; TJ: funding acquisition, methodology, formal analysis and review; ST: funding acquisition, methodology, data collection, formal analysis, writing, review and editing; All authors have read and agreed to the published version of the manuscript.

Data sharing

The data that participants have consented to share will become available to potential researchers at the end of this study. Requests detailing the research aims and use of the data should be sent to the research team via email: ROWTATE@nottingham.ac.uk.

Ethical Approval

Ethical approval was obtained from the University of Nottingham Faculty of Medicine and Health Sciences Research Ethics Committee (Ref: FMHS 150-1811) and Leicester South NHS Research Ethics Committee (Ref 19/EM/0114).

27

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Declaration of Conflicting Interests

The authors declare that there is no conflict of interest.

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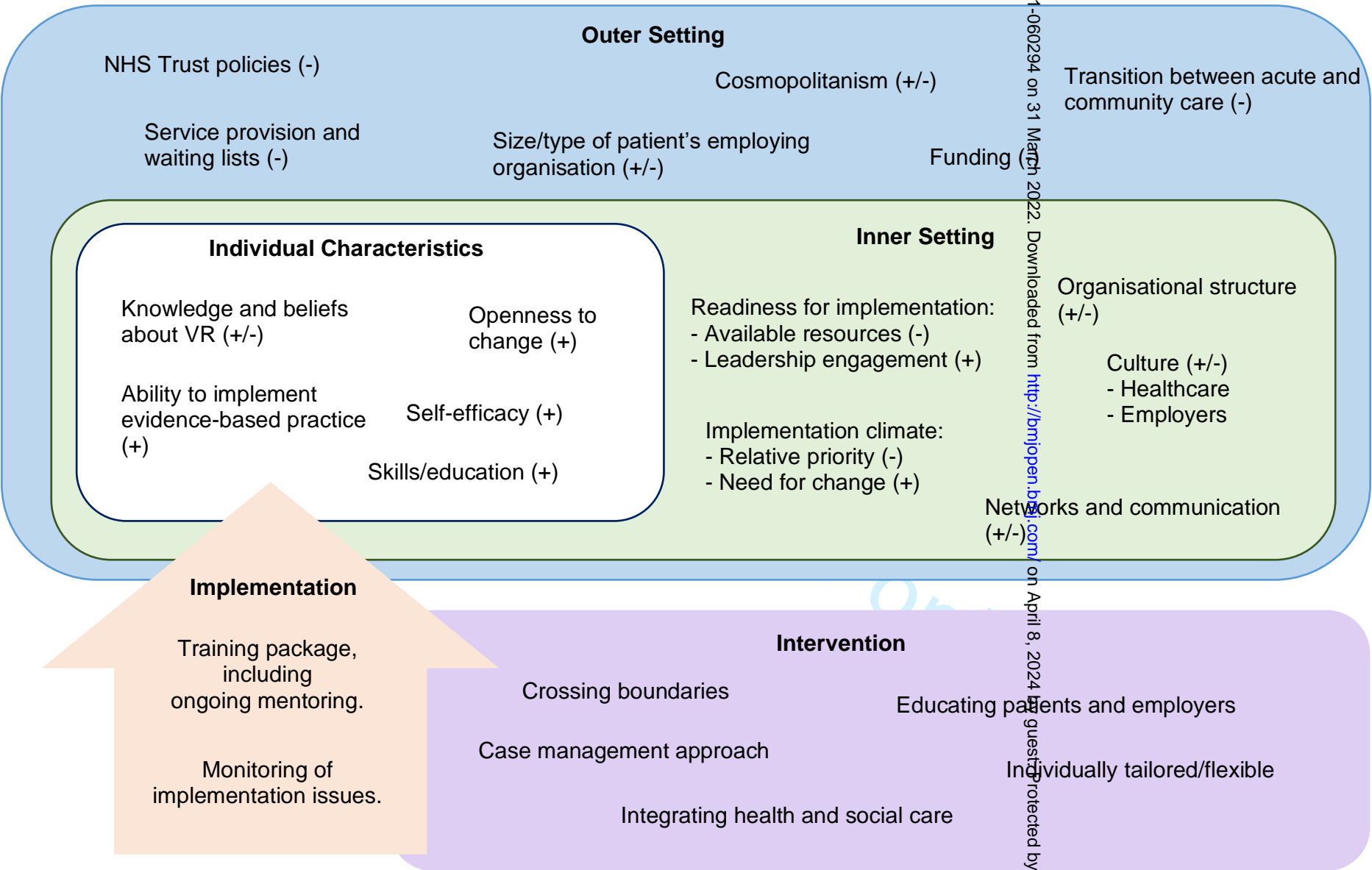**References**

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31

Outer Setting

NHS Trust policies (-)

Cosmopolitanism (+/-)

Transition between acute and community care (-)

Service provision and waiting lists (-)

Size/type of patient's employing organisation (+/-)

Funding (-)

Inner Setting

Individual Characteristics

Knowledge and beliefs about VR (+/-)

Openness to change (+)

Ability to implement evidence-based practice (+)

Self-efficacy (+)

Skills/education (+)

Readiness for implementation:
- Available resources (-)
- Leadership engagement (+)

Implementation climate:
- Relative priority (-)
- Need for change (+)

Organisational structure (+/-)

Culture (+/-)
- Healthcare
- Employers

Networks and communication (+/-)

Implementation

Training package, including ongoing mentoring.

Monitoring of implementation issues.

Intervention

Crossing boundaries

Educating patients and employers

Case management approach

Individually tailored/flexible

Integrating health and social care

(+) indicates facilitator   (-) indicates barrier

Figure 1: Summary of barriers and facilitators to the implementation of a vocational rehabilitation intervention, mapped onto CFIR.

COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
Personal characteristics			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	
Occupation	3	What was their occupation at the time of the study?	
Gender	4	Was the researcher male or female?	
Experience and training	5	What experience or training did the researcher have?	
Relationship with participants			
Relationship established	6	Was a relationship established prior to study commencement?	
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: Study design			
Theoretical framework			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	
Sample size	12	How many participants were in the study?	
Non-participation	13	How many people refused to participate or dropped out? Reasons?	
Setting			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	
Data collection			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	
Field notes	20	Were field notes made during and/or after the inter view or focus group?	
Duration	21	What was the duration of the inter views or focus group?	
Data saturation	22	Was data saturation discussed?	
Transcripts returned	23	Were transcripts returned to participants for comment and/or	

Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			
Data analysis			
Number of data coders	24	How many data coders coded the data?	
Description of the coding tree	25	Did authors provide a description of the coding tree?	
Derivation of themes	26	Were themes identified in advance or derived from the data?	
Software	27	What software, if applicable, was used to manage the data?	
Participant checking	28	Did participants provide feedback on the findings?	
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	
Data and findings consistent	30	Was there consistency between the data presented and the findings?	
Clarity of major themes	31	Were major themes clearly presented in the findings?	
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

Once you have completed this checklist, please save a copy and upload it as part of your submission. DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.