Arts & Health

An International Journal for Research, Policy and Practice

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/rahe20

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To cite this article: Nuala Morse, L.J. Thomson, E. Elsden, H. Rogers & H.J Chatterjee (2022): Exploring the Potential of Creative Museum-led Activities to Support Stroke In-patient Rehabilitation and Wellbeing: A Pilot Mixed-methods Study, Arts & Health, DOI: 10.1080/17533015.2022.2032224

To link to this article: https://doi.org/10.1080/17533015.2022.2032224

Published online: 30 Jan 2022.

ARTS & HEALTH
https://doi.org/10.1080/17533015.2022.2032224

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Exploring the Potential of Creative Museum-led Activities to Support Stroke In-patient Rehabilitation and Wellbeing: A Pilot Mixed-methods Study

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ABSTRACT

Background: This paper proposes a framework for studying the potential of museum-led interventions for supporting stroke rehabilitation goals.

Methods: The intervention was based on Kirvevold et al.'s model for interventions for post-stroke wellbeing. Mixed-methods data was collected to review benefits in a pilot study, including retrospective video observations for six sessions with four patients; interviews with patients, carers and facilitators; pre-post patient assessments; and facilitator diaries.

Results: Systematic analysis of videos showed high levels of concentration and engagement with museum objects, low levels of social interaction, and positive or neutral mood throughout. Thematic qualitative analysis suggested patients felt engaged in meaningful activities, which lifted negative mood, provided positive distraction from the ward, and increased self-esteem, including belief in patient abilities.

Conclusion: Further research is needed to fully establish the potential of museum-led interventions for stroke rehabilitation.

ARTICLE HISTORY
Received 28 July 2021
Accepted 11 January 2022

KEYWORDS
Museum objects; stroke; rehabilitation; wellbeing; occupational therapy

Introduction

Stroke is the main cause of complex adult disability. Impacts include functional impairments (motor impairments such as dexterity and/or mobility), cognitive impairments (speech and language), and comprehensive psychosocial consequences, with research documenting long-lasting effects on identity, quality of life, social relations, and participation in valued activities (Hafsteinsdottir & Grypdonck, 1997). There are significant immediate emotional challenges post-stroke, linked to feeling unable to cope with and adapt to the extensive physical losses caused by the stroke (Kirkevold et al., 2012). Close to one in three of those affected by stroke report depressive symptoms (Hackett et al., 2005), and prolonged hospital stays can intensify negative emotions such as disorientation, loneliness, boredom, frustration, and distress (Bogousslavsky, 2003). The emotional and social

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This work was supported by the Arts Council for England Research Grant Programme under grant 29,250,851

aspects of stroke need to be addressed. Creative, non-pharmacological approaches are gaining attention to support the wider stroke recovery process alongside therapies focused on functional recovery (Lo et al., 2018).

Museum-led creative programs have shown promising benefits in terms of supporting psychosocial wellbeing for individuals with a range of health challenges, including dementia, mental ill-health and addiction (Camic et al., 2017; Chatterjee & Noble, 2013; Eekelaar et al., 2012; Morse et al., 2015; Thomson et al., 2018). These studies have established emotional and social benefits from engagement in museum-led activities such as supported visits, object handling, and creative activities inspired by collections, which all provide occasions for new learning, positive social interactions, increased positive emotions, and opportunities for reflection and self-expression, with at times profound impacts on sense of self and self-esteem. Partnerships with museums have been identified as having a strong potential for non-pharmacological interventions and adjunct therapeutic activities (Camic & Chatterjee, 2013).

One of the unique characteristics of museum-led engagement is the creative use of objects within "hands-on" activities led by creative practitioners. Research from a humanities perspective suggests that engaging with museum objects both physically and visually can trigger ideas, memories, and emotional responses (Chatterjee & Noble, 2013), and that by producing creative responses to objects, art and artefacts, people can express themselves in powerful ways and make sense of their identity (Dodd & Jones, 2014). From a neurological and psychoanalytic position, the particular relationship between museum objects and wellbeing has been described through the concepts of "emotional touch" and states of "flow", whereby a combination of physical (sensory), cognitive and emotional engagement during creative activities that utilise museum objects can support positive emotional states (Critchley, 2008; Csikszentmihalyi et al., 2014).

Within clinical settings, intervention studies have shown that museum object handling sessions can support positive emotions, self-esteem, and positive social interactions during hospital stays (Ander et al., 2013; Paddon et al., 2014; Thomson et al., 2011, 2012a, 2012b). The *Heritage in Hospitals* project (2008–2011), which involved over 300 patients from oncology and neurology wards in object handling sessions, found highly significant improvements in positive emotions for in-patients, as well as positive impacts on relationships among staff, patients and their carers (Chatterjee et al., 2009). A qualitative study with 10 women facing cancer revealed the profound ways that museum objects can address patients' emotional needs by providing comfort and enabling patients to address difficult topics often associated with prolonged hospitalization, such as feelings of distress, loss and mourning (Lanceley et al., 2012). The potential for museum-led interventions in hospital settings warrants further consideration for different patient groups. To date, no study has examined this potential for stroke patients.

The aims of this study were to design a pilot intervention on a stroke recovery ward and establish a framework to study the different areas of benefits for in-patients. The intervention draws on Kirkevold et al.'s (2012) theoretical model for developing nursing interventions to promote wellbeing in the early stages after a stroke. Within this model, the intervention focus should address patient needs by promoting psychosocial wellbeing, defined as having four key components: positive mood ('a basic mode of joy, pleasure and wellbeing and the absence of sadness or a feeling of emptiness'),

participation and engagement in meaningful activities beyond oneself, good social relations, and a self-concept (including 'self-acceptance, usefulness and belief in one's abilities'; Kirkevold et al., 2012, p. 392). These outcomes are all supported by the current evidence around museum-based activities for wellbeing. The pilot intervention was developed to support these different outcomes through museum object handling sessions designed by creative practitioners with advice from Occupational Therapists. Studies focused on arts engagement for stroke rehabilitation were also reviewed to develop the intervention (see below). A secondary objective of the intervention was to promote the gentle use of affected upper limbs during object handling. This paper presents a mixed-methods framework for studying the benefits of museum-led interventions, and reports findings from the pilot study. Future directions for research are discussed.

Arts-based approach to stroke rehabilitation

The range of benefits of arts-based engagement for stroke survivors is described in two reviews (Lo et al., 2018; Reynolds, 2012). While the evidence is primarily based on single-case examples, the reviews suggest that art-based interventions (including art therapy) can address the emotional, functional and cognitive needs of stroke survivors, and, therefore, have a potential role in supporting a range of rehabilitation outcomes. The common mechanism proposed in these studies is that the arts can restore motivation and provide the emotional resources to engage in rehabilitation tasks. Indeed, motivation has been highlighted across research as an important predictor of recovery for stroke patients, alongside the quality and intensity of therapy, patients' ability to learn, and family support (Langhorne et al., 2011).

To develop the intervention, a rapid review of "hands-on" arts-based approaches for stroke rehabilitation was conducted, focused on clinical settings and group interventions. Two key themes were established.

Positive mood and self-esteem

An interview-based study involving 16 longer-staying hospital-based stroke patients participating in one-to-one artist-facilitated programmes (four to six sessions including visual arts, creative writing, dance/movement, and music) found that sessions provided enjoyment and learning through meaningful activity, mental stimulation, and relief from boredom. Through this, the sessions enabled patients to reconnect with a valued sense of self (Baumann et al., 2013). Another interview-based study involving 11 in-patients in a weekly participatory visual arts programme over six months found improvements in mood, confidence, and self-esteem, alongside enhanced self-efficacy, and feelings of hope and control that appeared to mediate and support physical rehabilitation goals (J. Morris et al., 2015). This study highlighted the role of the social group context in improving mood, and the creative process and output as key to generating the emotional resources underpinning confidence, self-efficacy and hope.

In a randomised-control trial feasibility study led by J. H. Morris et al. (2019), 41 patients took part in a visual arts participation program (two sessions per week, 8 sessions overall) in addition to the usual rehabilitation care. The intervention group reported the greatest

mean improvement in positive affect compared to the control group (n = 40), and improvements in self-efficacy for arts score. The authors concluded that the intervention appeared to offer promise in terms of emotional wellbeing and self-efficacy outcomes.

Functional rehabilitation

Clay modelling was used to explore feelings about returning home across five 90-minute sessions to promote functional rehabilitation for a group of hospitalised older people, including three stroke survivors (Yaretzky et al., 1996). Through retrospective analysis of video and photos, and participant questionnaires, the study noted how participants increasingly used their stroke-affected arm/hand over time, and engaged more with other patients and staff.

Although the available evidence is very limited, taken together, these studies open up avenues for exploring the potential of integrated and adjunct creative hands-on programmes to support psychological wellbeing and stroke rehabilitation goals such as upper-limb functioning.

Methods

Procedure and materials

The pilot focused on the *Art & Culture Club* delivered by Manchester Museum and the Whitworth Art Gallery. Sessions were delivered on a stroke unit in a medium-sized northern England hospital over 6 months in 2016–17. Sessions took place every 2 weeks alongside routine care. Sessions were designed by creative practitioners, with object handling and group discussions (45 minutes), followed by singing to signal the end of the activity (15 minutes). Objects from the Manchester Museum handling collection were selected for their links to local stories and other popular themes to cater for diverse participant interests, as well as presenting different sensory engagements. Objects included authentic artefacts and a few replicas [Table 1]

The sessions took a creative approach to object handling to allow participants to make their own connections through creative games and open conversations. The sessions also provided factual information about the collections using archive images and large-print information booklets. Sessions were designed with accessibility in mind to ensure a range of impairments could be accommodated. They were led by a creative practitioner and a volunteer, with occasional support from OTs and ward staff. Sessions took place in the activity room on the ward and each session was attended on average by four patients and three relatives.

Table 1. List of museum objects used in the sessions.

- Objects related to local 19th century cotton industry, such as cotton samples at various stages of mechanical treatment in spinning machinery;
- Objects linked to local history of ship building, such as archives photographs, poems and an 18th century canal token;
- Taxidermy collections, including an elephant tusk, an opossum and insect boxes;
- A numismatic collection of coins across the ages; and
- Ancient Egypt replica objects, including a scarab, kohl mixing stone, stela, shabti figurine and papyrus.

The pilot sought to establish areas of benefit for stroke patients through a study framework combining a) patient and carers' experiences of participation, b) wellbeing and stroke impact for participants, c) creative practitioners' accounts of the activities, d) OT perceptions of the impact on patients, and e) observational data of the sessions. The framework was designed with OTs on the stroke ward, who were interested in the potential of museum-led activities to address patients' emotional needs, which was not always possible within routine functional therapies. In their view, improved patient well-being could mediate more positive feeling about recovery, and a more positive outlook could improve concentration and motivation to engage in routine rehabilitation therapy. OTs were also interested in how the sessions could provide meaningful activities for patients to use their stroke-affected arm, or find new ways of adapting the use of their non-dominant hand/arm in cases of more severe stroke. Museum object handling activities were suitable given the significant potential in supporting positive mood, and the opportunities for tactile engagement to support fine and gross motor skills.

Participants

Ethical approval was obtained from the Health Research Authority (Ethics ID 199643) and University College London Research Ethics Committee (Study Ref: 8297/001). The pilot focused on six sessions. Participants (n = 4: 2 male) were in-patients from the stroke unit with capacity to consent, deemed well enough to participate, selected by OTs and recruited by a researcher. Participation in the study was voluntary and did not preclude patients from attending the museum-led sessions. Six sessions were video recorded by a member of the research team. Participants attended between 2 and 4 sessions that included relatives and up to 3 other participants who did not take part in the study. They all attended the full 1 hour session. All participants identified as White British. The study group represented a convenience sample of patients in various stages of stroke rehabilitation, with one male patient presenting with severe communication difficulties (Table 2). OT goals relating to the programme were set for each patient. The sample size was appropriate for a pilot study with convenience sampling in an acute recovery ward. It reflects previous reviewed study design for arts-based interventions where participant numbers have been small. This was also necessary to ensure patients were supported throughout the sessions. However, the limitations of such a small sample and the pilot design are discussed.

Data collection

A mixed-methods framework was developed for data collection. Four stroke patients were observed through retrospective video analysis of six sessions. The video camera was set up in the activity room and appeared to be quickly forgotten by participants (e.g. no participants looked back to the camera in the recordings). It was not mentioned in any feedback and does not appear to have directly affected the intervention. An observational method was co-developed with the OT team as no suitable instrument was found. The method looked at five domains: concentration during the activity; upper limb involvement of the side most affected by stroke in the activity; types of engagement with museum objects; social interaction during the activity; and mood based on the

Table 2. Participant summary information.

Participant	Female 1	Male 1	Male 2	Female 2
Mood Screening score on admission	Low score	Low score	Low score	Not done
Barthel Index score on admission (0–100 score)	2	11	2	0
Modified Rankin score on admission (0–6 score)	4	4	5	5
Stroke history	Right Frontal inter-cerebral haemorrhage; Several previous strokes	Extensive Left Hemispheric stroke Affecting Right side First stoke	Middle Cerebral Artery Stroke Right hemiplegia First stroke, Very severe case	Frontal Lobe stroke – right hematoma First stroke
Stroke impact	Some speech impairments Fatigue Inattentive to right side visually Significant tremor in left hand and not always using automatically Poor general health	Some speech impairments Visual impairment Dyspraxia: not sure how to use object appropriately No loss physical activity Cognitive: ability to do tasks automatically impaired	Aphasia and severe communication difficulties Fatigue Visual impairment Dyspraxia: could not use object appropriately; difficulties with processing tasks Physical: no ability to walk	Fatigue Visual impairment/ hearing impairment No use of left arm Physical: walking impaired
OT rehabilitation goals	To participate in group activities and to interact and socialise with others	To increase ability to concentrate and plan tasks	To gain sense of achievement by being able to engage in activities e.g. handling items	To increase social interaction and maintain positive attitude and mood
Mood Screening score on discharge	Low score	Denied depression	Denied depression	Not done
Barthel Index score on discharge (0–100 score)	9	19	2	4
Modified Rankin score on discharge (0–6 score)	4	3	4	4

Observed Emotion Rating Scale (Lawton et al., 1999; grouped as either positive, neutral, or negative; Figure 1). The operational definitions were refined over 4 months through a series of feasibility sessions before the data collection (six sessions).

Two sets of quantitative measures comprising the Generic Wellbeing Questionnaire – Short 6-item version (GWQ-6) from the UCL Museum Wellbeing Measures Toolkit (Thomson & Chatterjee, 2014) and the Short-Form Stroke Impact Scale (SF-SIS; Jenkinson et al., 2013) were collected from patients (n = 3) at the beginning and end of the 6-week pilot. One participant was unable to complete measures due to language impairments and unavailability of a proxy respondent.

A range of qualitative data was collected to establish the potential of the activities for patients and staff. Pre – and post-assessments of participants (n = 4) by regular ward OTs were collected, with short summary notes on: participant mood (using OERS terminology); level of engagement and concentration in usual therapy; social interactions on the ward; abilities to use upper limb in set tasks; and specific OT rehabilitation goals related to the creative sessions, and if they were achieved post-programme. Post-intervention interviews with participants (n = 2), creative practitioners (n = 3), and care partners (n = 2) were collected. Interviews with participants and care partners focused on: impact of stroke; experience of participation; experience of being in a group activity; impact of activities on mood and affected upper limb. One participant was unable to take part in an interview because of communication difficulties, while another was discharged before the interview was conducted.

The topic guide for interviews with creative practitioners focused on: description of activities; social interaction observed during activities; observed changes in participants; impact on their own practice, and reflection on working in a hospital environment. Creative practitioners' reflective weekly diaries (n = 3) were also collected. These included guided questions on the type of activities delivered; level of engagement of participants with museum objects during sessions; levels of concentration of participants during the group; use of affected arm during sessions; interactions between participants.

Data analysis

The qualitative and quantitative analyses were undertaken separately by different members of the research team and then synthesised. Qualitative data analysis comprised thematic analysis of interviews together with diaries and OT assessments, and was conducted using NVivo 12 with a focus on identifying psychosocial well-being post-stroke as defined by Kirkevold et al. (2012), from which four deductive themes were examined: positive mood, meaningful activity, social interaction and self-concept. Qualitative themes were then integrated with the results arising from the observation data.

Continuous analysis of video data for each participant was conducted by one member of the research team, with each observed behaviour recorded every 1 minute across the five domains. Three independent raters analysed a sample of three 10-minute video clips to establish inter-rater reliability of the observation method, calculated as a percentage determined by the number of agreed observations divided by the total number of observations. Overall reliability was 70.56 per cent (range 10%) which was deemed acceptable given the pilot nature of the study. An additional level of event-sampling

Category	Operational Definitions
CONCENTRATION	
Left partway through (1)	**Participant gets up and leaves the activity area**
Unable to concentrate (2)	Participant is continuously distracted throughout the session, eyes darting around / Participant stares blankly into space
Concentrates for very short period only (less than 10 sec) (3)	**Participant only very briefly engages with the activity, for less than 10 seconds before pulling away or turning from the table and facilitator or staring in the distance. Participant is mostly distracted.**
Concentrates and Re-attends after distraction (4)	Participant sustains engagement for a short while before being distracted by an external factor, but re-attends and refocuses after this.
Concentrates for full periods (5)	**Participant appears alert and attentive throughout the facilitated interaction and creative activity.**
UPPER LIMB INVOLVEMENT	
No involvement (1)	**No involvement of side most affected by stroke**
Rarely and with assistance (2)	Most affected arm resting on table/lap during most of the session. On very rare occasions used with physical assistance from museum facilitator, staff, carer or volunteer
With repeated prompting/assistance (3)	**Most affected arm usually resting on table/lap during most of the session. Sometimes it is used but only with repeated prompting or assistance from museum facilitator, staff, carer or volunteer**
With minimal prompting/assistance (4)	Most affected arm usually resting on table/lap during the session. Used with minimal prompting or assistance from museum facilitator, staff, carer or volunteer
Uses automatically (5)	**Patient uses their affected arm automatically**
ENGAGEMENT WITH OBJECT/ARTS ACTIVITY	
Disengaged (1)	**Participant is actively disengaging from the activity, e.g. pushes work away; pushes him/herself away from table.**
Responds to prompts only (2)	Participant accepts the museum object when it is handed to them. Participant holds or handles the object but appears to do so in an automated way. Conversation around the object is very limited and vocalisations are very short, and participant appears on the whole mostly uninterested and unwilling
Explores objects/materials spontaneously (3)	**Participant accepts the museum object and explores it in a self-directed and attentive manner. Object is turned around and handled in different ways, including stroking, manipulating, or smelling the object. Exploration is done mostly in silence. Participant seems absorbed in their exploration**
Explores objects and shares personal stories (4)	Participant accepts the museum object, explores it a self-directed and attentive manner. Object is turned around and handled in different ways, including stroking, manipulating, or smelling the object. Participant initiates and maintains conversation about the museum object or shares a personal story or memory. Vocalisations and conversations are enthusiastic.
SOCIAL INTERACTION	
Negative social interaction (1)	**Participant makes complaints and verbalises the desire to leave, or participant interrupt other participants who are engaged in the activity.**
Does not engage socially (2)	Participant does not interact with those around him/her. Participant is usually uninterested or distracted.
Spoke only when asked (3)	**Responses or vocalisation are short or monosyllabic when directly addressed by staff or museum facilitator. Participant is usually uninterested.**
Interacts positively with staff only (4)	Participant interacts positively with facilitator or care staff only.
Shares in group activity with others (5)	**Participant interacts with other participants around the museum objects or in other conversation. Participant making eye contact with others, open body language and/or engaging in conversation.**
MOOD (Well-being)	
Bright, reactive	**Appears alert and aware of situation.**
Shows enjoyment	Smiling, laughing and relaxed body language, verbal expressions of enjoyment. Participant expresses general enjoyment of the activity verbally (eg. I like…, this is good….) and non-verbally (eg. nodding positively)
Shows humour	**Participant demonstrates their sense of humour verbally or non-verbally through playful interactions with the museum object.**
Resting / Settled	Appears calm and no discreet facial or body expression.
Sleepy / Asleep	**Asleep/sleepy in chair.**
Sad / Low Mood	Verbalisation of feeling sad over situation or sighing when talking about situation; expressing repetitive worry; head/eyes turned down, crying
Restless / Agitated / Anxious/ Angry	**Yelling, cursing, swearing, clenching teeth, narrowing eyes, eyebrows furrowed. Lines between eyebrows, tight facial muscles. Repetitive rubbing of limbs. Angry verbal outburst, brows furrowed or facial grimacing; psychomotor agitation (hand tapping, moving in chair, leg jiggling, wincing);**
Other (please state)	

Figure 1. Observational method operational definitions.

analysis was conducted to separate object handling and singing elements of the session. Data was recorded using Excel v.16.23. Analysis was broken down into the five domains and focused on impact at the level of the group across all sessions. Since patients attendance was irregular, it was not deemed suitable to observe impact over time; instead participation in each session is treated as a discrete datapoint, resulting in n = 12 across the six sessions. The focus of analysis was on the object handling portion of the sessions.

Findings

Qualitative findings

Positive Mood: Analysis of facilitator diaries and interviews suggested that patients displayed enjoyment during the sessions, both verbally and in their relaxed demeanour. Participants also directly reported enjoying the sessions.

Analysis of pre-post OT assessments suggested that the activities were directly related to small but noteworthy improvements in mood for all participants. OTs remarked that the male participant who had been on the ward for over 6 months had previously often complained of boredom and feeling low, and that the sessions had a positive effect on lifting his mood. Prolonged stays and delays in discharge were also noted by OTs as having a significant impact on one female participant's mood. For this participant, the OT reported that sessions provided a positive distraction that ameliorated her mood for a short while afterwards. This was confirmed by this participant's care partner.

OTs noted that the other male participant expressed through non-verbal communication that he enjoyed the session and that 'they seemed to offer him some form of release'. This was also noted in a facilitator diary:

> I always notice that he smiles and laughs with me when I catch his eye across the table (Facilitator diary)

According to OTs, for three of the participants, this positive mood seemed to carry over from the session to more general improvement in mood during their hospital stay. Anecdotally, it was reported by various ward staff that the second female participant was enthusiastic about the sessions during the rest of the week, and often stated she looked forward to the next session. Additionally, there was a feeling shared by staff that sessions could lift mood on the ward and lead to increases in staff morale when they had opportunities and time to take part in the activities.

Meaningful Activities: The creative activities were viewed by participants, care partners and OTs as a positive use of time on the ward and as a meaningful activity that could alleviate boredom and provide a positive distraction from the clinical environment:

> I think partaking in something like what you are doing is breaking her away from the fact that she is there in hospital. And it does help, and it helps in all kinds of ways. (Care partner for female participant interview)

Participants described how the museum object handling enabled new learning, and highlighted the collections links to local history as being of particular interest:

> Because I've been interested in local history for forty odd years. I've always been interested in local history whether it be here or other places that I'm local to at the time … All of the objects were interesting. (Male participant interview)

The facilitator commented further about the importance of the local links of the collections:

> The cotton mill, the ship canal … Because everybody is local so they know a lot about it … [but] maybe not as much as they thought. It was lots of different things that came up in the sessions, that brought people out of themselves. They were able to relate to their own experiences or their parents' experiences … that was really good. (Facilitator interview)

The objects sparked memories that participants shared. For example, in the money session, they shared stories of what they were to be able to buy with old money (a threepenny bit) when they were young children; in the cotton session they shared stories of family members who had worked in silk factories or other related factory work.

It seemed that the opportunity to engage with collections in a tactile manner also had a positive effect by providing opportunities to be actively engaged, both "hands-on" and "minds-on", tapping into people's imagination:

> I think [female participant] initially she was quite … not withdrawn, but fairly quiet, until something was sparked in her imagination. (Facilitator interview)

The printed information booklets that were used alongside the objects also stimulated patient engagement.

Social interactions: The sessions were catalysts for conversations, with object handling playing a focal point, as noted in diaries and interviews with facilitators. OTs also noted the impact of the sessions on the female participant who attended with her husband, reporting that the session provided a purposeful task they could both take part in. The husband confirmed this in his interview. Family members for two other patients attended at least one session, and it was observed in the videos that the format of the object handling enabled discussion and a positive activity to do together, with family members helping patients to touch and feel objects. By enabling care partners to take part in the activities, it appeared that the sessions might have supported carer–patient relationships.

Other times, object handling took place in silence. Given that patients could fatigue quite rapidly and that one had severe communication difficulties, the opportunity for this more personal contemplation provided by the museum materials also appeared to be beneficial.

Self-concept

The metaphor of "being able to take oneself out of oneself" was often used by participants, carers, facilitators and OTs as a way of describing the wider impact of the sessions:

> It takes you away rather than just sitting there. (Care partner for female participant interview)

> It's like a real opportunity to maybe like escape where you are without kind of physically escaping. (Facilitator interview)

This opportunity to take oneself away for a while seemed to enable participants to think beyond the stroke, and be able to reconnect with other aspects of themselves. This effect was noted in OT assessments as an improvement in self-

esteem for three participants. For one male participant, over time the sessions provided an opportunity for him to regain a sense of purpose through helping others, as noted by the facilitator interview and confirmed in the OT post-intervention assessment.

The sessions were designed to enable a range of different motor engagements with the museum objects (gripping, holding, stroking, etc). When reflecting on the sessions several participants commented on how the museum object handling activities had enabled them to feel a sense of achievement in terms of either using weakened limbs or using a wider range of movements to adapt with their dominant side. They tentatively commented on how the session enabled them to feel a little more in control of their bodies, increasing their belief in their own abilities:

> Yeah, because it's a [means to an] end. Not sort of half done. It's an end and you are engaged in something. You're doing something for yourself. (Male participant interview)

> Yes – it makes you forget what is wrong with you, but it also makes you use what you can do, your movement and things like that. (Care Partner for female participant interview)

OT post assessment for the non-verbal male participant stated that this patient gained a sense of achievement from a perceived sense of being able to do more activities as the weeks went on and his general condition improved. For the other female participant, it was noted that she was coping well with adapting the use of her non-affected side to the object handling activities.

Observational data

Analysis of videos rated the frequencies of five behaviours across participants over all 6 sessions (Table 3).

Levels of Concentration: This was sustained at the highest level for full periods throughout all the sessions for all participants (overall mean for all participants across all sessions, M 87.4%, SD 9.11). This finding suggests that all participants were focused on the museum activities in the sessions.

Social Interaction: Higher levels of interactions ("with staff only" or "with others") were regularly observed, accounting for on average just over a third of the session (M 34.87%, SD 17.46). Although low social interaction was the predominant behaviour, no negative social interaction was observed (<1% of the time).

Engagement with objects: High levels of engagement ("explores objects spontaneously" or "explore objects and shares stories") accounted on average for 45.17% for all participants during the object handling part of the sessions (SD 14.38).

Wellbeing (Mood): Participants expressed positive mood (total of recorded observed emotions "bright and reactive", "shows enjoyment" and "shows humour") during nearly half of each session (M 46.43%, SD 36.1) and neutral mood ("resting/settled") for the other half of each session (M 53.57%, SD 36.11), across all 6 sessions. No negative mood was observed. Further analysis was conducted to explore these effects (Spearman's Rank Correlation). No significant correlations were identified, which may be explained by the small sample size, which is discussed further.

Table 3. Results of video coding analysis. Values represent percentage time at each category of behaviour.

Sessions	1			2	3			4		5	6		
Participant code	S4-1	S2-2	S3-1	S3-1	S4-1	S3-1	S5-2	S3-1	S4-1	S5-2	S4-1	S5-2	**Average for all Sessions**
CONCENTRATION													
Unable to concentrate	–	–	–	–	–	–	–	–	–	–	–	–	–
Concentrates with prompts for very short period (less then 10 secs)	–	2.41	1.2	–	–	–	–	–	–	–	–	–	**0.3**
Concentrates and re-attends after distraction	22.89	12.05	4.82	–	14.55	9.43	12.5	10.2	12.5	25.81	28.07	–	**12.8**
Concentrates for full periods	77.11	85.54	93.98	100	85.45	90.57	87.5	89.8	87.5	74.19	71.93	100	**87.4**
ENGAGEMENT with Object/Art materials													
Disengaged	50.6	42.17	31.33	44.59	43.64	30.19	29.17	36.73	49.98	32.26	71.93	47.54	**42.43**
Responds to prompts	4.82	12.05	2.41	10.81	27.27	41.51	6.25	8.16	4.08	19.35	10.53	1.64	**12.41**
Explores objects/materials spontaneously	42.17	45.78	65.06	18.92	23.64	26.42	52.08	38.78	46.94	30.65	17.54	47.54	**37.96**
Explores objects and shares personal stories	2.41	–	1.2	25.68	5.45	1.88	12.5	16.33	–	17.74	–	3.28	**7.21**
SOCIAL INTERACTION													
Negative social interaction	–	–	–	–	–	–	–	–	–	9.68	1.75	–	**0.95**
Does not engage socially	49.4	39.76	57.83	37.84	42.27	30.19	18.75	63.27	46.94	14.52	54.39	11.48	**39.3**
Spoke only when asked	27.71	48.19	19.28	24.32	16.98	20.75	22.92	12.24	24.49	17.74	31.15	31.15	**24.87**
Interacts positively with staff only	20.48	7.23	19.28	27.03	32.73	49.06	29.17	22.45	28.57	35.48	10.53	32.79	**26.23**
Shares on the group activity	2.41	4.82	3.61	10.81	3.62	–	29.16	2.08	–	22.58	–	24.59	**8.64**
WELL-BEING													
Bright and Reactive	–	–	–	93.24	–	1.89	37.5	4.08	36.73	88.71	28.07	83.61	**31.15**
Shows enjoyment	12.05	2.41	3.61	–	7.27	11.32	8.33	4.08	6.12	11.29	10.53	9.84	**7.24**
Shows humour	3.61	–	–	6.76	23.64	9.43	25	22.45	2.04	–	3.51	–	**8.04**
Resting/Settled	84.34	97.59	96.39	–	69.09	77.36	29.17	69.39	55.1	–	57.89	6.56	**53.57**
Sleepy/Asleep	–	–	–	–	–	–	–	–	–	–	–	–	–
Sad/Low Mood	–	–	–	–	–	–	–	–	–	–	–	–	–
Restless/Agitated/Anxious/Angry	–	–	–	–	–	–	–	–	–	–	–	–	–

Upper Limb Involvement: It was not possible to directly observe upper limb involvement as the convenience sample did not present with upper-limb impairment, or were unable to use their affected side at all. Nonetheless, this domain may be useful for future studies.

Quantitative measures

Pre-post scores for GWQ-6 and SF-SIS were calculated showing possible increases but neither reached statistical significance (Appendix 1 & 2). This finding can in part be explained by the very small number of participants. Nonetheless, these measures were easy for the majority of participants to complete with the help of the researcher, and may be useful for future intervention studies with larger groups.

Discussion

Studies of museum-led engagement reviewed in the introduction have established psychosocial wellbeing benefits in the areas of mental health, addiction recovery, cancer, older adults and dementia. This study adds to this body of work for stroke populations. The proposed framework for studying impact identified benefits as described in Kirkervold et al.'s theoretical model. The pilot enabled further reflections on the potential of museum-led activities, and reflections on the limitations of the intervention design.

The observational results showed positive mood for a significant amount of the session, confirming the results of the qualitative data. Given the sustained negative impacts of stroke on mood in acute stroke in-patients, these are promising results. Observed levels of concentration showed that participants focused on the activities for long periods of time, which is significant given high levels of fatigue that are common in stroke in-patient groups. The main mechanisms through which the activities seemed to support wellbeing were that they offered a positive distraction from the ward environment and an opportunity to engage in a meaningful, enjoyable activity based on object handling. The meaning and value of the activity appeared to be derived from opportunities for sensory exploration of objects; the links from the objects to participants' interests in local history; and how objects enabled discussion, learning, and personal story sharing. These findings align with published studies on museum-led activities for hospital patients. The opportunities to link museum objects to participants' interest in local history is a noteworthy addition to the literature, and can help guide future museum interventions directed at improving wellbeing.

In terms of in-patient outcomes, participants reported that the sessions were a valuable use of their time, and there were indications that sessions supported patients in feeling a greater confidence in their own abilities. Taken together these could indicate motivation within sessions. Given the importance of motivation as a predictor for recovery, this is a promising finding, pointing to further research to examine how this might translate into motivation in other rehabilitation tasks. The results suggest that the object handling activities provided a moment to get "out of oneself" as a stroke patient and reconnect with other valued aspects of identity (e.g. as someone with an interest in local history). This finding corroborates with the published literature on arts activities in stroke rehabilitation noted above. Self-esteem is important after a stroke, since survivors who have low self-esteem experience lower functional status and greater levels of depression than

those with a positive self-image (Vickery et al., 2008). More generally, these results provide a valuable insight given the importance of psychosocial adjustment post-stroke, towards regaining a sense of coherence (Kirkevold et al., 2012).

The findings showed there were relatively low levels of social interaction during most of the sessions, but there is some indication in qualitative results that patient–carer interactions within the activities were valued.

A secondary objective of this pilot study was to provide an initial exploration of the unique potential of museum object handling to support functional areas of stroke rehabilitation. No data on upper limb involvement was collected in this pilot study because the patient group was not suitable for such analysis. Nonetheless, the qualitative data suggests that the object handling enabled some patients to feel a greater sense of their own functional abilities, which was also noted by OTs. Object handling provided a simple task that was accessible to patients with a range of impairments, similar to clay modelling presented in the previous arts-based study by Yaretzky et al. (1996). Given that the museum activities were well received by patients as meaningful use of their time, there is scope to pursue this line of enquiry. In further studies, a different approach to sampling would be required to include participants with limited upper-limb functionality. Observational methods could be used alongside standardised outcome measures for functional ability of hands/arm to examine the outcomes of museum-led activities compared to usual stroke rehabilitation activities only. Future theoretically informed research is also needed to consider what tailored techniques and modalities might be purposefully designed with physical rehabilitation goals in mind (such as grip, grasp or gross motor movements), and what type of museum objects might be best suited for these activities.

Limitations

The pilot was limited by sample availability. Recruitment presented the main challenge for the six week pilot. Many patients were too ill to take part or were bed-bound, while others did not have capacity to consent and were excluded. While acceptable for a pilot study, there are inherent limitations to a very small sample and the intervention needs to be tested through replications with larger numbers of participants. Running a multi-sited research project or a longer study could address these issues, although there are funding implications to both. This pilot also raises questions about format of delivery, since there was little social interaction. In our pilot the ratio was 1 facilitator per 2 participants (patients and/or carers). It appears that 1:1 support is important for ward-based activities with patients with complex needs to ensure supported participation in activities. Another approach would be to design a bedside intervention. This would take away some of the social dimension of the intervention, but may prove a more suitable design for participation of stroke in-patients.

The framework for this pilot focused primarily on methods to capture the experience of objecthandling, with an emphasis on “in-the-moment” engagement captured in videos complemented by other mixed-method data. While this yielded interesting results, a case study approach would have been useful to gain greater insight from a very small sample. Given the findings reflect themes derived from the wider literature, key benefits are likely

to have been captured. Nonetheless, inductive approaches (for instance, in a case study analysis or Interpretative Phenomenological Analysis) in a larger study may capture further complexity in terms of patient experience.

As a result of the small sample size, standardised measures were inconclusive; however, inclusion of such measures for future replication is recommended. This study did not establish whether the sessions had a cumulative effect over time, with further sessions leading to greater wellbeing, though there was some anecdotal suggestion this impact may have been sustained during the week. This could be investigated in further studies to better understand effects of session frequency and length.

Conclusion

This pilot study shows promising indications that museum-led creative activities can support psychosocial wellbeing for stroke-inpatients. Although our discussion is very preliminary, there is a suggestion that museum-led activities could be used to support wider rehabilitation goals by offering meaningful and enjoyable creative activity. The results add to previous studies about the impact of museum activities for wellbeing in clinical settings, in particular their potential for providing distraction from clinical environments, supporting positive mood and self-esteem, including belief in patient abilities. Further research based on the proposed framework is required to explore the full potential of such interventions as an adjunct or integrated creative rehabilitation program.

Acknowledgments

The authors would like to thank all the stroke patients, creative facilitators and healthcare staff who gave their time to participate in this study. We would also like to thank Wendy Gallagher at Manchester Museum, University of Manchester, for support with this research. Our thanks to the reviewers and editor for the feedback on earlier drafts.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by the Arts Council England [29250851].

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Appendix 1: Pre-post intervention mean SF-SIS differences

SF-SIS 8 questions	Mean (SD) at beginning of intervention	Mean (SD) at end of intervention	Mean difference
Q1	3.00 (1.83)	3.50 (1.29)	+0.50
Q2	4.00 (1.15)	3.50 (1.29)	−0.50
Q3	4.00 (1.41)	4.00 (0.82)	0.00
Q4	2.25 (1.50)	2.75 (1.71)	+0.50
Q5	2.25 (1.89)	3.00 (1.83)	+0.75
Q6	2.00 (1.41)	2.25 (1.50)	+0.25
Q7	3.75 (0.50)	4.00 (1.41)	+0.25
Q8	2.50 (1.29)	3.00 (1.41)	+0.50
Total	23.75 (10.98)	26.00 (11.26)	+2.25

Appendix 2: Pre-post intervention mean GWQ-6 differences

QWQ-6 statements	Mean (SD) at beginning of intervention	Mean (SD) at end of intervention	Mean difference
I felt happy	4.75 (0.50)	4.67 (0.47)	−0.08
I felt engaged	3.50 (1.00)	4.33 (0.94)	+0.83
I felt comfortable	5.00 (0.00)	4.33 (0.94)	−0.67
I felt safe and secure	4.75 (0.45)	4.67 (0.47)	−0.08
I enjoyed the company of other people	4.25 (0.96)	4.67 (0.41)	+0.42
I talked to other people	3.75 (0.96)	4.33 (0.94)	+0.58
Total wellbeing (out of 30)	26.00 (2.94)	27.00 (4.24)	+1.00