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Systematic Review of the Literature

Pain, anxiety and depression are common post-surgical experiences and can have a significant negative impact on recovery. Guided imagery has been found helpful in treating pain, anxiety and depression outside of the surgical setting, and may be a useful treatment in this context due to its flexibility and low demands for patients and clinicians. However, previous reviews of its efficacy have been limited to post-operative pain and pre-operative delivery, leaving important gaps for clinical practice. The aim of this review was to analyse the efficacy of guided imagery for treating post-operative pain, anxiety and depression, across the pre- and post-operative period. A systematic review of the literature was conducted, searching databases for controlled experimental studies of adults receiving guided imagery for post-operative pain and anxiety or post-operative pain and depression in any surgical setting. A total of 685 records were identified, of which 8 were included in the final synthesis. All included studies explored guided imagery for pain and anxiety only. Guided imagery was indicated to be effective in reducing post-operative pain and anxiety in the immediate post-operative and post-intervention period but appeared less effective over a longer period. Guided imagery appeared similarly effective across surgical domains, timepoint of intervention and intervention length, but heterogeneity across studies and gaps in the research and reporting limited comparisons of this type. In conclusion, guided imagery is a promising treatment for clinicians in surgical and critical care contexts. However, further research is needed to broaden and consolidate the evidence base.

Service Improvement Project

There are increasing numbers of patients admitted to intensive care units (ICUs) following incidents of self-harm. This presents challenges for staff, who frequently report insufficient training and support to manage caring for these patients, who are considered more emotionally and behaviourally demanding to care for. This imbalance of demands and resources leaves staff at risk of burnout, putting healthcare under strain and jeopardising patient care. This study aimed to explore staff experiences of caring for patients admitted following self-harm in the ICU of Buckinghamshire NHS Foundation Trust. Thirty members of staff completed a survey, and semi-structured interviews were completed with a further six participants. The survey found that although staff were working with patients admitted following self-harm on a regular basis, with frequent incidents of aggression, staff had almost no specific training and limited confidence managing risk. Staff interviews, analysed using thematic analysis, highlighted five key themes: 'Otherness' of Mental Health Patients, Provision of Mental Health Care, Personal Impact of Care, Building Effective Relationships with Patients and Working with Risk. Overall, both the survey and interviews highlighted that staff felt confident in the support of their team and demonstrated significant resilience. However, there was limited confidence in the mental health support given to patients and in managing risk incidents on the ward, which had a detrimental impact on staff wellbeing and patient care. Recommendations were therefore provided for the service to improve staff training in mental health and risk management, and to make procedural adjustments to enhance staff wellbeing.

Theory-Driven Research Project

Objectives: To refine the Leventhal Common Sense Model (CSM) of health adjustment for acquired brain injury (ABI) and psychosocial outcomes. It is hypothesised that appraisals of injury controllability will differentiate individuals with positive or negative adjustment, above and beyond other appraisals, and that the relationship between controllability appraisals and outcomes is mediated by coping strategy.

Setting: Outpatient and community-based sample.

Participants: 44 adults with ABI, excluding those with mild traumatic brain injury.

Design: Cross-sectional observational.

Measures: Illness Perception Questionnaire - Revised (IPQ-R), BRIEF COPE, Hospital Anxiety and Depression Scale (HADS) and WHO Quality of Life Brief Inventory (WHOQOL-BREF), completed by participants; the Disability Rating Scale (DRS) was also completed by a clinician for each participant.

Results: ANOVAs found that individuals with high controllability beliefs had greater mood, psychological, physical, social and environmental quality of life, although with mixed statistical significance. Regression analyses found that controllability beliefs significantly predicted mood, and psychological and environmental quality of life, in addition to identity, coherence and timeline appraisals. Individuals with high controllability beliefs endorsed on average greater use of adaptive coping strategies, and reduced use of maladaptive coping strategies, although these mean differences were statistically non-significant. Moreover, use of adaptive coping strategies was unrelated to psychosocial outcome. Mood effects were independent of level of disability,

although quality of life was not, and controllability was not mediated by adaptive coping.

Conclusion: It is possible to refine the CSM of ABI adjustment, although appraisals of identity and coherence should be considered in addition to appraisals of control, which should be considered when supporting individuals after ABI. Additionally, models and rehabilitation interventions should consider delineating psychosocial from functional outcomes, and differentiate domains of mood and quality of life, as the concept of adjustment is multifaceted and it appears that different appraisals are relevant for different outcome domains.

Systematic Review of the Literature

Effectiveness of Pre- and Post-Operative Guided Imagery as a Treatment for Postoperative Pain, Anxiety and Depression in Surgery and Critical Care Settings: A systematic review

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Abstract

Pain, anxiety and depression are common post-surgical experiences and can have a significant negative impact on recovery. Guided imagery has been found helpful in treating pain, anxiety and depression outside of the surgical setting, and may be a useful treatment in this context due to its flexibility and low demands for patients and clinicians. However, previous reviews of its efficacy have been limited to post-operative pain and pre-operative delivery, leaving important gaps for clinical practice. The aim of this review was to analyse the efficacy of guided imagery for treating post-operative pain, anxiety and depression, across the pre- and post-operative period. A systematic review of the literature was conducted, searching databases for controlled experimental studies of adults receiving guided imagery for post-operative pain and anxiety or post-operative pain and depression in any surgical setting. A total of 685 records were identified, of which 8 were included in the final synthesis. All included studies explored guided imagery for pain and anxiety only. Guided imagery was indicated to be effective in reducing post-operative pain and anxiety in the immediate post-operative and post-intervention period but appeared less effective over a longer period. Guided imagery appeared similarly effective across surgical domains, timepoint of intervention and intervention length, but heterogeneity across studies and gaps in the research and reporting limited comparisons of this type. In conclusion, guided imagery is a promising treatment for clinicians in surgical and critical care contexts. However, further research is needed to broaden and consolidate the evidence base.

Introduction

The problem of post-operative pain, anxiety and depression

For the millions undergoing surgery each year, pain and distress are common post-operative complications. Despite improvements over time in pharmacological pain management, nearly all patients report experiencing acute post-operative pain, which for many is moderate or even severe in intensity (1–3). Additionally, between 9%-50% patients report experiencing postoperative anxiety or depression, which occurs across surgery types (7,8,26,28,35).

The reasons for this appear to be manifold. Although there is no unified understanding of why people experience psychological distress in this context, factors including the experience of pain, trauma associated with the surgery or physical condition necessitating the surgery, and life changes resulting from the surgery are thought to contribute to the development of post-operative anxiety or depression (5,15,28,39). Additionally, although it is expected that a significant amount of post-operative pain is due to physical damage, the experience of post-operative distress is also theorised to contribute to pain. Emotional states such as anxiety and depression appear to lower patient pain thresholds, enhance pain sensations or otherwise 'prime' them to experience pain (9,15,30,32,33). Moreover, pain has been theorised to be highly influenced by cognitive processes including perception, attention, and appraisals of pain and coping (29). Individuals with anxiety and depression are more likely to make negative appraisals of threats and coping, and experience perceptual and attention biases towards threatening or unpleasant stimuli such as pain (6,10), and this is then thought to increase pain for

individuals in distress. It is understandable, therefore, that distress is one of the most significant predictors of post-operative pain and analgesic consumption (18).

Pain, anxiety and depression can significantly impact post-surgical recovery (20). They appear to increase the likelihood of developing chronic pain and delirium and delay wound healing (15,18,34,43,44), leading to lengthier or incomplete recovery following surgery, and have been found to increase the risk of infection, physical comorbidities, and mortality (7,15,41). As such, it is important to find effective treatments for postoperative pain, anxiety and depression to maximise patient outcomes.

Guided imagery as a treatment of pain, anxiety and depression

Guided imagery (GI) may be one such treatment. GI describes a technique of guiding the patient through a soothing mental visual, which may be delivered in varied ways (e.g. in-person or over audio file, individually or in groups, with additional sensory stimuli or without). GI has been suggested to help patients with pain, anxiety and depression by engaging a physiologic relaxation response which can relieve both pain and distress, and by promoting a positive affect within the patient and providing a distraction from disturbing sensations, feelings or thoughts, both of which interrupts the physiologic and cognitive maintenance of pain, anxiety and depression (1,17,21).

Importantly, GI is accessible to patients within the particular constraints of the acute post-operative period. During this time, patients may be less mobile or have a more limited ability to communicate and may have little capacity to engage in cognitively-demanding tasks due to pain, illness, medication, fatigue or other factors. Additionally, the immediate environment may be distressing or may have limited available activities or resources. Such conditions make

many psychological or complimentary therapies, such as exercise or talking therapies, impractical or unhelpful. By contrast, GI requires relatively little from the patient and can be adapted easily to post-operative care situational demands.

The present review

Despite the clear potential for GI as a treatment for post-operative psychological complications, existing GI systematic reviews have concentrated on pre-surgical GI only, and on pain as the only post-operative outcome (1,16). This leaves two critical gaps. Firstly, the efficacy of GI delivered post-operatively, as well as pre-operatively, is unresolved. This is important, as many surgeries are unplanned and as such many GI interventions to reduce pain or distress may be conducted post-operatively. Secondly, there is a lack of attention given to the impact of GI on post-operative psychological wellbeing, particularly anxiety and depression, despite evidence that rates of both conditions are elevated post-surgery, are strongly associated with the presence of pain, and have significant implications for broader recovery. As such, the present review aims to answer whether GI, delivered either pre- or post-operatively, is effective at resolving the post-operative symptoms of pain, anxiety and depression.

Method

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) recommendations were used as guidelines to report this review (27). A protocol for the review was registered with PROSPERO (CRD42024494888).

Search Strategy

Studies were searched through electronic databases (PsychINFO, PubMed, CINAHL, Scopus, Embase, Medline). This study aimed to review completed published studies, therefore it did not include searches of clinical trial registries or grey literature. The search strategy was as detailed in Table 1.

Table 1: Search terms used

("guided imagery")
(pain OR anxiety OR depression)
("intensive care unit" OR "surgery" OR "surgical" OR "operation" OR "operative" OR "critical care" OR "post-operat*" OR "post-surg*" OR "surgical suite" OR theatre OR "post operative recovery area" OR "wake-up room" OR "post- anaesthesia Care Unit" OR PACU OR "Surgical Intensive Care Unit" OR SICU OR "Step-Down Unit" OR SDU OR "Medical Surgical Unit" OR "orthopaedic Unit" OR "postoperative intensive care" OR PICU OR "high dependency Unit" OR HDU OR “Respiratory intensive Care unit” OR RICU OR "Paediatric intensive care unit" OR "coronary care unit" OR CCU OR "recovery room" OR "Cardiac Care Unit" OR "Neurology Unit" OR "Gastrointestinal Unit" OR GU OR "urology Unit" OR "Plastic Surgery Unit Ear Nose Throat Unit" OR "Wound Care Unit" OR "Vascular Surgery Unit" OR "ophthalmology unit" OR "rehabilitation unit")

Eligibility Criteria

Published experimental and quasi-experimental studies reporting primary data on post-operative pain and either post-operative anxiety or post-operative depression were included. The target intervention was guided imagery (the “deliberate prompting of mental images” with the intention of relieving pain or distress (46); GI), delivered as either the experimental or control condition within the acute pre- and post-operative period. Only studies delivering GI as a distinct intervention were included. It was acknowledged that GI methods often include some element of inducing a relaxed state, for example encouraging participants to adopt a soothing breathing rhythm; however, in

order to identify more clearly the efficacy of GI specifically, studies which made use of additional psychotherapeutic treatments were excluded. As such, studies were only included when the primary feature of the intervention involved bringing to mind an image (rather than, for example, focusing on the participant's breathing) and when the intervention was not clearly indicated to involve other, named components; otherwise, they were excluded. The target population was adult surgical patients, with surgery defined as cutting open the body in order to repair, remove or replace a damaged part (45). Only surgeries conducted with general anaesthesia were included, to reduce discrepancies in type of surgery and intervention delivery that might impact on results. No year of publication restrictions were employed, but only studies published in English were included.

The exclusion criteria comprised: a) meta-analyses, reviews, case reports, comments, editorials, letters, non-peer-reviewed studies (dissertations, conference papers); b) studies that used a single group cross-sectional design; c) studies using additional therapies or therapeutic techniques (such as progressive muscle relaxation) in combination with the GI; d) participants under the age of 18.

Selection Process and Data Extraction

Databases were searched on 7th April 2025. In the first stage, the abstracts and titles of all records were screened for possible inclusion and duplicates were removed. In the second stage, the full text of papers was reviewed according to the eligibility criteria to determine included studies. In the final stage, data was extracted from included studies on sample characteristics, study design and measures, intervention and control group specifics, analyses and outcomes using author-developed data extraction forms.

All stages were completed by the primary researcher (MW). An additional reviewer (SH) screened 20% of abstracts and titles (n = 137) and 25% of full-text papers (n = 8), and completed data extraction for 50% of final studies (n = 4). Initial ratings were completed independently and then compared. Disagreements between raters were resolved by discussion between them or, if needed, by a third researcher (NC).

Quality Assessment

All studies were evaluated for quality using the Standard Quality Assessment Criteria for quantitative studies (KMET tool) (19). This tool was chosen as it has demonstrated high inter-rater reliability and is appropriate for rating the quality of quantitative studies across a variety of study designs. This tool provides a rating of quality based on fourteen items: description of question/objectives, appropriate study design, appropriate methods of participant selection, adequate description of baseline characteristics, describing and reporting of random allocation, blinding of participants, blinding of researchers, robust description of outcome measures, appropriate sample size, reporting of variance for the main results, controlling for confounding, appropriate reporting of results, and conclusions supported by results. The final rating also takes into account where some items might not be applicable for all study designs (e.g. blinding of researchers). The final quality rating was derived by summing each study's score and dividing this by the total possible scores on all items (excluding items that were not applicable), which could then be represented as a percentage score. There is currently no widely-used categorisation of scores using the KMET tool; however, it is suggested in the original paper that scores above 75% represent a fairly strong paper and

scores above 55% an acceptable paper, and these boundaries have been used to group the studies included here (19).

Synthesis

In line with the guidance of Popay et al (31) on conducting narrative syntheses, the extracted data from included studies were written out and then grouped according to the primary research questions, with sub-divisions according to study quality, intervention characteristics (timepoint, length, frequency and number of GI interventions, and mode of delivery) and surgery characteristics (type of surgery, elective vs emergency surgery, length of stay). Once grouped, patterns in the data were identified and described, and potential explanations for and factors affecting these patterns were considered, although there were some limitations to this level of analysis due to heterogeneity in the studies and limited availability of some key information about participants, study design, interventions and confounding variables. However, these limitations were considered in evaluating the quality of the synthesis and review as a whole. As no studies examined the impact of GI on post-operative depression, it was not possible to answer this research question within the present study. Similarly, not all of the planned sub-comparisons were possible due to a lack of evidence or reporting of relevant details.

Results

A total of 685 records were identified in databases. After removing duplicates, 360 titles and abstracts were screened and 329 of these excluded. Of the 31 full-text articles then assessed for eligibility, one was excluded as a duplicate of another study, one was excluded as a non-English publication, three were excluded as conference abstracts rather than published papers, two were

excluded as a theoretical paper, three were excluded for studying non-surgical participants, seven were excluded for not examining post-operative pain and either post-operative anxiety or post-operative depression as outcome measures, five were excluded for not assessing GI as a distinct intervention and one was excluded for not delivering the GI intervention in the acute pre- or post-operative period (Figure 1). This resulted in eight papers to be included in the final synthesis, with a total of 857 participants across the eight studies (Table 2).

Figure 1: Flowchart of systematic searches and selection of studies for review

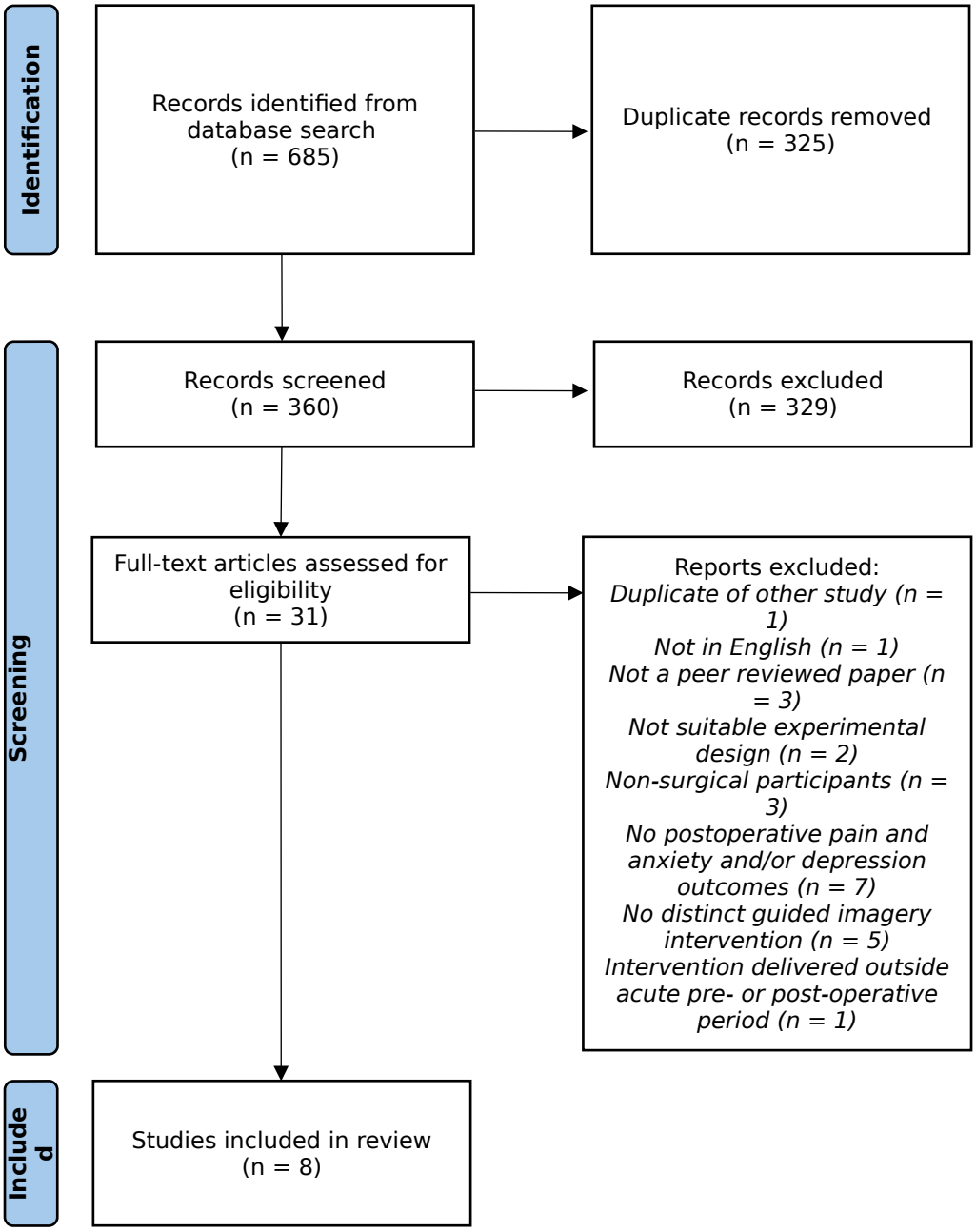


Table 2: Summary of Included Studies on Guided Imagery for Pain, Anxiety and Depression Delivered Pre- and Post-Operatively. BAI = Beck Anxiety Inventory; CBAI = Chinese Beck Anxiety Inventory; CPOT = Critical Care Pain Observation Checklist; CPSQI = Chinese Pittsburgh Sleep Quality Index; GI = guided imagery; HAS = Hamilton Anxiety Rating Scale; N-RCT = non-randomised control trial; NRS = numeric rating scale; POMS = Profile of Mood States; RCT = randomised control trial; STAI = State and Trait Anxiety Inventory; VAS = visual analogue scale. [a] only results relevant to pain, anxiety or depression reported here.

Authors (year), location	Method	N total (N intervention)	Age (mean)	Gender (% female)	Surgery Specified	Psychological Intervention	Comparison Condition(s)	Outcomes	Tools	Results [a]
Lu et al (2022), Taiwan (24)	RCT	66 (33)	55.35	57.4	Laparoscopic cholecystectomy	Guided Imagery CD 15-20 minutes Repeated morning and evening prior to surgery, then daily until discharge (3-4 days) Inclusive of GI, music and breathing	Pain relief as usual Oral guidance on pain control delivered by nursing staff for 10-15 minutes	Pain, 2 days post-operation (T2)	NRS	**Pain** Pain significantly lower in GI group than control (2.21 ± 1.39 vs 4.00 ± 1.62, p < 0.001) **Anxiety** Significantly less post-intervention anxiety in GI group than control (0.42 ± 0.97 vs 4.79 ± 7.56, p = 0.01) Anxiety reduced following intervention for GI (6.0 ± 3.4 vs 0.42 ± 0.97) and control conditions (8.55 ± 6.58 vs 4.79 ± 7.56)
								Anxiety, 1 day pre-operation (T1) and 2 days post-operation (T2)	CBAI	
								Quality of Sleep, T1 and T2	CPSQI	
Singh (2021), India (36)	N-RCT	50 (25)	Not reported		Cardiac	Guided Imagery (mode not reported) 10-15 minutes Delivered twice during first	Pain relief as usual	Pain, pre-intervention (T1), post-first (T2) and second (T3) session of intervention	NRS CPOT	**Pain** Post-intervention pain lower in GI than control group (NRS=3.72, CPOT=3.48 vs NRS= 5.38, CPOT= 4.64) Post-intervention pain reduced for GI group in both NRS and CPOT

Authors (year), location	Method	N total (N intervention)	Age (mean)	Gender (% female)	Surgery Specified	Psychological Intervention	Comparison Condition(s)	Outcomes	Tools	Results [a]
						ambulatory stage post-surgery		Anxiety, T1, T2 and T3	BAI	scores (5.48 vs 3.73; 4.72 vs 3.48) Post-intervention pain reduced for control group in CPOT (4.88 vs 4.64) but not NRS scores (5.32 vs 5.38) **Anxiety** Post-intervention anxiety lower in GI than control group (22.96 vs 30.48)
Forward et al (2015), USA (14)	RCT	224 (75)	Not reported	66.1	Total joint arthroplasty	Guided Imagery MP3 track 20 minutes Delivered once before surgery, once after surgery (same day), once daily for days 1 and 2 post-surgery	Structured touch (M) of 18-20 minutes	Pain, pre- and post-intervention, pre-operation (T1 and T2), pre- and post-intervention post-operation on day of surgery (T3 and T4), and pre- and post-intervention on day 1 (T5 and T6) and day 2 (T7 and T8) post-operation	NRS	**Pain** Post-intervention reduction in pain greater in GI than usual care at T2 (p = 0.0188), T6 (p = 0.0135), but not T4 (p = 0.1056) or T8 (p = 0.1498) Post-intervention reduction in pain greater in structured touch than GI at T2 (p < .0001), but not T4 (p = 0.0648), T6 (p = 0.5369) or T8 (p = 0.7599) Pain reduced in all groups T1-T8; M decreased the most, followed by GI, then usual care, but no significant difference between reduction Pre-intervention pain a

Authors (year), location	Method	N total (N intervention)	Age (mean)	Gender (% female)	Surgery Specified	Psychological Intervention	Comparison Condition(s)	Outcomes	Tools	Results [a]
							Pain relief as usual	Anxiety, T1-T8	NRS HAS	significant predictor of post-intervention improvement in pain across all groups Baseline pain, amount of medication and type of surgery predicted overall improvement **Anxiety** Post-intervention reduction in anxiety greater in GI than usual care at T2 ($p < 0.0001$), T6 ($p = 0.001$), and T8 ($p = 0.0276$) but not T4 ($p = 0.273$) No significant difference between post-intervention reduction of GI and structured touch at T2 ($p = 0.0884$), T4 ($p = 0.7599$), T6 ($p = 1$), and T8 ($p = 1$) Anxiety reduced in all groups T1-T8; M decreased the most, followed by GI, then usual care, but no significant difference between reduction Pre-intervention anxiety a significant predictor of post-intervention improvement in anxiety across all groups
								Satisfaction with intervention, T8	N/A	
Lin	N-RCT	93 (45)	71	64.5	Total joint	Guided	Bed rest	Pain, pre-	VAS	**Pain**

Authors (year), location	Method	N total (N intervention)	Age (mean)	Gender (% female)	Surgery Specified	Psychological Intervention	Comparison Condition(s)	Outcomes	Tools	Results [a]
(2012), Taiwan (22)					arthroplasty	Imagery tape 20 minutes Delivered once the evening before surgery, and once daily on post-operative days 1, 2 and 3		and post-intervention, pre-operation (T1 and T2), pre- and post-intervention post-operation on days 1 (T3 and T4), 2 (T5 and T6) and 3 (T7 and T8) post-operation	(0-10)	Significantly greater post-intervention improvement in pain scores for GI group than control group at T1-T2 (0.48 ± 0.94 vs 0.10 ± 0.3, p = 0.009) and T3-T4 (0.93 ± 1.46 vs 0.20 ± 0.71, p = 0.003) but not T5-T6 (1.04 ± 1.33 vs 0.60 ± 1.42, p = 0.128) and T7-T8 (0.51 ± 1.07 vs 0.52 ± 1.12, p = 0.966) **Anxiety** Significantly greater post-intervention improvement in anxiety scores for GI group than control group at T1-T2 (0.95 ± 1.18 vs 0.22 ± 0.90, p = 0.001), T3-T4 (0.84 ± 1.02 vs 0.43 ± 0.76, p = 0.032) and T5-T6 (1.06 ± 1.86 vs 0.16 ± 1.52, p = 0.012) but not T7-T8 (0.64 ± 1.66 vs 0.41 ± 1.08, p = 0.435) No significant differences between GI and control group STAI scores
								Anxiety, T1-T8	VAS (0-10) STAI	
								Blood pressure Heart rate Satisfaction with intervention All T1-T8	N/A	
Diaz & Larsen (2005),	N-RCT	230 (115)	Not reported		Total joint arthroplasty Hysterectomy	Guided Imagery CD Duration	Pain relief as usual	Pain at rest, once post-	VAS (0-10)	**Pain** Median pain at rest reduced for both GI (T3

Authors (year), location	Method	N total (N intervention)	Age (mean)	Gender (% female)	Surgery Specified	Psychological Intervention	Comparison Condition(s)	Outcomes	Tools	Results [a]
USA (11)					Colectomy	unreported Provided 3-7 days pre-surgery, and recommended use twice daily until post-operative symptoms resolve Inclusive of GI, affirmations and music		operative on the day of operation (T3), three times post-operative day 1 (T4, T5, T6) and day 2 (T7, T8, T9) Pain with movement, as above		4.0 vs T9 2.0) and control (T3 4.0 vs T9 3.0) Median pain with movement reduced for both GI (T3 7.0 vs T9 6.0) and control (T3 7.0 vs T9 6.0) No significant difference in median pain at rest at T3 (4.0 vs 4.0, p = .79), T4 (4.0 vs 5.0, p = .058), T5 (3.0 vs 4.0, p = .33), T6 (3.0 vs 3.0, p = .57), T7 (2.0 vs 3.0, p = .25), T8 (2.0 vs 3.0, p = .53) or T9 (2.0 vs 3.0, p = .46) No significant difference in median pain with movement at T3 (7.0 vs 7.0, p = .68), T4 (7.0 vs 8.0, p = .15), T5 (7.0 vs 7.0, p = .35), T6 (7.5 vs 7.5, p = .65), T7 (5.5 vs 7.0, p = .21), T8 (6.0 vs 6.0, p = .53) or T9 (6.0 vs 6.0, p = .75) **Anxiety** Post-operative anxiety reduced in the control (T3 3.0 vs T9 2.0) but not GI condition (T3 1.0 vs T9 1.0) Median anxiety was significantly lower for GI than the control
								Anxiety, twice pre-operatively (T1, T2), as well as T3-T9	VAS (0-10)	
								Quality of Sleep (T4, T7) Frequency of CD use (T6, T9) Intervention evaluation (T9)	N/A	

Authors (year), location	Method	N total (N intervention)	Age (mean)	Gender (% female)	Surgery Specified	Psychological Intervention	Comparison Condition(s)	Outcomes	Tools	Results [a]
										condition immediately following surgery (T3) (1.0 vs 3.0, p = .046) but no significant difference at T4 (2.0 vs 2.0, p = .06), T5 (2.0 vs 2.0, p = .78), T6 (2.0 vs 2.0, p = .53), T7 (2.0 vs 2.0, p = .30), T8 (2.0 vs 2.0, p = .97) or T9 (1.0 vs 2.0, p = .10)
Antall & Kresevic (2004), USA (2)	RCT	13 (split not reported)	67.85	0	Total joint arthroplasty	Guided Imagery tape 20 minutes Delivered once in the evening following surgery, then twice daily until discharge Inclusive of GI, affirmations and music	Usual care of assessment, education, physical therapy, pain management and relaxing music tape	Pain, before and after exercise	VAS (0-10)	**Pain** Mean pain less in GI than control condition (2.35 vs 5.30) **Anxiety** Anxiety reduced for GI condition (6.57 vs 2.80) and control condition (3.25 vs 1.67)
								Anxiety, timepoints not reported	POMS	
								Physical Functioning	N/A	
Tusek et al (1997), USA (42)	RCT	130 (65)	Not reported		Colorectal	Guided Imagery tape 20 minutes Delivered	Pain relief as usual	Worst pain and least pain, three days before surgery	NRS (0-100)	**Pain** Less increase in median worst pain from T1 to T4 for GI than control condition (42.5 vs 72.5,

Authors (year), location	Method	N total (N intervention)	Age (mean)	Gender (% female)	Surgery Specified	Psychological Intervention	Comparison Condition(s)	Outcomes	Tools	Results [a]
						once daily for three pre-operative days, then twice daily for six post-operative days Music only tape played during surgery Inclusive of GI and music		(T1), morning and evening of six post-operative days, which were averaged for analysis (T4, T5, T6, T7, T8, T9)		p < .001) Less increase in median best pain from T1 to T4 for GI than control condition (12.5 vs 30, p = .001) **Anxiety** Greater median reduction in anxiety from T1 to T4 for GI than control condition (30.0 vs 0.0, p < .001)
								Anxiety, three days before surgery (T1), shortly before surgery (T2), immediately before surgery (T3) and morning and evening of six post-operative days, averaged for analysis (T4-T9)	NRS (0-100)	Median post-operative anxiety scores lower in GI than control condition on all post-operative days No significant difference in rate of post-operative reduction in anxiety
								Narcotic consumptio	N/A	

Authors (year), location	Method	N total (N intervention)	Age (mean)	Gender (% female)	Surgery Specified	Psychological Intervention	Comparison Condition(s)	Outcomes	Tools	Results [a]
								n Time to first bowel movement Side effects Quality of sleep Length of stay		
Manyande et al (1995), UK (25)	RCT	51 (26)	45	41	Colorectal	Guided Imagery tape Mean duration 49 minutes Given to patients the day before surgery, to use at least once daily from day before surgery to post-operative day 2	Pain relief as usual Audio tape describing hospital, care and procedures, mean length 25 minutes	Pain intensity, pain distress, and how well coped with pain, before tapes given (T1) and on days 1 and 2 post-surgery (T3, T4)	VAS (0-10)	**Pain** GI condition had significantly less post-operative pain intensity ($p < .05$) and pain distress ($p < .01$) than control condition GI condition had significantly better post-operative pain coping than the control condition ($p < .001$) No significant post-operative reduction in pain for either GI or control **Anxiety** Post-operative decline in anxiety for both GI and control condition ($p < .001$), with no difference between groups
								Anxiety, pre- and post-tapes before surgery (T1, T2) and on days 1 and 2 post-surgery (T3, T4)	STAI	

Description of Studies

A summary of study descriptives is provided in Table 3. Five of the included studies were randomised control trials (RCTs) and three were non-randomised control trials (N-RCTs). All studies employed a longitudinal design. Four of the included studies were conducted in the US, two in Taiwan, one in India and one in the UK. All studies were conducted as single site studies, and all participants were clinical patients.

Seven of the included studies recruited participants of a single surgery type (2,14,22,24,25,36,42) and one study recruited participants from multiple (three) surgery types (11). Of the ten surgery types included across the eight studies, four were total joint replacement surgeries (2,11,14,22), two were abdominal surgeries (11,24), three were colorectal surgeries (11,25,42), and one was cardiac surgery (36).

Two studies specified that the surgical procedure undergone was an elective surgery (14,42); of the other eight surgeries included in the studies, three are typically performed as elective surgeries (2,11,22), and five might be performed as elective or emergency surgeries (11,24,25,36), although the studies did not include details of whether this was the case for participants in the studies.

Only three studies reported the mean length of stay for participants. Antall and Kresevic (2) reported the total mean length of stay was 12 days (9.29 days for the imagery group, and 14.83 days for the control group), Tusek et al. (42) reported the mean length of stay was 7.4 days, and Manyande et al. (25) reported that the mean post-operative stay for the imagery group was 5.7

days and 5.0 days for the control group. Lu et al. (24) also indicated that the usual length of stay for patients undergoing the surgery was 3-4 days, although the specifics for the study were not stated.

All included studies delivered the GI intervention as a pre-recorded intervention, by means of CD (11,24), audio MP3 file (14), audio tape (2,22,25,42) or unspecified device (36), which was delivered individually in all studies. Four studies specified that the imagery tape was accompanied by music (2,11,24,42). Of the seven studies that reported the duration of the audio recording, this was 20 minutes in four studies (2,14,22,42), 15-20 minutes in one study (24), 10-15 minutes in one study (36), and an average of 49 minutes in one study (25).

Two studies delivered the intervention following surgery only (2,36), whilst the other six studies delivered the intervention in both the pre-operative and post-operative periods. Frequency of intervention delivery was reported in all studies. In the pre-operative period, the intervention was delivered twice daily in two studies (11,24), once daily in three studies (14,22,42), and at least once daily in one study (25). In the post-operative period, the intervention was delivered twice daily in three studies (2,11,42), daily in three studies (14,22,24), at least once daily in one study (25) and twice in total in one study (36). However, the total duration of the intervention period and number of GI uses across studies was not clearly reported in all studies, and the reported figures indicated significant variation. The earliest the intervention began prior to surgery was 3-7 days (11), and the latest the intervention was specified to end was six days post-surgery (42); however, in two studies participants were instructed to listen to the GI recording ‘until discharge’ (2,24) and in a further study participants listened ‘until post-operative symptoms resolve’ (11), with

the final end dates not recorded. Of the five studies that gave a specific number of times for participants to listen to their GI recording, the greatest number of times was 15 (42) and the fewest was twice (36), with the other three studies all asking their participants to listen to the GI recording four times (14,22,25); however, Manyande et al (25) also instructed participants to listen 'at least once daily', and Lin (22) encouraged participants to listen outside of prescribed times, with the final total number of uses per participant not recorded.

In two studies, participants were supported to listen to the intervention by a researcher or therapist (2,14), which ensured their compliance, and in two other studies participants were asked to record their use of the tape to assess compliance (11,22), although only Diaz and Larsen (11) reported the results of this. Participant fidelity to the intervention was not reported in the other four studies.

In seven studies, GI was compared to a single control condition; in one study, GI was compared to two control conditions (14). The nine control conditions across the studies consisted of pain relief as usual (11,14,36,42), pain relief as usual enhanced by oral guidance from nurses (24) or a tape detailing the hospital, care and procedures (25), bed rest (22), structured touch (14) and a usual care that consisted of assessment, education, physical therapy, pain management and a relaxing music tape (2).

All included studies reported on post-operative pain and post-operative anxiety; in one study pain was divided into pain at rest and pain with movement (11), in one study pain was divided into worst and best pain (42) and in one study pain was divided into pain intensity, pain distress and pain-

related coping (25). No studies reported on post-operative depression. Additionally, the included studies reported outcomes in sleep quality (11,24,42), satisfaction with the intervention (11,14,22), blood pressure, heart rate (22), physical functioning (2), analgesic use, time to first post-operative bowel movement, side effects and length of stay (42).

Only two studies included any consideration of potential confounds: Lu et al (24) included sleep quality and time of anxiety report and Forward et al (14) included baseline scores, surgery type and medication type as covariates in the final statistical analyses. Lu et al. (24) also ran separate analyses on the use of post-operative analgesics between control and intervention groups, finding no significant differences.

Table 3: Summary of Included Studies Descriptives

Study details		**N studies**	**Study reference(s)**
Study location	United States	4	Antall & Kresevic, 2004; Diaz & Larsen, 2005; Forward et al., 2015; Tusek et al., 1997 (2,11,14,42)
	Taiwan	2	Lin, 2012; Lu et al., 2022 (22,24)
	India	1	Singh, 2021 (36)
	United Kingdon	1	Manyande et al., 1995 (25)
Study design	RCT	5	Antall & Kresevic, 2004; Forward et al., 2015; Lu et al., 2022; Manyande et al., 1995; Tusek et al., 1997 (2,14,24,25,42)
	N-RCT	3	Diaz & Larsen, 2005; Lin, 2012; Singh, 2021 (11,22,36)
Number of control conditions	One	7	Antall & Kresevic, 2004; Diaz & Larsen, 2005; Lin, 2012; Lu et al., 2022; Manyande et al., 1995; Singh, 2021; Tusek et al., 1997 (2,11,22,24,25,36,42)
	Two	1	Forward et al., 2015 (14)
Control condition	Pain relief as usual	4	Diaz & Larsen, 2005; Forward et al., 2015; Singh, 2021; Tusek et al., 1997 (11,14,36,42)
	Pain relief as usual enhanced by oral or tape guidance	2	Lu et al., 2022; Manyande et al., 1995 (24,25)
	Bed rest	1	Lin, 2012 (22)
	Structured touch	1	Forward et al., 2015 (14)
	Usual care of assessment, education, therapy, pain management and relaxation tape	1	Antall & Kresevic, 2004 (2)

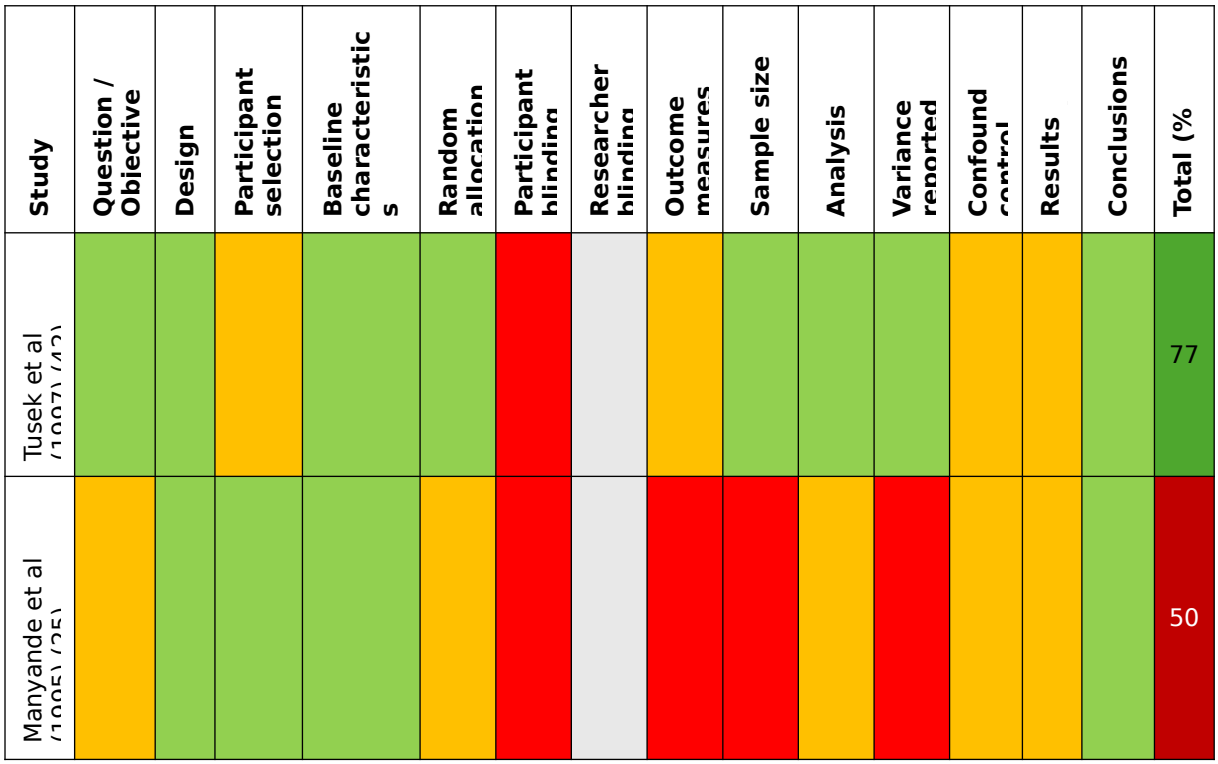
Study details		N studies	Study reference(s)
Participants recruited from single or multiple surgical domains	Single surgery only	7	Antall & Kresevic, 2004; Forward et al., 2015; Lin, 2012; Lu et al., 2022; Manyande et al., 1995; Singh, 2021; Tusek et al., 1997 (2,14,22,24,25,36,42)
	Multiple surgeries	1	Diaz & Larsen, 2005 (11)
Surgery domain	Joint replacement	4	Antall & Kresevic, 2004; Diaz & Larsen, 2005; Forward et al., 2015; Lin, 2012 (2,11,14,22)
	Colorectal	3	Diaz & Larsen, 2005; Manyande et al., 1995; Tusek et al., 1997 (11,25,42)
	Abdominal	2	Diaz & Larsen, 2005; Lu et al., 2022 (11,24)
	Cardiac	1	Singh, 2021 (36)
Surgery type	Specified elective	2	Forward et al., 2015; Tusek et al., 1997 (14,42)
	Not-specified, typically elective	3	Antall & Kresevic, 2004; Diaz & Larsen, 2005; Lin, 2012 (2,11,22)
	Not specified, possibly elective or emergency	5	Diaz & Larsen, 2005; Lu et al., 2022; Manyande et al., 1995; Singh, 2021 (11,24,25,36)
Length of stay	Mean 12 days (9.29 days for the imagery group, and 14.83 days for the control group)		Antall & Kresevic, 2004 (2)
	Mean 7.4 days		Tusek et al., 1997 (41)
	Mean 5.7 days for the imagery group and 5.0 days for the control group		Manyande et al., 1995 (25)
	Usually 3-4 days for the surgery type		Lu et al., 2022 (24)
	Not reported	4	Diaz & Larsen, 2005; Forward et al., 2015; Lin, 2012; Singh, 2021 (11,14,22,36)
Guided imagery modality	Audio tape	4	Antall & Kresevic, 2004; Lin, 2012; Manyande et al., 1995; Tusek et al., 1997 (2,22,25,42)
	CD	2	Diaz & Larsen, 2005; Lu et al., 2022 (11,24)
	MP3	1	Forward et al., 2015 (14)
	Unspecified recorded device	1	Singh, 2021 (36)
Musical accompaniment	With music	4	Antall & Kresevic, 2004; Diaz & Larsen, 2005; Lu et al., 2022; Tusek et al., 1997 (2,11,24,42)
	Without music	4	Forward et al., 2015; Lin, 2012; Manyande et al., 1995; Singh, 2021 (14,22,25,36)
Guided imagery audio duration	20 minutes	4	Antall & Kresevic, 2004; Forward et al., 2015; Lin, 2012; Tusek et al., 1997 (2,14,22,42)
	15-20 minutes	1	Lu et al., 2022 (24)
	10-15 minutes	1	Singh, 2021 (36)
	Average of 49 minutes	1	Manyande et al., 1995 (25)
	Not specified	1	Diaz & Larsen, 2005 (11)
Delivery of intervention	Pre- and post-surgery	6	Diaz & Larsen, 2005; Forward et al., 2015; Lin, 2012; Lu et al., 2022; Manyande et al., 1995; Tusek et al., 1997 (11,14,22,24,25,42)
	Post-surgery only	2	Antall & Kresevic, 2004; Singh, 2021 (2,36)
Pre-operative	Once daily	3	Forward et al., 2015; Lin, 2012;

Study details		N studies	Study reference(s)
frequency of intervention			Tusek et al., 1997 (14,22,42)
	Twice daily	2	Diaz & Larsen, 2005; Lu et al., 2022 (11,24)
	At least once daily	1	Manyande et al., 1995 (25)
Post-operative frequency of intervention	Twice daily	3	Antall & Kresevic, 2004; Diaz & Larsen, 2005; Tusek et al., 1997 (2,11,42)
	Once daily	3	Forward et al., 2015; Lin, 2012; Lu et al., 2022 (14,22,24)
	At least once daily	1	Manyande et al., 1995 (25)
	Twice total	1	Singh, 2021 (36)
Number of uses of guided imagery recording	Four times	3	Forward et al., 2015; Lin, 2012; Manyande et al., 1995 (14,22,25)
	Fifteen times	1	Tusek et al., 1997 (42)
	Twice	1	Singh, 2021 (36)
	Not specified	3	Antall & Kresevic, 2004; Diaz & Larsen, 2005; Lu et al., 2022 (2,11,24)
Fidelity methods	Participants listened to recording with support	2	Antall & Kresevic, 2004; Forward et al., 2015 (2,14)
	Participants asked to record usage of recordings	2	Diaz & Larsen, 2005; Lin, 2012 (11,22)
	None reported	4	Lu et al., 2022; Manyande et al., 1995; Singh, 2021; Tusek et al., 1997 (24,25,36,42)
Confounds considered	Sleep quality and time of anxiety report	1	Lu et al., 2022 (24)
	Baseline scores, surgery type and medication type	1	Forward et al., 2015 (14)
Primary outcomes	Anxiety and pain	5	Antall & Kresevic, 2004; Forward et al., 2015; Lin, 2012; Lu et al., 2022; Singh, 2021 (2,14,22,24,36)
	Anxiety, pain at rest, pain with movement	1	Diaz & Larsen, 2005 (11)
	Anxiety, best pain, worst pain	1	Tusek et al., 1997 (42)
	Anxiety, pain intensity, pain distress, pain-related coping	1	Manyande et al., 1995 (25)
Additional outcomes	Sleep quality	3	Diaz & Larsen, 2005; Lu et al., 2022; Tusek et al., 1997 (11,24,42)
	Satisfaction with the intervention	3	Diaz & Larsen, 2005; Forward et al., 2015; Lin, 2012 (11,14,22)
	Blood pressure	1	Lin, 2012 (22)
	Heart rate	1	Lin, 2012 (22)
	Physical functioning	1	Antall & Kresevic, 2004 (2)
	Analgesic use	1	Tusek et al., 1997 (42)
	Time to first bowel movement	1	Tusek et al., 1997 (42)
	Side effects	1	Tusek et al., 1997 (42)
	Length of stay	1	Tusek et al., 1997 (42)

Quality Assessment

Table 4: Quality Analysis of Included Studies.

Study	Question / Objective	Design	Participant selection	Baseline characteristics	Random allocation	Participant blinding	Researcher blinding	Outcome measures	Sample size	Analysis	Variance reported	Confound control	Results	Conclusions	Total (%
Lu et al (2022) (24)															96
Singh (2021) (26)															27
Forward et al (2015) (14)															85
Lin (2012)															58
Diaz & Larsen (2005) (11)															54
Antall & Kresevic (2004) (2)															64



Green indicates a maximum score of 2 for that domain, amber indicates a partial score of 1 for that domain, and red indicates a minimum score of 0 for that domain; grey indicates that the domain was considered N/A for that study.

The quality ratings for each study are depicted in Table 3. The overall quality percentage of studies ranged from 27%-96%. Three studies met the cut-off for 'good' (14,24,42), two for 'adequate' (2,22) and three scored below this cut-off (11,25,36).

Efficacy of Guided Imagery for Reducing Postoperative Pain and Anxiety

Divided by quality of study

Of the three 'good' quality studies, Lu et al. (24) and Tusek et al. (42) found that compared to usual care, participants in the GI group had significantly less pain on post-operative day two and experienced significantly less of an increase from baseline (pre-operative) to post-operative pain. However, whilst

Forward et al. (14) also found that the GI showed a significantly greater reduction in pain following the intervention on post-operative day one than usual care, there was no difference in post-intervention improvement between usual care, GI and structured touch immediately after surgery or on post-operative day two, and no difference between these groups in overall post-operative pain reduction trends. Lu et al. (24) and Tusek et al. (42) also found that compared to usual care, participants in the GI group had significantly less post-operative anxiety on post-operative day two and lower anxiety up to six days post-surgery, although this latter difference was not significant. Moreover, GI was significantly more effective than usual care or structured touch for reducing anxiety on post-operative days one and two (14). However, there was no difference in the overall rate of post-operative improvement in anxiety between usual care, GI and structured touch (14,42).

The two 'acceptable' quality studies found that compared to usual care, post-operative pain was lower for participants in the GI group, particularly following the intervention, although this difference between groups diminished from the second post-operative day (2,22). The same studies indicated that whilst GI resulted in a post-intervention improvement in anxiety for the first two days post-surgery, there was no overall difference between GI and control groups for anxiety reduction over time.

Two of the 'low' quality studies found that compared to usual care, post-operative pain was less for participants in the GI condition (25,36), although only Manyande et al. (25) reported the significance of this difference. All three studies found that post-operative pain reduced over time for participants in both the GI and usual care conditions (11,25,36). However, Singh (36) did not report the significance of any difference between groups, and the other two

studies found no significant differences (11,25). Two studies found that participants in the GI condition had lower post-operative anxiety than participants in the usual care condition (11,36), although only Diaz and Larsen (11) reported the significance of this difference. Manyande et al. (25) found that post-operative anxiety reduced for both GI and control conditions, with no significant differences between the two groups, whilst Diaz and Larsen (11) found that post-operative anxiety reduced for only the control condition and not GI condition.

Divided by surgery details

There were few differences in results between the different types of surgery. Two of the three studies that exclusively examined total joint replacement found that there was a significantly greater post-intervention improvement in pain and anxiety in the short-term following surgery, but that the difference between groups waned with time (14,22). They also found no difference in the overall rate of anxiety reduction, and whilst the third study found that pain was overall lower in GI group (2), Forward et al. (14) found no difference between groups. Similarly, both abdominal and colorectal surgery studies found that the GI groups experienced significantly lower post-operative pain and anxiety, but that the rate of anxiety and pain reduction following surgery was the same across groups (22,25,42). Finally, the study that researched cardiac patients found that the GI group experienced lower post-operative pain and anxiety, although pain and anxiety reduced for both groups over time (36). Interestingly, the only study to include mixed surgery types had the most ambivalent results regarding the efficacy of GI, with no significant differences between the two groups in post-operative pain and no post-operative reduction in anxiety for the GI group (11); however, there were also

a number of other differences in the design and results of this study, including a lower take-up of the intervention and significant baseline differences in anxiety between the two groups.

Due to a lack of reporting of whether surgeries were elective or emergency, it was not possible to compare the efficacy of GI across the different types of surgery in this respect. Similarly, limited reporting of participants length of stay before and after surgery made it unfeasible to compare results between surgeries of different length of stay.

Divided by intervention features

Results did not appear to differ significantly depending on whether the intervention was delivered both pre- and post-operatively, or only post-operatively. In the two studies that only delivered GI post-operatively, it was found that post-operative pain was lower for the GI group (2,36), and in one study post-operative anxiety was also lower for the GI group (36). In both studies, pain reduced in both groups over time, and in Antall and Kresevic (2) anxiety also reduced in both groups over time. These trends are consistent with the findings of those studies which delivered GI both pre- and post-operatively: pain and anxiety were lower post-operatively and post-intervention in the GI group than the control group (14,22,24,25,42), but with the efficacy of the intervention over time less clear in comparison to control. However, the two studies that delivered the intervention post-operatively reported only limited statistical analyses, which makes comparisons of results to the other studies difficult. The total duration of the intervention period was also insufficiently recorded across studies to address whether this had an impact on efficacy.

There also seems to have been minimal impact on results of the length of the GI. In the single study where the GI was specified to last more than 20 minutes, there was significantly less post-operative pain and better coping for those in the GI group, and a reduction in pain and anxiety for both groups (although no significant difference in the rate of reduction over time) (25). For the four studies that specified a 20-minute GI recording, there was significantly less pain and anxiety, and greater post-intervention improvement in pain, for those in the GI condition, and pain and anxiety reduced for both groups over time, but with no significant difference between groups in the rate of improvement over time (2,14,22,42). Finally, the two studies that specified the GI recording lasted less than 20 minutes found that post-operative, post-intervention pain and anxiety was lower for the GI group (significantly where this was reported), although both control and GI groups showed a reduction in pain and anxiety over time (24,36).

Finally, there appears to be little impact on efficacy of the frequency with which participants listened to the GI recordings. In the two studies that delivered the GI recordings once daily, there was significantly greater post-intervention improvement in pain on the first post-operative day, and in anxiety on the first two post-operative days, but not the other pre- or post-operative days (14,22). Forward et al. (14) also found that whilst pain and anxiety reduced for all groups, there were no significant differences between. These findings are very similar to the two studies that delivered the GI intervention once daily pre-operatively, then twice daily post-operatively (2,42), and the single study that delivered the GI intervention twice daily pre-operatively, then once daily post-operatively (24). In all three studies, post-operative pain and anxiety was less in the GI group, and pain and anxiety

reduced for all groups; however, there were no significant differences between groups in the rate of this reduction. These results did differ slightly to those of Diaz and Larsen (11), the single study that delivered GI twice daily, who found no significant differences in post-operative pain for the control and GI groups, although pain improved for both groups, and that post-operative anxiety only improved for the control group. Finally, Manyande et al. (25), in which it was only specified that GI was delivered at least once daily, found there was significantly less pain intensity and distress two days post-surgery for those in the GI group, and a significant decline in anxiety; however, there was no change in pain over time and no difference in anxiety improvement rates over time between groups.

Due to the heterogeneity between studies, it was not possible to group studies according to the number of times participants listened to GI recordings. Similarly, as all studies delivered GI individually and by means of a recording, it was not possible to compare the effects of GI delivered in alternative ways, such as in a group or live session.

Efficacy of Guided Imagery for Reducing Postoperative Pain and Depression

No studies included measures of postoperative depression. As such, it is not possible to draw any conclusions about the efficacy of GI for reducing postoperative pain and depression based on the present research.

Discussion

The present study aimed to identify whether guided imagery (GI) is an effective treatment for pain, anxiety and depression following surgery. It found

that there were no studies that explored GI as a treatment for post-operative pain and depression, but eight studies that examined the efficacy of GI for post-operative pain and anxiety.

Across the studies, there was broad consensus that participants who underwent GI experienced lower post-operative pain and anxiety, and that both post-operative pain and anxiety were responsive to GI delivered to reduce these symptoms. This is in keeping with other systematic reviews on the efficacy of GI, which have found that pre-operative GI reduces post-operative pain for adults (1), and that critically-ill adults experience lower pain, take less pain medication, and trend towards lower anxiety when they are provided with a GI intervention (16). Evidence from other studies beyond this review indicates that GI provides an effective way of relaxing individuals and lowering their physiological stress response (1,17,21), which play a significant role in pain, anxiety and recovery following surgery, and this review extends and strengthens these findings by indicating that GI demonstrates this efficacy in a surgical context.

However, these findings must be interpreted with some caveats. Firstly, the differences in pain and anxiety levels between GI and control conditions were not always significant; whilst in some studies this was because significance was not calculated, in others it was because no significant effect was found. This is similar to the findings of Hadjubalassi et al. (16): in that review, whilst all papers on pain and anxiety reviewed found these outcomes were better for participants receiving GI, only half of the studies found this difference to be significant. Secondly, it is possible that GI only has a significant effect within the first two days of post-surgical recovery. Although few studies explored or reported on the impact of GI after two days, Lin (22) found that the difference

in pain scores for GI and control were no longer significant from day two post-operation, and the difference in anxiety non-significant at day three post-operation. Given that the significant findings of the other studies were all within this window, it is therefore not possible to conclude that GI remains notably more effective than usual care at managing pain and anxiety beyond the second post-operative day. Thirdly, where a reduction in participants' pain and anxiety over time was calculated, this did not differ between GI and usual care or alternative therapy (2,11,14,25,42). It can be argued that we would expect both pain and anxiety to reduce over time following surgery, as the surgical trigger of both states naturally resolves. Therefore, although most of the studies found greater improvements over time for participants who received GI than participants who received usual care only, the lack of significant differences between conditions suggests that GI may be no more effective than the usual, organic recovery after the first few days.

There is little evidence of GI's efficacy varying by surgery type, with a shared pattern of results across abdominal, colorectal, joint and cardiac surgeries. However, limitations to the available studies mean that this must be considered with some caution. For example, there were only a few studies conducted for each surgical domain, with significant methodological differences between studies. Consequently, both comparisons between surgical domains, and syntheses of findings within surgical domains, can only be tentative. Furthermore, the studies did not always report sufficient detail about the surgery to interpret the impact of these aspects on results. For example, despite evidence that the electiveness of surgery is a significant predictor of post-operative pain and anxiety (40), particularly in the short term, this was not reported on, let alone controlled for, in most of the studies.

As such, the present findings indicate that GI may be considered a promising treatment across surgical domains but would benefit from further research before drawing firmer conclusions.

Similarly, GI efficacy does not seem to differ significantly according to features of the intervention, with similar trends displayed across studies. Importantly, on the basis of the current evidence, it appears no less effective to deliver GI post-operatively only. As up to a quarter of surgeries in the UK are emergency surgeries (12), in addition to other reasons why a patient may not be willing or appropriate for pre-operative interventions, it is significant that GI appears effective regardless of the timepoint of delivery. Moreover, there appears to be no real grounds to suggest that the length of the GI recording has an impact on results, with the shortest recordings (10-15 minutes) and longest recordings (approximately 50 minutes) demonstrating very similar results. As such, the present review suggests that GI can be an effective intervention when delivered for as few as 10 minutes. Again, the practical constraints on interventions delivered in surgical and critical care contexts mean that this presents an important finding for clinical practice, where there may be limited windows in which clinicians can support patients to engage with therapeutic techniques or fit these around other aspects of care. It is possible that there may be a tail-off in the efficacy of GI with saturation. Diaz and Larsen (11), who asked participants to use the GI recording twice daily, reported the most equivocal results in the present review. However, as the same study also reported that very few participants used the recording with this frequency, it seems unlikely that listening twice daily would account for a less effective intervention. As such, it appears reasonable to conclude that GI can be

effective with as little as once daily practice, although there appears no particular benefit of more regular usage.

However, as with the results across surgeries, the heterogeneity across studies makes comparisons and syntheses of studies challenging; for example, although it appears promising that in the research so far, exclusively post-operative GI is no less effective than pre- and post-operative GI, there were only two studies, of low and medium-quality, who explored post-operative GI only (2,36). Additionally, it was notable that all studies adopted very similar modalities of GI (audio-recorded, individually-delivered). Whilst the individual, pre-recorded method offers a number of practical benefits for clinicians in a surgical and critical care setting, other methods may be clinically or pragmatically-indicated, and it is therefore a weakness of the evidence base that the efficacy of Gi across modalities is under-explored.

Limitations and Future research

There were some limitations to the scope of the present study, which would benefit from further work. Firstly, due to the heterogeneity of the included studies, and deficits in the reporting of study results, it was not possible to complete a meta-analysis. This would be valuable in future, should additions to the literature allow, in order to draw firmer conclusions about the efficacy of GI interventions. Secondly, this review excluded studies that conducted GI during procedures, that only examined one of the post-surgical outcomes (pain, anxiety or depression) and that were in a language other than English. As such, there is undoubtedly further research on GI as a peri-operative intervention for pain, anxiety or depression which may valuably add to our understanding of GI and post-surgical outcomes, but which is not within the

scope of the present review. Furthermore, the present review methodology did not control for risk of publication bias, which may have been particularly relevant in light of only including published papers. Consequently, it is unclear how far the published evidence on GI is a valid or reliable reflection of the impact of GI.

Furthermore, as already indicated, there is a need for more, higher-quality studies in this area. Firstly, there are difficulties in drawing conclusions on the efficacy of GI due to the quality of the current literature. For example, in the present review, not all studies calculated or reported the significance and effect sizes of differences between GI and control groups; this therefore limits the extent to which the efficacy of GI can be interpreted. Similarly, very few included studies accounted for potential confounds, despite the evidence that a number of patient, surgical and analgesic factors affect the likelihood of pain following surgery (4,23,44). As such, whilst the review only examined studies with a pre- and post-, control group design in order to ensure a degree of control is included in the study, the present results are far from conclusive on the efficacy of GI *specifically*, given all the potential factors un-acknowledged. Moreover, as already indicated, the heterogeneity in methods and reporting across studies, such as a lack of specificity in the timeframe or number of interventions, or lack of detail regarding the surgery undertaken, means that it is either challenging or not possible to identify patterns within or between groups that might otherwise be helpful for practice.

Secondly, there are notable gaps in the current literature on this subject. It has already been noted that there were no studies that specifically examined the efficacy of GI for post-operative pain and depression, despite the evidenced co-occurrence and significant interaction of the two conditions and

benefit of GI for both (21). As such, further research is needed in order to explore whether GI may be of value for surgical patients experiencing pain and depression whilst in recovery. Additionally, no included studies considered the relationship between post-operative pain and anxiety, and the impact of GI on both together. It is evident from the present review that post-operative pain and anxiety shared trends: GI appeared to be an effective treatment for both in the immediate post-operative period, and also appeared to have minimal efficacy in reducing pain and anxiety over time. However, the included studies often used different outcomes and analyses for anxiety and pain, which makes synthesising these results problematic. In light of the significant relationship between the two (30,37), it would therefore be beneficial to have further research pulling together the two constructs.

Conclusions and Clinical Implications

In conclusion, guided imagery (GI) appears to be an effective treatment for post-operative pain and anxiety, particularly in the first few days following surgery. This appears to be the case regardless of surgical domain, time point of intervention and duration of GI recording. However, GI is not necessarily more effective than usual care and natural recovery over an extended period of time. Additionally, the paucity, heterogeneity and quality of studies in the present review limit the conclusions that can be drawn, and there is still much that remains to be better-understood, such as the impact of different surgical or intervention types, and the efficacy of GI for treating post-operative pain and depression. Overall, as a relatively low-cost, patient-centred intervention, which can be effective in the acute post-surgical phase with relatively little input, GI is a promising treatment for clinicians in surgical and critical care

contexts to consider. However, further research is needed in order to broaden and consolidate the evidence base for treatment of different types and applications.

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Service Improvement Project

The Experience of Staff Caring for People Admitted to ICU Following Self-Harm: Challenges and Supports

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Rationale: A journal which publishes research on advances within critical care, including intensive care units.

Abstract

There are increasing numbers of patients admitted to intensive care units (ICUs) following incidents of self-harm. This presents challenges for staff, who frequently report insufficient training and support to manage caring for these patients, who are considered more emotionally and behaviourally demanding to care for. This imbalance of demands and resources leaves staff at risk of burnout, putting healthcare under strain and jeopardising patient care. This study aimed to explore staff experiences of caring for patients admitted following self-harm in the ICU of Buckinghamshire NHS Foundation Trust. Thirty members of staff completed a survey, and semi-structured interviews were completed with a further six participants. The survey found that although staff were working with patients admitted following self-harm on a regular basis, with frequent incidents of aggression, staff had almost no specific training and limited confidence managing risk. Staff interviews, analysed using thematic analysis, highlighted five key themes: 'Otherness' of Mental Health Patients, Provision of Mental Health Care, Personal Impact of Care, Building Effective Relationships with Patients and Working with Risk. Overall, both the survey and interviews highlighted that staff felt confident in the support of their team and demonstrated significant resilience. However, there was limited confidence in the mental health support given to patients and in managing risk incidents on the ward, which had a detrimental impact on staff wellbeing and patient care. Recommendations were therefore provided for the service to improve staff training in mental health and risk management, and to make procedural adjustments to enhance staff wellbeing.

Introduction

Approximately 100,000 individuals are admitted annually to hospital in England following an event of deliberate self-harm (DSH) (1), defined as "intentional self-poisoning or injury, irrespective of the apparent purpose" (2, p.6). Many of these individuals require treatment in a specialist physical health intensive care unit (ICU).

However, current literature from across healthcare settings highlights several challenges to working with this patient group which negatively impact staff working conditions and morale, including patient violence and aggression, emotionally-challenging conversations regarding risk and negative perceptions of high-risk patients (3–6). Additionally, although few studies apply this area of research to critical care staff specifically, studies conducted in emergency departments and general medical wards echo the findings from mental health settings that staff find high-risk patients more emotionally-demanding and labour-intensive to care for than others, and that the emergency setting further exacerbates this: for example, there are greater time constraints and fewer opportunities to build therapeutic relationships (7,8).

Moreover, many healthcare staff feel ill-equipped to care for high-risk patients (7,8). Knowledge and confidence in DSH and its treatment are key to staff implementing safe, compassionate and effective care (4). However, hospital staff are significantly less likely to have received training in understanding and caring for people who self-harm than specialist mental health professionals: more than 25% nursing staff have neither pre- nor post-qualification training in this area, and only 31% healthcare

professionals report receiving this training within the last five years (9,10). Similarly, effective support structures are important in caring for high-risk patients (6). However, few professionals feel aware of risk assessment guidelines and procedures (9) and many staff lack social and collegial support in dealing with difficult patients (7).

Outline of Service Improvement Project

The number of people admitted to hospital following DSH has increased over recent years (11,12), and so too has the number receiving ICU treatment. In Buckinghamshire NHS Trust (BHT), ICU admissions following DSH have risen since 2018 from 22 patients annually to 31 patients annually. However, there are concerns within the BHT ICU that staff find this patient group difficult to cope with, and that this may present a risk to staff wellbeing in the long-term. Specifically, several members of unit staff had sought emotional and psychological support from the psychology team following distressing experiences of caring for patients admitted with DSH, with some recommended to take time off work. It was understood from these conversations between the psychology service and members of staff that this was not an isolated set of difficulties.

The conceptualisation of this project was based on the job demands-resources (JD-R) model of burnout (13). It is understood that when work demands, such as the challenges associated with this patient group, are high and resources, such as training or support, are low, there is a risk of staff burnout (13). Burnout, a “chronic state of work-related psychological stress” (14), has been associated with lower staff retention, poorer job performance, and lower quality patient care (14–16). This is a particular

concern in the context of the ICU, where treatment of mental health difficulties is not considered within the core remit and training of ICU staff, resulting in insufficient resources to manage increasing care demands, and where it is understood that staff have greater vulnerability to burnout and poor psychological wellbeing (17–20).

This service improvement project therefore aimed to explore and understand staff experiences of caring for patients admitted to ICU following DSH, with a specific focus on answering the questions: what do staff find difficult about caring for patients admitted to ICU following DSH, and what helps them to cope with or manage these difficulties? This was used to identify recommendations for the service on how best to support staff to address concerns about burnout within the team, as well as contribute to the wider literature on how critical care staff find the experience of caring for this patient group.

Method

Design

This project employed a mixed-methods design and was conducted in three phases: a survey, semi-structured interviews exploring ICU staff experiences of patients admitted following DSH, and the development of recommendations to the service.

Participants and Service Context

The study was conducted within the BHT ICU, with 22 beds across the two sites, approximately 900 admissions per year, and approximately 120 members of

staff, including nursing staff, healthcare assistants, medical staff and allied health professionals. There is a psychology service embedded within the ICU team, the remit of which is to support staff wellbeing, offering training and emotional support as required; however, care of patient psychological needs within the ICU falls within the remit of the psychiatric inpatient liaison service (PIRLS), a separate service to psychology. To understand staff experiences as comprehensively as possible, all clinical members of staff working in the ICU were considered eligible to participate in the study. The survey was open for responses until no further participants could be recruited; as no inferential statistical analysis was anticipated, there was no pre-determined minimum number of participants. The recruitment for interviews was closed when a minimum distribution of job roles and experience was reached, and sufficient detail from responses was achieved.

Study Procedures and Data Collection

In the first phase, a survey was distributed to all members of staff electronically to gather contextual information, understand the scope of the problem for the service, and to help develop an interview schedule for the second phase. Survey questions are summarised in Appendix A and included closed response questions gathering information on participants' job role and level of experience, the frequency and recency of their experiences caring for someone admitted following DSH, whether they had experienced aggression from these patients, and training received in this area. Closed and open response questions evaluated the most common barriers and supports identified in the literature, and participants were also

asked to rate their confidence in risk assessment and managing risk and emotions.

The survey also included the Maslach Burnout Inventory (MBI) and Short Warwick-Edinburgh Mental Wellbeing Scale (SWEMWBS). The MBI (21) is a validated measure of burnout with a version specifically developed for medical and healthcare professionals (used in this study) and normative data available for healthcare staff (21). Three subscales (Emotional Exhaustion [EE], Depersonalisation [DP] and Personal Accomplishment [PA]) are calculated by summing participants' scores; higher scores in EE and DP indicate a greater degree of burnout, with higher scores in PA indicating lower burnout. The SWEMWBS is an abbreviated version of the Warwick-Edinburgh Mental Wellbeing Scale (22), a measure of wellbeing designed for use with non-clinical populations and with normative data available for the general public (23). Higher scores indicate a greater degree of wellbeing; a score of 18 or below is considered indicative of low mental wellbeing (24). The MBI and SWEMWBS were included in order to provide the service with some contextual data on staff wellbeing and to provide a baseline for a future project evaluating the impact of implementing the present study's recommendations.

In the second phase, participants' responses to the survey and existing literature were used to develop a semi-structured interview schedule on staff experiences, resources and demands (Appendix B), which was then conducted with members of staff. Interviews were recorded and transcribed by the primary researcher.

In both the first and second phase, the study was advertised by means of posters displayed around the unit, presentations given by the primary researcher at team meetings and by word of mouth. For the first phase, participants opted-into the study by completing the survey via a link provided on posters. For the second phase, participants opted in by contacting the primary researcher to discuss participation and arrange a time to meet.

In the third phase, survey and interview findings were used to develop recommendations to help the service improve the support provided to staff. Recommendations were developed in collaboration with the ICU psychology team and unit managers, by presenting initial findings and considering the relevant recommendations that might be made. Recommendations were presented to wider service management, including disciplinary leads and consultants, at a weekly business meeting, and to the wider nursing staff at a monthly meeting attended by all nurses and HCAs. At both meetings, study findings were presented along with proposed recommendations, with time given to discuss both the findings and the proposals in order to amend the recommendations as seemed appropriate for the service. Study findings were also publicised in the unit by displaying posters so that staff who might have been unable to attend the meeting were aware, and the psychologist within the unit also made it known that findings and recommendations could be discussed with her directly, to ensure that it was easier for staff to voice their opinions.

Data Analysis

Survey data was analysed descriptively and collated to understand the scope of the problem in the service. For closed option questions, totals were calculated for the number and percentage of respondents in each category of response. The mean score and distribution of responses was calculated for confidence ratings, as well as the mean score for MBI subscales and SWEMWBS total score. Where norms were available (for the MBI and SWEMWBS), these are also reported. Open-text responses about challenges and supports were reviewed to inform second phase interviews.

Interview data was analysed using thematic analysis (TA), following the guidance provided by Braun and Clarke (25,26); all six steps (Table 1) were conducted by the primary researcher. TA provided a systematic means of identifying patterns across a whole dataset, whilst the inductive, 'bottom-up' approach to generate themes allowed a broad, exploratory consideration of participants' experiences.

Table 1: Summary of 6-Step Process of Thematic Analysis as Outlined by Braun and Clarke and Applied in Study

Step of Analysis	Contents of Analysis
Step I: Familiarisation with data	Transcription of interviews. Repeated, active reading through each question in each interview, noting initial ideas. Entire dataset transcribed and read before moving onto the next step.
Step II: Generation of preliminary codes	Entire dataset read through multiple times, highlighting interesting features of the data. Initial codes listed out, with all questions and interviews given equal attention in coding.
Step III: Search for patterns/themes in the codes	Initial codes collated into potential themes, then increasingly solidified into sub-themes (continually reviewed against the dataset to check fit of sub-themes to participant responses and fit of codes to summary subthemes) and themes. Multiple revisions of themes and subthemes to establish best representation of the dataset and codes.
Step IV: Revision of themes	Reviewed the fit of themes to data by checking themes a) an appropriate representation and summary of initial codes and b) an appropriate representation and summary of dataset as a whole. Generated thematic 'map' (Figure 3). Discussion of themes with researchers IC and MH to establish fit for service context and further refinement.
Step V: Defining	Definitions and names produced for themes, allowing for further

and naming of themes	refinement of themes should it be difficult to provide a summary description or name.
Step VI: Report production	Descriptions and analysis of themes written, including the selection of appropriate illustrative extracts. Discussion of themes with researchers IC and MH to establish fit for service context and further refinement.

Stakeholder Involvement

ICU stakeholders (including management staff on the ICU and wider Trust Psychology service) were engaged throughout the project and helped to refine project methodology, the survey and final recommendations. Although it was infeasible to include patient views on the development of this project, this has been considered as an important recommendation for future research and for ongoing service development within the unit.

Results

31 members of staff completed the survey, and a further 6 members of staff participated in interviews.

Survey Results

Most respondents (Table 2) were nurses, white, of more senior banding or role, between 25 and 55 and with more than 5 years of experience in ICU; this indicated an over-representation of those with more seniority and experience, and from a white ethnic background, comparative to the overall unit staff makeup.

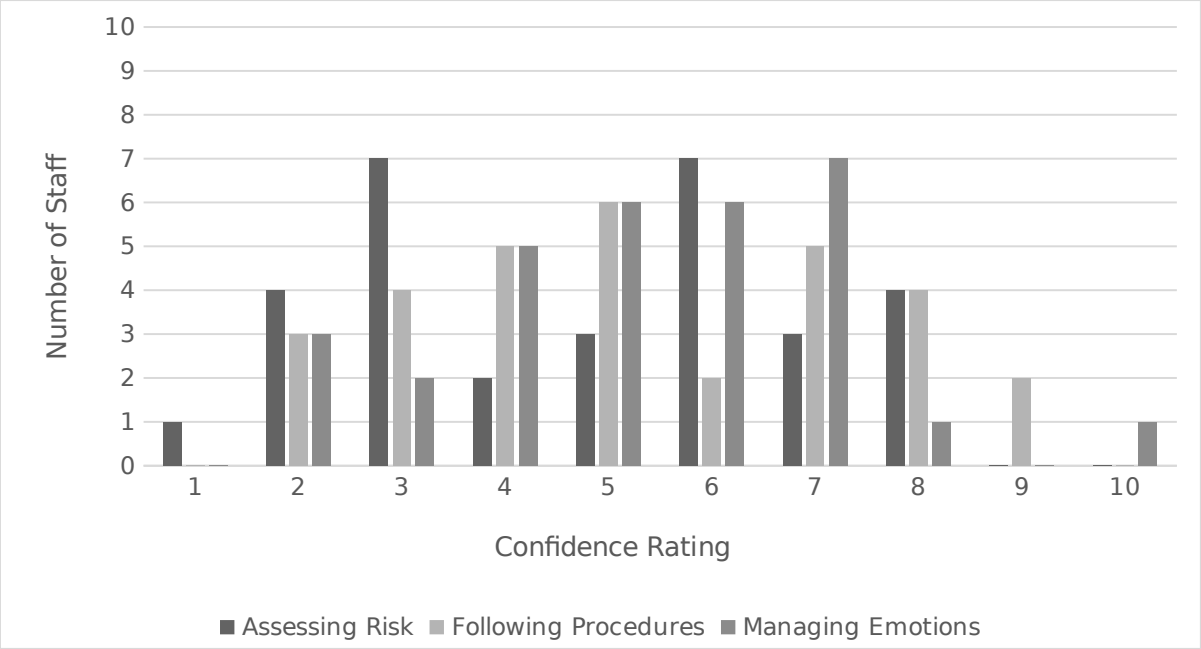
Table 2: Survey Demographic Results

		N (%)
Role	Nurse or Healthcare Assistant (HCA)	22 (71)
	Medic	7 (23)
	Allied Health Professional (AHP)	1 (3)

	Other	1 (3)
Banding/Level	Band 5	9 (29)
	Band 7	7 (23)
	Consultant	5 (16)
	Band 6	4 (13)
	Band 4	2 (6)
	Band 3	1 (3)
	Band 8 or higher	1 (3)
	Foundation Doctor	1 (3)
	Specialty Registrar	1 (3)
	Other	0 (0)
Age	35-45	13 (42)
	25-35	7 (23)
	45-55	7 (23)
	55-65	3 (10)
	18-25	1 (3)
	Over 65	0 (0)
Ethnicity	White (any background)	19 (61)
	Asian or Asian British (any background)	10 (32)
	Mixed (any background)	1 (3)
	Other	1 (3)
	Black or Black British (any background)	0 (0)
Years of ICU Experience	10-20 years	12 (39)
	5-10 years	8 (26)
	Less than 1 year	4 (13)
	20-30 years	3 (10)
	1-5 years	3 (10)
	Over 30 years	1 (3)

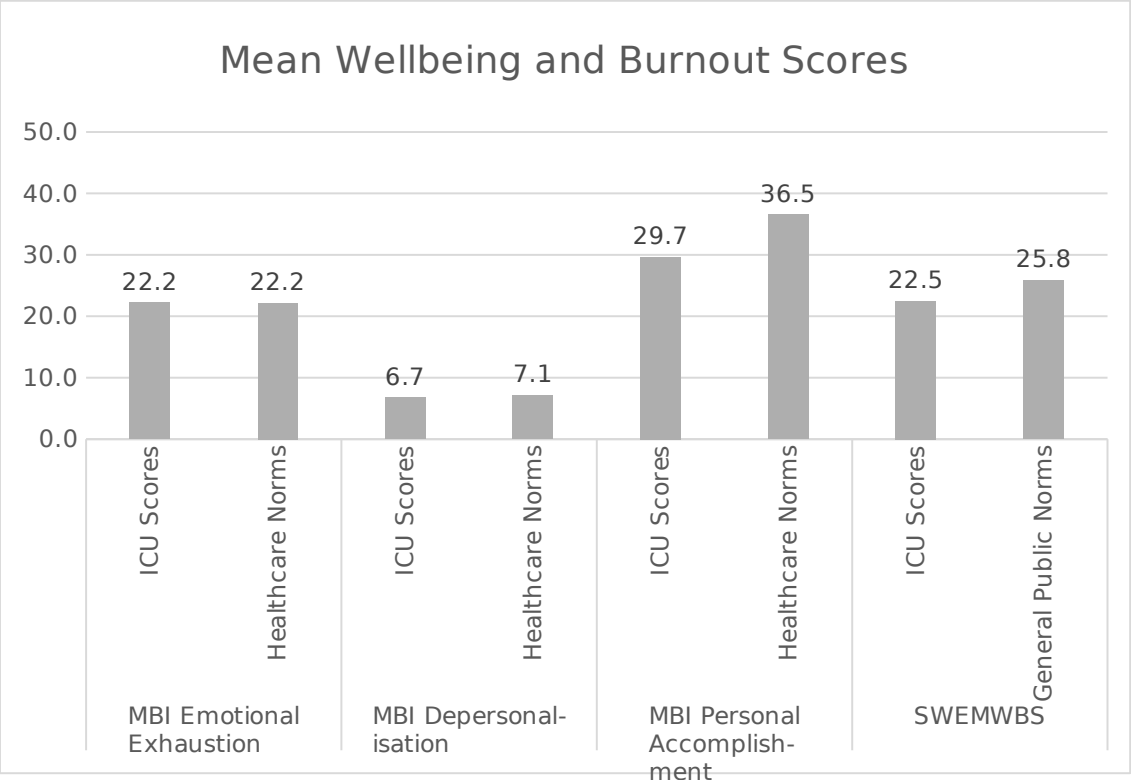
All respondents reported having cared for someone admitted following DSH. Most respondents reported this contact to be approximately monthly (52%), followed by yearly (35%) and weekly (13%). Nearly half of respondents reported never (N=7, 23%) or rarely (N=8, 26%) having conversations about risk, and only 2 respondents (6%) reported that they frequently had risk conversations with patients. The mean and median confidence in assessing risk, following risk procedures, and managing high levels of distress was 5/10, although there was marked variation across responses (Figure 1). Only 2 respondents (6%) reported receiving specific training on caring for patients admitted following DSH. Most (81%) respondents reported experiencing aggression from patients admitted following DSH.

Figure 1: Distribution of Confidence Scores; 0 was considered 'no confidence' and 10 was considered 'complete confidence'.



The mean scores for MBI and SWEMWBS were as presented below (Figure 2). The only notable difference between scores was in the PA domain; although clinical cutoffs are not available for this scale, those working in ICU appear to experience less personal accomplishment than would otherwise be expected of healthcare professionals.

Figure 2: MBI and SWEMWBS Result. MBI normative data drawn from MBI manual (21); SWEMWBS normative data drawn from UK national study (23). Error bars represent standard deviation of the sample.



Most respondents (Table 3) agreed or strongly agreed that patients admitted following DSH were more difficult to take care of and required more care, that it was upsetting work, it was difficult to have risk conversations and there was an inadequate system in place from the Trust. In addition, in the open-response questions, respondents associated the patient group with demands such as concern providing adequate or appropriate mental health support and keeping patients safe, and difficulties engaging patients and ensuring compliance with care. However, most reported awareness of support structures, good support from immediate management and colleagues, and that they could cope with working with patients in distress (Table 3). Similarly, in the open-text questions, respondents identified

effective MDT working and access to psychologists and psychiatrists as additional resources in caring for this patient group.

Table 3: Participant Endorsement of Challenges Identified in the Literature

Challenge	% Respondents Endorsing Difficulty
It is difficult to have conversations about risk with patients admitted following self-harm	94%
Patients admitted following self-harm are more difficult to take care of	84%
Patients admitted following self-harm require more work to care for than other patients	81%
It is upsetting to work with patients admitted following self-harm	77%
There is not a good system in place in caring for patients admitted following self-harm	68%
The Trust does not manage issues of risk or high risk patients well	61%
It is hard to cope with patients in distress	42%
Talking to patients about risk does not have a positive outcome	32%
I do not know what to do when a patient presents with high risk on the ward	29%
There is not a good level of support from line or clinical management in taking care of patients admitted following self-harm	16%
I do not have the support of colleagues in taking care of patients admitted following self-harm	3%

Interview Results

Interview length ranged from 40 – 63 minutes (mean 51 minutes). 5 themes were identified, with 16 subthemes. These are depicted graphically in Figure 3, and illustrative quotes are detailed in Table 4.

Figure 3: Thematic Map. Boxes with a dotted outline used to indicate those subthemes that represented a counter-narrative to the dominant narrative (represented in boxes with a solid line).

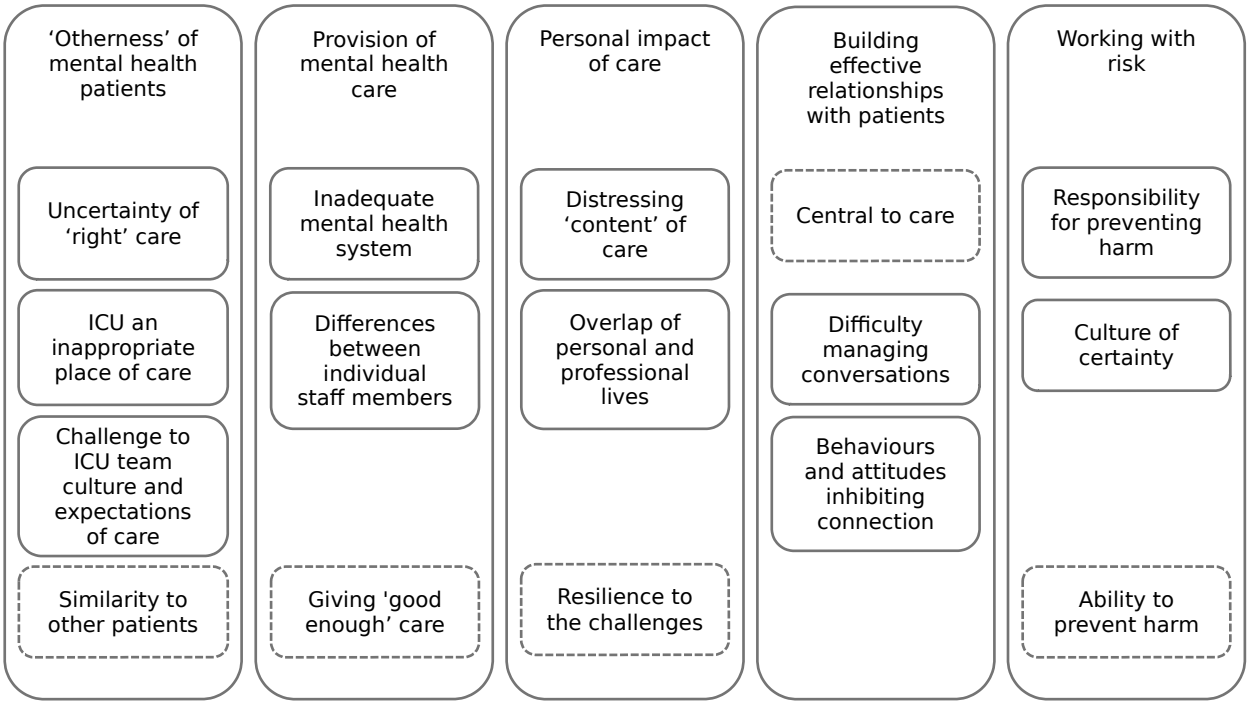


Table 4: Illustrative quotes for themes.

'Otherness' of mental health patients	
Uncertainty of the 'Right' Care	"In ICU, I can say from my perspective that maybe we do not have the, err, proper education on how to handle patients with self-harm and mental health issues […] So, from my point of view I don't know how I would approach someone with, um, mental health issues or self-harm, because I don't know, I'm not a mental health nurse, so I don't know what questions I can ask, what questions I can't ask." (P4) "I feel a bit like I don't know what I should and shouldn't say." (P3) "[The psychiatric liaison team is] a very pressured service and people look to them for help and guidance. […] Whereas because of the constraints of their service and their own guidelines, it often tends not to happen, and so people then back off with doing anything because they don't feel like that service are involved […] We're looking to various people to provide a bit of structure, a bit of help, a bit of guidance, who realistically are not in a position to do much of that and when it doesn't happen makes us feel a bit further isolated." (P6)
ICU an Inappropriate Place of Care	"It can be quite overstimulating as well […] there's people everywhere, there's doctors everywhere… There could be someone screaming on the end of the corridor or you know, erm, sometimes smells can be overstimulating […] you know, [patients] might see something, they might see someone getting chest compressions in the corner, someone's getting a line put in over here, and obviously the curtains are closed for a lot of these things, but the curtains aren't sound proof and you can hear a lot of things." (P1) "I think we're quite limited in what we can do. 'Cause I think that it's obviously a very long process trying to help somebody heal from that […] And I think for the limited time that they're with us, it's quite difficult…" (P5)
Challenge to ICU Team Culture and Expectations of Care	"Sometimes it feels like we'll see the same people over and over again. Which is, I guess, challenging because you work hard to […] get them out of ICU […] you feel like they're really improved only for them to come back to the ICU again. And I guess personally it just feels a bit demoralizing." (P3) "And then there is the question on why are we doing this? If someone is so desperately not wanting to be here […] what are we doing? (P3) "We've got to look after their mental well-being as well as their physical well-being […] but what, what could we do, in that acute phase, in those first few days post injury? […] And you have those that totally shut down, that don't want anything or refuse treatment […] That's quite difficult because you want to make them better. And then you have the other extreme, you know, the patient that's going to try and abscond because they just don't want to be here." (P5)
Similarities to Other Patients	"Actually, this shouldn't be difficult at all. If there's wounds, they need to be closed. If there's injuries, they need to be treated. If there's poisoning, that needs to be looked after […] But as I said, I think in [a physical health] situation, there's kind of well-trodden ways to navigate those situations that people feel more comfortable with, whereas in this [self-harm] situation less so." (P6) "I think they deserve the respect, they deserve a caregiver that's going to give to them in the same way they would give to any

	patient.” (P2)
Provision of Mental Health Support	
Inadequate Mental Health System	“A lot of patients are coming to us who probably didn't need to come in to us at our point if they could have had that help that they wanted a few years ago […] and I think everybody kind of knows, even if they don't need to avail of these services, it's gonna be so long to wait, there's no point even trying.” (P1) “I think if there was more support it would be beneficial for the patient, beneficial for the nursing team, but obviously that's probably something that's not going to happen because we don't have the budget to have [the psychology team] there 24/7.” (P5)
Differences between Individual Staff Members	“There's nothing about it, that I've seen, that means any of the staff members won't be able to cope, but it really depends on which nurse is at the bedside. So, the more experienced nurse who's done it, you know, 20 times before, no problem at all […] But certainly, you know, some of the newer, less experienced nurses, particularly nurses who have trained overseas, they're not at the stage in their career where they're confident to take ownership of these sorts of things.” (P6)
‘Good Enough’ Care	“I think we're really good. We are a very good team, and we do have this culture of honesty and talking to your manager and expressing your concerns […] I've always had support, and we are quite an open team.” (P4) “As somebody experienced, I certainly have those conversations. I don't fear them and I feel from my experience it's better to have them.” (P2) “I think I'd say now that [psychology] are on board there's more, it's easy to access the support that they need.” (P5) “We don't really have the knowledge or skill or we don't know how to care for them. We know how to improve their [physical health] but the mental health side of it […] they need a lot more interventions and care. […] Obviously we have drugs available to help us […] but that's more kind of sedating someone, and I'm not sure if it's the best route for someone who has a mental health disorder” (P1)
Personal Impact of Care	
Distressing ‘Content’ of Care	“To see people badly injured, whether it be on a ventilator, having been so close to death […] I think just to carry that burden of what they've been through is really, really hard.” (P2) “[If] you actually thought about what the hell they've done, some of the things have been horrendous […] And you just, I think if you actually sat and thought about ‘my God, they’re physically sitting and doing that’ - maybe that is a bit much.” (P3)
Overlap of Personal and Professional Lives	“A lot of nurses would have previous experience, obviously, with mental health patients. They might have their own personal experiences, with family or friends or even themselves […] and then know how to talk to somebody if they need to, or to not talk to them at all.” (P1) “You might identify that patient with someone from your family. […] When I see someone like [my relative], I always think about him, so, you know, it can be the same for someone else.” (P4) “The guy that would climb out the window, that's probably 20 years ago. So yeah, so yeah, they do, they do stay with me, you know, and seeing the family of the patient […] coming in to say goodbye to him. So yeah, they do, they do stick there for, probably for the

	rest of my life.” (P5)
Resilience to the Challenges	“I find that I can switch that off and you just deal with what's in front of you. […] I think you have to have a bit of distance, um, because when you don't that makes it really hard to then be, I guess professional maybe at times? And again, if you didn't have distance, yeah, it must get really hard to work with these patients.” (P3) “We just get on with it and do our job. I actually – do you know what, however negative I make it sound, I do quite like sometimes, I do see it as challenging my communication skills, and it's an area I can improve. And I do quite enjoy it.” (P2) “Actually, it's a great privilege to be able to care for them, particularly where you see somebody months later, who's made big strides forward with their mental health, and you've got them through that crisis period of time.” (P6) “I've got very good strategies […] about how to navigate all of this, which I've developed over time. And it's, a lot of it's just being experienced in knowing how things work. And once you're in that enviable position, things get a lot easier.” (P6)
Building Effective Relationships with Patients	
Central to Care	“We're good listeners on the unit, we're always here for an ear to listen to or, you know, someone might need to talk to a stranger, to offload their issues. Sometimes someone needs that really.” (P1) “Sometimes it is just a case of someone’s upset about something. That's fine. We do a lot of hand holding.” (P3)
Difficulty Managing Conversations	“I think in our culture, in ICU, we are quite careful […] We don't ask the patients too many questions because obviously it's a very uncomfortable situation. […] maybe I can make the patient feel uncomfortable or trigger some other thoughts, some other type of behaviour. That's something that I don't want.” (P4) “They can disclose things to us that we don't necessarily have the knowledge or understanding to be able to have those difficult conversations with them. You know, somebody's telling us ‘So I'm gonna kill myself’. It's like, well, what do you say to that?” (P5)
Behaviours and Attitudes Inhibiting Connection	“What gets in the way? Erm, sometimes it could be someone who's like […] ‘Oh, she's been here before. She'll abscond again.’ I think it's kind of, that kind of mindset really, which I think a lot of mental health patients have encountered.” (P1) “They might approach it with a […] ‘Ahhh, I don't wanna do this, why have they allocated me this patient?’ And that rubs- the patient recognises those kind of feelings from their caregiver and it's not good, you know?” (P2) “I can imagine it would make you […] more reluctant to want to treat them, because whenever you feel uncomfortable, you feel out of your depth […] you desperately don't wanna do anything wrong, so you would prefer not to treat them, I guess. Erm, I think there certainly is the feeling […] - time-wasters seems a bit too harsh - but there is that sort of undercurrent, I feel, that you’ve done loads for this one person, and here we are again” (P3)
Working with Risk	
Responsibility for Preventing Harm	“I think a lot of nurses will just sit at the bedside […] and they'll just sit and watch and hope ‘Not on my watch’, you know. […] With those nurses that don't really know what they're doing, and they've given been given this patient, there must be some fear that ‘My God, if anything happens to this patient on my shift, you know, I'll be at fault in some way.’ It's a culture, isn't it? That, you know,

	somebody will be blamed because this patient escaped and jumped off a bridge or ran in front of a train. And I should, I should have been keeping them safe. It was my role, my responsibility.” (P2)
Culture of Certainty	“We're trained as critical care nurses and we understand delirium […] so when that happens, the assumption is there that we deliver care appropriate to our training […] I think when we're dealing with a patient with mental health problems who self-harmed, it can switch in a moment, they're very unpredictable patients, and I don't feel like we're really adequately trained to know how to prevent it.” (P2)
Ability to Prevent Harm	“99% of the time I feel safe. I mean, none of those patients admitted following DSH […], I don't feel like any of them are aggressive with the staff […] When I had that incident with the girl […] we were all there in that incident, supporting me, the patient I'm working with.” (P4) “Obviously in the mental health ward, erm, they've got […] all those safety precautions. And then in ICU, God, we have none of that.” (P1) “I don't really know what the processes and procedures are so that that says it all really, doesn't it?” (P2) “I don't know, but I never managed to talk to her about the situation because she was either very delirious or in withdrawal. So, I don't think it was appropriate to talk.” (P4)

'Otherness' of mental health patients

Patients admitted to ICU for reasons associated with their mental health, in particular DSH, were considered to have different care needs and require a different skillset to treat them. Within the subtheme *Uncertainty of the 'Right' Care*, it was identified that, like the medical model followed within the ICU, many felt there was 'right' way to care for patients admitted following DSH but that without specific training, they did not know and were not capable of delivering it (Table 4, P4, P3). Participants also expressed reliance on 'experts', which led them to feel unsupported and uncertain when there was a gap between perceived need and the specialist service offer (Table 4, P6).

Whilst acknowledging the severe condition of patients, the subtheme *ICU an Inappropriate Place of Care* captures staff's belief that the ICU was not the best place to care for patients admitted following DSH. The environment of ICU was described as busy and lacking privacy, which was considered particularly inappropriate for patients admitted following DSH, who were viewed as especially vulnerable to distress (Table 4, P1). Participants also reflected that due to high workloads, shift patterns, and the acuity of care, they were unable to offer the significant amount of time and support that they felt people with mental health difficulties required (Table 4, P5).

Staff believed that 'usual' care in ICU meant resolving immediate physical health needs and 'curing' patients for the long-term; as such, patients admitted following DSH, with unresolved mental health needs, presented a *Challenge to ICU Team Culture and Expectations of Care* by resisting a long-term fix (Table 4, P3). This led to staff, who frequently shared their reasons

for work being the pride in seeing patients' recovery, feeling "demoralised" and deskilled. Readmissions of patients with DSH also presented a moral challenge for staff, who felt conflicted in their obligations towards patients' recovery (Table 4, P3). Participants reported difficulty balancing the ICU focus on the physical needs of patients with emotional needs. Staff expected patients admitted following DSH to be more challenging to care for than other patients and for this, combined with their physical condition, to be a barrier to treatment (Table 4, P5).

However, all participants indicated *Similarities to Other Patients*, drawing parallels to other patient presentations, such as delirium, and noting that patients with DSH needed physical health treatment like any other patient (Table 4, P6). Participants also highlighted the need to treat to offer equal treatment regardless of patient context (Table 4, P2).

Provision of Mental Health Support

In many ways, participants felt that the mental health care provided to patients admitted following DSH was inadequate. Firstly, there was a strong sense that there was an *Inadequate Mental Health System* in the NHS, leading to an increased number of patients admitted who had reached crisis level (Table 4, P1). This was felt to be an unnecessary escalation, and staff were distressed not only by additional anguish for patients but also their positioning as a safety net that they felt unable to be. Furthermore, the lack of NHS mental health resources meant that staff felt there were insufficient mental health resources available to ICU for staff to meet patients' needs (Table 4, P5).

The second subtheme, *Differences between Individual Staff Members*, highlights that due to how care was delivered in the ICU, where each patient receives one-to-one care from a single nurse for a 12-hour shift, the burden of care fell largely to the individual allocated and the experience and delivery of care could vary by staff ability. Staff with more experience were considered more confident and able to cope with challenges such as volatility, unpredictability and higher emotional demands. By contrast, newer or less experienced members of staff were considered more vulnerable and felt uncertain or unsupported (Table 4, P6). Participants also noted that there was a natural variation in staff temperament and inclination to work with distress, which meant some staff were perceived as better suited to work with patients admitted following DSH.

The final subtheme explored the degree to which staff felt they delivered *'Good Enough' Care*. All staff reported a high regard for their colleagues and a team commitment to delivering the best possible care (Table 4, P4). Moreover, where support was available from specialist mental health clinicians, such as an embedded psychology team, all participants felt this had improved their ability to respond in what they felt was an appropriate and timely manner to patient mental health concerns (Table 4, P2, P5). Some staff members, particularly those with experience of mental health, acknowledged confidence in the care they gave to patients. However, others, who considered themselves untrained in mental health, expressed feelings of inadequacy and doubt, and feared patients admitted after DSH possibly received a worse quality of care. For example, sedation was reportedly used more often with patients admitted after DSH, creating unnecessary health risks (Table 4, P1).

Personal Impact of Care

The third theme identified the impact of caring for patients admitted after DSH on staff. Within *Distressing 'Content' of Care*, staff reflected that despite regular exposure to serious illness and injury on the ward, DSH was seen as more upsetting. All staff reported experiencing and witnessing difficult staff emotions around the work, which in many cases was connected to the sense that inflicting the injury themselves put staff in the mindset of a much deeper distress than they were comfortable connecting with (Table 4, P2, P3).

The second subtheme highlighted the *Overlap of Personal and Professional Lives*. Most participants reported more personal connections to mental health difficulties than physical health, particularly after COVID-19. Whilst some expressed ways in which experience facilitated care delivery, particularly by enhancing their understanding of mental health and their communication skills (Table 4, P1), it was more common for identification with mental health to make care more distressing (Table 4, P4). Experiences at work also impacted wellbeing beyond shifts. Notably, all participants had patients or experiences that had stayed with them, in some cases for decades. This indicated the degree to which patients with DSH was felt to permeate out from their professional life to personal in a way that felt different for staff to their other patients (Table 4, P5).

The way staff coped with caring for patients admitted following DSH is covered in the final subtheme, *Resilience to the Challenges*. All participants acknowledged coping strategies that they and peers used to manage the emotional strain of the work, particularly creating distance between yourself and work through cultivating detachment, focusing on the 'here and now' or

taking breaks from the work (Table 4, P3). Other coping strategies included drawing on team support and adopting a more growth-focused mindset (Table 4, P2), which they likened to a broader idea of choosing critical care because of the challenges. Similarly, several participants highlighted moments of success achieved (Table 4, P6), such as seeing patients recover or have transformative insights into their mental health, which made the difficult journey feel worthwhile and was linked for them to the critical care mindset of being able to 'fix' what was wrong for patients.

However, the ability to cope with the demands of care varied significantly across staff members. Almost without exception, coping ability was associated with increased life experiences, both personal and professional. Whilst this meant that more experienced members of staff adopted a more confident stance towards working with patients admitted following DSH, it was noted that the majority of ICU staff were on the less experienced end of the spectrum, meaning that most people in the unit felt quite uncertain and emotionally-uncontained in working with these patients (Table 4, P6).

Building Effective Relationships with Patients

The subtheme *Central to Care* captures the perceived importance of building relationships with patients as part of the job, and that staff had associated strengths and expertise in communication skills. Participants expected patients of all contexts to experience distress whilst on the ward, related to either the circumstances of their admission or their anticipated life afterwards, and supporting patients through this was viewed positively (Table 4, P1). However, staff clearly felt talking was particularly important for patients with mental health difficulties, and should be seen as part of their caregiving duties (Table 4, P3).

However, the subtheme *Difficulty Managing Conversations* notes the fears that formed a barrier to talking. It was common for participants to report avoiding conversations about mental health or risk because they expected for patients to become distressed by this, or to make a disclosure of risk or traumatic experiences that staff would then need to manage. This was avoided by staff due to self-doubt and broader challenges in how risk issues were escalated in the unit, and a taboo around mental health in the unit and society more broadly (Table 4, P4, P5).

The subtheme *Behaviours and Attitudes Inhibiting Connection* also captures the behaviours and attitudes of both staff and patients that blocked communication. Staff reportedly often expected patients to be aggressive, manipulative, distressed or otherwise too fragile to work with, leaving staff reluctant to build relationships with them. Participants also noted derogatory, dismissive and unempathetic attitudes within the staff team towards patients; these were particularly directed towards those with repeat admissions, as repeatedly and deliberately consuming resources challenged staff values and often felt like a rejection of the care that staff had given patients. Several participants also commented on how patients could see these attitudes as staff rejecting them, further impeding effective relationships (Table 4, P1, P2, P3).

Working with Risk

Risk was prominent throughout interviews, and for many staff seemed to be the crux of their concerns about patients admitted following DSH. The subtheme of *Responsibility for Preventing Harm* describes the core staff culture of ensuring both patient and staff safety which, on the surface, stemmed from fear of blame and professional repercussions (Table 4, P2).

Importantly, however, the idea of harm not occurring ‘on my watch’ was also intrinsically connected to their professional self-concept as people who cared for patients.

The subtheme *Culture of Certainty*, meanwhile, speaks to the beliefs explicitly and implicitly indicated by participants that ‘knowing’ was important. By contrast, risk in the context of DSH was seen as something volatile and unknown, and thus felt to be deeply threatening (Table 4, P2).

The final subtheme of *Ability to Prevent Harm* reflects staff ambivalence about the actual likelihood of harm. Participants considered major harm unlikely, as few patients presented an active risk and the ICU was able to respond quickly to concerns (Table 4, P4). However, a lack of safety was implicit, as many staff shared doubts about their own or the unit’s ability to respond effectively to threats. Nearly all participants cited instances where harm or threat had occurred, and despite reflecting on the unlikelihood of this repeating, it seemed to have a significant impact on the staff culture. Indeed, it seemed that the infrequency of risk escalations in fact added to the staff sense of doubt, as they lacked opportunities to become familiar with the processes or develop their capacity to deal with threats (Table 4, P1, P2). Additionally, risk discussions were felt to be at best challenging, and often inappropriate or unhelpful in the context of the ICU. Patients were often considered too unwell to engage effectively with staff, and the reluctance to create unnecessary stress for patients at these times led staff to judge that conversations about risk were best left to another time or clinician (Table 4, P4).

Discussion

In summary, the present study reinforces the existing literature that ICU staff regularly care for patients admitted following DSH, and that this presents staff with various challenges. Staff feared harm coming to themselves or patients, felt themselves insufficiently skilled in mental health care to manage patient needs, were emotionally affected by the subject of DSH, and struggled to care for patients in the context of wider stigmatising attitudes and the ICU context. However, experience and support systems were important protective factors, and it was noted that the ICU context was broadly resilient.

The lack of staff confidence in the mental health support given to patients and in managing risk was an important finding in the present study. Across both the survey and interviews, it was clear that staff did not feel they had adequate training in mental health, and at lower rates expected from the broader literature (9,10,30). Feelings of incompetence have elsewhere been noted as a concern for clinical staff working with DSH (29,31), and the present study highlights that in a context where training is associated with certainty, and certainty with competence, and the lack of training evidently established a dichotomy within the staff team of expert/inexpert, with mental health falling firmly on the 'inexpert' side. ICU staff, used to working to specific or correct treatment pathway for patients' difficulties, also clearly felt that 'appropriate' treatment of DSH fell elsewhere in the healthcare system, and struggled feeling like a last resort for patients. Whilst patient-focused research has elsewhere echoed the sentiment that the rise in ICU admissions was a mark of broader systemic weaknesses (32,33), such concerns have been much less frequently reported from staff. There were some fears around staff safety: incidents of aggression were reportedly

common, and comparable to existing research (6,34), and, as with earlier studies, staff clearly expected more aggressive and demanding behaviour from patients with a comorbid mental health difficulty (35). However, ambivalence about the likelihood of harm in the ICU, with a responsive team and strong culture of safety, suggests that staff perception of risk was often constructed from ideas of mental health rather than the patient. Staff were much less confident understanding, assessing and managing patient-focused risk behaviours, as well as responding appropriately within the constraints of the ICU, which also presented a much greater moral and professional threat to staff who view their role to be preventing harm. This reinforces research conducted with clinical staff in other settings, who found DSH behaviours unpredictable and difficult to discuss with patients, and lacked the tools to stop people from acting on urges (36–38).

Staff attitudes were also a notable source of challenge. As with other studies, many staff expressed empathy, understanding and tolerance but also cited ideas that patients were 'attention-seeking', 'manipulative' or disinterested in making changes (28,29,31,39). The present study found that these attitudes challenged care for patients admitted following DSH, who apparently undermined staff values and their conceptualisation of ICU work, leaving some staff distressed and questioning the value of care they provided.

However, the present study highlighted several key resources within ICU for coping with challenges associated with patients admitted following DSH. As expected from previous research (27), both survey and interview results endorsed peer and managerial support as a means of tolerating difficult work. This was considered particularly true in ICU, where effective team-

working is critical in caring for acutely unwell patients, itself a source of pride for staff. It was also evident in the present findings that staff considered the team resilient, good at persevering through challenges, committed to connecting with and caring for patients, and had well-developed means of seeking out support. It is possible that less resilient narratives were missed through recruitment and data collection methods. However, it might also be expected that the ICU context, where staff expect to work with the most seriously unwell patients, gives staff a particular advantage in coping with challenging patients. Finally, participants considered both professional and personal experiences of DSH and mental health gave them a better understanding of mental health and treatment, which in turn built their confidence. Although some studies have challenged this relationship (28,29), the present study supports evidence from clinical staff working with DSH in other settings that greater experience improves staff confidence and optimism (28,30).

Clinical Implications

Following the JD-R model, there are clear indications in the present study of personal and team resources, and the significance of these is demonstrated by the relative lack of staff burnout and impaired wellbeing on the MBI and SWEMWBS. However, there are also evidently high levels of demand, with participants also endorsing the sentiment that caring for patients admitted following DSH was difficult and expressing their frustration and distress. It is notable that personal accomplishment appears particularly impacted by work with DSH, which has been noted elsewhere along with staff feeling frustrated, powerless and anxious (4,29). Such feelings, and the potential

burnout risk of greater demands than resources, are an evident wellbeing concern and associated with clinical staff seeking to leave the profession (27).

Additionally, the emotional impact on staff may have negative implications for patient care. As found elsewhere (38,40), participants observed staff avoidance or disengagement from patients admitted following DSH as a result of fears, distress or negative attitudes towards patients. However, such avoidance may, as indicated in patient-focused studies, exacerbate patient feelings of de-prioritisation and stigma, which is likely to worsen the risk of DSH (32,40), and result in less responsive or unequal standard of care for patients with known mental health difficulties.

It is therefore important that healthcare services in which non-psychiatric clinical staff work with patients with DSH are aware of the potential challenges associated with this patient group and take steps to address these difficulties. It was recommended that the Buckinghamshire ICU implement training and procedural changes in the unit to increase staff awareness of and confidence in mental health, and create additional routes to staff support (further detailed in Table 5). Based on the present study, it was recommended that changes and training be co-developed with staff members, in acknowledgement that there were likely many voices that were not captured in the current study. These recommendations were accepted by the team, who also commented on other ways the logistical running of the unit could be adapted, such as using particularly accessible beds for patients with self-harm, and the ways in which mental health of staff could be promoted going forward.

Table 5: Table summarising recommendations. Some recommendations were made for immediate action, and some recommendations were made for further consideration for the team, in light of contextual challenges that made immediate action difficult.

Recommendations for action	Additional training and supplementary guidelines	ICU psychology and psychiatric liaison team to produce training and accompanying guidelines or 'frequently asked questions' material, focusing on: • Understanding mental health and the psychological mechanisms of self-harm • Working with uncertainty, particularly in the context of risk. The aim of this training would be to reduce the felt 'otherness' of mental health and increase staff confidence in the mental health care that they already deliver on the unit.
	Procedural changes	The psychology team to work with unit management and the psychiatric liaison team to: • Identify ways of flagging patients on admission who might benefit from additional support • Streamline the development and sharing of a mental health care plan for patients • Develop ways of signalling that a patient or staff member needed additional support, such as with a notice or light that could be outside of the bed space. The aim of these changes would be to increase staff confidence in treatment and make it easier for staff to access support on shift.
	Behaviour support plans	Where indicated (for example, where patients had at least one previous admission and would likely have a longer ICU stay than usual), the psychology or psychiatric liaison teams to work with ICU staff to develop a positive behaviour support (PBS) informed plan to understand patient behaviours and manage the impact of this on the staff team.
Recommendations for consideration	Allocation changes	It was recommended that the unit consider: • Allocating a member of staff on shift each day as mental health champion who could lead at handovers or huddles in checking in with other staff members on duty and acknowledging where patient care might be more challenging for them • Allocating a staff members more consistently with patients across shifts, particularly where it was known that the patient had additional mental health needs.
	Awareness of personal experiences of self-harm	Through conducting the present study, it had been made clear that many members of staff were affected by self-harm in their personal lives, and it was recommended that the unit hold in mind moving forward how present this issue was for the staff team.

Limitations and Future Research

Although many of the themes identified are in keeping with broader research, it is difficult to say how far a study conducted within a single ICU team will generalise. The participants were also potentially less representative of the team than would be hoped, with an overrepresentation of senior and white members of staff, and those with personal and positive experiences of mental health difficulties. Although efforts were made to negate this through recruitment, future research would benefit from considering how to reach those from minority backgrounds and with more challenging personal experiences of DSH, as experience has been shown to influence a more positive or sympathetic view towards patients admitted following DSH (28), and counter-narratives may be underdeveloped. It was also beyond the scope of the present study to involve patient views. However, future research could valuably combine the two perspectives, which appear to have a number of thematic overlaps (32).

Conclusions

In conclusion, it was found that staff in BHT ICU regularly cared for patients admitted following DSH, and although they demonstrated significant resources through their use of collegial support and broader coping strategies, there were notable demands managing risk, negative attitudes towards patients, and feelings of inadequacy. This has notable negative implications for both staff wellbeing and patient care, and it is recommended that the service implement a package of training and support materials, as well as considering systemic changes to streamline care and bolster staff support and confidence.

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Theory-Driven Research Project

The Importance of Appraisals of Symptom Controllability for Psychosocial Outcomes Following Acquired Brain Injury

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Abstract

Objectives: To refine the Leventhal Common Sense Model (CSM) of health adjustment for acquired brain injury (ABI) and psychosocial outcomes. It is hypothesised that appraisals of injury controllability will differentiate individuals with positive or negative adjustment, above and beyond other appraisals, and that the relationship between controllability appraisals and outcomes is mediated by coping strategy.

Setting: Outpatient and community-based sample.

Participants: 44 adults with ABI, excluding those with mild traumatic brain injury.

Design: Cross-sectional observational.

Measures: Illness Perception Questionnaire - Revised (IPQ-R), BRIEF COPE, Hospital Anxiety and Depression Scale (HADS) and WHO Quality of Life Brief Inventory (WHOQOL-BREF), completed by participants; the Disability Rating Scale (DRS) was also completed by a clinician for each participant.

Results: ANOVAs found that individuals with high controllability beliefs had greater mood, psychological, physical, social and environmental quality of life, although with mixed statistical significance. Regression analyses found that controllability beliefs significantly predicted mood, and psychological and environmental quality of life, in addition to identity, coherence and timeline appraisals. Individuals with high controllability beliefs endorsed on average greater use of adaptive coping strategies, and reduced use of maladaptive coping strategies, although these mean differences were statistically non-significant. Moreover, use of adaptive coping strategies was

unrelated to psychosocial outcome. Mood effects were independent of level of disability, although quality of life was not, and controllability was not mediated by adaptive coping.

Conclusion: It is possible to refine the CSM of ABI adjustment, although appraisals of identity and coherence should be considered in addition to appraisals of control, which should be considered when supporting individuals after ABI. Additionally, models and rehabilitation interventions should consider delineating psychosocial from functional outcomes, and differentiate domains of mood and quality of life, as the concept of adjustment is multifaceted and it appears that different appraisals are relevant for different outcome domains.

Introduction

Acquired brain injury (ABI) refers to a traumatic or non-traumatic injury to the brain resulting in neurological impairment, including head injury, stroke, anoxia, encephalitis and related neurological injuries. The physical, psychological and cognitive features of this can range from altered or impaired sensory and motor abilities, dizziness, nausea or fatigue, to impaired memory, communication skills, insight or personality changes, and such symptoms can impact significantly on daily activities, role participation, social relationships, and physical and psychological health [1–4].

ABI appears to increase the risk of psychiatric morbidity and reduced quality of life (QoL) [5–11]. However, as psychiatric disorders or impaired QoL are not inevitable following ABI, nor entirely accounted for by physical aspects of the brain injury [8,12], understanding psychosocial influences on outcomes is critical for informing effective clinical interventions.

The Common-Sense Model of Adjustment to ABI

Adjustment to ABI is often approached using a cognitive-behavioural framework, whereby the appraisals or meanings made by an individual of a life event inform and are influenced by an individual's behaviours, with both appraisals and behaviour consequently informing and becoming informed by the individuals' emotional and functional state (which might then be considered poor or good adjustment).

A cognitive-behavioural model of adjustment to physical health stressors that has been applied to ABI is the Leventhal Common-Sense Model (CSM) [13,14]. The CSM posits that when an individual experiences external or

internal cues of an illness or injury, they construct a cognitive representation of the ABI (the appraisal aspect of the cognitive-behavioural framework). This is done by making appraisals of the health stressor across five domains: appraisals of the identity, the controllability, the consequences, the coherence and the timeline of the health stressor. Such appraisals are believed to be informed by the individual's broader context, including previous experiences of health and the views of others. In the CSM, these appraisals of perceived identity, control, consequences, coherence and timeline are termed the cognitive representation of the injury or illness. Individuals will also subsequently form an emotional representation, which refers to how individuals feel about their injury (e.g. fearful, angry, sad), influenced by both the cognitive representation and the individual's wider context. Depending on the cognitive and emotional response of the individual, they will select a coping behaviour (the behavioural aspect of the cognitive-behavioural framework). Finally, the interaction of the individual's appraisals, coping behaviour and context will then lead to either positive or negative functional and emotional outcomes. The CSM has been applied across a number of physical health conditions, including brain injury, with robust evidence of the value of the model for understanding clinical outcomes [15].

Appraisals of ABI Controllability and Adjustment

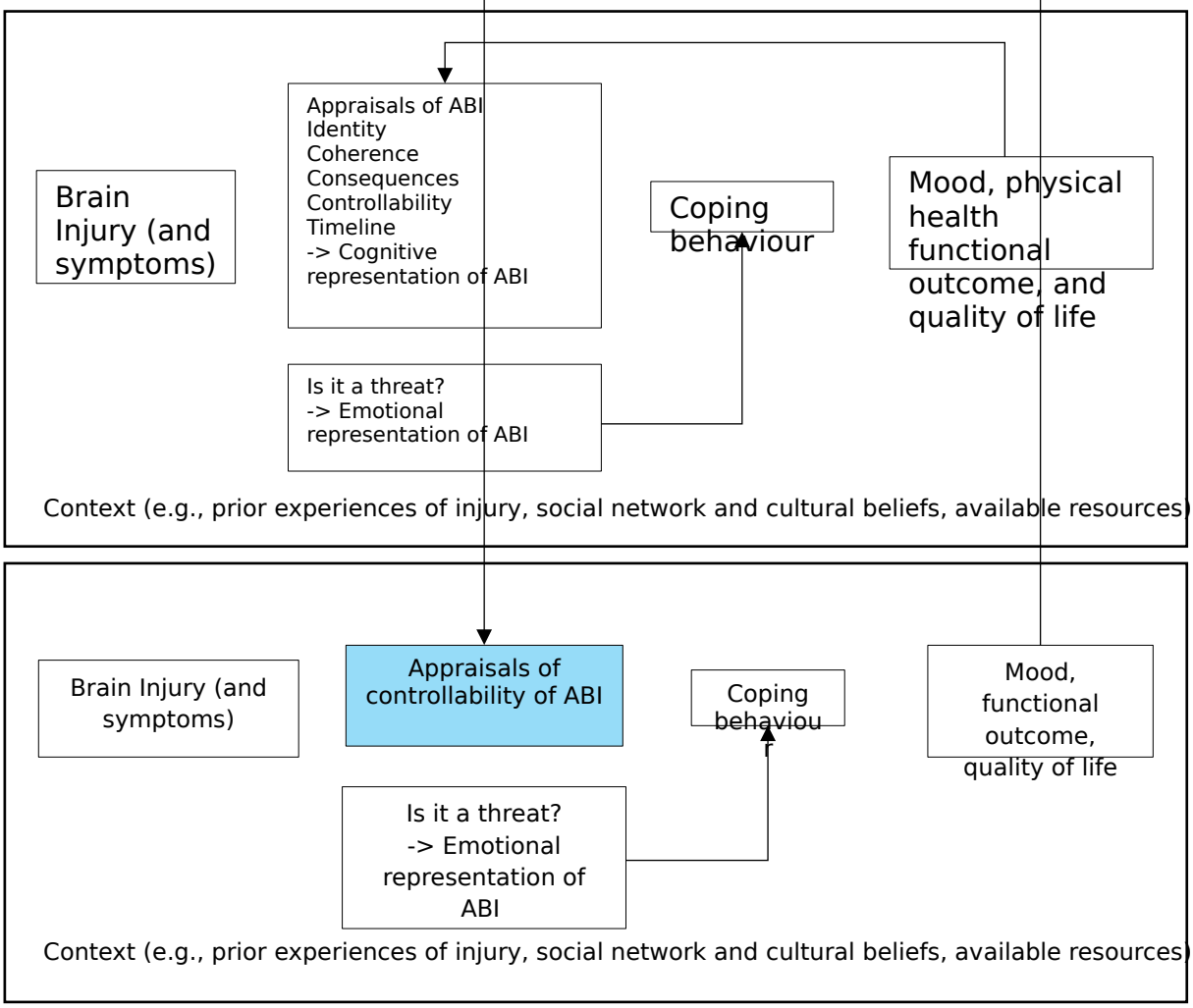
The CSM suggests that all appraisal domains have equal significance for outcomes. However, in its application, the importance of different cognitive representations within the model has varied across conditions. In coronary heart disease patients, for example, the specific appraisals of control,

coherence and timeline were found to be particularly significant in their relationship to mood and quality of life [16], whilst in patients with rheumatoid arthritis, appraisals of identity, consequence and control were of the greatest relevance to these outcomes[17]. There is some limited research currently applying the CSM to mild traumatic brain injury, with recent reviews identifying that appraisals of identity, control and consequence are most strongly and consistently associated with functional and symptomatic outcomes, with timeline and coherence featuring less prominently [9,18]. Even more limited research that includes those with severe ABI has highlighted the role of consequences, control, timeline and identity appraisals, but with significant discrepancy across these studies[19,20]. As such, there is still a need to examine which appraisals hold most significance following a severe ABI.

From the limited research that exists in this area, appraisals of control (referring to an individual's belief that their condition or the consequences of their condition can be improved or optimally managed by their own actions or prescribed treatment) might be argued to hold the most theoretical weight in understanding psychosocial outcomes such as mood, social functioning, and quality of life. It is notable that across the existing studies on those with severe ABI, control was a consistent appraisal of significance[19,20]. Evidence suggests that positive appraisals of control are associated with greater post-traumatic growth following ABI [19], suggesting that such individuals are more likely to acknowledge gains alongside losses, which might then lead to more positive mood and better quality of life. Additionally, evidence from across health conditions including ABI, has found that positive appraisals of control have been associated with greater

engagement in activity including rehabilitation treatment and physical exercise [21–23]. This is well-understood from cognitive-behavioural models to be associated with more positive mood and quality of life [24]. Perhaps most significantly for the CSM, individuals with a TBI with greater perceived control engage in fewer avoidant coping strategies which, as theorised in the CSM model, is likely to improve their outcomes [25]. Therefore, there are grounds to hypothesise that when applied to ABI, the CSM might be refined to specify that more positive appraisals of injury controllability would be associated with higher reported mood, wellbeing and quality of life, above and beyond other appraisals of injury included in the CSM (Figure 1). Additionally, these appraisals of control may be associated with increased use of adaptive coping strategies, which may explain any observed positive relationship between controllability beliefs and psychosocial outcomes.

Figure 2: Summary of Leventhal CSM as Applied to ABI (above) and hypothesised refinement by emphasising appraisals of controllability (below)



Aims and Hypotheses

As such, this study aims primarily to explore whether the Leventhal CSM can be refined more specifically to understand adjustment to ABI.

The primary hypothesis is that individuals who endorse positive appraisals of injury controllability will demonstrate more positive mood and quality of life than those who endorse negative appraisals of injury controllability.

Secondarily, it is hypothesised that positive mood and quality of life will be significantly predicted by positive appraisals of injury controllability, above

and beyond appraisals of injury identity, coherence, consequences and timeline.

Further, it is anticipated that control beliefs will be important in part due to the coping strategies individuals adopt, and thus it is hypothesised that:

- Individuals who endorse positive appraisals of injury controllability will endorse greater use of active (adaptive) coping strategies and reduced use of avoidant (maladaptive) coping strategies than those who endorse negative appraisals of injury controllability.
- The relationship between appraisals of control and mood and quality of life outcomes will be mediated by the use of adaptive coping strategies.

Method

The views of individuals with lived experience of ABI and rehabilitation were sought in developing the study. Specifically, the primary researcher met on four occasions with three individuals with ABI who had previously received rehabilitation from the service and expressed interest in supporting research projects undertaken in future. The input of individuals with lived experience helped clarify the wording of key documents including information sheet, consent form and questionnaires, refine the scope of the study and adapt the data collection methodology to meet the needs of the study population. Some of the changes that resulted from this process include: deciding not to impose an upper time limit *since brain injury* that an individual could be recruited, as all lived experience experts reflected on the different length of time that could elapse for people between injury and rehabilitation, and the nature of adjustment as ongoing for the rest of their life; making the

questions on rehabilitation input received less specific, to reduce confusion about what the question was asking of participants; removing an additional questionnaire on wellbeing, as this was judged an unnecessary burden for participants that did not significantly add to the theory. The research was registered on the Open Science Framework before data collection.

Participants

Participants were individuals who had experienced an acquired brain injury (ABI), and had been referred to specialist neurorehabilitation and lived in the community for at least 12 months following their injury. All ABI causes were eligible, including traumatic brain injury, stroke, brain haemorrhage, aneurysm or tumour, hypoxic brain injury, hydrocephalus, meningitis, or encephalitis. Other inclusion criteria included: aged 18 and over; possessing sufficient English and cognitive capacity to complete questionnaires. Exclusion criteria were: significant additional injuries or comorbidities that impeded discrimination between different injury symptoms; an ABI classed as a mild traumatic brain injury (MTBI), as defined by the WHO [26]. A power analysis was conducted using G*Power [27,28]. This was based on the primary expected analysis, an ANOVA with up to three anticipated groups, a power of 0.8, alpha value of 0.05 and an effect size of 0.5. This effect size was selected as the nearest comparable study conducted with ABI participants, in addition to other comparable study designs with MTBI, found effect sizes of 0.5-0.8, so an effect size of 0.5 was considered a conservative estimate based on the extant literature [19,29–31]. This analysis indicated that a minimum of 42 participants was required. A second power analysis based on the anticipated regression analysis, with

the same power, alpha and effect size values, and the eleven anticipated predictor variables, indicated a sample of 45 participants was required. As such, the study aimed to recruit the higher number of 45 participants but was judged to have acceptable numbers for the primary analysis once 42 participants were recruited.

Design and Measures

The study was conducted using a cross-sectional, between-subjects design. Participants completed measures of illness beliefs, coping strategies, mood and quality of life (detailed below and given in full in Appendix D), and provided details of their gender, age (current and at injury), rehabilitation dates, and rehabilitation MDT input. A clinician familiar with the participant completed the DRS (Appendix E) after participation in the study was confirmed.

Participant Measures

The Illness Perception Questionnaire, later revised as the IPQ-R [32], was developed to assess the core domains of Leventhal's CSM [13,33] and includes seven sub-scores (Identity, Consequences, Timeline (Cyclic), Timeline (Acute/Chronic), Control, Coherence, and Emotional Representation), calculated as a sum of item responses. Higher scores indicate greater endorsement of beliefs. As recommended [32], the IPQ-R was adapted for the population studied in line with changes adopted by similar studies [25,34] and with assistance from individuals with lived experience. For example, 'injury', 'brain injury' or 'condition' were substituted for 'illness', and additional items were added to capture commonly-reported symptoms. Although examination of its psychometric properties in this population is limited, the

IPQ-R has good internal consistency and face validity as a measure and has been used with individuals with varied brain injuries [35,36].

The Brief Coping Orientation to Problems Experienced Inventory (Brief COPE) [37] is a 28 item version of the longer COPE Inventory developed by Carver et al. [38] to assess different coping strategies, and generates scores of Maladaptive and Adaptive coping by summing item scores [39]. It has been found to have good internal consistency and face validity for use with people with ABI and has been judged acceptable for use with this population [39]. Higher scores are indicative of greater use of coping strategies.

The Hospital Anxiety and Depression Scale (HADS) [40] is a fourteen-item measure of anxiety and depression considered appropriate for assessing psychological distress in clinical populations including ABI [41,42]. Although scores can be separated into Anxiety and Depression scores, a single Mood score was used in this study due to limited theoretical grounds for splitting anxiety and depression, and previous findings that the single Mood score is stronger than the traditional split structure [41,42] and both clinically and psychometrically valid [42,43]. Lower scores are indicative of more positive mood.

The World Health Organization Quality of Life (WHOQOL-BREF) [44] is a 26-item version of the WHOQOL-100, an instrument designed to assess individuals' quality of life across Physical (PQOL), Psychological (PsQOL), Social (SQOL) and Environmental (EQOL) subscales [44]. It has been found to have good internal consistency and test-retest reliability, and moderate to good validity, when used with people with ABI [45,46]. Higher scores are indicative of more positive quality of life.

Disability Rating Scale (DRS) [42]

The DRS is a standardised measure of impairment from ABI developed and tested within the ABI rehabilitation setting [47]. An observer scores patients on eight areas of functioning (eye opening, verbal response, motor response, feeding, toileting, grooming, dependence on others and employability) on a scale of 0 to either 3 or 5. Higher scores represent a greater level of disability.

Study Procedures and Data Collection

The study received ethical approval from an NHS Research Ethics Committee (24/NW/0295). Participants were recruited from December 2024 to June 2025 through the Buckinghamshire Community Head Injury Service (CHIS), which provides countywide specialist community neurorehabilitation on the basis of professional and patient referrals. All patients discharged from the service up to five years prior to the study, and current patients who had been with the service for at least twelve months, were contacted by email or by their keyworker with information about the study. Patients who expressed interest in the study were subsequently contacted by the primary researcher to discuss the study and complete consent forms before receiving questionnaires. A follow up email was sent to participants if they expressed an interest in taking part in the study but had not replied after two weeks following their expression of interest. 298 patients were initially contacted, of whom 70 expressed interest and were contacted by the primary researcher.

Participants could complete questionnaires electronically, by post, or over the telephone. This was so that individuals with ABI symptoms impacting on

their ability to use computers, read or write independently would not be unnecessarily excluded from participating in the study. Participants were provided with a unique 4-digit code to use when completing their questionnaires, pseudonymising the final dataset.

Data Analysis

Statistical analyses were conducted using SPSS 30.0 software.

Outcome variables of Mood, PQOL, PsQOL, SQOL and EQOL, and predictor variables of Injury Controllability, Maladaptive and Adaptive coping, and DRS score, as well as age at injury, time since injury, time since rehabilitation, length of rehabilitation and number of multi-disciplinary team members involved in rehabilitation were calculated. Participants more than one standard error of measurement above the sample mean in control subscale scores were allocated to the 'high' controllability group, and participants more than one standard error of measurement below the sample mean were allocated to the 'low' controllability group. Participants falling between these groups were treated as the 'average' controllability group. In order to preserve the statistical power of the study as much as possible, the 'average' group was included as a third level, with ANOVAs being run instead of t-tests, to use all participant data [48].

Correlations, t-tests and ANOVAs were used to check for any significant relationships between the outcome variables and the demographic variables as reported in Table 1. These were added to analyses as covariates in instances of significant associations.

After checking that data met assumptions for parametric tests, ANCOVAs were used to explore whether high and low controllability (IV) differentiated QoL and Mood scores (DV); nonparametric alternatives were used where necessary. Three-step hierarchical multiple regressions were then conducted with Mood and QOL variables as the dependent outcomes. Age, rehabilitation and DRS variables were added at the first step of the model, followed by the other appraisal sub-scores (Identity, Consequences, Timeline, Coherence) in the second step, followed by Control scores in the third step. ANOVAs were then used to explore whether high and low controllability (IV) differentiated Maladaptive and Adaptive coping (DV). Finally, a mediation analysis examined whether coping style mediates the relationship between control appraisals (IV) and Mood and QOL scores (DV).

Results

44 participants completed questionnaires and were included in analysis. Participant details are provided below (Table 1). Most chose to complete questionnaires electronically (n = 38), with some electing to complete by phone (n = 5) and post (n = 1).

Table 5: Participant Details

Variable		**N (%)**
Gender	Male	27 (61)
	Female	17 (39)
Cause of Injury	Traumatic brain injury	18 (41)
	Stroke	11 (25)
	Tumour	6 (14)
	Infection	5 (11)
	Hypoxia	1 (2)
	Other	3 (7)
Multi-disciplinary team members input	No input	5 (11)
	Single profession	26 (59)
	Two professionals	6 (14)
	Three professionals	4 (9)
	Full MDT	3 (7)
		Mean (s.d.) [range]
Age (years)		57.4 (11.4) [29.0-78.0]

Age at injury (years)	49.4 (14.9) [12.0-74.0]
Time since injury (months)	97.1 (113.0) [11.5-615.9]
Time since rehabilitation (months)	27.9 (33.0) [0.0-147.0]
Length of rehabilitation (months)	33.4 (41.0) [0-168.7]
Disability Rating Scale (DRS) score	1.2 (1.6) [0.0-6.0]
Mood (Total Sample)	14.6 (9.5) [0-39.0]
Physical Quality of Life (PQOL) (Total Sample)	63.5 (18.4) [32.1-100]
Psychological Quality of Life (PsQOL) (Total Sample)	57.8 (22.9) [4.2-95.8]
Social Quality of Life (SQOL) (Total Sample)	66.1 (19.3) [16.7-100]
Environmental Quality of Life (EQOL) (Total Sample)	68.8 (15.8) [31.3-100]

Current age, time since rehabilitation, length of rehabilitation, and DRS score were all significantly correlated with some, although not all, outcome variables (Table 2). These were included as covariates in the relevant analyses. No significant associations were found between gender, cause of injury or MDT input and mood or quality of life variables, or coping strategy. There were no significant differences between high, low and average controllability groups according to gender, cause of injury, MDT input, age (current and injury), time since injury, time since rehabilitation, length of rehabilitation and DRS score.

Table 6: Correlations between outcome and participant variables.

Variable	Age (years)	Age at injury (years)	Time since injury (months)	Time since rehabilitation (months)	Length of rehabilitation (months)	Disability Rating Scale (DRS) score
Mood	r = -.358, p = .017*	r = -.261, p = .087	r = .002, p = .989	r = -.397, p = .008**	r = .045, p = .775	r = .359, p = .018*
Physical Quality of Life (PQOL)	r = .193, p = .209	r = .223, p = .145	r = -.149, p = .335	r = .354, p = .020*	r = -.310, p = .043*	r = -.420, p = .005**
Psychological Quality of Life (PsQOL)	r = .304, p = .045*	r = .215, p = .161	r = .006, p = .971	r = .296, p = .054	r = -.208, p = .180	r = -.460, p = .002**
Social Quality of Life (SQOL)	r = .304, p = .045*	r = .159, p = .303	r = .105, p = .496	r = -.105, p = .505	r = .062, p = .691	r = -.178, p = .254

Environmental Quality of Life (EQOL)	r = .425, p = .004**	r = .320, p = .034*	r = .378, p = .012*	r = .378, p = .012	r = -.132, p = .400	r = -.391, p = .010**
Adaptive Coping	r = -.302, p = .046*	r = -.310, p = .041*	r = .140, p = .366	r = -.089, p = .580	r = -.008, p = .959	r = -.037, p = .816
Maladaptive Coping	r = -.303, p = .045*	r = -.189, p = .218	r = -.355, p = .019*	r = -.355, p = .019*	r = .265, p = .086	r = .386, p = .011*

** indicates a pairwise difference of <.05, ** indicates a pairwise difference of <.01, *** indicates a pairwise difference of < .001.*

Relationship of Control Beliefs to Mood and QOL

Table 7: Means and standard errors of outcome scores across control belief groups.

Variable		**Controllability Group**		
		High (n = 16)	Average (n = 8)	Low (n = 19)
Mood	Mean	11.279	14.334	16.534
	Standard Error	2.04	2.80	1.85
Physical Quality of Life (PQOL)	Mean	74.643*	60.627	58.018*
	Standard Error	3.99	5.51	3.63
Psychological Quality of Life (PsQOL)	Mean	67.934	59.246	51.851
	Standard Error	4.88	6.59	4.30
Social Quality of Life (SQOL)	Mean	70.229	66.939	62.441
	Standard Error	4.75	6.70	4.24
Environmental Quality of Life (EQOL)	Mean	78.764**	61.212**	66.360*
	Standard Error	2.96	2.69	4.09
Adaptive Coping	Mean	42.959	39.506	38.680
	Standard Error	2.36	3.34	2.10
Maladaptive Coping	Mean	19.372	21.192	19.204
	Standard Error	1.31	1.80	1.19

** indicates a pairwise difference of <.05, ** indicates a pairwise difference of <.01, *** indicates a pairwise difference of < .001.*

Control beliefs did not have a significant group effect on mood when controlled for current age, time since rehabilitation and DRS score ($F(2,42) = 1.433$, $p = .251$), on PsQOL when controlled for length of rehabilitation ($F(2,42) = 2.661$, $p = .082$) or on SQOL when controlled for current age ($F(2,42) = 0.502$, $p = .609$). Although the 'low' control group demonstrated

a lower mood and quality of life than ‘high’ or ‘average’ control groups (Table 3), no group differences were significant.

However, there was a significant group effect of control beliefs on PQOL ($F(2,42) = 4.938$, $p = .011$) with a small effect size ($\eta^2p = .215$), even when controlled for time since rehabilitation. Pairwise comparisons with a Bonferroni correction indicated a significant difference between ‘high’ and ‘low’ controllability ($p = .010$). Similarly, there was a significant group effect of control beliefs on EQOL when controlled for current age, age at injury, time since rehabilitation and DRS score ($F(2,42) = 7.674$, $p = .002$), with a small effect size ($\eta^2p = .305$). Pairwise comparisons with a Bonferroni correction indicated a significant difference between ‘high’ and ‘average’ controllability ($p = .004$) and ‘low’ controllability ($p = .015$).

Table 8: Results of final step of hierarchical step regressions for Mood and QOL outcome variables.

	B	SE B	β	t	p	R^2	Δ R^2	p
Mood						.609	.081	.019*
Age (years)	-.101	.203	-.129	-.495	.624			
Age at injury (years)	-.002	.139	-.003	-.015	.988			
Time since rehabilitation (months)	-.061	.041	-.227	-1.467	.153			
Length of rehabilitation (months)	-.052	.038	-.242	-1.368	.182			
Disability Rating Scale (DRS) Score	.055	.822	.010	.066	.947			
Illness Identity	.828	.248	.558	3.342	.002**			
Timeline (Acute/Chronic)	-.010	.321	-.006	-.031	.975			
Timeline (Cyclical)	-.464	.522	-.168	-.888	.382			
Consequences	.190	.279	.095	.682	.500			
Coherence	-.520	.266	-.294	-1.960	.059			
Control	-.431	.173	-.349	-2.490	.019*			
Physical Quality of Life (PQOL)						.781	.049	.063
Age (years)	-.285	.416	-.179	-.684	.499			
Age at injury (years)	.131	.285	.104	.459	.649			
Time since rehabilitation (months)	.014	.084	.026	.171	.865			

Length of rehabilitation (months)	.022	.077	.050	.280	.781			
Disability Rating Scale (DRS) Score	-.668	1.683	-.058	-.397	.694			
Illness Identity	-.930	.507	-.306	-1.833	.077			
Timeline (Acute/Chronic)	-1.197	.657	-.321	-1.821	.079			
Timeline (Cyclical)	-2.032	1.069	-.359	-1.901	.067			
Consequences	.026	.571	.006	.046	.963			
Coherence	.640	.544	.177	1.178	.248			
Control	.685	.355	.271	1.932	.063			
Psychological Quality of Life (PsQOL)						.671	.053	.035*
Age (years)	.553	.466	.284	1.186	.245			
Age at injury (years)	-.297	.319	-.193	-.930	.360			
Time since rehabilitation (months)	-.044	.095	-.065	-.462	.647			
Length of rehabilitation (months)	.006	.087	.010	.064	.949			
Disability Rating Scale (DRS) Score	-1.895	1.887	-.135	-1.004	.323			
Illness Identity	-1.476	.569	-.397	-2.595	.015*			
Timeline (Acute/Chronic)	-.872	.737	-.191	-1.183	.246			
Timeline (Cyclical)	-.504	1.199	-.073	-.420	.677			
Consequences	-.002	.641	.000	-.003	.997			
Coherence	1.679	.610	.379	2.754	.010**			
Control	.877	.398	.284	2.205	.035*			
Social Quality of Life (SQOL)						.451	.033	.187
Age (years)	1.079	.488	.685	2.213	.035*			
Age at injury (years)	-.582	.334	-.469	-1.742	.092			
Time since rehabilitation (months)	-.145	.099	-.269	-1.468	.153			
Length of rehabilitation (months)	-.024	.091	-.055	-.265	.793			
Disability Rating Scale (DRS) Score	-.086	1.973	-.008	-.044	.966			
Illness Identity	-.710	.595	-.236	-1.194	.242			
Timeline (Acute/Chronic)	-.504	.771	-.137	-.653	.518			
Timeline (Cyclical)	1.464	1.254	.261	1.168	.252			

Consequences	-.382	.670	-.094	-.570	.573			
Coherence	1.167	.638	.325	1.830	.077			
Control	.562	.416	.225	1.351	.187			
Environmental Quality of Life (EQOL)						.627	.100	.008**
Age (years)	.507	.348	.371	1.454	.156			
Age at injury (years)	-.054	.239	-.050	-.228	.821			
Time since rehabilitation (months)	-.006	.071	-.012	-.079	.938			
Length of rehabilitation (months)	-.002	.065	-.005	-.028	.978			
Disability Rating Scale (DRS) Score	-1.693	1.410	-.172	-1.201	.239			
Illness Identity	-.797	.425	-.306	-1.876	.070			
Timeline (Acute/Chronic)	.208	.551	.065	.378	.708			
Timeline (Cyclical)	-.623	.896	-.128	-.696	.492			
Consequences	.483	.479	.137	1.008	.321			
Coherence	.774	.455	.249	1.700	.099			
Control	.843	.297	.388	2.836	.008**			

** indicates a pairwise difference of <.05, ** indicates a pairwise difference of <.01, *** indicates a pairwise difference of < .001.*

Three-step hierarchical regressions were conducted for each of the primary outcome variables (Table 4, full results in Appendix F). At the first step, current and injury age, time since rehabilitation, length of rehabilitation, and impairment contributed significantly to the model for Mood (F = 3.311, p = .015, accounting for 32% of the variance), PQOL (F = 2.814, p = .030, accounting for 28.1% of the variance), PsQOL (F = 3.840, p = .007, accounting for 34.8% of the variance) and EQOL (F = 4.545, p = .003, accounting for 38.7% of the variance). Although accounting for 24.5% of the variance in SQOL, these variables did not contribute significantly to the model. Adding IPQ-R variables of Identity, Consequences, Coherence and Timeline Acute/Chronic and Cyclical) was significant change for Mood, (F = 2.800, p = .034, a further 25.3% of the variance), PQOL (F = 3.947, p .007, a further 28% of the variance) and PsQOL (F = 4.384, p = .004, a further

27% of the variance), but not SQOL and EQOL (a further 17.3% and 14.1% of the respective variance). Finally, adding Control beliefs accounted for a further 8.1% of the variance in Mood, which was a significant change ($F = 6.200$, $p = .019$), 5.3% of the variance in PsQOL, which was a significant change ($F = 4.863$, $p = .035$) and 10% of the variance in EQOL, which was a significant change ($F = 8.045$, $p = .008$), as well as a further 4.9% and 3.3% of the variance in PQOL and SQOL, which were not significant changes.

The full model accounted for 60.9% of the variance in Mood and PQOL, 67.1% of the variance in PsQOL, 45.1% of the variance in SQOL and 62.7% of the variance in EQOL. Identity and Control both represented significant predictors of Mood, Identity, Coherence and Control all represented significant predictors of PsQOL, and only Control was a significant predictor of EQOL. There were no significant predictors of PQOL, and only current age was a significant predictor of SQOL in the full model.

Mediating Role of Coping Strategy

When controlled for age (current and at injury), there was no significant effect of control beliefs on adaptive coping strategies ($F = 0.948$, $p = .396$). Although the ‘high’ control group demonstrated a greater use of adaptive coping strategies than ‘low’ or ‘average’ control groups (Table 3), no group differences were significant. When controlled for current age, time since rehabilitation and DRS score, there was no significant effect of control beliefs on maladaptive coping strategies ($F = 0.578$, $p = .566$). Although the ‘high’ control group demonstrated the least use of maladaptive coping strategies, followed by ‘low’ controllability and then ‘average’ (Table 3), no group differences were significant.

Table 9: Results of mediation analyses for Mood and QOL outcome variables.

	Adaptive Coping					Mood				
	B	**SE B**	**β**	**t**	**p**	**B**	**SE B**	**β**	**t**	**p**
Control	.453	.192	.342	5.548	.023*	-.364	.211	-.276	-1.722	.093
Adaptive Coping						.133	.159	.134	.836	.408
	Adaptive Coping					**Physical Quality of Life (PQOL)**				
	B	**SE B**	**β**	**t**	**p**	**B**	**SE B**	**β**	**t**	**p**
Control	.453	.192	.342	5.548	.023*	1.087	.389	.425	2.799	.008**
Adaptive Coping						-.401	.293	-.208	-1.370	.178
	Adaptive Coping					**Psychological Quality of Life (PsQOL)**				
	B	**SE B**	**β**	**t**	**p**	**B**	**SE B**	**β**	**t**	**p**
Control	.453	.192	.342	5.548	.023*	1.204	.492	.380	2.446	.019*
Adaptive Coping						-.336	.371	-.140	-.904	.371
	Adaptive Coping					**Social Quality of Life (SQOL)**				
	B	**SE B**	**β**	**t**	**p**	**B**	**SE B**	**β**	**t**	**p**
Control	.453	.192	.342	5.548	.023*	.300	.432	.112	.696	.490
Adaptive Coping						.358	.325	.177	1.100	.278
	Adaptive Coping					**Environment Quality of Life (EQOL)**				
	B	**SE B**	**β**	**t**	**p**	**B**	**SE B**	**β**	**t**	**p**
Control	.453	.192	.342	5.548	.023*	.879	.338	.399	2.600	.013*
Adaptive Coping						-.359	.255	-.216	-1.409	.166

** indicates a pairwise difference of <.05, ** indicates a pairwise difference of <.01, *** indicates a pairwise difference of < .001.*

A mediation analysis was intended to explore the extent to which adaptive coping mediated the relationship between Control and Mood and QOL variables. However, whilst Control was a significant predictor of Adaptive Coping, and Control was also a significant predictor of PQOL, PsQOL and EQOL, Adaptive Coping was not a significant predictor of any Mood or QOL variables and Control did not significantly predict Mood or SQOL (Table 5). No further analysis was therefore run as Adaptive Coping could not

significantly mediate the relationship between Control and any Mood or QOL variables.

Discussion

The present study aimed primarily to explore whether Leventhal's Common-Sense Model (CSM) could be refined in understanding adjustment to acquired brain injury (ABI) by emphasising the role of injury controllability appraisals. The mean scores trended in the expected direction, with individuals with 'high' controllability appraisals having higher mood and quality of life on average, and in the secondary regression analysis appraisals of injury controllability were a significant predictor of mood, and psychological and environmental quality of life. It is notable that this regression effect was observed even with the inclusion of other appraisals and covariates including level of disability, which serves to reinforce the importance of cognitive appraisals independent of physical recovery or ability for adjustment to health conditions, and control appraisals in particular for ABI.

However, the findings that differences between means were not always significant, and that only in environmental quality of life did control beliefs surpass all other appraisals, demonstrates that other appraisals of the CSM, particularly identity and coherence, cannot be discounted. This is useful to know, as comparable literature is limited, but it is notable that the only other identified study exploring injury appraisals and mood in community-based adults with severe ABI also identified appraisals of control, timeline and identity as significantly associated with outcomes [19]. This suggests that it is particularly critical for individuals to have positive expectations of

control and to be able to integrate their injury into their sense of self. Whilst it is more novel for the present study to find individuals' understanding of their injury important, it is possible that these beliefs are more significant for individuals who are no longer in contact with rehabilitation services compared to those in Rogan's study who were still accessing rehabilitation services at the time of the study [19]. It may be that once discharged and living in the community, individuals may come to vary more in how much sense they were able to make of their injury. As such, although conclusions must be tentative given the paucity of studies, it is plausible that control, and identity, and potentially coherence and timeline appraisals, are particularly significant for outcomes following ABI.

Secondarily, the present study aimed to explore whether adaptive coping strategies explained the relationship between injury controllability beliefs and mood and quality of life. It was found that, in line with the CSM, those with the most positive appraisals of injury controllability had on average the greatest use adaptive coping strategies, and the least use of maladaptive coping strategies when comparing means; however, in contrast to previous findings [25], there were no significant differences between mean scores. Moreover, adaptive coping did not impact mood or quality of life, and thus did not explain or mediate the role of control appraisals. Whilst this differs from similar studies conducted with other health populations [49], it has been noted that the mediating effects of coping are generally inconsistent [50] and previous research in ABI has also failed to find a significant relationship between mood and adaptive coping strategies [19].

There are several possible explanations for why coping strategies in the present and other studies were not found to significantly affect outcomes,

despite a broader literature on the importance of coping style. Firstly, it is possible that, as a secondary research question, the study was not sufficiently powered to identify an effect. However, there are also considerations related to how we study coping styles with people with ABI. For example, in the present study coping styles were defined as either adaptive or maladaptive; however, alternative measures define coping styles differently, for example as problem-focused, emotion-focused or avoidant, in line with alternative models of adjustment such as Lazarus and Folkman's Stress-Appraisals model [51]. It is possible that using these different categories of coping style may have resulted in more nuanced results in the relationship of coping to outcomes. Additionally, the present study did not include any specific assessments of executive function or memory, as this was not deemed necessary for exploration of personal appraisals of injury. However, it is possible that impairments in executive function or memory, as might result following ABI, might interact with assessments of coping style in a more pronounced way than assessments of appraisals, mood or wellbeing. For example, rather than asking participants how they feel about their injury at the time of completing the questions, measures of coping ask participants to reflect on how they typically manage difficulties over a period of time; this might be more challenging for someone with impaired memory, problem solving or more metacognitive awareness of how they typically address challenges. Finally, it is also possible that individuals with ABI may not consider ABI something that requires problem-solving or active attempts at 'coping', but rather something that they internally come to terms with through processes or personal re-appraisal, for example. This, firstly, will also interact with how

they answer questions regarding coping style as they may score themselves low across both adaptive and maladaptive coping styles if they do not think they actively 'cope' with much day-to-day; it is possible that this occurred in the present sample, as whilst the data on coping style was normally distributed and had no obvious ceiling or floor effects, the average scores were perhaps lower than might be expected. It is also understood that adjustment to ABI is affected by complex, interrelated factors, both internal and external, and the present results highlight that whilst coping strategies may well lead to more adaptive behaviour such as engagement in rehabilitation as in other health conditions [22], which logically would have a positive impact upon functional outcomes, psychosocial outcomes incorporate processes beyond this. It is important, therefore, for any understanding of psychosocial outcomes following ABI to take account of this complexity.

Clinical and Research Implications

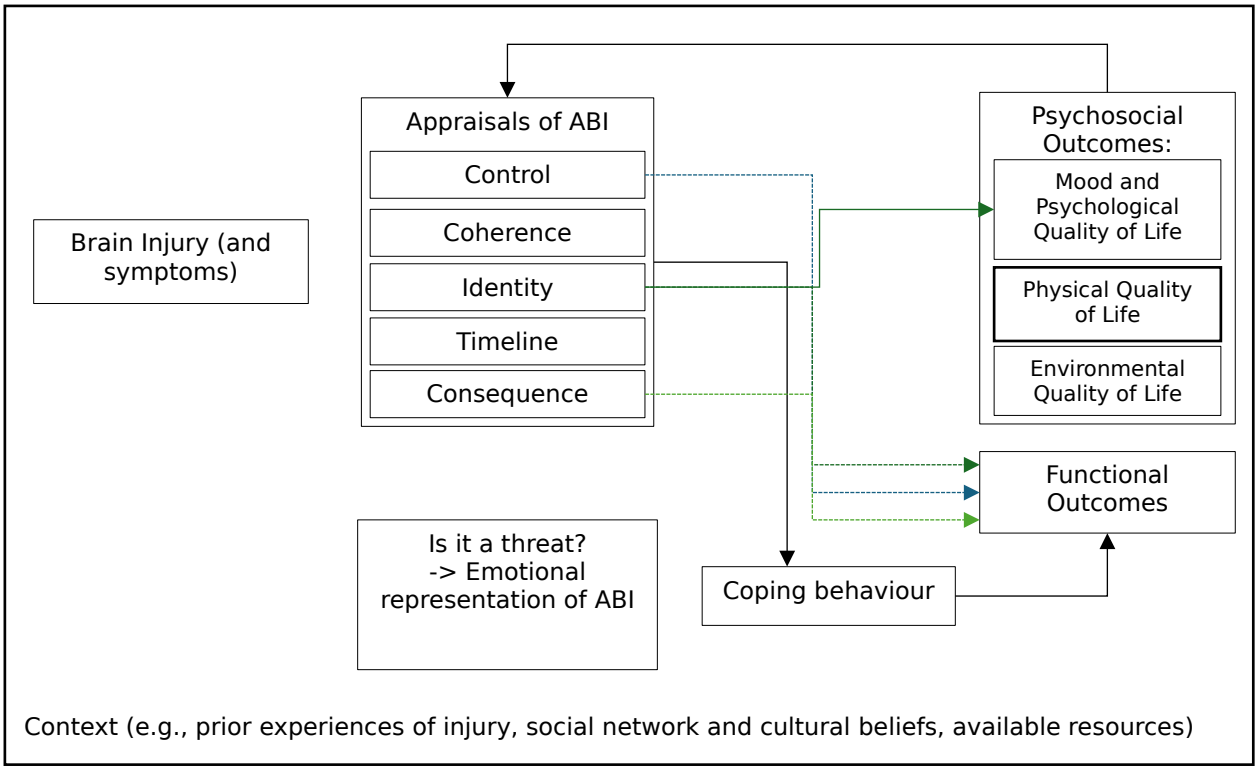
The present findings suggest that the CSM of adjustment following ABI may be refined to emphasise beliefs around control, coherence and identity, which in clinical practice means targeting such beliefs in post-ABI interventions. For example, psychoeducation and cognitive-behavioural therapies, especially those incorporating patient values, which have already been used to great effect in rehabilitation programmes [52–54], may help patients develop their understanding of injury, an adaptive perception of personal and treatment control, and integrate this into their personal identity.

Furthermore, the present results suggest that the CSM might be adapted to highlight specific appraisals depending on the outcome of interest (Figure 2). The findings that control, identity, and coherence are the most notable appraisals differs slightly from previous studies focusing on mild traumatic brain injury [9,18]. Whilst it is possible that this is due to the severity of ABI, it is also possible that this discrepancy might be explained by the focus in the present study on psychosocial outcomes as opposed to functional or symptomatic outcomes as in the mild traumatic brain injury literature. For example, the perceived severity of injury has a plausible relationship to how participants might rate their level of impairment, whilst confusion about symptoms might plausibly be of greater relevance to how anxious individuals feel regarding participating in activities of daily living. As such, it is possible that the model would usefully be adapted to specify the utility of appraisals of control, identity and coherence for psychosocial outcomes in particular, with the possibility that appraisals of control, identity and consequences are significant for functional outcomes as a separate concept.

Additionally, it was notable that even within the psychosocial outcomes explored in the present study there were different patterns of significant appraisals, as has been found in studies conducted with other health populations [17]. Some areas of adjustment, such as social quality of life, may even be unrelated to the variables of interest in the present study. Whilst this is somewhat surprising given existing literature indicating that people consider their social relationships to change significantly, often for the worse, after brain injury [1,2], it also perhaps indicates that for some domains external processes, such as changes to roles within relationships, play a more significant role in adjustment than internal appraisals. Overall, there is

a clear multi-dimensionality to adjustment following ABI, and it is important to consider, both clinically and in research, the different appraisals involved in different, specific, areas of difficulty when tailoring interventions.

Figure 3: Amended CSM as applied to ABI developed from present study results. Dotted lines represent hypothesised relationships from broader literature but beyond the scope of the present study.



Limitations and Future Research

Firstly, as a community-based, post-rehabilitation sample with a low response rate in recruitment, it is possible that the present sample is only partially representative of the brain injury population. Additionally, sample size calculations were based on the primary analysis and a larger effect size than that found, which indicates that the present study may have been underpowered for the analyses conducted. As such, further research would be beneficial to replicate the current findings and further consolidate the

proposed refinement of the CSM. In particular, studies recruiting from those who have not completed rehabilitation and also including objective assessments of symptoms after injury may further differentiate relevant appraisals across psychosocial and functional or symptomatic outcomes, and whether this varies depending on rehabilitative input, and studies with a greater sample size may be able to verify whether null findings were related to the power of the study or not. Secondly, several unexpected variables were found to be associated with mood and quality of life, particularly age and time since rehabilitation. Whilst it was beyond the scope of the present study to explore these relationships in more detail, future research, for example into whether those of older age encounter fewer setbacks or discrepancies between expected and realistic activities and might therefore find it easier to adjust to ABI, could examine this further. Finally, the absence of a significant relationship between adaptive coping and outcomes warrants further research into whether alternative internal mechanisms, such as emotional representations or post-traumatic growth, are of greater significance for individuals with ABI when considering psychosocial as opposed to functional outcomes.

Conclusions

In conclusion, it appears possible that the CSM model is both applicable to individuals with severe ABI and can be refined for use in this population by considering appraisals of control, identity and coherence as influences on psychosocial outcomes, above and beyond level of impairment or coping style. This provides important information for how rehabilitation interventions may be targeted for people following ABI. However, due to

the paucity of research in this area, further studies are needed to replicate and extend the present findings to better understand the relationship of varied appraisals to different functional and psychosocial outcomes, and the potential mediators of these relationships.

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Theory-Driven Research Project Executive Summary

Introduction and Aims

Many people experience low mood and anxiety following an acquired brain injury (ABI). This can limit their physical recovery as well as their long-term quality of life and wellbeing. However, it has been found that not everyone experiences these negative outcomes, and there is significant variation in long-term adjustment to injury.

Current research suggests that the way people think about the brain injury, and how they choose to cope with symptoms, are important factors in this variation in people's outcomes following ABI. However, it is currently unclear whether specific beliefs are especially important. It is possible that believing you or the treatment you undertake have some control over the symptoms of ABI can influence your mood and quality of life more than beliefs about other aspects of injury. In particular, strong belief in your ability to impact symptoms may lead to greater engagement in positive activity, positive coping strategies, and positive ways of thinking about life after ABI, which may all positively impact mood and life satisfaction. However, it has not yet been studied whether these beliefs about controllability are more significant than other beliefs.

This study therefore aimed to examine whether people with different beliefs in their ability to influence symptoms of ABI also have different levels of mood and life satisfaction. The study also explored whether this seems to be because they use more helpful coping strategies. It is hoped that

understanding this better will help us to give better support to people struggling after an ABI.

Method

Forty-four adults with an ABI severe enough for referral to a specialist rehabilitation team, and who had lived with their ABI for at least twelve months, were recruited from the Buckinghamshire Community Head Injury Service (CHIS). All types of ABI were considered eligible for the study, including traumatic brain injury, stroke, brain haemorrhage, aneurysm or tumour, hypoxic brain injury, hydrocephalus, meningitis, or encephalitis. Participants completed questionnaires on their beliefs about their head injury, their coping strategies, their current mood and current quality of life.

At the stage of scoring questionnaire results, participants were grouped into 'high', 'low' and 'average' controllability beliefs. These groups were then compared to see if mood and quality of life differed depending on controllability beliefs. Further analyses then considered whether participants' beliefs about control were significantly associated with mood and quality of life scores, above and beyond other beliefs about injury and factors such as age, time since injury, length of and time since rehabilitation, and degree of disability following ABI. Finally, 'high', 'low' and 'average' controllability groups were compared to see if use of different coping strategies differed depending on controllability beliefs.

Key Findings

As expected, belief in the ability to control or influence ABI symptoms was significantly associated with mood and quality of life, and those with higher

beliefs in their ability to control or influence their ABI symptoms had greater mood and quality of life than those with limited beliefs in their ability to control symptoms. This difference between groups was particularly great when considering quality of life related to physical health and participants' environment. It is notable that this difference existed irrespective of other potentially important factors, such as participants' level of disability following ABI. Beliefs about controllability were also found to account for a statistically significant amount of variation in mood and some quality of life scores, above and beyond other beliefs about injury and participant or injury factors; this suggests that controllability beliefs are an important and defining factor in how people feel after ABI.

However, it was notable that other beliefs about ABI, particularly how much people feel their injury makes sense and how much ABI defines their life, were also important factors in predicting mood and quality of life. As such, although controllability beliefs are important, so too are these other beliefs. Additionally, it was found that whilst people with the greatest belief in their ability to control their injury and symptoms used more positive coping strategies and fewer negative coping strategies, this difference was not as great as expected. Moreover, use of more positive coping strategies was not related to mood or quality of life, and therefore did not explain why people who believe their symptoms can be controlled appear to feel happier and more satisfied with life.

Limitations and Future Research

This study was only conducted with people who had undergone rehabilitation and were living in the community; we do not therefore know

whether the results can be extended to people who have not undergone this treatment, or who are still receiving inpatient care. The number of participants was also relatively small, which may limit how far the findings can represent the ABI population as a whole. It would therefore be helpful for future research to replicate the present study with extended samples, particularly recruiting from inpatient settings or from those who have not undergone rehabilitation. The findings that coping strategies were not as important as expected also means that further research into why control beliefs affect mood and life satisfaction is needed.

Conclusion

These findings suggest that rehabilitation programmes should support people to have a good understanding of their injury and how ABI fits with their wider sense of themself, and positive expectations of change over time, which they believe they can influence. This may be more significant for individuals than merely focusing on physical recovery, as the current study demonstrates that beliefs have more impact on wellbeing than physical ability, or positive coping strategies.

Connecting Narrative

Although I started the course with no fixed intentions of committing to a particular area of psychology, I found myself following on from my previous experience working in hospital and neurorehabilitation settings for my research projects. I have always felt particularly drawn to the multidisciplinary nature of this work, approaching clinical change from varied theoretical perspectives and enacted through many levels of intervention. As the course of my placements have taken me in new clinical directions, I have valued being able to maintain a connection to adult and clinical health populations via my research, as I feel that sustaining a multidisciplinary focus and awareness of different clinical settings has made me both a better researcher and clinician. I also feel I have developed as a clinician and researcher through the practical and reflective learning undertaken through these projects. Conducting this research has highlighted how much I value dedicating time and focus to thinking about concepts and research ideas, in addition to giving me a better understanding of the time and focus demanded by research. As I hope to continue with research in future roles, learning a realistic scope of projects and how to balance the time and mental demands of research with clinical work has been valuable.

Service Improvement Project (SIP)

My SIP was the first project I developed. Prior to the doctorate I worked in an inpatient rehabilitation MDT, during which time I developed an interest in establishing psychologically-minded services to impact patient care beyond

therapy. I became curious about how healthcare workers outside of psychological professions think about and manage clinical care associated with mental health, leading to the present project exploring the impact of this on staff in an ICU.

I was particularly struck by the perceived separation of mental and physical healthcare, viewing mental health as something requiring a particular expertise. This felt surprising because they appeared to be managing well working with patients with more severe mental health challenges than I, a psychologist, typically saw in the community. However, not only does this show the relativity of concepts like expertise and confidence but also the power of narratives around mental health, competence and professional identity, which have proliferated in recent years. This felt particularly resonant to our work as psychologists, and this project reconfirmed to me the importance of considering how we as a profession can do more to participate in these conversations to shape the narrative in a way that hopefully supports and upskills others.

This project also presented challenges which proved a further education in conducting research. Both recruiting participants and developing recommendations were complicated by my position as a researcher external to the team, and maintaining a connection to the team and key stakeholders was essential to smooth and effective running of the project. This was also my first time working with this volume of interview data, and I was grateful to my notes during the analysis stage for helping me to make sense of my sense-making.

Systematic Review of the Literature (SRL)

Through my previous experience I had also developed an interest in how psychological care or treatments can be delivered within the context of physical health environments, which can often present with constraints to traditional therapeutic interventions. I began by exploring the use of guided imagery for pain, as this is a promising treatment receiving increasing interest in recent years. I noticed that whilst guided imagery was indeed increasingly being used to treat anxiety, low mood and pain in physical health contexts, particularly in the period around surgery, there was a lack of attention to these difficulties together rather than solely in isolation. This surprised me as, in my experience, clinicians are highly aware of the relationship between patients' psychological and physical wellbeing when recovering from physical traumas. I therefore developed my systematic review around understanding the potential of guided imagery to treat biopsychological health needs in a context where other therapeutic strategies may be contraindicated, and also whether this intervention worked across pain, mood and anxiety inter-relatedly.

This project was most challenging at the stage of developing my research question and search strategies, and it certainly demonstrated the importance of refining and clarifying ideas at an early stage to manage the project later. However, I found I enjoyed the process of pulling together the literature more than I expected, and I felt proud of seeing at the end how my skills in consolidating large amounts of information had developed to produce this review.

Theory-Driven Research Project (TDRP)

This project was one of the more challenging projects I have worked on, particularly at the stages of conceptualisation and recruitment. Although I had many ideas from previous roles in neurorehabilitation I wanted to explore, I found when refining the project's scope that there was huge variation in the quantity and quality of existing research: some areas around acquired brain injury and adjustment were extensively researched, and other areas almost completely unexplored. I suspect this was in part due to the need, when conducting research with individuals with acquired brain injuries, to consider the impact of their injury on cognitive functions, as well as the significant range and variation in injuries. It proved challenging to design a project both grounded in the theory and manageable to conduct; however, I'm content that I learned to strike this balance through the experience.

This project also presented me with a lot of opportunity to think about the accessibility of research, including participation demands and what that means for who and how many take part. This provided practical learning points around how to develop a study making full use of experts by experience and thinking creatively about data collection, as well as addressing recruitment challenges with persistence and flexibility. I am also grateful for the opportunity to reflect on my position as a psychologist and a researcher, and how to think critically about gaps in the literature, and ways to fill these that also align with values around accessibility and representation.

Acknowledgements

I would like to thank all my supervisors for their extended and inexhaustible support across my three projects. I have benefitted endlessly from their attentive, thoughtful and thorough advice and encouragement through setbacks, and have been inspired throughout by their knowledge and skill. Particular thanks, of course, go to Dr Libby Barnardo who, in addition to her supervision of my SLR, also had the distinct (perhaps debateable) honour of being my course tutor through my doctorate. I am deeply grateful for your guidance in navigating my way through this unique experience of a DClinPsych, and if I could be half the supervisor you have been for me I would consider it a job well done.

I would also like to extend a heartfelt thanks to all the participants across my projects, without whom this thesis would not exist. It has been a privilege to meet and work with them all, and I hope I have done their experiences justice. I also thank those with lived experience of brain injuries who helped in the development of my TDRP, and the management of the Buckinghamshire ICU who were essential in keeping the wheels turning on my SIP when I couldn't be there in person; both projects would be poorer without you.

Finally, on a personal note, I would like to thank my family and friends who have been essential support in the undertaking of this research journey. I am forever grateful for the words of encouragement and love, the endless patience in hearing me work through ideas and problems, and the belief that I would get to the end even when I couldn't see it myself. Special acknowledgements go to my parents, who I know will read every word of

this thesis because that is the sort of cheerleaders they are; Stuart, without whose love and care I may not have made it to the end; Clover, a late addition to the thesis effort but no less supportive in her insistence that I take breaks from work to pay attention to her instead; and Hugo, always ready with a hug, words of wisdom and a listening ear.

Appendices

Appendix A: Systematic Literature Review Proposed Journal Author Guidelines

Systematic Reviews and Meta-Analyses

These review papers rigorously evaluate the research evidence regarding a particular scientific question by systematically identifying all relevant studies, judging their quality, and providing a fair and balanced statement regarding their overall findings. Systematic Reviews and Meta-Analyses must include the PRISMA checklist and flow diagram, including any relevant extensions [http://prisma-statement.org/].

For more information about what constitutes a good systematic review, see also the PRISMA statement. The review should include a descriptive and succinct title; an unstructured abstract; an introduction that specifies the purpose of the review; a methods section that identifies the databases that were searched, search terms used, and inclusion/exclusion criteria for identified articles; an assessment of the validity of reviewed studies; and a summary that includes future directions for studies in this area. Each study mentioned in the review should include the study design, a description of the study population (age range, disease/severity), the dose and duration of each treatment administered, and the data and P values to accompany any valid comparisons). For further information on reviews, see CD Mulrow. The medical review article: State of the science. Ann Intern Med 1987;106:485-8 and AD Oxman et al. User's guide to the medical literature. VI. How to use

an overview. Evidencebased medicine working group. JAMA 1994;272:1367-71.

The manuscript must contain an Abstract (unstructured, 250 words), Introduction, Methods, Results, Discussion, Acknowledgments, and References. There is no specific word limit for systematic reviews, but reviews longer than 6,000–8,000 words are discouraged.

File format should be Microsoft Word, and manuscript pages should be numbered.

Title page. The title page should include the following: (i) complete title (preferably no chemical formulas or arbitrary abbreviations); (ii) full names of all authors; (iii) complete affiliations of all authors; (iv) the number of text pages of the entire manuscript (including pages containing figures and tables) and the actual number of figures and tables; (v) the author to whom correspondence should be sent and this author's complete mailing address, telephone number, fax number, and e-mail address, and, if available, institutional URL.

Acknowledgments. Place acknowledgments at the end of the text before the reference list and specify the following: (1) contributions that need acknowledging but do not justify authorship; (2) acknowledgments of technical help; (3) acknowledgments of financial and material support, specifying the nature of the support; (4) financial arrangements that may represent a possible conflict of interest. This would also include any of the following arrangements, such as if any of the authors have a financial relationship to the work; have received any government or company grants or research support; are employees of a company; are consultants for a

company; are stockholders of the company; are members of a speakers bureau; or have received any other form of financial support.

Conflict of Interest. A Conflict of Interest statement must be included for all manuscripts within the Acknowledgments section. Even if there are no conflicts of interest, please explicitly state this.

References. Cite literature references in the text using bracketed numbers that correspond to the alphabetised and numbered reference list as follows: "Pain is made worse if you hit the already injured site [15]." For multiple references in the text, please use the format [number,number] (with a comma and no spaces). For example: [2,4,28,33].

- All references cited in the text must be listed at the end of the paper. They should be numbered, double spaced, and arranged alphabetically by first author last name.

- All authors must be listed in the references; the use of et al. is not acceptable.

- References must be complete, including initial(s) of author(s) cited, title of paper, journal, year of publication, and volume and page numbers.

- For citations of books, the following uniform sequence should be maintained: author(s), title of article, editor(s), complete title of book, place of publication, publisher, year, and page numbers.

- Journal titles should be abbreviated according to the National Library of Medicine’s Index Medicus. Please refer to the NLM website to find Index Medicus journals: https://www.ncbi.nlm.nih.gov/ nlmcatalog/journals

- Unpublished data, personal communications, abstracts that cannot be retrieved by casual readers (e.g., meeting abstracts that require logging into a members-only site), and other inaccessible materials should not be listed as references. Unpublished materials may be cited in parentheses within the text.

- For manuscripts containing citations that are in press, authors must have electronic copies immediately available in case reviewers/editors request these materials.

- URLs should be included for all references that are publicly accessible via the Internet.

Examples:

[1] Adams CWM. Neurohistochemistry. Amsterdam: Elsevier, 1965.

[2] Apkarian AV, Bushnell MC, Treede RD, Zubieta JK. Human brain mechanisms of pain perception and regulation in health and disease. Eur J Pain 2005;9:463-84.

[3] Eccles R. Understanding the symptoms of the common cold and influenza. Lancet Infect Dis 2005;5:718-25.

[4] Turner JA. Coping and chronic pain. In: Bond MR, Charlton JE, Woolf CJ, editors. Pain research and clinical management. Proc. VIth World Congress on Pain, Vol. 4. Amsterdam: Elsevier, 1991. pp. 219-227.

Figures. Upload figures as separate, individual files.

Figure legends. Provide each illustration with a title and an explanatory legend. The title should be part of the legend; do not reproduce the title and legend on the figure itself. Legends should appear on a separate page at the

end of the manuscript. Each legend should be numbered consecutively with Arabic numerals (i.e., Fig. 1, Fig. 2, etc.), and should begin with the number of the illustration to which they refer. Explain all symbols and abbreviations used in the figure. Place all figure legends in manuscript file after the reference list (note: this does not apply to table titles); do not place legends in figure files.

Tables. Tables, with their captions and legends, should be intelligible with minimal reference to the text. Tables of numerical data should each be typed (double spaced) on a separate page, numbered in sequence with Arabic numerals (i.e., Table 1, Table 2, etc.), provided with a title/heading, and referred to in the text as Table 1, Table 2, etc. Provide a detailed description of its contents and any footnotes below the body of the table.

Appendix B: Service Improvement Project Survey and Interview Questions

Table 10: Phase One Survey Questions

Demographic Questions	Job role Banding Age Ethnicity Years working in ICU	Closed response questions
Experience Caring for Patients Admitted Following Self-harm	How recently cared for target patient group How frequently care for target patient group Specific training for target patient group Experiences of aggression from target patient group	Closed response questions
Risk Assessment	Frequency of risk conversations Confidence in risk assessment Confidence following risk procedures Confidence managing high emotions	Closed response questions Numeric ratings
Barriers and Supports in Caring for Patients Admitted Following Self-harm	How far respondents endorse barriers identified in the literature Self-identified barriers and supports	Likert scale questions Open-text questions
Maslach Burnout Inventory (MBI)		22 Likert-Scale questions indicating how far respondent endorse a statement about their job
Short Warwick and Edinburgh Mental Wellbeing Scale (SWEMWBS)		7 Likert-Scale items indicating how often participants feel able to perform or achieve certain areas of functioning

Table 11: Phase Two Semi-Structured Interview Schedule

Questions	Additional prompt questions
What's your experience of the staff culture in the ICU team around caring for patients following self-harm?	*How do you think staff view people who are admitted following self-harm?*
What are your experiences of caring for patients admitted following self-harm?	*Do you think caring for patients admitted to the ICU following self-harm is more difficult than caring for other patients? If so, why might this be?* *Are these patients more demanding in other ways? If so, in what way?*

How do you find having conversations with people in this situation, particularly when talking about risk?	*How important are these conversations?* *Do these conversations tend to be more emotional than other conversations with patients? If so, does that make it harder?*
What helps you when caring for patients who are admitted following self-harm?	*Are there particular skills or knowledge that people have that helps? If so, what?* *In what ways are you supported when caring for patients admitted following self-harm?*
What gets in the way of you caring for patients who are admitted following self-harm?	*Do you think staff in the ICU find caring for this group of patients more emotionally demanding than caring for other patients? If so, why might that be?* *Can you tell me about the procedures or processes in place for looking after patients admitted following self-harm? Do you think these procedures work well? If not, how?* *In what ways does the ward environment make it challenging to care for people in this situation?* *How safe do you feel working with patients admitted following self-harm?*
What does the ICU team do well in taking care of patients admitted following self-harm?	
What would make people's experiences of caring for patients admitted following self-harm better?	

Appendix C: Service Improvement Project Letter of Approval from Trust

NHS
Buckinghamshire Healthcare
NHS Trust

Buckinghamshire
Health Research &
Innovation Centre

Research and Innovation Department
Buckinghamshire Health Research and Innovation Centre
Mandeville Road
Aylesbury
Bucks
HP21 8AL

Tel: 01296 831411
Email: bht.research@nhs.net
Web: www.bhtresearchandinnovation.org

Research Office

Date: 12th June 2023

Dear Martha

Letter of access for research

As an existing NHS Employee, you do not require an additional honorary research contract with this NHS organisation. We are satisfied that the research activities that you will undertake in this NHS organisation are commensurate with the activities you undertake for your employer. Your employer is fully responsible for ensuring such checks as are necessary have been carried out. Your employer has confirmed in writing to this NHS organisation that the necessary pre-engagement checks are in place in accordance with the role you plan to carry out in this organisation. This letter confirms your right of access to conduct research project **'The experiences of staff caring for people admitted to ICU following Self Harm, Challenges & Supports'** through Bucks Healthcare for the purpose and on the terms and conditions set out below. This right of access commences on 12/06/2023 and ends on 12/06/2024 unless terminated earlier in accordance with the clauses below.

You have a right of access to conduct such research as confirmed in writing in the letter of permission for research from this NHS organisation. Please note that you cannot start the research until the Principal Investigator for the research project has received a letter from us giving permission to conduct the project.

You are considered to be a legal visitor to Bucks Healthcare premises. You are not entitled to any form of payment or access to other benefits provided by this organisation to employees and this letter does not give rise to any other relationship between you and this NHS organisation, in particular that of an employee.

While undertaking research through Bucks Healthcare, you will remain accountable to your employer **Oxford Healthy NHS,** but you are required to follow the reasonable instructions of your nominated manager, **Clare Daniels** in this NHS organisation or those given on her behalf in relation to the terms of this right of access.

Where any third party claim is made, whether or not legal proceedings are issued, arising out of or in connection with your right of access, you are required to co-operate fully with any investigation by this NHS organisation in connection with any such claim and to give all such assistance as may reasonably be required regarding the conduct of any legal proceedings.

If you have a physical or mental health condition or disability which may affect your research role and which might require special adjustments to your role, if you have not already done so, you must notify your employer and each participating **Healthcare NHS Trust** prior to commencing your research role at each site.

You are required to ensure that all information regarding patients or staff remains secure and *strictly confidential* at all times. You must ensure that you understand and comply with the requirements of the NHS Confidentiality Code of Practice and the Data Protection Act 2018, further more you should be aware that under the Act, unauthorised disclosure of information is an offence and such disclosures may lead to prosecution.

The **Buckinghamshire Healthcare NHS Trust** will not indemnify you against any liability incurred as a result of any breach of confidentiality or breach of the Data Protection Act 2018. Any breach of the Data Protection Act 2018 may result in legal action against you and/or your substantive employer.

You must act in accordance with Bucks Healthcare policies and procedures, which are available to you upon request, and the Research Governance Framework.

You are required to co-operate with Bucks Healthcare in discharging its duties under the Health and Safety at Work etc Act 1974 and other health and safety legislation and to take reasonable care for the health and safety of yourself and others while on Bucks Healthcare premises. Although you are not a contract holder, you must observe the same standards of care and propriety in dealing with patients, staff, visitors, equipment and premises as is expected of a contract holder and you must act appropriately, responsibly and professionally at all times.

You should ensure that, where you are issued with an identity or security card, a bleep number, email or library account, keys or protective clothing, these are returned upon termination of this arrangement. Please also ensure that while on the premises you wear your ID badge at all times, or you are able to prove your identity if challenged. Please note that this NHS organisation accepts no responsibility for damage to or loss of personal property.

We may terminate your right to attend at any time either by giving seven days' written notice to you or immediately without any notice if you are in breach of any of the terms or conditions described in this letter or if you commit any act that we reasonably consider to amount to serious misconduct or to be disruptive and/or prejudicial to the interests and/or business of this NHS organisation or if you are convicted of any criminal offence. Where applicable, your substantive employer will initiate your Independent Safeguarding Authority (ISA) registration in-line with the phasing strategy adopted within the NHS and the applicable legislation. Once you are ISA-registered, your employer will continue to monitor your ISA registration status via the on-line ISA service. Should you cease to be ISA-registered, this letter of access is immediately terminated. Your substantive employer will immediately withdraw you from undertaking this or any other regulated activity and you MUST stop undertaking any regulated activity.

Your substantive employer is responsible for your conduct during this research project and may in the circumstances described above instigate disciplinary action against you.

If your circumstances change in relation to your health, criminal record, professional registration or ISA registration, or any other aspect that may impact on your suitability to conduct research, or your role in research changes, you must inform the NHS organisation that employs you through its normal procedures. You must also inform your nominated manager in this NHS organisation.

Yours sincerely

Nicola Higgins, RM&G Manager

cc: **R&I office at Bucks Healthcare NHS Trust**
HR department of the substantive employer (and provider of honorary clinical contract, where applicable)
HR department, Bucks Healthcare NHS Trust

Appendix D: Service Improvement Project Proposed Journal Author Guidelines

Writing and formatting

Title page

You are required to include the following details in the title page information:

Article title. Article titles should be concise and informative. Please avoid abbreviations and formulae, where possible, unless they are established and widely understood, e.g., DNA).

Author names. Provide the given name(s) and family name(s) of each author. The order of authors should match the order in the submission system. Carefully check that all names are accurately spelled. If needed, you can add your name between parentheses in your own script after the English transliteration.

Affiliations. Add affiliation addresses, referring to where the work was carried out, below the author names. Indicate affiliations using a lower-case superscript letter immediately after the author's name and in front of the corresponding address. Ensure that you provide the full postal address of each affiliation, including the country name and, if available, the email address of each author.

Corresponding author. Clearly indicate who will handle correspondence for your article at all stages of the refereeing and publication process and also post-publication. This responsibility includes answering any future queries

about your results, data, methodology and materials. It is important that the email address and contact details of your corresponding author are kept up to date during the submission and publication process.

Present/permanent address. If an author has moved since the work described in your article was carried out, or the author was visiting during that time, a "present address" (or "permanent address") can be indicated by a footnote to the author's name. The address where the author carried out the work must be retained as their main affiliation address. Use superscript Arabic numerals for such footnotes.

Abstract

You are required to provide a concise and factual abstract which does not exceed 250 words. The abstract should briefly state the purpose of your research, principal results and major conclusions. Some guidelines:

Abstracts must be able to stand alone as abstracts are often presented separately from the article.

Avoid references. If any are essential to include, ensure that you cite the author(s) and year(s).

Avoid non-standard or uncommon abbreviations. If any are essential to include, ensure they are defined within your abstract at first mention.

Keywords

You are required to provide 1 to 7 keywords for indexing purposes. Keywords should be written in English. Please try to avoid keywords consisting of multiple words (using "and" or "of").

We recommend that you only use abbreviations in keywords if they are firmly established in the field.

Highlights

You are encouraged to provide article highlights at submission.

Highlights are a short collection of bullet points that should capture the novel results of your research as well as any new methods used during your study. Highlights will help increase the discoverability of your article via search engines. Some guidelines:

Submit highlights as a separate editable file in the online submission system with the word "highlights" included in the file name.

Highlights should consist of 3 to 5 bullet points, each a maximum of 85 characters, including spaces.

We encourage you to view example article highlights and read about the benefits of their inclusion.

Graphical abstract

You are encouraged to provide a graphical abstract at submission.

The graphical abstract should summarise the contents of your article in a concise, pictorial form which is designed to capture the attention of a wide readership. A graphical abstract will help draw more attention to your online article and support readers in digesting your research. Some guidelines:

Submit your graphical abstract as a separate file in the online submission system.

Ensure the image is a minimum of 531 x 1328 pixels (h x w) or proportionally more and is readable at a size of 5 x 13 cm using a regular screen resolution of 96 dpi.

Our preferred file types for graphical abstracts are TIFF, EPS, PDF or MS Office files.

We encourage you to view example graphical abstracts and read about the benefits of including them.

Tables

Tables must be submitted as editable text, not as images. Some guidelines:

Place tables next to the relevant text or on a separate page(s) at the end of your article.

Cite all tables in the manuscript text.

Number tables consecutively according to their appearance in the text.

Please provide captions along with the tables.

Place any table notes below the table body.

Avoid vertical rules and shading within table cells.

We recommend that you use tables sparingly, ensuring that any data presented in tables is not duplicating results described elsewhere in the article.

Figures, images and artwork

Figures, images, artwork, diagrams and other graphical media must be supplied as separate files along with the manuscript. We recommend that you read our detailed artwork and media instructions. Some excerpts:

When submitting artwork:

Cite all images in the manuscript text.

Number images according to the sequence they appear within your article.

Submit each image as a separate file using a logical naming convention for your files (for example, Figure_1, Figure_2 etc).

Please provide captions for all figures, images, and artwork.

Text graphics may be embedded in the text at the appropriate position. If you are working with LaTeX, text graphics may also be embedded in the file.

Artwork formats

When your artwork is finalised, "save as" or convert your electronic artwork to the formats listed below taking into account the given resolution requirements for line drawings, halftones, and line/halftone combinations:

Vector drawings: Save as EPS or PDF files embedding the font or saving the text as "graphics."

Color or grayscale photographs (halftones): Save as TIFF, JPG or PNG files using a minimum of 300 dpi (for single column: min. 1063 pixels, full page width: 2244 pixels).

Bitmapped line drawings: Save as TIFF, JPG or PNG files using a minimum of 1000 dpi (for single column: min. 3543 pixels, full page width: 7480 pixels).

Combinations bitmapped line/halftones (color or grayscale): Save as TIFF, JPG or PNG files using a minimum of 500 dpi (for single column: min. 1772 pixels, full page width: 3740 pixels).

Please do not submit:

files that are too low in resolution (for example, files optimised for screen use such as GIF, BMP, PICT or WPG files).

disproportionally large images compared to font size, as text may become unreadable.

Figure captions

All images must have a caption. A caption should consist of a brief title (not displayed on the figure itself) and a description of the image. We advise you to keep the amount of text in any image to a minimum, though any symbols and abbreviations used should be explained.

Provide captions in a separate file.

Color artwork

If you submit usable color figures with your accepted article, we will ensure that they appear in color online.

Please ensure that color images are accessible to all, including those with impaired color vision. Learn more about color and web accessibility.

For articles appearing in print, you will be sent information on costs to reproduce color in the printed version, after your accepted article has been sent to production. At this stage, please indicate if your preference is to

have color only in the online version of your article or also in the printed version.

Generative AI and Figures, images and artwork

Please read our policy on the use of generative AI and AI-assisted tools in figures, images and artwork, which can be found in Elsevier's GenAI Policies for Journals. This policy states:

We do not permit the use of Generative AI or AI-assisted tools to create or alter images in submitted manuscripts.

The only exception is if the use of AI or AI-assisted tools is part of the research design or methods (for example, in the field of biomedical imaging). If this is the case, such use must be described in a reproducible manner in the methods section, including the name of the model or tool, version and extension numbers, and manufacturer.

The use of generative AI or AI-assisted tools in the production of artwork such as for graphical abstracts is not permitted. The use of generative AI in the production of cover art may in some cases be allowed, if the author obtains prior permission from the journal editor and publisher, can demonstrate that all necessary rights have been cleared for the use of the relevant material, and ensures that there is correct content attribution.

Supplementary material

We encourage the use of supplementary materials such as applications, images and sound clips to enhance research. Some guidelines:

Cite all supplementary files in the manuscript text.

Submit supplementary materials at the same time as your article. Be aware that all supplementary materials provided will appear online in the exact same file type as received. These files will not be formatted or typeset by the production team.

Include a concise, descriptive caption for each supplementary file describing its content.

Provide updated files if at any stage of the publication process you wish to make changes to submitted supplementary materials.

Do not make annotations or corrections to a previous version of a supplementary file.

Switch off the option to track changes in Microsoft Office files. If tracked changes are left on, they will appear in your published version.

Video

This journal accepts video material and animation sequences to support and enhance your scientific research. We encourage you to include links to video or animation files within articles. Some guidelines:

When including video or animation file links within your article, refer to the video or animation content by adding a note in your text where the file should be placed.

Clearly label files ensuring the given file name is directly related to the file content.

Provide files in one of our recommended file formats. Files should be within our preferred maximum file size of 150 MB per file, 1 GB in total.

Provide "stills" for each of your files. These will be used as standard icons to personalise the link to your video data. You can choose any frame from your video or animation or make a separate image.

Provide text (for both the electronic and the print version) to be placed in the portions of your article that refer to the video content. This is essential text, as video and animation files cannot be embedded in the print version of the journal.

We publish all video and animation files supplied in the electronic version of your article.

For more detailed instructions, we recommend that you read our guidelines on submitting video content to be included in the body of an article.

Research data

We are committed to supporting the storage of, access to and discovery of research data, and our research data policy sets out the principles guiding how we work with the research community to support a more efficient and transparent research process.

Research data refers to the results of observations or experimentation that validate research findings, which may also include software, code, models, algorithms, protocols, methods and other useful materials related to the project.

Please read our guidelines on sharing research data for more information on depositing, sharing and using research data and other relevant research materials.

For this journal, the following instructions from our research data guidelines apply.

Option B: Research data deposit, citation and linking

You are encouraged to:

Deposit your research data in a relevant data repository.

Cite and link to this dataset in your article.

If this is not possible, make a statement explaining why research data cannot be shared.

Data statement

To foster transparency, you are encouraged to state the availability of any data at submission.

Ensuring data is available may be a requirement of your funding body or institution. If your data is unavailable to access or unsuitable to post, you can state the reason why (e.g., your research data includes sensitive or confidential information such as patient data) during the submission process. This statement will appear with your published article on ScienceDirect.

Read more about the importance and benefits of providing a data statement.

Data linking

Linking to the data underlying your work increases your exposure and may lead to new collaborations. It also provides readers with a better understanding of the described research.

If your research data has been made available in a data repository there are a number of ways your article can be linked directly to the dataset:

Provide a link to your dataset when prompted during the online submission process.

For some data repositories, a repository banner will automatically appear next to your published article on ScienceDirect.

You can also link relevant data or entities within the text of your article through the use of identifiers. Use the following format: Database: 12345 (e.g. TAIR: AT1G01020; CCDC: 734053; PDB: 1XFN).

Learn more about linking research data and research articles in ScienceDirect.

Research Elements

This journal enables the publication of research objects (e.g. data, methods, protocols, software and hardware) related to original research in Elsevier's Research Elements journals.

Research Elements are peer-reviewed, open access journals which make research objects findable, accessible and reusable. By providing detailed descriptions of objects and their application with links to the original research article, your research objects can be placed into context within your article.

You will be alerted during submission to the opportunity to submit a manuscript to one of the Research Elements journals. Your Research Elements article can be prepared by you, or by one of your collaborators.

Article structure

Article sections

Divide your manuscript into clearly defined sections covering all essential elements using headings.

Glossary

Please provide definitions of field-specific terms used in your article, in a separate list.

Acknowledgements

Include any individuals who provided you with help during your research, such as help with language, writing or proof reading, in the acknowledgements section. Acknowledgements should be placed in a separate section which appears directly before the reference list. Do not include acknowledgements on your title page, as a footnote to your title, or anywhere else in your article other than in the separate acknowledgements section.

Author contributions: CRediT

Corresponding authors are required to acknowledge co-author contributions using CRediT (Contributor Roles Taxonomy) roles:

Conceptualisation

Data curation

Formal analysis

Funding acquisition

Investigation

Methodology

Project administration

Resources

Software

Supervision

Validation

Visualisation

Writing – original draft

Writing – review and editing

Not all CRediT roles will apply to every manuscript and some authors may contribute through multiple roles.

We advise you to read more about CRediT and view an example of a CRediT author statement.

Funding sources

Authors must disclose any funding sources who provided financial support for the conduct of the research and/or preparation of the article. The role of sponsors, if any, should be declared in relation to the study design, collection, analysis and interpretation of data, writing of the report and decision to submit the article for publication. If funding sources had no such involvement this should be stated in your submission.

List funding sources in this standard way to facilitate compliance to funder's requirements:

Funding: This work was supported by the National Institutes of Health [grant numbers xxxx, yyyy]; the Bill & Melinda Gates Foundation, Seattle, WA [grant number zzzz]; and the United States Institutes of Peace [grant number aaaa].

It is not necessary to include detailed descriptions on the program or type of grants, scholarships and awards. When funding is from a block grant or other resources available to a university, college, or other research institution, submit the name of the institute or organisation that provided the funding.

If no funding has been provided for the research, it is recommended to include the following sentence:

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Appendices

We ask you to use the following format for appendices:

Identify individual appendices within your article using the format: A, B, etc.

Give separate numbering to formulae and equations within appendices using formats such as Eq. (A.1), Eq. (A.2), etc. and in subsequent appendices, Eq. (B.1), Eq. (B. 2) etc. In a similar way, give separate numbering to tables and figures using formats such as Table A.1; Fig. A.1, etc.

References

References within text

Any references cited within your article should also be present in your reference list and vice versa. Some guidelines:

References cited in your abstract must be given in full.

We recommend that you do not include unpublished results and personal communications in your reference list, though you may mention them in the text of your article.

Any unpublished results and personal communications included in your reference list must follow the standard reference style of the journal. In substitution of the publication date add "unpublished results" or "personal communication."

References cited as "in press" imply that the item has been accepted for publication.

Linking to cited sources will increase the discoverability of your research.

Before submission, check that all data provided in your reference list are correct, including any references which have been copied. Providing correct reference data allows us to link to abstracting and indexing services such as Scopus, Crossref and PubMed. Any incorrect surnames, journal or book titles, publication years or pagination within your references may prevent link creation.

We encourage the use of Digital Object Identifiers (DOIs) as reference links as they provide a permanent link to the electronic article referenced.

Reference style

Indicate references by number(s) in square brackets in line in the text. You can refer to author names within your text, but you must always give the

reference number, e.g., "as demonstrated [3,6]. Barnaby and Jones [8] obtained a different result ....".

Number the references in the reference list in the order in which they appear in the text.

Please note the shortened form for last page number. e.g., 51-9, and that for more than 6 authors the first 6 should be listed followed by 'et al.'.

For further details you are referred to 'Uniform Requirements for Manuscripts submitted to Biomedical Journals' (J Am Med Assoc 1997;277:927-34) and more samples of formatted references.

Abbreviate journal names according to the List of Title Word Abbreviations (LTWA).

Examples:

Reference to a journal publication:

[1] Van der Geer J, Hanraads JAJ, Lupton RA. The art of writing a scientific article. J Sci Commun 2020;163:51-9. https://doi.org/10.1016/j.sc.2020.00372.

Reference to a journal publication with an article number:

[2] Van der Geer J, Hanraads JAJ, Lupton RA. The art of writing a scientific article. Heliyon. 2022;19:e00205. https://doi.org/10.1016/j.heliyon.2022.e00205.

Reference to a book:

[3] Strunk Jr W, White EB. The elements of style. 4th ed. New York: Longman; 2000.

Reference to a chapter in a book:

[4] Mettam GR, Adams LB. How to prepare an electronic version of your article. In: Jones BS, Smith RZ, editors. Introduction to the electronic age, New York: E-Publishing Inc; 2023, p. 281-304.

Reference to a website:

[5] Cancer Research UK. Cancer statistics reports for the UK, http://www.cancerresearchuk.org/aboutcancer/statistics/cancerstatsreport/; 2023 [accessed 13 March 2023].

Reference to a dataset:

[6] Oguro M, Imahiro S, Saito S, Nakashizuka T. Mortality data for Japanese oak wilt disease and surrounding forest compositions [dataset]. Mendeley Data. 2015. https://doi.org/10.17632/xwj98nb39r.1.

Reference to software:

[7] Coon E, Berndt M, Jan A, Svyatsky D, Atchley A, Kikinzon E, et al. Advanced Terrestrial Simulator (ATS). Version 0.88 [software]. Zenodo; 2020 Mar 25. https://doi.org/10.5281/zenodo.3727209.

Web references

When listing web references, as a minimum you should provide the full URL and the date when the reference was last accessed. Additional information (e.g. DOI, author names, dates or reference to a source publication) should also be provided, if known.

You can list web references separately under a new heading directly after your reference list or include them in your reference list.

Data references

We encourage you to cite underlying or relevant datasets within article text and to list data references in the reference list.

When citing data references, you should include:

author name(s)

dataset title

data repository

version (where available)

year

global persistent identifier

Add [dataset] immediately before your reference. This will help us to properly identify the dataset. The [dataset] identifier will not appear in your published article.

Preprint references

We ask you to mark preprints clearly. You should include the word "preprint" or the name of the preprint server as part of your reference and provide the preprint DOI.

Where a preprint has subsequently become available as a peer-reviewed publication, use the formal publication as your reference.

If there are preprints that are central to your work or that cover crucial developments in the topic, but they are not yet formally published, you may reference the preprint.

Reference management software

Most Elsevier journals have their reference template available in popular reference management software products. These include products that support Citation Style Language (CSL) such as Mendeley Reference Manager.

If you use a citation plug-in from these products, select the relevant journal template and all your citations and bibliographies will automatically be formatted in the journal style. We advise you to remove all field codes before submitting your manuscript to any reference management software product.

If a template is not available for this journal, follow the format given in examples in the reference style section of this Guide for Authors.

Appendix E: Theory Driven Research Project Participant Questionnaires

Participants were given a patient information sheet and completed a consent form separately, as well as expressing their preferred means of completing questionnaires prior to being provided with a copy.

Participant Information

Please enter your 4-digit participant identification code. Please note that this is the number given to you by the researcher, this is not your NHS number.

_____

What is your current age?

_____

What is your gender?

O Male

O Female

O Prefer not to say / my gender is not listed here

What was the cause of your brain injury

- O Traumatic brain injury
- O Stroke
- O Infection
- O Tumour
- O Hypoxia
- O Other (please specify)

_____

What was your age when you had your ABI?

_____

What was the date of your ABI (month and year)

_____

When were you referred for rehabilitation with CHIS (month and year)

_____

What rehabilitation have you had from CHIS? Please select as many as apply.

O Occupational therapy (OT)

O Physiotherapy

O Psychological therapy

O Speech and language therapy (SLT)

O Other _____

When did you finish rehabilitation with CHIS?

O Month and year _____

O N/A - I am still undergoing rehabilitation with CHIS

Illness Perception Questionnaire – Revised

Listed below are a number of symptoms that you may or may not have experienced since your brain injury. Please indicate by ticking Yes or No, whether you have experienced any of these symptoms since your brain injury, and whether you believe that these symptoms are related to your brain injury. You may not be sure what to answer for some of them, but please give your best guess.

	I have experienced this symptom *since my injury*		**This symptom is *related to my injury***	
Pain	Yes	No	Yes	No
Sore throat	Yes	No	Yes	No
Nausea	Yes	No	Yes	No
Breathlessness	Yes	No	Yes	No
Weight loss	Yes	No	Yes	No
Fatigue	Yes	No	Yes	No
Stiff joints	Yes	No	Yes	No
Sore eyes	Yes	No	Yes	No
Wheeziness	Yes	No	Yes	No
Headaches	Yes	No	Yes	No
Upset stomach	Yes	No	Yes	No
Sleep difficulties	Yes	No	Yes	No
Dizziness	Yes	No	Yes	No

	I have experienced this symptom *since my injury*		This symptom is *related to my injury*	
Loss of strength or function in limbs	Yes	No	Yes	No
Memory problems	Yes	No	Yes	No
Concentration problems	Yes	No	Yes	No
Irritability	Yes	No	Yes	No
Balance or coordination problems	Yes	No	Yes	No
Difficulties or changes with language	Yes	No	Yes	No
Loss of eyesight or hearing	Yes	No	Yes	No
Loss of sensation in limbs	Yes	No	Yes	No
Difficulty planning, making decisions or problem solving	Yes	No	Yes	No
Impulsivity	Yes	No	Yes	No
Apathy	Yes	No	Yes	No
Rapid and/or extreme mood changes	Yes	No	Yes	No
Anxiety	Yes	No	Yes	No
Low mood	Yes	No	Yes	No

We are interested in your own personal views of how you now see your brain injury. Please indicate how much you agree or disagree with the following statements about your brain injury by ticking the appropriate box. You may not be sure what to answer for some of them, but please give your best guess.

	Strongly Disagree	**Disagree**	**Neither Agree nor Disagree**	**Agree**	**Strongly Agree**
My symptoms will last a short time					

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
My symptoms are likely to be permanent rather than temporary					
My symptoms will last for a long time					
These symptoms will pass quickly					
I expect to have these symptoms for the rest of my life					
This is a serious injury					
My injury has major consequences on my life					
My injury does not have much effect on my life					
My injury strongly affects the way others see me					
My injury has serious financial consequences					
My injury causes difficulties for those who are close to me					
There is a lot which I can do to control my symptoms					
What I do can determine whether my symptoms get better or worse					
The course of my symptoms depends on me					
Nothing I do will affect my symptoms					
I have the power to influence my symptoms					

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
My actions will have no effect on the outcome of my injury					
My symptoms will improve in time					
There is very little that can be done to improve my symptoms					
My rehabilitation or treatment will be effective in curing my symptoms					
The negative effects of my injury can be prevented (avoided) by my rehabilitation or treatment					
My rehabilitation or treatment can control my symptoms					
There is nothing which can help my symptoms					
The symptoms of my injury are puzzling to me					
My injury is a mystery to me					
I don’t understand my injury					
My injury doesn’t make any sense to me					
I have a clear picture or understanding of my injury					
The symptoms of my injury change a great deal from day to day					
My symptoms come and go in cycles					
My symptoms are very unpredictable					

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I go through cycles in which my symptoms get better and worse					
I get depressed when I think about my injury					
When I think about my injury I get upset					
My injury makes me feel angry					
My injury does not worry me					
Having this injury makes me feel anxious					
My injury makes me feel afraid					

We are interested in what you consider may have been the cause of your brain injury.

As people are different, there is no correct answer for this question. We are most interested in your own views about the factors that caused your brain injury rather than or as well as what others including doctors or family may have suggested to you.

Below is a list of possible causes for your brain injury. We do not expect that all of them will be relevant to you. Please indicate how much you agree or disagree that they were causes for you by ticking the appropriate box. You may not be sure what to answer for some of them, but please give your best guess.

	Strongly Disagree	**Disagree**	**Neither Agree nor Disagree**	**Agree**	**Strongly Agree**
Stress or worry					
Hereditary – it runs in the family					
A germ or virus					
Diet or eating habits					
Chance or bad luck					
Poor medical care in my past					
Pollution in the environment					
My own behaviour					
My mental attitudes (e.g. thinking about life					

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
negatively)					
Family problems or worries caused by my condition					
Overwork					
My emotional state (e.g. feeling down, lonely, anxious, empty)					
Ageing					
Alcohol					
Smoking					
Accident or injury					
My personality					
Altered immunity					

Brief Coping Orientation to Problems Experienced

The following questions ask how you have sought to cope with your brain injury. Read the statements and indicate how much you have been using each coping style.

	I haven't been doing this at all	I have been doing this a little bit	I have been doing this a medium amount	I've been doing this a lot
I've been turning to work or other activities to take my mind off things				

I've been concentrating my efforts on doing something about the situation I'm in				
I've been saying to myself "this isn't real"				
I've been using alcohol or other drugs to make myself feel better				
I've been getting emotional support from others				
I've been giving up trying to deal with it				
I've been taking action to try to make the situation better				
I've been refusing to believe that it has happened				
I've been saying things to let my unpleasant feelings escape				
I've been getting help and advice from other people				
I've been using alcohol or other drugs to help me get through it				
I've been trying to see it in a different light, to make it seem more positive				
I've been criticising myself				
I've been trying to come up with a strategy about what to do				
I've been getting comfort and understanding from someone				
I've been giving up the attempt to cope				

I've been looking for something good in what is happening				
I've been making jokes about it				
I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping				
I've been accepting the reality of the fact that it has happened				
I've been expressing my negative feelings				
I've been trying to find comfort in my religion or spiritual beliefs				
I've been trying to get advice or help from other people about what to do				
I've been learning to live with it				
I've been thinking hard about what steps to take				
I've been blaming myself for things that happened				
I've been praying or meditating				
I've been making fun of the situation				

Hospital Anxiety and Depression Scale

Tick the box beside the reply that is closest to how you have been feeling in the past week.

I feel tense or 'wound up'

O Most of the time

O A lot of the time

O From time to time, occasionally

O Not at all

Tick the box beside the reply that is closest to how you have been feeling in the past week.

I still enjoy the things I used to enjoy

O Definitely as much

O Not quite as much

O Only a little

O Hardly at all

Tick the box beside the reply that is closest to how you have been feeling in the past week.

I get a sort of frightened feeling as if something awful is about to happen

- O Very definitely and quite badly
- O Yes, but not too badly
- O A little, but it doesn't worry me
- O Not at all

Tick the box beside the reply that is closest to how you have been feeling in the past week.

I can laugh and see the funny side of things

O As much as I always could

O Not quite so much now

O Definitely not so much now

O Not at all

Tick the box beside the reply that is closest to how you have been feeling in the past week.

Worrying thoughts go through my mind

- O A great deal of the time
- O A lot of the time
- O From time to time, but not too often
- O Only occasionally

Tick the box beside the reply that is closest to how you have been feeling in the past week.

I feel cheerful

O Not at all

O Not often

O Sometimes

O Most of the time

Tick the box beside the reply that is closest to how you have been feeling in the past week.

I can sit at ease and feel relaxed

O Definitely

O Usually

O Not often

O Not at all

Tick the box beside the reply that is closest to how you have been feeling in the past week.

I feel as if I am slowed down

O Nearly all the time

O Very often

O Sometimes

O Not at all

Tick the box beside the reply that is closest to how you have been feeling in the past week.

I get a sort of frightened feeling like 'butterflies' in the stomach

- O Not at all
- O Occasionally
- O Quite often
- O Very often

Tick the box beside the reply that is closest to how you have been feeling in the past week.

I have lost interest in my appearance

O Definitely

O I don't take as much care as I should

O I may not take quite as much care

O I take just as much case as ever

Tick the box beside the reply that is closest to how you have been feeling in the past week.

I feel restless as if I have to be on the move

- O Very much indeed
- O Quite a lot
- O Not very much
- O Not at all

Tick the box beside the reply that is closest to how you have been feeling in the past week.

I look forward with enjoyment to things

O As much as I ever did

O Rather less than I used to

O Definitely less than I used to

O Hardly at all

Tick the box beside the reply that is closest to how you have been feeling in the past week.

I get sudden feelings of panic

- O Very often indeed
- O Quite often
- O Not very often
- O Not at all

Tick the box beside the reply that is closest to how you have been feeling in the past week.

I can enjoy a good book or radio or TV program

O Often

O Sometimes

O Not often

O Very seldom

World Health Organisation Quality of Life Brief Scale

This assessment asks how you feel about your quality of life, health, or other areas of your life. Please answer all the questions. If you are unsure about which response to give to a question, please choose the one that appears most appropriate. This can often be your first response.

	Very poor	**Poor**	**Neither poor nor good**	**Good**	**Very good**
How would you rate your quality of life?					

	Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
How satisfied are you with your health					

The following questions ask about how much you have experienced certain things in the last two weeks.

	Not at all	A little	A moderate amount	Very much	An extreme amount
To what extent do you feel that (physical) pain prevents you from doing what you need to do?					
How much do you need any medical treatment to function in your daily life?					
How much do you enjoy life?					
To what extent do you feel your life to be meaningful?					
How well are you able to concentrate?					
How safe do you feel in your daily life?					
How healthy is your physical environment?					

The following questions ask about how completely you experience or were able to do certain things in the last two weeks.

	Not at all	A little	A moderate amount	Very much	An extreme amount
Do you have enough energy for everyday life?					
Are you able to accept your bodily appearance?					
Have you enough money to meet your needs?					
How available to you is the information that you need in your day-to-day life?					
To what extent do you have the opportunity for leisure activities?					
How well are you able to get around?					

The following questions ask you to say how good or satisfied you have felt about various aspects of your life over the last two weeks.

	Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
How satisfied are you with your sleep?					

	Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
How satisfied are you with your ability to perform your daily living activities?					
How satisfied are you with your capacity for work?					
How satisfied are you with yourself?					
How satisfied are you with your personal relationships?					
How satisfied are you with your sex life?					
How satisfied are you with the support you get from your friends?					
How satisfied are you with the conditions of your living place?					
How satisfied are you with your access to health services?					
How satisfied are you with your transport?					

The following question refers to how often you have felt or experienced certain things in the last two weeks.

	Never	Seldom	Quite often	Very often	Always
How often do you have negative feelings such as blue mood, despair, anxiety, depression?					

End of Questionnaire Message

Thank you for taking part in this research study. We really appreciate your time and effort helping with this research. This study is being conducted at The University of Oxford.

To remind you, all of your data is kept confidential. This means that nobody can identify you from the answers you give and that your answers are only accessible by the research team. We store all the data on a password-protected document on a secure computer which can only be accessed by the research team. We do not keep any of your identifiable information (e.g. name and/or email address) linked to your survey responses and we delete this data after the study ends.

Further Advice & Support

If you have found it distressing to think about the topics discussed in these questionnaires, and feel you would like further support, the first step is usually to talk to your GP surgery who can explore your options with you. Additionally the NHS '111' phoneline can provide advice and support. You can also contact the Community Head Injury Service directly.

If you have any questions about any aspect of the study, please contact the lead researcher Martha Wallace (martha.wallace@psy.ox.ac.uk), who will do

their best to answer your queries. Alternatively, you can contact the Community Head Injury Service team.

Appendix F: Theory Driven Research Project Clinician Questionnaire (Disability Rating Scale)

This is a questionnaire completed by a Community Head Injury Service clinician familiar with the participant using details from the patient's medical records after the questionnaire has been received. It was **not** provided in the participant questionnaire pack; however, it is provided here in the interest of clearly detailing all information that will be completed regarding participants.

Clinicians tick the box best representing the participant's abilities in that area.

Eye Opening		
☐	0	SPONTANEOUS: eyes open with sleep/wake rhythms indicating active arousal mechanisms, does not assume awareness.
☐	1	TO SPEECH AND/OR SENSORY STIMULATION: a response to any verbal approach, whether spoken or shouted, not necessarily the command to open the eyes. Also, response to touch, mild pressure.
☐	2	TO PAIN: tested by a painful stimulus.
☐	3	NONE: no eye opening even to painful stimulation.
Communication Ability		
☐	0	ORIENTED: implies awareness of self and the environment. Patient able to tell you a) who he is; b) where he is; c) why he is there; d) year; e) season; f) month; g) day; h) time of day
☐	1	CONFUSED: attention can be held and patient responds to questions but responses

		are delayed and/or indicate varying degrees of disorientation and confusion.
☐	2	INAPPROPRIATE: intelligible articulation but speech is used only in an exclamatory or random way (such as shouting and swearing); no sustained communication exchange is possible.
☐	3	INCOMPREHENSIBLE: moaning, groaning or sounds without recognisable words, no consistent communication signs.
☐	4	NONE: no sounds or communications signs from patient.
Motor Response		
☐	0	OBEYING: obeying command to move finger on best side. If no response or not suitable try another command such as “move lips,” “blink eyes,” etc. Do not include grasp or other reflex responses.
☐	1	LOCALISING: a painful stimulus at more than one site causes limb to move (even slightly) in an attempt to remove it. It is a deliberate motor act to move away from or remove the source of noxious stimulation. If there is doubt as to whether withdrawal or localisation has occurred after 3 or 4 painful stimulations, rate as localisation.
☐	2	WITHDRAWING: any generalised movement away from a noxious stimulus that is more than a simple reflex response
☐	3	FLEXING: painful stimulation results in either flexion at the elbow, rapid withdrawal with abduction of the shoulder or a slow withdrawal with adduction of the shoulder. If there is confusion between flexing and withdrawing, then use pinprick on hands.
☐	4	EXTENDING: painful stimulation results in extension of the limb.
☐	5	NONE: no response can be elicited. Usually associated with hypotonia. Exclude spinal transection as an explanation of lack of response; be satisfied that an

		adequate stimulus has been applied.
Feeding (Cognitive Ability Only) Does the patient show awareness of how and when to perform this activity? Ignore motor disabilities that interfere with carrying out this function. (This is rated under Level of Functioning described below.)		
☐	0	COMPLETE: continuously shows awareness that he knows how to feed and can convey unambiguous information that he knows when this activity should occur.
☐	1	PARTIAL: intermittently shows awareness that he knows how to feed and/or can intermittently convey reasonably clearly information that he knows when the activity should occur.
☐	2	MINIMAL: shows questionable or infrequent awareness that he knows in a primitive way how to feed and/or shows infrequently by certain signs, sounds, or activities that he is vaguely aware when the activity should occur.
☐	3	NONE: shows virtually no awareness at any time that he knows how to feed and cannot convey information by signs, sounds, or activity that he knows when the activity should occur.
Toileting (Cognitive Ability Only) Does the patient show awareness of how and when to perform this activity? Ignore motor disabilities that interfere with carrying out this function. (This is rated under Level of Functioning described below.) Rate best response for toileting based on bowel and bladder behavior		
☐	0	COMPLETE: continuously shows awareness that he knows how to toilet and can convey unambiguous information that he knows when this activity should occur.
☐	1	PARTIAL: intermittently shows awareness that he knows how to toilet and/or can intermittently convey reasonably clearly information that he knows when the activity should occur

☐	2	MINIMAL: shows questionable or infrequent awareness that he knows in a primitive way how to toilet and/or shows infrequently by certain signs, sounds, or activities that he is vaguely aware when the activity should occur.
☐	3	NONE: shows virtually no awareness at any time that he knows how to toilet and cannot convey information by signs, sounds, or activity that he knows when the activity should occur.
Grooming (Cognitive Ability Only) Does the patient show awareness of how and when to perform this activity? Ignore motor disabilities that interfere with carrying out this function. (This is rated under Level of Functioning described below.) Grooming refers to bathing, washing, brushing of teeth, shaving, combing or brushing of hair and dressing.		
☐	0	COMPLETE: continuously shows awareness that he knows how to groom self and can convey unambiguous information that he knows when this activity should occur.
☐	1	PARTIAL: intermittently shows awareness that he knows how to groom self and/or can intermittently convey reasonably clearly information that he knows when the activity should occur
☐	2	MINIMAL: shows questionable or infrequent awareness that he knows in a primitive way how to groom self and/or shows infrequently by certain signs, sounds, or activities that he is vaguely aware when the activity should occur.
☐	3	NONE: shows virtually no awareness at any time that he knows how to groom self and cannot convey information by signs, sounds, or activity that he knows when the activity should occur.
Level of Functioning (Physical, Mental, Emotional or Social Function)		
☐	0	COMPLETELY INDEPENDENT: able to live as he wishes, requiring no restriction due

		to physical, mental, emotional or social problems.
☐	1	INDEPENDENT IN SPECIAL ENVIRONMENT: capable of functioning independently when needed requirements are met (mechanical aids)
☐	2	MILDLY DEPENDENT: able to care for most of own needs but requires limited assistance due to physical, cognitive and/or emotional problems (e.g., needs non-resident helper).
☐	3	MODERATELY DEPENDENT: able to care for self partially but needs another person at all times. (person in home)
☐	4	MARKEDLY DEPENDENT: needs help with all major activities and the assistance of another person at all times.
☐	5	TOTALLY DEPENDENT: not able to assist in own care and requires 24-hour nursing care.
“Employability” (as a Full-Time Worker, Homemaker or Student)		
☐	0	NOT RESTRICTED: can compete in the open market for a relatively wide range of jobs commensurate with existing skills; or can initiate, plan execute and assume responsibilities associated with homemaking; or can understand and carry out most age relevant school assignments.
☐	1	SELECTED JOBS, COMPETITIVE: can compete in a limited job market for a relatively narrow range of jobs because of limitations of the type described above and/or because of some physical limitations; or can initiate, plan, execute and assume many but not all responsibilities associated with homemaking; or can understand and carry out many but not all school assignments.
☐	2	SHELTERED WORKSHOP, NON-COMPETITIVE: cannot compete successfully in a job market because of limitations described above and/or because of moderate or severe physical limitations; or cannot without major assistance initiate, plan,

		execute and assume responsibilities for homemaking; or cannot understand and carry out even relatively simple school assignments without assistance.
□	3	NOT EMPLOYABLE: completely unemployable because of extreme psychosocial limitations of the type described above, or completely unable to initiate, plan, execute and assume any responsibilities associated with homemaking; or cannot understand or carry out any school assignments.

Appendix G: Theory Driven Research Project Supplementary Results Tables

Mood								
	B	SE B	β	t	p	R^2	Δ R^2	p
Step 1						.315	.315	.015*
Age (years)	-.302	.200	-.388	-1.509	.140			
Age at injury (years)	.094	.157	.153	.598	.553			
Time since rehabilitation (months)	-.075	.042	-.282	-1.793	.081			
Length of rehabilitation (months)	-.013	.040	-.063	-.333	.741			
Disability Rating Scale (DRS) Score	1.858	.846	.332	2.197	.035*			
Step 2						.528	.213	.034*
Age (years)	-.056	.219	-.071	-.254	.801			
Age at injury (years)	-.001	.150	-.002	-.010	.992			
Time since rehabilitation (months)	-.066	.045	-.245	-1.472	.151			
Length of rehabilitation (months)	-.069	.040	-.321	-1.707	.098			
Disability Rating Scale (DRS) Score	.799	.827	.143	.965	.342			
Illness Identity	.668	.259	.450	2.583	.015*			
Timeline (Acute/Chronic)	.308	.318	.169	.969	.340			
Timeline (Cyclical)	-.165	.549	-.060	-.300	.766			
Consequences	.219	.301	.109	.725	.474			
Coherence	-.504	.287	-.285	-1.756	.089			
Step 3						.609	.081	.019*
Age (years)	-.101	.203	-.129	-.495	.624			
Age at injury (years)	-.002	.139	-.003	-.015	.988			
Time since rehabilitation (months)	-.061	.041	-.227	-1.467	.153			
Length of rehabilitation (months)	-.052	.038	-.242	-1.368	.182			
Disability Rating Scale (DRS) Score	.055	.822	.010	.066	.947			
Illness Identity	.828	.248	.558	3.342	.002**			
Timeline (Acute/Chronic)	-.010	.321	-.006	-.031	.975			
Timeline (Cyclical)	-.464	.522	-.168	-.888	.382			
Consequences	.190	.279	.095	.682	.500			
Coherence	-.520	.266	-.294	-1.960	.059			

Control	-.431	.173	-.349	-2.490	.019*			
Physical Quality of Life (PQOL)								
	B	SE B	β	t	p	R^2	Δ R^2	p
Step 1						.281	.281	.030*
Age (years)	.319	.420	.200	.760	.452			
Age at injury (years)	-.041	.328	-.033	-.125	.901			
Time since rehabilitation (months)	.084	.088	.153	.948	.349			
Length of rehabilitation (months)	-.087	.085	-.199	-1.023	.313			
Disability Rating Scale (DRS) Score	-3.790	1.775	-.330	-2.136	.040*			
Step 2						.561	.280	.007**
Age (years)	-.356	.432	-.224	-.824	.416			
Age at injury (years)	.130	.297	.103	.437	.665			
Time since rehabilitation (months)	.022	.088	.041	.255	.801			
Length of rehabilitation (months)	.049	.079	.111	.611	.546			
Disability Rating Scale (DRS) Score	-1.849	1.635	-.161	-1.131	.267			
Illness Identity	-.675	.511	-.222	-1.322	.196			
Timeline (Acute/Chronic)	-1.703	.629	-.457	-2.707	.011*			
Timeline (Cyclical)	-2.507	1.086	-.443	-2.310	.028*			
Consequences	-.018	.596	-.004	-.031	.976			
Coherence	.614	.567	.169	1.083	.287			
Step 3						.781	.049	.063
Age (years)	-.285	.416	-.179	-.684	.499			
Age at injury (years)	.131	.285	.104	.459	.649			
Time since rehabilitation (months)	.014	.084	.026	.171	.865			
Length of rehabilitation (months)	.022	.077	.050	.280	.781			
Disability Rating Scale (DRS) Score	-.668	1.683	-.058	-.397	.694			
Illness Identity	-.930	.507	-.306	-1.833	.077			
Timeline (Acute/Chronic)	-1.197	.657	-.321	-1.821	.079			
Timeline (Cyclical)	-2.032	1.069	-.359	-1.901	.067			
Consequences	.026	.571	.006	.046	.963			
Coherence	.640	.544	.177	1.178	.248			

Control	.685	.355	.271	1.932	.063			
Psychological Quality of Life (PsQOL)								
	B	SE B	β	t	p	R^2	Δ R^2	p
Step 1						.348	.348	.007**
Age (years)	1.040	.489	.534	2.128	.040*			
Age at injury (years)	-.446	.382	-.291	-1.166	.251			
Time since rehabilitation (months)	.032	.103	.049	.316	.754			
Length of rehabilitation (months)	-.114	.099	-.213	-1.151	.257			
Disability Rating Scale (DRS) Score	-5.696	2.066	-.406	-2.757	.009**			
Step 2						.618	.270	.004**
Age (years)	.462	.493	.237	.937	.356			
Age at injury (years)	-.298	.339	-.194	-.880	.385			
Time since rehabilitation (months)	-.034	.100	-.050	-.334	.741			
Length of rehabilitation (months)	.040	.091	.075	.441	.662			
Disability Rating Scale (DRS) Score	-3.407	1.864	-.243	-1.828	.077			
Illness Identity	-1.150	.582	-.309	-1.974	.057			
Timeline (Acute/Chronic)	-1.519	.717	-.333	-2.119	.042*			
Timeline (Cyclical)	-1.112	1.238	-.161	-.898	.376			
Consequences	-.059	.679	-.012	-.087	.931			
Coherence	1.645	.646	.371	2.545	.016*			
Step 3						.671	.053	.035*
Age (years)	.553	.466	.284	1.186	.245			
Age at injury (years)	-.297	.319	-.193	-.930	.360			
Time since rehabilitation (months)	-.044	.095	-.065	-.462	.647			
Length of rehabilitation (months)	.006	.087	.010	.064	.949			
Disability Rating Scale (DRS) Score	-1.895	1.887	-.135	-1.004	.323			
Illness Identity	-1.476	.569	-.397	-2.595	.015*			
Timeline (Acute/Chronic)	-.872	.737	-.191	-1.183	.246			
Timeline (Cyclical)	-.504	1.199	-.073	-.420	.677			

Consequences	-.002	.641	.000	-.003	.997			
Coherence	1.679	.610	.379	2.754	.010**			
Control	.877	.398	.284	2.205	.035*			
Social Quality of Life (SQOL)								
	B	SE B	β	t	p	R^2	Δ R^2	p
Step 1						.245	.245	.062
Age (years)	1.164	.426	.739	2.735	.010**			
Age at injury (years)	-.628	.333	-.506	-1.886	.067			
Time since rehabilitation (months)	-.182	.090	-.337	-2.036	.049*			
Length of rehabilitation (months)	-.092	.086	-.213	-1.072	.291			
Disability Rating Scale (DRS) Score	-2.440	1.799	-.215	-1.356	.184			
Step 2						.417	.173	.135
Age (years)	1.021	.492	.648	2.073	.047*			
Age at injury (years)	-.582	.338	-.469	-1.721	.095			
Time since rehabilitation (months)	-.139	.100	-.256	-1.385	.176			
Length of rehabilitation (months)	-.002	.090	-.005	-.022	.983			
Disability Rating Scale (DRS) Score	-1.056	1.863	-.093	-.567	.575			
Illness Identity	-.501	.582	-.167	-.861	.396			
Timeline (Acute/Chronic)	-.919	.716	-.249	-1.282	.209			
Timeline (Cyclical)	1.075	1.237	.192	.869	.392			
Consequences	-.418	.678	-.103	-.617	.542			
Coherence	1.145	.646	.319	1.773	.086			
Step 3						.451	.033	.187
Age (years)	1.079	.488	.685	2.213	.035*			
Age at injury (years)	-.582	.334	-.469	-1.742	.092			
Time since rehabilitation (months)	-.145	.099	-.269	-1.468	.153			
Length of rehabilitation (months)	-.024	.091	-.055	-.265	.793			
Disability Rating Scale (DRS) Score	-.086	1.973	-.008	-.044	.966			
Illness Identity	-.710	.595	-.236	-1.194	.242			

Timeline (Acute/Chronic)	-.504	.771	-.137	-.653	.518			
Timeline (Cyclical)	1.464	1.254	.261	1.168	.252			
Consequences	-.382	.670	-.094	-.570	.573			
Coherence	1.167	.638	.325	1.830	.077			
Control	.562	.416	.225	1.351	.187			
Environmental Quality of Life (EQOL)								
	B	SE B	β	t	p	R^2	Δ R^2	p
Step 1						.387	.387	.003**
Age (years)	.642	.333	.470	1.930	.062			
Age at injury (years)	-.095	.260	-.088	-.365	.717			
Time since rehabilitation (months)	.092	.070	.196	1.316	.197			
Length of rehabilitation (months)	-.013	.067	-.034	-.191	.849			
Disability Rating Scale (DRS) Score	-3.653	1.406	-.371	-2.598	.013*			
Step 2						.528	.141	.133
Age (years)	.419	.384	.306	1.089	.285			
Age at injury (years)	-.056	.264	-.052	-.210	.835			
Time since rehabilitation (months)	.004	.078	.009	.054	.957			
Length of rehabilitation (months)	.031	.071	.083	.442	.662			
Disability Rating Scale (DRS) Score	-3.146	1.455	-.320	-2.163	.038*			
Illness Identity	-.484	.455	-.186	-1.065	.295			
Timeline (Acute/Chronic)	-.414	.560	-.129	-.740	.465			
Timeline (Cyclical)	-1.207	.966	-.249	-1.250	.221			
Consequences	.428	.530	.122	.807	.426			
Coherence	.742	.504	.239	1.471	.151			
Step 3						.627	.100	.008**
Age (years)	.507	.348	.371	1.454	.156			
Age at injury (years)	-.054	.239	-.050	-.228	.821			
Time since rehabilitation (months)	-.006	.071	-.012	-.079	.938			
Length of rehabilitation (months)	-.002	.065	-.005	-.028	.978			
Disability Rating Scale (DRS) Score	-1.693	1.410	-.172	-1.201	.239			
Illness Identity	-.797	.425	-.306	-1.876	.070			
Timeline (Acute/Chronic)	.208	.551	.065	.378	.708			
Timeline (Cyclical)	-.623	.896	-.128	-.696	.492			
Consequences	.483	.479	.137	1.008	.321			

Coherence	.774	.455	.249	1.700	.099
Control	.843	.297	.388	2.836	.008**

*Table: Full results of hierarchical step regressions for Mood and QOL outcome variables. * indicates a significance of <.05, ** indicates a significance of <.01, *** indicates a significance of < .001*

Appendix H: Theory Driven Research Project Ethical Approval Letter

Ymchwil Iechyd a Gofal Cymru
Health and Care Research Wales

NHS
Health Research Authority

Miss Martha Wallace
Oxford Institute of Clinical Psychology Training and Research
Isis Education Centre, Warneford Hospital
Headington, Oxford
OX3 7JX

Email: approvals@hra.nhs.uk

29 October 2024

Dear Miss Wallace

HRA and Health and Care Research Wales (HCRW) Approval Letter

Study title:	**The Importance of Appraisals of Symptom Controllability for Psychosocial Outcomes Following Acquired Brain Injury**
IRAS project ID:	**338237**
Protocol number:	**PID18165**
REC reference:	**24/NW/0295**
Sponsor	**University of Oxford, Research Governance, Ethics and Assurance**

I am pleased to confirm that HRA and Health and Care Research Wales (HCRW) Approval has been given for the above referenced study, on the basis described in the application form, protocol, supporting documentation and any clarifications received. You should not expect to receive anything further relating to this application.

Please now work with participating NHS organisations to confirm capacity and capability, in line with the instructions provided in the "Information to support study set up" section towards the end of this letter.

How should I work with participating NHS/HSC organisations in Northern Ireland and Scotland?
HRA and HCRW Approval does not apply to NHS/HSC organisations within Northern Ireland and Scotland.

If you indicated in your IRAS form that you do have participating organisations in either of these devolved administrations, the final document set and the study wide governance report

(including this letter) have been sent to the coordinating centre of each participating nation. The relevant national coordinating function/s will contact you as appropriate.

Please see IRAS Help for information on working with NHS/HSC organisations in Northern Ireland and Scotland.

How should I work with participating non-NHS organisations?
HRA and HCRW Approval does not apply to non-NHS organisations. You should work with your non-NHS organisations to obtain local agreement in accordance with their procedures.

What are my notification responsibilities during the study?

The standard conditions document "*After Ethical Review – guidance for sponsors and investigators*", issued with your REC favourable opinion, gives detailed guidance on reporting expectations for studies, including:

- Registration of research
- Notifying amendments
- Notifying the end of the study

The HRA website also provides guidance on these topics, and is updated in the light of changes in reporting expectations or procedures.

Who should I contact for further information?
Please do not hesitate to contact me for assistance with this application. My contact details are below.

Your IRAS project ID is **338237**. Please quote this on all correspondence.

Yours sincerely,
Tina Cavaliere

Approvals Specialist

Email: approvals@hra.nhs.uk

Copy to: *University of Oxford Research Governance, Ethics and Ass,*

Lead Researcher: Martha Wallace, Trainee Clinical Psychologist, Oxford Institute for Clinical Training and Research, martha.wallace@ox.ac.uk

Appendix I: Theory Driven Research Project Participant Information Sheet

PARTICIPANT INFORMATION SHEET

The Importance of Appraisals of Symptom Controllability for Psychosocial Outcomes Following Acquired Brain Injury (ABI)

We'd like to invite you to take part in our research study. Before you decide, it is important that you understand why the research is being done and what participation would involve for you. Please take time to read this information and discuss it with others if you wish. If there is anything that is not clear, or if you would like more information, please contact us to ask.

Summary

- This study invites individuals who have experienced an acquired brain injury (ABI) and have undergone or are currently undergoing rehabilitation with the Community Head Injury Service (CHIS) to participate in research to help us understand the importance of beliefs about ABI.
- Participants will be asked to complete a set of questionnaires about how they think about their injury and their current mental and physical wellbeing.
- These questionnaires will take about 30 minutes to complete, although you do not have to do this in one sitting. They can be completed online, on paper, or over the phone with a researcher.
- The results of the questionnaires will be used to help us to better understand how beliefs about injury might be important for how people feel after their ABI.
- We do not think there are any risks to taking part. If you are distressed by the questionnaires, you can contact the research team who can direct you towards the most appropriate source of support.
- Participation is entirely voluntary and will not affect the care you receive from the Community Head Injury Service.

Lead Researcher: Martha Wallace, Trainee Clinical Psychologist, Oxford Institute for Clinical Training and Research, martha.wallace@ox.ac.uk

What is the purpose of the study?

This study is being conducted by the researcher in order to meet the requirements of their Doctorate in Clinical Psychology.

We know that acquired brain injury (ABI) can have a significant and long-lasting impact on both the individual with the ABI and their family. Research tells us that how people think about their brain injury can be important in the process of adjusting to life with an ABI and is one of the factors that can influence mood and quality of life in the years after injury. However, we do not know much about what specific beliefs are important in how people adjust to ABI.

We are conducting this study to better understand whether certain beliefs about injury influence individuals' adjustment to their ABI.

Why have I been invited?

You are being invited to participate in this because you have experienced an acquired brain injury, and you have said that you would be willing to be contacted to help with research conducted in this area. We are hoping to recruit about 50 individuals to participate in this study.

Do I have to take part?

No, participation in this study is entirely voluntary and it is up to you to decide whether or not to take part. If you do decide to take part, you are invited to keep this information sheet. You will also be asked to sign a consent form. If you decide to take part and given written consent, you are still free to withdraw unprocessed data at any time and without giving a reason, by contacting the researcher at martha.wallace@psy.ox.ac.uk. **Your treatment with the Community Head Injury Service will not be affected in any way whether you decide to take part or not.**

What will happen to me if I decide to take part?

If you wish to take part, you will be given a consent form to complete. If you have not completed this within 2 weeks, the researcher will contact you to confirm whether you do not wish to take part in the study.

Lead Researcher: Martha Wallace, Trainee Clinical Psychologist, Oxford Institute for Clinical Training and Research, martha.wallace@ox.ac.uk

You will be provided with a unique participant identification code to protect the data you give to the study. Only the primary researcher will have access to your code.

You will also be given a copy of a set of questionnaires; these will be provided electronically, unless you are unable to complete questionnaires electronically (e.g. if you do not have access to a private mobile or computer device). If you choose to complete the questionnaires on paper, these will be sent to you in the post with an envelope to return them; otherwise, you will be sent a link to complete the questionnaires online. You can also request for the researcher to complete the questionnaires with you over the phone, if that is easiest for you.

These questionnaires will ask you a few details about yourself, including your age now and when you had your ABI, what caused your ABI and what rehabilitation you had. You will then be asked about the symptoms of your ABI and how you feel and think about these symptoms. You will also be asked how you typically try to cope with problems in your life. Finally, you will be asked about your mood and quality of life currently.

We expect it to take approximately 30 minutes to complete the questionnaires, although you can take as long as you need. You will also be able to pause the survey and come back to it later. We will contact you if we have not received your questionnaires after 2 weeks. Otherwise, we should not need to contact you further unless you would like to discuss any aspect of the study further.

By consenting to take part in this study, we will also use data from your clinical records about the severity of your brain injury to calculate a score called the Disability Rating Scale to include in our analyses. This will be completed by a clinician you met with during your rehabilitation. The purpose of this is that we need to make sure that we have accounted for all factors that might impact your wellbeing after ABI, so we will compare your score to your questionnaire results to see if this is having an impact on your adjustment. Your data will be stored securely and pseudonymously (i.e. your name and identifiable information is removed from your data and replaced by your unique identifier code) with the results of your questionnaires. Only a member of your clinical team will have access to this data before it is pseudonymised.

Lead Researcher: Martha Wallace, Trainee Clinical Psychologist, Oxford Institute for Clinical Training and Research, martha.wallace@ox.ac.uk

Are there any possible disadvantages or risks from taking part?

There are no particular risks associated with taking part in this process. If you experience any distress in considering the issues addressed by the study, you can contact the primary researcher to discuss your concerns and you may choose to cease participation with no judgement or adverse consequences. The research and clinical team involved will also be happy to signpost you towards the most appropriate source of support for any distress that may arise in participating.

In the event that you are struggling with your mental health following your ABI, you can contact your GP surgery, who can explore your options with you, or call the NHS '111' phoneline for advice and support. You can also contact the Community Head Injury Service directly to discuss your concerns with a member of the clinical team, or access support from charities such as Headway, The Stroke Association or Different Strokes. The researcher is not able to provide any support for your wellbeing as part of this project.

What are the possible benefits of taking part?

Though there will not be any direct benefit to you from participating in the study, your participation will help us to understand how individuals adjust to ABI. We hope that this will also help us to deliver the most effective care and support for people affected by an ABI.

It is also possible that you find participation in this process an interesting and enjoyable experience.

Will my taking part in the study be kept confidential?

Yes. All information you share with the researcher, including the fact of your involvement, will be kept confidential. If any information is shared, for example with the project supervisors or members of the research team responsible for approving the project, it will be done without revealing any details that may identify you. All study records will be identified only by a code. We will only use date of birth, NHS and/or hospital MRN numbers where this is necessary to link to your NHS records/contact you. Information that can identify you will only be held securely by Buckinghamshire NHS

Foundation Trust for the purposes of the study. For further information, see also the 'What will happen to my data?' section.

Responsible members of the University of Oxford, regulatory bodies, and Buckinghamshire Healthcare NHS Foundation Trust may be given access to data for monitoring and/or audit of the study to ensure that the research is complying with applicable regulations.

If you choose to complete the questionnaires on paper, we cannot guarantee the security of your information whilst in the post as this is a service outside of our control. However, the completed questionnaires will contain no identifiable information and therefore none of your personal data will be compromised in the event of a problem with the postal service.

Will I be reimbursed for taking part?

Unfortunately, we are not able to reimburse you for your participation in this study.

What will happen to my data?

Data protection regulation requires that we state the legal basis for processing information about you. In the case of research, this is 'a task in the public interest.' The University of Oxford is the sponsor for this study. It is the data controller and is responsible for looking after your information and using it properly.

You will be asked to complete the questionnaires using software called Qualtrics, unless you choose to complete questionnaires on paper or over the phone. Qualtrics is a secure site that has been checked by the University of Oxford for data security and compliance with data protection standards. If you complete the questionnaires this way, your answers will be kept electronically and stored on a secure electronic drive that can only be accessed by the primary researcher. If you choose to complete the questionnaires on paper (or over the phone with the researcher), your answers will be scanned and electronically stored in the same secure drive; the original copies will be kept in a secure file on site at CHIS until the end of the study, at which point they will be destroyed.

The answers you provide to the questionnaires will be labelled using a unique code. This means that only the primary researcher (Martha Wallace)

will be able to identify you from the answers you give and will only do so in order to pair medical details about your injury and your questionnaire responses for the purposes of data analysis. No one outside of the research team (Martha Wallace, Dr Nigel King and Dr Amy Murphy) will have access to the answers given in your questionnaire, and these will **not** be made available in your medical records or seen by your clinicians. Nothing else from your answers will be able to identify you, and we will not record your IP address.

We will store any research documents with personal information, such as consent forms, securely on site at CHIS. Only the research team will be able to access this, and your data will only be used for the purposes of developing this research study. Personal data will be deleted after the conclusion of the study. Anonymised study data will be held by the Oxford Clinical Institute of Training & Research, University of Oxford, for five years after the end of the study. We will store any research documents with personal information, such as consent forms, securely at the Oxford Institute of Clinical Psychology Training and Research for five years after the end of the study as part of the research record. Contact details will be retained until the end of the study, if you wish to receive a summary of the results.

We will be using information from Community Head Injury Service records in order to undertake this study and will use the minimum personally-identifiable information possible. The Community Head Injury Service will use your NHS number and contact details, to contact you about the research study, and to oversee the quality of the study. A copy of the consent form from this study will be kept in your medical records for as long as those records are retained.

Data protection regulation provides you with control over your personal data and how it is used. When you agree to your information being used in research, however, some of those rights may be limited in order for the research to be reliable and accurate. Further information about your rights with respect to your personal data is available at https://compliance.web.ox.ac.uk/individual-rights . You can contact the University of Oxford's data protection officer on data.protection@admin.ox.ac.uk.

Lead Researcher: Martha Wallace, Trainee Clinical Psychologist, Oxford Institute for Clinical Training and Research, martha.wallace@ox.ac.uk

You can find out more about how we use your information by contacting the chief investigator, Martha Wallace (martha.wallace@psy.ox.ac.uk) or any other member of the research team (see below).

What will happen if I don't want to carry on with the study?

You may withdraw from the study at any time without giving a reason by contacting the lead researcher (see below). If you wish to withdraw from the study prior to data analysis, all your identifiable information will be deleted. Once the data from all participants has been collected and analysed, it will no longer be possible to withdraw this data.

What will happen to the results of this study?

Participants will be provided with a summary of the results if they consent to this (we will need to retain your contact details for this purpose until the end of the study). We also aim to write a paper reporting the results of the study and aim to publish this in an academic journal. As part of this paper, we will report some demographic information about the participant group (e.g. age, gender, ethnicity). Only the group data will be analysed and no identifiable information about individual participants will be published. If published, the study article will be placed on the Oxford Institute for Clinical Psychology Training and Research website (https://oxicptr.web.ox.ac.uk/) after publication. Some of the research being undertaken will also contribute to the fulfilment of an educational requirement (a doctoral thesis).

What if there is a problem?

If there are any problems with the study questionnaire affecting your ability to participate or you wish to raise a concern, please contact the lead researcher (Martha Wallace; martha.wallace@psy.ox.ac.uk) in the first instance. Should your concern remain unresolved, it can be escalated to the research supervisors.

The investigators recognise the important contribution that volunteers make to medical research, and will make every effort to ensure your safety and wellbeing. The University of Oxford, as the research sponsor, has appropriate insurance in place in the unlikely event that you suffer any harm as a direct consequence of your taking part in this study. If something does go wrong, you are harmed during the research, and this is due to someone's

negligence, then you may have grounds for a legal action for compensation. While the Sponsor will cooperate with any claim, you may wish to seek independent legal advice to ensure that you are properly represented in pursuing any complaint. The study researcher can advise you of further clinical action and refer you to a doctor within the NHS for treatment, if necessary.

If you wish to complain about any aspect of the way in which you have been approached or treated, or how your information is handled during the course of this study, contact the chief investigator (martha.wallace@psy.ox.ac.uk) or you may contact University of Oxford Research Governance, Ethics & Assurance (RGEA) on 01865 616480, or the director of RGEA at rgea.complaints@admin.ox.ac.uk.

The Patient Advisory Liaison Service (PALS) is a confidential NHS service that can provide you with support for any complaints or queries you may have regarding the care you receive as an NHS patient. PALS is unable to provide information about this research study. If you wish to contact the PALS team please contact 01865 221473 or email PALS@ouh.nhs.uk

How have patients and the public been involved in this study?

Service users have helped develop us to develop this study. They have helped us decide what research questions should be asked and how we ask them. They have also been involved in reviewing this Participant Information Sheet and in describing the inclusion and exclusion criteria for this study.

Who has reviewed the study?

All research in the NHS is looked at by an independent group of people, called a Research Ethics Committee, to protect participants' interests. This study has been reviewed and given a favourable opinion by the Liverpool Central Research Ethics Committee.

Lead Researcher: Martha Wallace, Trainee Clinical Psychologist, Oxford Institute for Clinical Training and Research, martha.wallace@ox.ac.uk

KEY INFORMATION

- Taking part in this research study is voluntary and optional.
- The study involves completing one set of four questionnaires lasting between 10-30 minutes.
- You will only need to complete the questionnaires once.
- Please take a break during the questionnaires if you need to but ensure you complete the questionnaires the same day.
- Data will be extracted from your NHS medical record as a key piece of research information
- If you have any questions or concerns at any time during the study,

Further information and contact details:

If you would like any further information about this study, or are interested in participating, please contact Martha Wallace on martha.wallace@psy.ox.ac.uk. Alternatively, please let either Amy or Nigel know that you consent to them sharing your contact details so that the researcher can get in touch with you directly to discuss this further (buc-tr.CHIS@nhs.net)

Thank you for taking the time to read this information sheet and for your interest in the project.

Lead Researcher: Martha Wallace, Trainee Clinical Psychologist, Oxford Institute for Clinical Training and Research, martha.wallace@ox.ac.uk

Appendix J: Theory Driven Research Project Consent Form

CONSENT FORM

The Importance of Appraisals of Symptom Controllability for Psychosocial Outcomes Following Acquired Brain Injury (ABI)

Researcher to seek and record informed oral consent, after participant has had sufficient time to think about whether they want to take part.

Please check the boxes to record that the question has been asked by the researcher and that the participant has responded in the affirmative:

1. Do you confirm that you have read the information sheet dated..... (version.....) for this study? Have you had the opportunity to consider the information, ask questions and have these answered satisfactorily?	
2. Do you understand that your participation is voluntary and that you are free to withdraw at any time without giving any reason, without your medical care or legal rights being affected?	
3. Do you understand that if you choose to withdraw after completing the questionnaires, you can ask for your data not to be used but you understand that once the data has been anonymised for analysis it cannot be withdrawn.	
4. Do you understand that relevant sections of your medical notes	

Lead Researcher: Martha Wallace, Trainee Clinical Psychologist, Oxford Institute for Clinical Training and Research, martha.wallace@ox.ac.uk

and data collected during the study may be looked at by individuals from University of Oxford, from regulatory authorities and from Buckinghamshire Healthcare NHS Foundation Trust where it is relevant to your taking part in this research? Do you give permission for these individuals to have access to your records?		
5. Do you agree to take part in this study?		
6. Do you agree for the researcher to contact you after the study to provide a summary of the research findings.	Yes	No
Please provide your email or postal address for the research findings to be sent to you:		

_____

Name of Participant

_____ _____ _____

Name of Researcher taking consent *Date* *Signature*

When completed: 1 for participant (e.g. emailed securely or posted to participant, according to participant preference); 1 for researcher site file (original); 1 to be scanned and kept in medical notes.

Appendix K: Theory Driven Research Project Author Guidelines

SCOPE

The *Journal of Head Trauma Rehabilitation (JHTR)* is a bimonthly, international journal devoted to scientific information on restoring function and limiting disability due to traumatic brain injury (TBI). The primary aim of JHTR is to disseminate original research to professionals from multiple disciplines who study and/or provide care to persons living with TBI. All research manuscripts receive masked peer review.

Articles appearing in JHTR address functional effects of TBI and interventions intended to ameliorate those effects. Findings should inform the treatment of individuals and families affected by TBI, the systems of care in which services are provided, or epidemiologic and public health issues relevant to TBI. JHTR is interested in translational studies in humans that investigate biomarkers and other underlying mechanisms associated with outcomes following TBI. Manuscripts are expected to address questions of interest to the wide range of professionals involved in TBI care. Articles that are narrowly focused or relevant to only a single discipline typically are not published.

Populations of interest. Research reported in JHTR is generally limited to human subjects with a history of TBI, the families and caregivers of individuals with TBI, and/or the systems of care in which TBI services and research are undertaken. Studies may address injuries of any severity, sustained by any age group. If a study's sample includes individuals with acquired brain injuries other than TBI, analyses must be included to confirm that the findings reported for the entire sample are also true for those with a history of TBI.

Case ascertainment. Procedures used to determine that participants incurred a TBI must employ proven clinical techniques or validated research methods of TBI identification.

Transparency and openness. Please state in the article whether data, programming code or other materials are available to other researchers and, if so, how to access them. Data or code that was not the authors' own should be cited in the text and listed in the reference section.

Randomised controlled trials must be preregistered on *clinicaltrials.gov* or a similar independent, registry, prior to the initiation of data collection.

Preregistration, including analysis plans, is recommended for all study designs. If a trial is preregistered, a link to the registry should be provided in the main text.

Artificial Intelligence. Authors who use AI tools in the writing of a manuscript, production of images or graphical elements of the paper, or in the collection and analysis of data, must be transparent in disclosing in the Materials and Methods (or similar section) of the paper how the AI tool was used and which tool was used. Authors are fully responsible for the content of their manuscript, even those parts produced by an AI tool, and are thus liable for any breach of publication ethics.

In addition, authors should not upload an accepted or published manuscript or any part of it into a generative AI tool as this may violate the copyright agreement or licensing terms in effect at the time of acceptance.

Inclusion of diverse participants. Please provide sex or gender-specific and racial/ethnic-specific data in describing the outcomes of experimental and observational analyses, or specifically state that no sex-based or racial/ethnic-based differences were present. Where applicable, authors should explain why people of a particular age, race, ethnicity, gender, or sex were excluded from a study.

The term "sex" should be used as a classification, generally as male or female, according to the reproductive organs and functions that derive from the chromosomal complement. In the study of human subjects, the term "gender" should be used to refer to a person's self-representation as male or female, or how that person is responded to by social institutions on the basis of the individual's gender presentation.

MANUSCRIPT SUBMISSION

Article types: Original articles may employ experimental, observational, or qualitative designs. JHTR will publish replication studies. Systematic reviews, scoping reviews, and meta-analyses are also of interest.

Commentaries and Letters to the Editor will be reviewed and accepted at the discretion of the Editors. Other special communications must be discussed with the Editor-in-Chief prior to submission.

Both feasibility and pilot studies will be considered for publication. Feasibility studies should explicitly investigate pragmatic aspects of an investigation or the acceptability to key stakeholders. Pilot studies are a subset of feasibility studies in which primary outcomes data are collected. Because, by definition, pilot studies are under-powered, no conclusions may be made attributing change, or the lack of change, to the intervention.

Investigations of the efficacy of interventions using only quasi-experimental designs typically are not accepted.

Case studies or case series will not be reviewed unless they address a seminal clinical condition or procedure that has not been previously reported in the published literature.

Before beginning the manuscript preparation process, authors should consult relevant guidelines for research reporting found at <www.equator-network.org>. As part of the manuscript submission process, authors must upload a completed checklist with page and line numbers for each criterion met.

Unless an author has been invited by an issue editor to submit a manuscript for a topical issue, all original research should be submitted as "Unsolicited (Focus on Clinical Research)".

Article length: Manuscripts should not exceed 3500 words excluding abstract, references, tables, and figure legends. The total number of tables and figures should not exceed five (5). Typically, except for review articles, the number of references should not exceed 50. If the author(s) feels a longer manuscript is necessary, please contact the Editor-in-Chief in advance of submission. Authors are encouraged to use Supplemental Digital Content (SDC) for manuscript details that enhance but are not central to the comprehension of the research. SDC is linked to the article indefinitely via the *JHTR* website (for more information, see description below).

JHTR will accept Research Letters that do not exceed 2000 words, three (3) tables and/or figures and 15 references. This vehicle may be used for timely and innovative communication of *empirical* findings. Submit a Research Letter as “Original Research” and “Unsolicited”. The title should begin “Research Letter:…” to alert the Editors and readers to the intended type of communication.

Authorship: JHTR follows the International Committee of Medical Journal Editors recommendations for the roles of authors and contributors. Manuscripts should be limited to eight (8) authors. More than eight (8) authors requires submission of additional documentation of roles and contributions. Any change in authorship after initial submission will require justification to the Managing Editor and notification of all authors.

Online manuscript submission: All manuscripts must be submitted online through the Web site at www.edmgr.com/jhtr, which can also be accessed through the journal’s Web page.

First-time users: Please click the Register button from the menu and enter the requested information. On successful registration, you will be sent an e-mail indicating your user name and password. *Note:* If you have received an e-mail from us with an assigned user ID and password, or if you are a repeat user, do not register again. Just log-in. Once you have an assigned ID and password, you do not have to reregister, even when you log-in for a different role (i.e., author or reviewer).

Authors: Please click the Log-in button from the menu at the top of the page and log-in to the system as an Author. Submit your manuscript according to the author instructions. You will be able to track the progress of your manuscript through the system. If you experience any problems, please contact John D. Corrigan, PhD, Editor-in-Chief at johncorrigan1@me.com.

CONFLICTS OF INTEREST

Authors must state all possible conflicts of interest in the Title Page of the manuscript, including financial, consultant, institutional, and other relationships that might lead to bias or a conflict of interest. If there is no conflict of interest, this should also be explicitly stated as none declared. All relevant conflicts of interest and sources of funding for all authors should be included on the title page of the manuscript with the heading “Conflicts of Interest and Source of Funding:”. For example:

Conflicts of Interest and Source of Funding: Author A has received honoraria from Company Z. Author B is currently receiving a grant (#12345) from Organisation Y and is on the speaker’s bureau for Organisation X—the CME organisers for Company A. For the remaining authors none were declared.

In addition, each author must complete and submit the journal's online copyright transfer agreement, which includes a section on the disclosure of potential conflicts of interest based on the recommendations of the International Committee of Medical Journal Editors, "Uniform Requirements for Manuscripts Submitted to Biomedical Journals" (www.icmje.org/update.html).

A copy of the form is made available to the submitting author as part of the Editorial Manager submission process. Co-authors will automatically receive an email with instructions on completing the form upon submission.

MANUSCRIPT PREPARATION

Authors should pay particular attention to the following items before submitting their manuscripts:

- *JHTR* uses the *American Medical Association Manual of Style*, 11th edition.
- *JHTR* requires authors to use person-first language—avoid phrasing such as “the brain-injured participant” or the “TBI patient” and replace it with “participant with a brain injury” or “patient with a TBI.”
- MANUSCRIPTS SHOULD BE LINE NUMBERED IN THEIR ORIGINAL FORMAT (e.g., Microsoft Word line numbering).
- Manuscripts should be double-spaced, including quotations, lists, references, footnotes, figure captions, and all parts of tables.

- Manuscripts should be ordered as follows: title page, abstracts, text, references, appendices, tables, figure legends, and figures.
- Do not embed tables or figures in the text but provide guidance in the text where a table or figure should be placed (e.g., Table X about here").
- TO MAINTAIN A MASKED REVIEW PROCESS, IT IS THE AUTHOR'S RESPONSIBILITY TO MAKE EVERY ATTEMPT TO MASK ALL INFORMATION IN THE MANUSCRIPT THAT WOULD REVEAL THE IDENTITY OF THE AUTHOR TO THE REVIEWER. THIS VERSION OF THE MANUSCRIPT IS REFERRED TO AS THE "MASKED" MANUSCRIPT WHEN UPLOADING DOCUMENTS. Both a masked and unmasked version of the main text will need to be uploaded during manuscript submission.
- An accompanying cover letter should include attestations that (1) the work is original and has not been published or under review elsewhere; (2) all authors contributed to the work; and (3) the research was conducted consistent with ethical guidelines for the conduct of research.
- The cover letter should also summarise any conflicts of interest affecting any authors.
- Title page should include: (1) title of the article; (2) author names (with highest academic degrees) and affiliations (including titles, departments, and name and location of institutions of primary employment); (3) all possible conflicts of interest including financial, consultant, institutional, and other relationships that might lead to bias or a conflict of interest; (4) all funding received for the work including from any of the following organisations with public or open access policies: National Institutes of Health (NIH), National Institute on Disability Independent Living and Rehabilitation Research, Veterans Administration, Wellcome Trust, and the Howard Hughes Medical Institute; and (5) any acknowledgments, credits, or disclaimers.
- A structured abstract of no more than 300 words should be prepared (see further instructions, below). Authors should use telegraphic language where possible, including omission of introductory clauses. Headings should typically include the following: Objective, Setting, Participants, Design, Main Measures, Results, and Conclusions. The Conclusion section should be supported by the results and encapsulate clinical implications, not merely restate the findings.
- Include up to 10 key words that describe the contents of the article such as those that appear in the Cumulative Index to Nursing and Allied Health Literature (CINAHL) or the National Library of Medicine's (NLM's) Medical Subject Headings (MeSH).

- The author is responsible for obtaining written permission for any borrowed text, tables, or figures.
- Include at the beginning of the Methods section a statement describing approval by the appropriated institution’s review board for human participants’ protection or the basis for waiver of such approval.

Abstract

Objective

- State primary objective or hypothesis

Setting

- Where the data were collected (e.g., inpatient, outpatient, survey)

Participants

- Key eligibility criteria
- Number enrolled in study (by group if group comparison study)
- Number analyzed (by group if appropriate)

Design

- Type of design (for example, randomised, quasi-randomised, noninferiority, observational, prospective or retrospective)
- Brief description of intervention (for each group, if the design involved groups receiving different interventions or control conditions)
- Describe whether or not participants, intervention providers, and those assessing the outcomes were blinded
- If randomised or quasi-randomised, describe method of group allocation

Main Measures

- Clearly identify primary outcome measure
- List secondary outcome measures as such and word limit allows

Results

- Result for primary outcome measure (by group if groups were compared) and the estimated effect size and its precision
- Significant adverse events

Conclusion

- Encapsulate the clinical implications of the results; do not merely restate the findings.

NOTE: CONCLUSIONS MUST BE SUPPORTED BY RESULTS

References

- References must be cited in text and styled in the reference list according to the *American Medical Association Manual of Style*, 11th edition. They must be numbered consecutively in the order they are cited and listed in that sequence (not alphabetically); reference numbers may be used more than once throughout an article. Page numbers should appear with the text citation following a specific quote. References should be double-spaced and placed at the end of the text.
- References should not be created using Microsoft Word's automatic footnote/endnote feature.

Figures
A. Steps for Submitting Artwork

1. Learn about Digital Art creation here.
2. Create, Scan, and Save your artwork according to the Digital Artwork Guideline Checklist.
3. Upload each figure to Editorial Manager in conjunction with your manuscript text and tables.

B. Color Figures: The journal accepts color figures for publication that will enhance an article. Authors who submit color figures will receive an estimate of the cost for color reproduction in print. If they decide not to pay for color reproduction in print, they can request that the figures be converted to black and white at no charge. All color figures can appear in color in the online version of the journal at no charge.

C. Digital Artwork Guideline Checklist Basics before submitting your digital art.

- *Artwork should be saved as TIFF, EPS, or MS Office (DOC, PPT, XSL) files. High-resolution PDF files are also acceptable.*
- Artwork should be created as the actual size (or slightly larger) than it will appear in the journal. (To get an idea of the size images should be when they print, study a copy of the journal. Measure the artwork typically shown and scale your image to match.)
- Crop out any white or black space surrounding the image.
- Text and fonts in any figure should use one of the acceptable fonts: Helvetica, Times Roman, Symbol, Mathematical PI, and European PI.

- Color images are created/scanned and saved and submitted as CMYK only. Do not submit any figures in RGB mode because RGB is the color mode used for screens/monitors and CMYK is the color mode used for print.
- Diagrams, bar charts, graphs, and other line art must be vector image format or saved at a resolution of at least 1200 dpi. If created in an MS Office program, send the native (DOC, PPT, XLS) file. Examples of line art for reference can be seen here.
- Images such as photographs should be saved at a resolution of at least 300 dpi.
- Each figure should be saved as a separate file and saved separately from the accompanying text file.
- For multi-panel or composite figures only: any figure with multiple parts should be sent as one file, with each part labeled the way it is to appear in print.

Remember:

- Cite figures consecutively in your manuscript.
- Number figures in the figure legend in the order in which they are discussed.
- Upload figures consecutively to the Editorial Manager website and number figures consecutively in the Description box during upload.

Tables

Tables should be on a separate page at the end of the manuscript. Number tables consecutively and supply a brief title for each. Include explanatory footnotes for all nonstandard abbreviations. Cite each table in the text in consecutive order. If you use data from another published or unpublished source, obtain permission and acknowledge fully.

Supplemental Digital Content (SDC)

Authors may submit SDC with online access that enhances their article. SDC may include standard media such as text documents, graphs, audio, video, etc. On the Attach Files page of the submission process, please select Supplemental Audio, Video, or Data for your uploaded file as the Submission Item. If an article with SDC is accepted, our production staff will create a URL with the SDC file. The URL will be placed in the call-out within the article. SDC files are not copyedited by LWW staff; they will be presented digitally as submitted. For a list of all available file types and detailed instructions, please visit the Checklist for Supplemental Digital Content.

SDC must be cited consecutively in the text of the submitted manuscript. Citations should include the type of material submitted (Audio, Figure, Table,

etc.), be clearly labeled as “Supplemental Digital Content,” include the sequential list number and provide a description of the supplemental content. All descriptive text should be included in the call-out, as it will not appear elsewhere in the article.
Example: We performed many tests on the degrees of flexibility in the elbow (see Video, Supplemental Digital Content 1, which demonstrates elbow flexibility) and found our results inconclusive.

A listing of SDC items must be submitted at the end of the manuscript file. Include the SDC number and file type. This text will be removed by our production staff and not be published.
Example:
Supplemental Digital Content 1. wmv

All acceptable file types are permissible up to 10 MB. For audio or video files greater than 10 MB, authors should first query the journal office for approval. For a list of all available file types and detailed instructions, please visit the Checklist for Supplemental Digital Content.

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