

A group concept mapping and ethnographic study of intensive care rehabilitation culture: study protocol

Abstract

Background: Early physical activity and physical rehabilitation are advocated in the critical care unit for patients recovering from critical illness. Despite this, there are still many factors associated with implementation of early physical rehabilitation into routine critical care and practice. One such factor that has been consistently identified is unit culture, yet there is little understanding of how or why the culture of a critical care unit impacts on implementation of early rehabilitation.

Aim: To develop a detailed understanding of the cultural barriers and enablers to the promotion and implementation of physical activity and early mobilisation in National Health Service (NHS) critical care units in the United Kingdom (UK).

Design: A mixed-methods, two-phase study incorporating online Group Concept Mapping (GCM) and ethnography. GCM will be conducted to provide a multistakeholder co-authored conceptual framework of rehabilitation culture. Ethnographic observations and interviews will be conducted of culture and behaviours in relation to the implementation and promotion of early physical activity and rehabilitation in two NHS critical care units in the XXX.

Methods: GCM will be carried out via groupwisdom™ web platform. Critical care clinicians and former patients and their relatives will be recruited to participate. Ethnography will involve direct participant observations within two critical care units, semi-structured interviews with clinical staff and documentary analysis of key communications within the multi-disciplinary team.

Analysis: The conceptual framework developed from the GCM will be used to subsequently focus ethnographic observations. Ethnographic data will be analysed through a process of inductive framework analysis. The group-derived conceptual framework produced from GCM will be refined to reflect and incorporate the ethnographic findings.

Relevance to clinical practice: This study will provide a detailed understanding of barriers and facilitators in relation to providing a positive rehabilitation culture in the critical care unit.

Summary:

What is known

- Physical activity, mobilisation and rehabilitation are safe and feasible for patients in critical care and are a key component of recovery from critical illness.
- Unit culture is commonly cited as both a barrier and facilitator for physical activity and rehabilitation practices for survivors of critical illness.

What this paper adds:

- This protocol provides a basis for exploring rehabilitation culture within critical care to further understand and define the concept.

1. Background

Advances in critical care medicine mean more patients are surviving critical illness and critical care admission (Iwashyna & Netzer, 2012). This has changed the focus from survival to optimising survivorship and quality of life (Angus & Carlet, 2003; Iwashyna, 2010). Survivors of critical illness can be afflicted with physical, cognitive, and psychological impairments that persist after critical care discharge, referred to in the literature as post-intensive care syndrome (PICS), (Jackson *et al.*, 2014; Herridge *et al.*, 2011)

Over the past fifteen years, there has been a growing body of literature to support early mobilisation, rehabilitation and physical activity in patients undergoing critical care. Multiple studies have deemed it safe and feasible in the critical care unit, with evidence to show reduced critical care length of stay, improved functional outcomes at discharge from critical care and reduced time to ventilator liberation (Schweickert *et al.*, 2009; Kayambu, Boots & Paratz, 2013; Morris *et al.*, 2008). Research and guidance highlight the role of activity and mobilisation in reducing days of critical care associated delirium, a contributor to cognitive impairment after critical illness (Schweickert *et al.*, 2009; Needham *et al.*, 2010; Nydahl *et al.*, 2021; Barr *et al.* 2013). Immobility and inactivity in patients recovering from critical illness contribute to the functional deficits that survivors face. Although the optimum type, timing and intensity of physical activity and early mobilisation remains unknown (Hodgson *et al.*, 2022), reducing the duration of immobilisation is an important target in the prevention of the physical and potentially cognitive domains of PICS (Hermans & Van den Berghe, 2015; Hodgson & Tipping, 2017).

Despite evidence and expert consensus that early mobilisation and physical activity are beneficial, practice is variable in critical care units across the UK and internationally (Bakhru *et al.*, 2016). A study by Connolly *et al.* (2017) found that patients on a UK mixed surgical and medical critical care unit spend over ninety-nine percent of their waking hours inactive. This study, and other international observational studies investigating daily physical activity of patients in critical care, highlight the need for culture change to facilitate practice that reflects current evidence (Connolly *et al.*, 2017; Berney *et al.*, 2014; Pastva *et al.*, 2017). Culture of critical care has been highlighted as significant factor associated with early mobilisation and physical activity practices (Bakhru *et al.* 2016; Dubb *et al.*, 2016; Parry *et al.*, 2017). The term 'culture' is used throughout literature exploring barriers and facilitators to mobilisation and activity in critical care, but there is little consensus on how culture is defined in this body of literature.

2. Aim of the study

This study aims to develop a detailed understanding of the cultural barriers and enablers to the promotion and implementation of physical activity and early mobilisation in UK NHS critical care units. Specific objectives are to:

- 1) Explore rehabilitation culture from the perspective of UK critical care clinicians, critical illness survivors and their relatives, and produce a group conceptualisation of the issue using a process of group concept mapping.

- 2) Explore rehabilitation culture within critical care units by observing practices and behaviour, and exploring clinicians' values and perspectives, relating to rehabilitation and physical activity in critical care and identify barriers and facilitators.
- 3) Develop a conceptual framework of rehabilitation culture, specific to critical care, through interpretation and analysis of the data.

3. Design and Methods

The study will employ a fully mixed concurrent equal status design (Leech & Onwuegbuzie, 2009). Mixed-methods, consisting of Group Concept Mapping (GCM) and qualitative ethnographic techniques, will be used. The study will comprise two distinct phases of data collection. The first phase will be online GCM to explore multi-stakeholder perspectives of culture of rehabilitation in critical care units. GCM is a mixed-methods participatory approach which captures knowledge and perspectives of a group and produces a series of concept maps by performing multivariate statistical analysis with this data (Kane & Rosas, 2018). It has previously been used within healthcare research to evaluate existing services, and to provide co-authored solutions to concepts or phenomena in healthcare that have previously been difficult to describe or define (Robinson et al., 2020; Leland et al., 2022). Unlike other participatory methods, such as a Delphi study, where the aim is to reach consensus and negate outlying responses, GCM recognises the views and perspectives of all stakeholder participants as valid and reflects these in the resultant concept map. Stakeholder participants are key throughout the GCM process, providing their perspectives in the generation of ideas, the cataloguing of the data and the interpretation of the results.

The second phase will use focused ethnography, incorporating direct observation, interviews with critical care multidisciplinary clinicians, and document analysis of daily ward rounds, multidisciplinary meetings and patient and relative information leaflets. An initial conceptual framework will be developed through the multi-stakeholder GCM study, which will then be used to focus ethnographic observations throughout the second phase of data collection.

3.1 Group concept mapping

3.1.1 Participants and sampling

Eligibility for participation is any healthcare professional who provides clinical care to patients in critical care, former adult patients or relatives/next of kin of adult patients who have stayed in critical care, for longer than 72 hours, in the 3 years prior to the start of the study. Participants will be purposively recruited through critical care patient and professional networks and social media networks, with an aim of maximum variation and representation of multiple critical care stakeholders.

At least 40 participants will be recruited to the idea generation stage to provide diversity of responses, but ensure the ideas generated are manageable in number, and at 20-30 to the organisation stage, in line with recommendations for quality and rigor in GCM (Rosas & Kane, 2012). Eligible participants will be provided with an electronic participant information sheet and provide

electronic informed consent before being directed to the respective activity on the project page on groupwisdom™. Participants are eligible to join at any stage of the group concept mapping activity.

3.1.2 Data Collection & Analysis

Group Concept Mapping will take place online using the groupwisdom™ web platform hosted by Concept Systems Incorporated which is specifically designed for GCM projects (<http://groupwisdom.tech>). Participant demographic data will be collected to provide transparency of the representation within sample, including profession/patient/relative, band/grade, years of clinical experience in critical care and number of critical care beds in base unit (as applicable). Some of this data (i.e. profession/relative/patient) will aid in comparison of pattern-matched data across categories. Participants will be invited to participate in at least one of the participant-led stages (Fig 1.).

Insert: Figure 1. The stages involved in GCM. The dark blue column indicates the GCM stage and the light blue column provides a description of the activities within that stage (adapted from Kane & Rosas, 2018)

Idea generation

Participants will be invited to respond to a focus prompt that has been developed by the research team and piloted with critical care multi-professional clinicians to ensure it is understood and interpreted correctly. The statement will be prefaced by widely accepted definitions of 'rehabilitation' and 'culture' to ensure relevance in responses (Turner-Stokes *et al.*, 2014; Manion & Davies, 2018)

"Rehabilitation is a process by which individuals are supported to achieve their maximum potential for physical, cognitive, social, and psychological function. Culture refers to a system of shared values, assumptions and beliefs that influence behaviours and practices.

*A specific component of **rehabilitation culture** that I believe to be important for patients in critical care is..."*

Idea synthesis

Qualitative statements that are contributed to idea generation will be interpreted, aggregated, and synthesised by the researchers into a final set of statements for participants to organise in the following stage. This process will be carried out systematically and independently by XX and XX, with any variances discussed until agreement is reached. Prior to advancing to the next stage, XXX will review the statements to ensure relevance to the focus prompt.

Organising (sorting and rating)

Once idea generation and synthesis have been completed, participants will be asked to examine the set of statements that have been synthesised by the researchers and sort them into themes based on their own interpretation. Participants will also rate each statement on two separate scales.

Firstly, they will rate each statement on how important they perceive it to be in relation to rehabilitation culture in critical care. They will then rate how present they perceive the concept or phenomenon to be within their organisation (healthcare professionals) or personal experience (patients and relatives).

Analysis

Statistical analysis of the sorting and rating data will be performed by groupwisdom™ software. The sorting data will be converted into quantitative data, via a similarity matrix, and analysed using multi-dimensional scaling to generate a point map, where statements frequently sorted together (i.e., that participants consider to be conceptually similar) are placed closer together. Hierarchical cluster analysis will be used to organise the content into meaningful concepts or groups based on the statements' proximities on the point map (Trochim & Kane, 2005), providing a number of unique concept maps with varying numbers of clusters. XXX, XX, XXX and XX will review and interpret the data throughout this process and determine the number of clusters, that they believe best illustrate the data results. The research team will also create domain names to describe each cluster and to represent the key themes that determine rehabilitation culture.

'Importance and presence' rating data will be analysed to identify the current presence of high-value cultural concepts or phenomena in current critical care practice, and to identify potential areas for practice change. These will be examined at cluster level (pattern matches) and individual statement level (go-zones). The pattern matching results in side-by-side visual data comparisons of importance and presence ratings as determined by all participants. Pattern matching will also be arrayed by professional subgroups, where possible, to identify any differences or distinctions across professions. Go-zones will be produced for each cluster, illustrating the average rating of each statement on both importance and presence (Kane & Rosas, 2018). The bivariate scatter plot will result in a four-quadrant graph, allowing for identification of concepts of that are deemed currently successful in achieving positive rehabilitation culture (very important/very present) and those that are high priority for practice change (very important/rarely present).

Interpretation

In the final participant-led stage, contributing participants will be requested to provide feedback on the results of the project via a face-to-face meeting via Microsoft Teams Visual representations of the analysed data will be shared with the participants and their interpretation of these will be sought. There will also be a collective discussion with contributing participants to determine how the results can be used within the critical care community to aid in development of positive rehabilitation culture.

Utilisation

The results of the GCM study will form the basis of a preliminary conceptual framework of rehabilitation culture and will be used to inform the second phase of the study.

3.2 Ethnography

3.2.1 Study setting

Ethnography will take place in two adult general medical/surgical critical care units within a tertiary hospital Trust in the UK. Unit 1 is a 20-bed unit, split into a ten-bed intensive care unit (ICU) and ten-bed high dependency unit (HDU). Unit 2 is a 22-bed integrated critical care unit with flexible Level 2 and Level 3 beds. Observations will be carried out by XXX on participating units following written consent from a lead consultant on behalf of the unit.

The lead researcher, XXX, has worked in a clinical capacity as a physiotherapist on the critical care units where ethnography is taking place. She will clearly explain her role as a PhD student and researcher, whilst acknowledging her clinical background as an interest for the research.

3.2.2 Sampling and participants (interviews)

Semi-structured interviews will be conducted with up to 20 members of clinical staff, purposively sampled to represent the critical care multidisciplinary team (MDT). A recent systematic review of empirical studies that assessed saturation in qualitative research, recommends that 9-17 interviews is sufficient to reach data saturation in most cases (Hennink & Kaiser, 2022). Planning for up to 20 interviews allows for some additional insight to be identified, given the professional heterogeneity of the sample. Interview participants will include consultant and junior grade medical staff, advanced critical care practitioners, senior nurses, senior physiotherapists, other embedded therapy staff (e.g., occupational therapists, speech and language therapists), staff nurses, critical care assistants and rehabilitation assistants. Eligible participants may be approached by the researcher or may provide an expression of interest and contact details. Selected participants will be provided with written participant information and will provide written informed consent.

3.2.3 Data collection (observations)

Direct participant observation will be conducted in each critical care unit, covering various times between 7:30am and 9pm, during both weekdays and weekends. 8:30am – 8pm has previously been used in relevant literature to define patients' potential active hours (Connolly *et al.*, 2017). An hour either side of this will allow observation of handover processes and discussions relevant to rehabilitation. The total number of hours will be determined by the study team reflecting on data saturation and information power (Fusch & Ness, 2015; Malterud, 2016), which is anticipated to be met within sixty hours of observation on each unit. This should allow for observation of a wide range of practice activities and rituals over a reasonable period of time, and is similar to other focused observational healthcare research (Dixon-Woods *et al.*, 2013; Scott *et al.*, 2019)

Initially, the periods of observation will be exploratory and inductive in nature. A further period of observation will be undertaken once the GCM phase of the study has been completed. During this period, the conceptual framework developed from the group concept mapping phase of the study, and the analysed data from the first periods of observation will focus and guide observations and interviews in relation to the aims of the study.

Routine practice on the critical care unit, and formal and informal interactions between healthcare staff/ healthcare staff and patients will be observed. Where possible, the researcher will attend

relevant meetings such as multi-disciplinary team meetings and will be present during handover processes. Within a critical care unit, these artefacts reflect the rituals and discourses that are the primary foci of observational research (Gobo, 2008). Data will be recorded in the form of handwritten field notes and the researcher will keep a reflective diary throughout the process. Observations and data collection will take place following an orientation phase on each site, which will involve the researcher spending time in each unit to become familiar with the daily processes via shadowing.

3.2.4 Data collection (interviews)

Interviews of up to one hour will be conducted by XXX within the hospital setting, or another agreed location as appropriate. Demographic data including profession, band/grade, years of experience, age and gender will be collected. Interviews will be digitally recorded (audio only), transcribed verbatim and anonymised. The researcher will also keep reflective notes of the interview experience. As the interviews are semi-structured, a topic guide with prompts has initially been developed, which will be iteratively refined to reflect emergent data from the GCM and throughout the observation period. The total number of interviews will be determined by the study team reflecting on data saturation and information power (Fusch & Ness, 2015; Malterud, 2016).

3.2.5 Data analysis

Data generated through the first period of ethnographic research (both observations and interviews) will be analysed through a process of inductive descriptive and theoretical analysis incorporating cataloguing and organisation, categorisation, and pattern identification (Angrosino, 2007). Samples of data will be reviewed, classified, analysed, and crosschecked independently by XXX and XX.

Data will be triangulated with the data from the GCM and the resulting group conceptualisation, to explore commonalities and differences. From this process, an analytic framework will be created to aid in the analysis of the second period of observation.

Data generated through the second period of observation will be analysed using the Framework Method, using the framework developed through a period of reflection and triangulation following the first observation period. This inductive-deductive method will allow for further refinement of the framework throughout analysis (Gale *et al.* 2013). This aim of this process is to ultimately develop a working conceptual framework of rehabilitation culture in critical care.

3.3 Ethical issues and regulatory considerations

3.3.1 Ethical and research approvals

Ethics approval for the study has been granted by XXX University Faculty of XXX and XXX XXX ethics committee (XXXXX) and the Health Research Authority (XX/XX/XXX).

3.3.2 Ethical considerations

Unit-level agreement will be sought from the lead consultant at the study outset. The researchers will seek to ensure that all staff are aware and informed of the research by providing all staff with

participant information sheets, which will be cascaded by a lead consultant and/or senior nurse on the ward via email. Posters will be displayed in staff areas to inform that research is taking place in the clinical area and the researcher will provide verbal information and obtain verbal permission to conduct observations where possible. If a member of staff explicitly expresses that they do not wish to be observed, this will be acknowledged, and no observations of that member of staff will take place. All field note entries will be anonymised, with no identifiable information about staff members recorded, other than their profession, grade and gender.

Although patients are not the intended ‘participants’ of this research, steps have been taken to consider ethical implications of conducting observational research involving patients who may lack capacity due to the nature of their critical illness. Health Research Authority (HRA) guidance has been consulted to understand the application of the Mental Capacity Act 2005 in this research study (NHS Health Research Authority, 2019).

The research will produce results relevant to the condition affecting those being observed and there are no clinical or physical risks identified. The research poses very low risk of causing potential distress to patients who are being observed and steps have been taken to mitigate this risk. The nature of the research is that it will have no direct impact on the care being delivered to patients on the critical care unit. As the research will involve the processing of non-identifiable data of patients only, it is not classed as ‘intrusive’ research, as defined by the Health Research Authority (NHS Health Research Authority, 2019). For this reason, the Mental Capacity Act does not apply to this research, and the main ethical responsibilities are in safeguarding the rights, dignity, and privacy of patients.

The Pathfinders group for Critical Care, a local organisation of former patients and staff, have been consulted and have helped inform practices for information provision and maintenance of rights, privacy, and dignity of patients throughout the study. This has been confirmed via the HRA approval process. Prior to entering a patient’s bedspace, the researcher will seek agreement from clinical staff and will leave if requested to do so by staff, patients, or visitors. At the bedside, they will introduce themselves to the patient, provide a brief overview of the research and seek agreement to continue the observation. Professional and clinical judgement will be exercised by the researcher to determine appropriateness of observations at any given time. Posters will be displayed in the visitors’ rooms and a short information sheet about the study can be provided to patients and relatives if they request further information.

4. Organisation and management

The research will be led by XXX, Lecturer and PhD researcher in Physiotherapy and Advanced Physiotherapist. XX, XX, XXX and XXX will have supervisory overview of the research. XXX will conduct the GCM study, under supervision of XX, XXX and XX, and will conduct the observations and interviews across both unit sites with organisational support of XXX. XX an experienced qualitative researcher, will provide support and moderation with coding and analysis.

5. Limitations

Although designed to widen participation, the use of an online platform to carry out GCM may limit participation from those with reduced computer-literacy or cognitive capacity. Participants who have strong opinions or investment in the topic may be more likely to participate, and there may be stronger representation from some professional groups, such as therapy professionals. Targeted advertising and dissemination via professional groups will be used to try and ensure wide representation, however, this cannot be guaranteed.

The researcher's positionality as an insider within critical care, whilst providing advantages with relation to familiarity and access to both the environment and artefacts of critical care routines, may impact on the responses and behaviours of participants in the study. Regular reflection, using a reflective diary during and after data collection and analysis, and regular discussion with the wider research team will be undertaken to acknowledge and mitigate this potential impact.

6. Discussion

Culture, although commonly cited as both a barrier and facilitator to physical activity practices in critical care, remains under-explored and poorly described in the literature. A systematic review of factors influencing physical activity in critical illness survivors, separated findings into five key themes; motivations and beliefs, patient physical and psychological influences, safety influences and clinician and team influences (Parry *et al.*, 2017). Workplace culture was highlighted as a sub-theme of 'clinician and team influences'. Those in the field of organisational psychology argue that culture refers to a system of shared values, assumptions and underlying beliefs that influences the way of doing things in work units (Guidet & Gonzalez-Roma, 2011), and also incorporates 'motivations and beliefs', another theme within the review. It could also be reasoned that 'environmental influences', and the additional sub-themes within 'clinician and team influences' all contribute to the rehabilitation culture of the unit.

The use of Group Concept Mapping will be the first example of a multi-stakeholder group conceptualisation of positive rehabilitation culture. Participants with experiences of different critical care units will help to determine transferability across NHS organisations. This will add to the understanding of the relationship of concepts that determine rehabilitation culture and will form the basis of a conceptual framework for further investigation.

The culture of an organisation (or critical care unit, in this instance) is derived from the interactions of the 'idiocultures' or subcultures which contribute to that organisation (Bolon & Bolon, 1994). These interactions and their resultant behaviours are unlikely to be perceptible from the use of interview and focus groups methods alone, which are the predominant qualitative methods used in previous studies that have identified culture as a facilitator or barrier to physical activity (Anekwe *et al.*, 2020; Parry *et al.* 2017; Dubb *et al.* 2016). Ethnography, as a methodology, is concerned with studying the way groups work within a specified setting, in order to convey a detailed account of the way they live and practice within their own context (Gobo, 2011). Due to the ethnographic approach to data collection, this study will achieve a deeper understanding of the vast number of variables which interplay within the context of critical care clinical practice. Combined with GCM it will aid in the development of a conceptual framework or rehabilitation culture in critical care, a concept that is currently poorly understood.

7. Conclusion

This protocol provides a mixed-methods approach, utilising and triangulating data from group concept mapping and ethnographic data collection, to explore rehabilitation culture in critical care and to refine and develop a conceptual framework to enable future practice development.

8. Impacts

This protocol provides a methodological framework to develop a conceptual framework of rehabilitation culture in critical care. This conceptual framework can form the basis of further research and quality improvement by identifying areas of best practice and priorities for potential practice change. Identifying areas for change will allow critical care clinicians and organisations to engage in interventions that will help to transform rehabilitation culture in critical care to reflect the emerging evidence base and remain clinically effective and patient-centred.

8. Author contributions

All authors contributed to protocol development, methodological design, manuscript preparation and editing.

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