

Use of sensory rooms in adult psychiatric inpatient settings

Haig, Stephanie; Hallett, Nutmeg

DOI:

[10.1111/inm.13065](https://doi.org/10.1111/inm.13065)

License:

Other (please specify with Rights Statement)

Document Version

Peer reviewed version

Citation for published version (Harvard):

Haig, S & Hallett, N 2022, 'Use of sensory rooms in adult psychiatric inpatient settings: a systematic review and narrative synthesis', *International Journal of Mental Health Nursing*. <https://doi.org/10.1111/inm.13065>

[Link to publication on Research at Birmingham portal](#)

Publisher Rights Statement:

This article may be used for non-commercial purposes in accordance with Wiley Terms and Conditions for Use of Self-Archived Versions. This article may not be enhanced, enriched or otherwise transformed into a derivative work, without express permission from Wiley or by statutory rights under applicable legislation. Copyright notices must not be removed, obscured or modified. The article must be linked to Wiley's version of record on Wiley Online Library and any embedding, framing or otherwise making available the article or pages thereof by third parties from platforms, services and websites other than Wiley Online Library must be prohibited.

General rights

Unless a licence is specified above, all rights (including copyright and moral rights) in this document are retained by the authors and/or the copyright holders. The express permission of the copyright holder must be obtained for any use of this material other than for purposes permitted by law.

- Users may freely distribute the URL that is used to identify this publication.
- Users may download and/or print one copy of the publication from the University of Birmingham research portal for the purpose of private study or non-commercial research.
- User may use extracts from the document in line with the concept of 'fair dealing' under the Copyright, Designs and Patents Act 1988 (?)
- Users may not further distribute the material nor use it for the purposes of commercial gain.

Where a licence is displayed above, please note the terms and conditions of the licence govern your use of this document.

When citing, please reference the published version.

Take down policy

While the University of Birmingham exercises care and attention in making items available there are rare occasions when an item has been uploaded in error or has been deemed to be commercially or otherwise sensitive.

If you believe that this is the case for this document, please contact UBIRA@lists.bham.ac.uk providing details and we will remove access to the work immediately and investigate.

Use of sensory rooms in adult psychiatric inpatient settings: A systematic review and narrative synthesis

Abstract

Reducing the use of restrictive interventions within psychiatric inpatient settings is a global priority. There are many strategies which may support the prevention of violence before escalation into more severe incidences. Sensory rooms have been identified as one such intervention, aiding patients to emotionally regulate and reduce distress, with a growing body of academic literature interested in whether sensory rooms can ultimately impact incidences of patient violence and the use of restraint, seclusion and other restrictive practices. A systematic literature review was conducted to identify how effective sensory rooms are at reducing patient violence and restrictive interventions within adult psychiatric inpatient settings. Eighteen studies met the eligibility criteria and were included in the review. There is a lack of evidence as to whether sensory rooms are effective at reducing seclusion, restraint or violence. They are, however, likely to support a reduction in patient distress. Patient and staff experiences suggest sensory rooms support emotional regulation, promote self-management, and positively impact the overall patient admission experience and ward environment. Further research is needed to identify what works, for who and in what circumstances in relation to the design of sensory rooms.

Keywords

Sensory room; Snoezelen; Sensory Modulation; Mental Health; Inpatient; Psychiatric hospital

Introduction

Patient violence and the restrictive interventions that are employed to manage it, particularly seclusion, restraint and rapid tranquilisation, are widespread in psychiatric inpatient settings. Psychiatric staff are over seven times more likely to be physically assaulted at work than staff in other settings, according to English National Health Service (NHS) data (Health Service Journal, 2018), and almost one fifth of the NHS workforce in mental health and learning disability settings have experienced patient violence in the previous 12 months (NHS, 2020). These figures are likely to be representative of healthcare staff's experiences globally; a recent review found that the prevalence of workplace violence against psychiatric nurses ranged from 11-97% (Jang et al., 2022). Moreover, restrictive interventions (restraint, seclusion, rapid tranquilisation) are widely used. A comparison of rates of seclusion and restraint between four countries (Ireland, Netherlands, Southwest Germany and Wales) found that 5-10% of patients were secluded or restrained during their admission (Lepping et al., 2016). Furthermore, global rates of restraint appear to remain stable at around 3-20% (Mion et al., 1996; Joanna Briggs Institute, 2002; Beghi et al., 2013). Violence and restrictive practices are detrimental to staff and patient wellbeing both psychologically and physically, and impose a financial burden for services (National Institute of Health and Care Excellence [NICE], 2015a). Reducing the use of restrictive interventions is receiving increasing recognition at governmental level. In England and Wales, the Mental Health Units (Use of Force) Act 2018 was introduced with the intention of reducing the use of force taken by staff working in mental health settings (Department of Health and Social Care, 2021). The Australian government launched the Seclusion and Restraint Reduction Declaration in 2013 for organisations and individuals to sign up to (National Mental Health Commission, 2022). The aim of reducing restrictive interventions is also highlighted in clinical guidelines. For

example, NICE (2015b) guidelines on the management of violence and aggression emphasise the need to deliver graded interventions which focus on identifying and preventing violence before it escalates to more severe incidents, and which subsequently need to be managed with restrictive interventions.

There are a variety of interventions aimed at reducing violence; one group that are increasingly used in practice are sensory modulation interventions (Scanlan & Novak, 2015). Sensory modulation refers to the personalisation of sensory input by controlling the environment, and use of equipment and/or activities designed to support an individual to self-regulate by achieving their optimum level of calm or alertness (Sutton & Nicholson, 2011). Sensory modulation interventions incorporate a range of multi-sensory strategies and environmental adaptations. A sensory room is one method of delivering sensory modulation. Within a sensory room an individual can be supported by the practitioner to develop an understanding of their sensory preferences and responses, and use this enhanced self-awareness to aid emotional regulation, thus improving day to day functioning and reducing unsafe behaviours (Champagne & Pfeiffer, 2019). Sensory rooms contain a variety of equipment to address all the senses: tactile, vestibular, proprioception, auditory, visual, olfactory and taste. Equipment may include lights and visual projection, music and auditory experiences, various seating and movement opportunities, olfactory and tactile stimulation, vibration and weighted items.

There is a small but growing body of research that explores the effectiveness and outcomes of sensory rooms within adult psychiatric settings. Various reviews have explored sensory approaches within mental health. Scanlan and Novak (2015), in their scoping review, found that whilst sensory approaches appeared to reduce distress, findings related to seclusion and restraint reduction were mixed. This is supported by a systematic review of sensory modulation in schizophrenia, which also found that sensory modulation reduces distress (Machingura et al., 2018). In their integrative review of sensory approaches in adult inpatient mental health settings, Craswell et al. (2021) found that sensory modulation could create positive changes in how a person feels, improve behaviour and foster recovery. These reviews all included sensory rooms as one of numerous sensory modulation interventions, but none explored the efficacy of sensory rooms as a standalone intervention, or examined staff and patient experiences of sensory rooms. A rapid review exploring design features that reduce rates of seclusion and restraint included sensory rooms as one of many possible design features and briefly examined the efficacy of each feature but with little detail (Oostermeijer et al. 2021). Moreover, this rapid review included a variety of different settings, e.g., child and adolescent mental health, as well as studies where it was not possible to identify whether the sensory room or another intervention was responsible for reductions in rates of seclusion or restraint.

With sensory rooms being increasingly used in psychiatric inpatient settings, it is important to understand whether they are effective. To understand this, it is necessary to also identify the design features of sensory rooms and what equipment is included, and how they are implemented. Finally, it is important to gain a deeper understanding of how staff and patients experience sensory rooms in practice in order to establish if they are an acceptable alternative to more restrictive interventions within psychiatric inpatient settings.

Aims

The aim of this review was to identify how effective sensory rooms are at reducing patient violence and restrictive interventions in adult psychiatric inpatient settings. Secondary aims were to examine:

1. How effective sensory rooms are at reducing distress, and psychological, behavioural and physiological outcomes

2. What are the design features and components of sensory rooms in adult psychiatric inpatient settings
3. How sensory room interventions are delivered/facilitated in adult psychiatric inpatient settings
4. What are the experiences of patients and staff when using sensory rooms in adult psychiatric inpatient settings.

Methods

Design

A systematic review was undertaken and is reported following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2020).

Search strategy

The following electronic databases were searched: Cinahl, EMBASE, Medline, PsycINFO, and Web of Science Core Collection, as recommended by Bramer et al. (2017). Database searching was supplemented with a Google Scholar search. The searches were completed in May 2022. Topic or full text was searched as appropriate to the database. Search terms were based on the intervention (sensory room), field (mental health) and setting (inpatient). Subject headings were used where available, see **Error! Reference source not found.** No limit to publication date was set, but results were limited to English language only. The reference lists of final included papers, as well as relevant literature reviews, were hand searched to identify further, relevant papers.

<**Error! Reference source not found.** about here>

Inclusion and exclusion criteria

Papers exploring sensory room interventions within psychiatric inpatient settings were included. We excluded papers looking at sensory rooms in physical health, learning disabilities or other age categories within mental health, i.e., adolescent units (participants under 18) and older age psychiatry/dementia care (participants over 65), as people in these settings are likely to have different needs and experiences. Studies were only included where the focus was on sensory rooms or where data on sensory rooms could be extracted. Any published, empirical literature was included, including qualitative, quantitative and mixed methods designs. Due to the sparsity of literature, we also included published quality improvement initiatives; we have addressed the impact that the quality of such studies has on the implications of our findings. We did not include grey literature as the searching required was beyond the capacity of the reviewing team.

Study selection

Initially, titles and abstracts were screened against the eligibility criteria. Full papers were then obtained and a final stage of screening occurred to ensure relevance. Both authors conducted all stages of screening. Differences were discussed until a consensus was reached.

Quality appraisal

Intervention studies of all designs, including quality improvement studies, were assessed for risk of bias using the Risk of Bias in Non-randomised Studies – of Interventions (ROBINS-I) tool (Sterne et al, 2016). As only one randomised study was identified this was also assessed using the ROBINS-I tool to allow for comparison between studies. Studies exploring staff or patient experiences of sensory rooms were assessed for quality using the relevant sections of the Mixed Methods Appraisal Tool (MMAT; Hong et al., 2018). No studies were excluded based on the quality assessment due to the paucity of research in this area. However, quality was considered when addressing how much weight to give to the findings of studies. Appraisals were conducted by both authors and disputes were agreed by discussion.

Data extraction and synthesis

Study characteristics (setting and country, sample population and sample size) were extracted. The following data was extracted in relation to sensory rooms for each study: design of, and equipment offered in sensory rooms, which senses were catered to, procedures for delivery of the sensory room sessions, average duration of sessions and outcome measures used.

Qualitative and quantitative data were extracted and synthesised separately. Meta-analysis was not possible due to the heterogeneity of the data, and Synthesis Without Meta-analysis (SWiM) guidelines (Campbell et al., 2020) could not be followed due to the variety of different outcomes and outcome measures. Therefore, a narrative synthesis of the quantitative outcome data was conducted following the Cochrane Consumers and Communication Review Groups guidelines (Ryan, 2013). This entailed developing a preliminary synthesis, by describing and grouping the studies and tabulating the results; exploring relationships within and between studies, by considering variability in outcomes and outcome measures, study designs and populations/interventions/settings; and assessing the robustness of the synthesis, by considering the amount and quality of the evidence. Qualitative findings were combined with quantitative findings using a convergent, integrated approach (Joanna Briggs Institute, 2022). Qualitative findings were synthesised using thematic analysis: coding all the qualitative study data, including verbatim quotes and authors' interpretations, and grouping the codes. Themes were created deductively where they aligned with quantitative findings, and inductively, where there was no alignment. This process was conducted by the first author, and discussed and agreed with the second.

Results

Search outcome

From database searching, 214 records were identified, of which 136 were duplicates, see **Error! Reference source not found.** After screening, first by title and abstract, and then by full text, 18 studies met the eligibility criteria and were included in this review. No new studies were identified when searching the reference lists of included studies. Of the studies excluded by full text (n=29), almost half (n=12) were about sensory modulation interventions other than sensory rooms, and five included sensory rooms but within multi-intervention studies where it was not possible to extract outcomes related specifically to sensory rooms.

<Figure 1 about here>

Characteristics of the studies

Studies were conducted in Australia (n=6), USA (n= 4), UK (n=2), Canada (n=2), Sweden (n=2), and New Zealand and Taiwan (each n=1), see **Error! Reference source not found..** Studies were published between 2003 and 2020. Settings included adult inpatient psychiatric units (n=10), high dependency/psychiatric intensive care units (n=1), and forensic mental health settings (n=1). Three studies (Knight et al., 2010; Bjorkdahl et al., 2016; Lindberg et al., 2019) recruited participants from units across a variety of study settings, with the remaining studies recruiting participants from the same setting. All studies included both male and female participants apart from two studies, one of which recruited from a female unit (Wiglesworth & Farnworth, 2016) and the other which recruited from a male unit (Forsyth & Trevarrow, 2018). Despite only including studies in acute adult settings, participants' ages ranged from 16-93. Few studies provided information regarding participants' diagnoses. Of those that did, two listed the diagnoses of participants in the study without providing a breakdown of the number of participants with each diagnosis (Champagne & Sayer, 2003; Wiglesworth & Farnworth, 2016). Two studies provided greater detail (Novak et al., 2012; Lindberg et al, 2019); patients with schizophrenia accounted for 33% and 14% of participants respectively, bipolar disorder accounted for 24% and 11%, and depression accounted for 8% and 21%, no other diagnoses were represented by more than 10% of participants. No studies reported participant ethnicity information.

<Table 2 about here>

A majority of the included studies sought to explore the effects of sensory rooms (n=13, see table 2). Of these, three utilised quasi-experimental pre-/post-test designs (Knight et al., 2010; Chalmers et al., 2012; Novak et al., 2012), with two of these being described as pilot studies (Knight et al., 2010; Novak et al., 2012). A further three papers described QI projects, all of which utilised pre-/post-test designs (Champagne & Sayer, 2003; Cummings et al., 2010; Sivak, 2012). Two studies utilised repeated measures to explore the impact of sensory rooms on patients (Reddon et al., 2004; Dorn et al., 2020), whilst one study combined repeated measures with a pre-/post-test designs design (Lloyd et al., 2014). Only one study used a randomised design with a crossover trial (Cheng et al., 2017). Two studies utilised mixed methods designs. Smith and Jones (2014) described an explanatory sequential study combining qualitative interviews and pre-/post-test measures; Wiglesworth and Farnworth (2016) claimed to utilise a mixed methods design but actually described a multi-method study which included repeated measures, evaluation forms and focus groups. The five qualitative studies (Sutton et al., 2013; Forsyth & Trevarrow, 2018; Barbic et al., 2019; Lindberg et al., 2019; Wright et al., 2020) collected data via interviews (n=2), focus groups (n=1), and a combination of interviews and focus groups (n=1) and interviews and a questionnaire (n=1). One study utilised a descriptive cross-sectional survey design (Björkdahl et al., 2016).

Risk of bias and study quality

Twelve studies were assessed for risk of bias and all were appraised as being at serious risk of bias, with moderate to high risk of bias across most domains, see **Error! Reference source not found.** and supplementary table. No studies addressed the possibility of confounders meaning that it is not possible to draw firm conclusions on the efficacy of sensory rooms as a standalone intervention. While the studies all had low risk of bias in classification of the intervention, it was easy to assess whether a person had used the sensory room or not, most (n=9) did not provide detail about how the rooms were actually used in

practice and whether this deviated from the intended use. Two studies used sensory rooms in experimental conditions and thus room use was standardised for all participants (Reddon et al., 2004; Cheng et al., 2017).

The five qualitative studies all scored highly on the MMAT, see **Error! Reference source not found.** A qualitative approach was not deemed to be appropriate to answer the research question for two of the studies. Sutton et al. (2013) sought to evaluate the acceptability, implementation and impact of a sensory room. Whilst acceptability could be addressed qualitatively, implementation and impact are better assessed using less subjective means. However, this concern is somewhat mitigated by the relatively large sample size of 40 staff and 20 patients. Wright et al. (2020) aimed to gain an understanding of the use of, and barriers and enablers to, implementing a sensory room. A qualitative approach could go some way to addressing this aim but the small sample size, 15 staff, means that findings are limited. The three other studies assessed with the MMAT were of weaker quality than the qualitative studies. The likelihood of nonresponse bias in the study by Bjorkdahl et al. (2016) was high and it is unlikely that the sample was representative of the population due to the low response rate (38%). The qualitative elements of the two mixed methods studies were high quality, but the quantitative methods were weak. While there was adequate rationale for using a mixed methods approach, neither study properly integrated the findings.

Findings

Combined quantitative and qualitative findings are presented in the sections on ‘Rates of seclusion, restraint and aggression’ and ‘Distress, psychological, behavioural and physiological outcomes’. Descriptive data on sensory room design and procedures for use is provided in the section of the same name. Two additional themes relating to patient and staff experiences of sensory rooms were identified during thematic analysis: impact on admission experience and ward environment, and enablers of/barriers to implementation; these are reported in the final sections.

Rates of seclusion, restraint and aggression

Six studies examined the efficacy of sensory rooms in relation to rates of seclusion, restraint and aggression. Three reported rates of seclusion (Novak et al., 2012; Lloyd et al., 2014; Smith & Jones, 2014), one reported rates of restraint (Champagne and Sayer, 2003) and two reported both (Cummings et al., 2010; Sivak, 2012). Two of these studies also included data on rates of aggression (Novak et al., 2012; Sivak, 2012).

The reported effect of sensory rooms on rates of seclusion and restraint was variable. Only one out of the four studies that examined seclusion use found a reduction after sensory room implementation (Lloyd et al., 2014). One out of two studies found a reduction in incidents of restraint (Champagne & Sayer, 2003) and similarly, one out of two studies identified a reduction in patient assault/aggression (Sivak, 2012). All studies were at moderate to high risk of bias, and there was variability in how the sensory rooms were designed and facilitated, see Table 5. Four rooms had equipment designed to regulate arousal for most (5-7) sensory systems (Champagne & Sayer, 2003; Novak et al., 2012; Lloyd et al., 2014; Smith & Jones, 2014). Of these studies, two identified positive effects (Lloyd et al., 2014; Champagne & Sayer, 2003) and two did not (Novak et al., 2012; Smith & Jones, 2014). There was no staff facilitation in the room described by Cummings et al. (2010) and Smith and Jones (2014) did not state how the room was facilitated. Neither study found any positive reduction in rates of seclusion or restraint; furthermore Sivak (2012) did not identify a reduction in restraints after implementation of a non-facilitated room, although they did identify a reduction in patient assaults. Novak et al. (2012) did have a facilitated room, and did not find a reduction in seclusion or aggression.

Despite most studies demonstrating little to no effect on rates of seclusion, restraint or aggression, it was evidenced in two of the qualitative studies that both staff and patients perceived the sensory room offered a valuable alternative to physical restraint and had reduced the rates of seclusion (Smith & Jones, 2014; Barbic et al., 2019).

Distress, psychological, behavioural and physiological outcomes

All seven studies measuring distress identified a notable decrease in distress post sensory room use. Distress levels reduced in 57% - 92% of participants (Champagne & Sayer, 2003; Cummings et al., 2010; Novak et al., 2012; Sivak, 2012; Wigglesworth & Farnworth, 2016). Chalmers et al. (2012) found a statistically significant reduction in distress pre and post use ($p < .0005$, $n=125$) from a mean of 2.69 (SD 0.99, $n=127$) to 1.42 (SD 0.72, $n=125$). This was based on patients' reports of distress scored out of 10. Novak et al. (2012) used a similar procedure, with staff asking patients to rate their level of distress from 1 (not distressed at all) to 10 (extremely distressed). Mean distress was 4.87 (SD 2.64) before and 2.54 (SD 1.93) after sensory room use, a statistically significant mean difference ($t(69) = 9.97$, $p < .001$). Neither Chalmers et al. (2012) nor Novak et al. (2012) state whether these differences are clinically significant.

This reduction in distress was also captured in the qualitative studies (Sutton et al., 2013; Smith & Jones, 2014; Bjorkdahl et al., 2016; Forsyth & Trevarrow, 2018; Barbic et al., 2019; Lindberg et al., 2019; Wright et al., 2020). Participants reported that the rooms created feelings of calm and relaxation, were grounded by the experience, and experienced a reduction in muscle tension (Sutton et al., 2013; Smith & Jones, 2014; Bjorkdahl et al., 2016; Barbic et al., 2019; Lindberg et al., 2019). This was in part possible by having space to process thoughts, break destructive thought processes and by shifting the mind to another place or time (Sutton et al., 2013; Forsyth & Trevarrow, 2018).

I wanted the sound of the beach, of the waves, so I had that. And the smell of the hand cream reminded me of sort of sun block . . . and so I was taken back in time to good childhood memories, felt like I was at the beach, tension was relieved and [I was] at peace. (Sutton et al., 2013, p.504).

It was evident that for some qualitative participants, the sensory room could provide an alternative treatment option for staff and patients to utilise when patients were distressed or agitated, instead of pro re nata (PRN) medication or other more restrictive interventions such as a one-to-one nursing session (Sutton et al., 2013; Bjorkdahl et al 2016; Forsyth & Trevarrow, 2018; Barbic et al., 2019; Lindberg et al., 2019; Wright et al., 2020).

The first time I tried the sensory room was I was feeling a bit upset, so I asked for [lorazepam]... So the nurse I talked with said: 'try the sensory room and see if you still feel emotional about what your thought patterns are'. So I did that and I was in there for a good fifteen minutes, and I came out much calmer, and decided not to pursue the sort of 'as needed' medication. (Barbic et al., 2019, p.9)

The effects of sensory rooms on the use of as needed medication only received limited attention in the studies in this review. No participants used PRN medication within 30 minutes before or after using the sensory room according to Sivak (2012), suggesting that the sensory room may have been used as an alternative. This is supported by anecdotal evidence from clinicians who facilitated the sensory room in the study described by Dorn et al. (2020), who reported a decrease in PRN medication use since implementation of the sensory room. Furthermore, during focus groups participants indicated that sensory modulation approaches could be the first line in managing distress and agitation (Wright et al. 2020).

Sensory rooms were described as a way of promoting self-management, providing an opportunity for individuals to develop skills and self-awareness, which could prevent subsequent aggression and be utilised on discharge (Sutton et al., 2013; Lindberg et al., 2019).

... there's the tools in that room that they can figure out what helps, and then hopefully, they can think about how to take that home in some form (Sutton et al., 2013, p.506)

Some participants described how specific aspects of the room were supportive:

Initially, I felt quite anxious, but then I used the weighted blanket, listened to some relaxing music, and then those thoughts drifted away. (Lindberg et al., 2019, p.934)

I remember being really, really emotional and going in there and sort of calming down. Just looking at the colourful walls in there with the lights off and that, it made your mind feel at ease. (Sutton et al., 2013, p.503)

The focus on sensory needs provides an 'acceptable' space, which is non-judgemental, where an individual can reduce the stimulus, and personalise the intervention to meet their needs so as to regulate their emotions (Sutton et al., 2013; Smith & Jones, 2014; Wiglesworth & Farnworth, 2016; Forsyth & Trevarrow, 2018; Lindberg et al., 2019). However, Sivak (2012) and Wiglesworth and Farnworth (2016) found that 36% and 6% of participants respectively, reported an increase in distress. Sivak (2012) posited that this may be due to participants struggling to understand the distress scale. Some participants in the qualitative studies also described negative emotional responses to using the sensory space including boredom, increased anxiety, increased distress and flashbacks (Bjorkdahl et al., 2016; Lindberg et al., 2019). Some participants found it stressful when there were staff or other patients in the sensory room with them (Wiglesworth & Farnworth, 2016; Lindberg et al., 2019).

Whilst Cheng et al. (2017) did not find any reduction in anxiety and depression, as measured with the Hospital Anxiety and Depression Scale (HADS), post room use, they did find that HADS scores decreased significantly with the number of successive interventions. This suggests that sensory rooms may be most effective, in reducing anxiety and depression at least, when used repeatedly.

Five studies measured additional emotional/psychological/behavioural outcomes alongside ratings of distress levels, again demonstrating an overall improvement in these outcomes. Lloyd et al. (2014) assessed self-rated emotions before and after room use, with the Emotions Activity Rating Scale, a 10-point scale asking the patient to rate their emotional state from calm (1) to intense (10). Upon exiting the sensory room patients were asked to provide a retrospective rating of emotional state prior to room use as well as their current rating. Mean scores fell from 6.58 to 3.72, a mean decline of 2.68 (95%CI 2.22-3.50), and statistically significant ($F = 79.3$, $df = 1$, $p < .001$).

Novak et al. (2012) analysed mean rates of a number of variables before and after use of the sensory room and found significant reductions in pacing ($t(13) = 4.77$, $p < .001$), loudness ($t(12) = 4.18$, $p < .001$), irritability ($t(24) = 4.97$, $p < .001$), intrusiveness ($t(8) = 3.60$, $p < .001$), elevation ($t(18) = 4.88$, $p < .001$) and anxiety ($t(31) = 6.67$, $p < .001$), and with participants also being significantly less withdrawn ($t(7) = 2.83$, $p < .05$). Similarly, Knight et al. (2010) found significant reductions ($p = .000$) in tension, excitement, hostility, anxiety, conceptual disorganisation, uncooperativeness, emotional withdrawal, blunted affect, somatic concerns and depression after using the sensory room, measured with the Brief Psychiatric Rating Scale (BPRS); no test statistics were reported. They also found an overall reduction in BPRS scores post room use ($p = 0.000$), as did Cheng et al. (2017) (test statistic not reported,

$p = .02$), a reduction which was not seen in the control group who received routine rehabilitation care. Finally, Dorn et al. (2020) found that arousal, as measured by the Sensory Modulation Consumer Self Rating Tool, was consistently lower post room use, apart from one incidence of increased arousal. Mean pre room use was 6.41 (95%CI 5.98-6.85) and reduced to 3.12 (95%CI 2.68-3.56) post use; mean reduction was 3.39 (95% CI 3.03-3.76, $p < .001$).

Two studies explored physiological responses; both were unique in their approach; neither study used the room with patients who were agitated or aggressive. Cheng et al. (2017), utilising a crossover study design, evaluated a sensory room intervention where patients ($n=60$) with a diagnosis of chronic schizophrenia were treated with six 30-minute sessions in a multisensory room over a three-week period; the intervention was timetabled rather than used as needed. It is perhaps because of this that no interaction effect was detected for galvanic skin response (GSR), electromyography, heart rate or respiratory rate. However, heart rate and respiratory rate reduced significantly more post room use in the experimental group than the control group. Reddon et al. (2004), utilised a case control design to explore physiological responses to sensory room use, with patients ($n=50$) as the experimental group and staff ($n=50$) acting as the control group. Again, this was not typical sensory room use, with room use being more akin to standard treatment than as needed. There was a significant reduction in heart rate for all patients ($p = .002$) and GSR in male patients ($p = .05$) pre and post room use; no test statistics were reported.

Sensory room design and procedures for use

What constitutes a sensory room, in terms of the environment, the equipment, and the facilitation varied significantly between the studies, see **Error! Reference source not found.** Wright et al. (2020) did not provide any description of the sensory rooms. Two studies classified their rooms as ‘comfort rooms’ (Cummings et al., 2010; Sivak, 2012), and one a Snoezelen (Reddon et al., 2004); the remaining studies referred to them as sensory rooms ($n=15$).

<**Error! Reference source not found.** about here>

All rooms provided some form of visual stimulation which included photographs or murals ($n=8$), lighting ($n=11$), projectors ($n=5$) and televisions ($n=3$). Additionally, all rooms also provided auditory stimulation through music or sound devices, and tactile stimulation in some form, with tactile toys ($n = 3$), and fabrics and soft furnishings ($n = 5$) most common.

All but four of the studies (Wright et al., 2020; Lindberg et al. 2019; Smith & Jones 2014; Chalmers et al., 2012) described how the room was initiated, see **Error! Reference source not found.** Of those that provided the information, most of the sessions could be initiated by either patients or staff ($n=12$). In terms of facilitation, four studies allowed independent use of the sensory room if the individual was not on special observations and this was their preference. For the most part the rooms were facilitated by staff ($n=11$), mostly by nurses ($n=8$) and occupational therapists ($n=7$). Smith & Jones (2014) did not state if the sessions were staff facilitated or independently used.

Most studies ($n=10$) did not detail the length of time patients spent in the sensory room, see Table 3. Three studies reported the range of time: 20-30 minutes, up to 30 minutes and 15-60 minutes. From the studies that reported it ($n=5$), mean time in the room ranged from 20 to 39 minutes (Reddon et al. 2004; Chalmers et al., 2012; Novak et al., 2012; Wigglesworth & Farnworth, 2016; Cheng et al., 2017).

Four studies provided a breakdown of equipment use in the rooms (Chalmers et al., 2012; Knight et al., 2010; Novak et al., 2012; Wiglesworth & Farnworth, 2016). The most frequently used items, by percentage of sessions they were utilised during, were massage/rocking chairs/beanbags 17-79%, music 25-73%, and visual items/lighting 13-71%. The most commonly used item identified by Novak et al. (2012) was the weighted blanket (39%), and Wiglesworth & Farnworth (2016) identified weighted items were used in 22% of sessions. Scents were the least used items in two studies, 4-7% (Knight et al., 2010; Novak et al., 2012), but were a popular choice (32%) in Wiglesworth & Farnworth (2016) study.

Impact on admission experience and the ward environment

Overall, sensory rooms provide a 'safe space' on the ward, away from other patients and the day-to-day business of a hospital environment (Sutton et al., 2013; Bjorkdahl et al., 2016; Wiglesworth & Farnworth, 2016, Barbic et al., 2019; Lindberg et al., 2019). This was deemed to be important, especially giving patients the opportunity to get away from other patients who may be loud or presenting with behaviours that can be distressing and threatening (Sutton et al., 2013; Bjorkdahl et al. 2016; Wiglesworth & Farnworth, 2016). The sensory rooms were described as 'pleasurable', 'enjoyable' and 'harmonious'. Participants identified that the sensory room intervention improved the ward environment and patients' admission experiences (Smith & Jones, 2014; Bjorkdahl et al., 2016, Barbic et al., 2019).

Participants identified the sensory room intervention as empowering, allowing patients to regain some control at a time when control is often taken away. The sensory room provided autonomy and choices for patients (Sutton et al., 2013; Bjorkdahl et al., 2016; Barbic et al., 2019; Lindberg et al., 2019).

It contributed directly to increase the feeling of self-empowerment and self-esteem because I relied on my response to this peaceful atmosphere to kind of boost my mood - so I wasn't relying so much on the medication to boost my mood - so it kind of increased the feeling of self-efficacy. (Barbic et al., 2019, p.6).

It was evident from both patients and staff that sensory rooms facilitated interactions and positive relationships between other patients and staff members (Sutton et al., 2013; Smith & Jones, 2014; Bjorkdahl et al. 2016; Barbic et al., 2019).

For me, it's been a place, at times, where I've been able to talk openly and freely to nurses about what's going on in my head. (Sutton et al., 2013, p.505)

The sensory room sessions promoted further ongoing engagement with patients who then felt calmer, and more able to access additional therapeutic interventions after spending time in the sensory room (Sutton et al., 2013; Barbic et al., 2019). Staff and patients both expressed utilising the sensory room to enhance their wellbeing, with staff access for debrief and supervision being valued highly (Forsyth & Trevarrow, 2018).

Enablers of/barriers to implementation and facilitation

Factors were identified that could either promote, or create barriers to the implementation and facilitation of sensory rooms. The timing of sensory sessions delivery was considered important with the potential for the sensory room to be utilised as both a proactive strategy to prevent future distress, and as a reactive strategy to avoid additional escalation of an already distressed patient (Sutton et al., 2013; Smith & Jones, 2014; Bjorkdahl et al., 2016; Wiglesworth & Farnworth, 2016; Forsyth & Trevarrow, 2018; Barbic et al., 2019; Lindberg et al., 2019). When used as a reactive strategy, there was acknowledgement that at times an individual could escalate beyond the point of safe or effective use of the sensory room (Smith & Jones, 2014).

Sufficient education and training of staff and patients was important in order for staff to understand how best to deliver sensory room interventions, and for patients to understand how and why the sensory room may be of use to them as an intervention. Insufficient training of multi-disciplinary staff members was identified as having a negative impact on the success of sensory room implementation and its outcomes (Forsyth & Trevarrow, 2018; Barbic et al. 2019; Wright et al., 2020). Regular refresher training is also needed to help overcome any lack of confidence staff may have in implementing their skills into practice (Wright et al, 2020). Despite training, a further barrier identified by Wright et al (2020) was one of professional role identity, with staff viewing sensory interventions as being the occupational therapist's role, which at times limited its usage.

A number of environmental barriers were identified as impacting the sensory room usage. There was a need for the sensory room environment to feel less 'clinical' and to be located in a quiet place on the ward where sessions would be uninterrupted (Wiglesworth & Farnworth, 2016, p.261). The sensory room needs to be easy to access, well stocked, and the equipment well maintained (Wright et al, 2020). Protecting the room usage so that it is exclusively available for sensory interventions was also important to the success of the sensory room intervention. Balancing the risk of the equipment getting damaged, or the risks of a patient harming themselves or others with sensory equipment was also seen as a barrier limiting the sensory room usage in some situations (Wiglesworth & Farnworth, 2016; Wright et al., 2020).

Staff attitudes and preconceptions upon implementation left concern as to how successful or useful the sensory space would be, and whether the patients would view the intervention positively (Bjorkdahl et al., 2016). Positive staff attitudes towards the sensory room were noted to empower patients and promote greater autonomy (Lindberg et al., 2019). Perceived lack of support from other colleagues on shift was a key factor identified as reducing the use of sensory interventions by staff, whereas modelling its usage by senior staff or peers influenced staff to utilise the approach more (Wright et al., 2020).

Autonomy to make choices was an important element in the success of sensory room sessions, with staff members needing to allow the patient to make the overall decision whether to use the sensory room or not (Lindberg et al., 2019). Effective care planning was also identified as important to be able to ensure that both staff and patients have a clear co-produced plan to follow when the patient becomes distressed. It should also set out how to deliver the sensory space and be personalised for the patients' needs (Smith & Jones, 2014; Wiglesworth & Farnworth, 2016).

Discussion

This systematic review set out to examine and appraise the evidence for the effectiveness of sensory rooms within adult psychiatric inpatient settings. The evidence that we found, in relation to the reduction of seclusion and restraint, was inconclusive and at risk of bias, similar to the findings of Scanlan and Novak in their 2015 scoping review. This suggests that despite increasing use in practice (e.g., Central and North West London NHS Foundation Trust, 2020; Herefordshire and Worcestershire Health and Care Trust, 2020), little has moved on in relation to the empirical evidence for reducing seclusion use.

What is unclear from this review is whether the differences in findings are due to the variation in quality or design of sensory rooms, or the quality of the research studies. The evidence does not present a coherent picture with regard to the former. Sensory rooms that offer equipment to moderate all seven senses may provide greater benefit than those with more limited features but this is a tentative assumption. Similarly, there is some evidence that having sensory rooms facilitated by staff may provide benefit over those that are used by patients independently. However, as only four of the studies that we identified used

experimental designs and only one used randomisation, all findings should be approached with caution. To address the latter, high quality intervention studies are needed, including realist review to unpick what works, for who and in what circumstances with sensory rooms as well as RCTs to provide a more thorough exploration of their impact on rates of violence, restraint and seclusion.

Espinosa et al. (2015) in their review, identified 18 principles to reduce violence, restraint and seclusion, and improve patient outcomes. One of these was the use of sensory rooms. Espinosa et al. found that when these principles were implemented in practice, long-term culture change achieved significant improvements to the therapeutic milieu (Espinosa et al., 2015). This suggests that sensory rooms should be considered alongside a range of alternative approaches to influence the culture and practices related to the management of violence, and restrictive intervention use within services. This does, however, make attempts to measure the impact of sensory rooms challenging. Such challenges are a common issue in research around reducing restrictive interventions. Baker et al. (2021) in their substantial review of non-pharmacological interventions to reduce restrictive practices found that most interventions contained multiple components and despite many studies demonstrating reductions in seclusion and restraint, it was not possible to identify which components were effective in achieving the reductions. This has implications for services; as Baker et al. (2021) identify, resources may be wasted on ineffective elements of interventions.

Despite the inconclusive findings about sensory room effectiveness as measured by rates of seclusion, restraint and aggression, patient and staff experiences of sensory room use were overwhelmingly positive. Interestingly also there were multiple references to the use of the sensory room as an alternative treatment option when patients were distressed or agitated, particularly with reference to its potential to reduce reliance on PRN medication usage. This is substantiated with anecdotal evidence that sensory rooms may reduce the need for PRN medication. Further research is needed that explores PRN reduction as an outcome measure for sensory room implementation.

One unexpected finding was related to the diagnoses of people who utilised the sensory rooms. Of the studies that reported diagnoses, all identified that people with a diagnosis of depression utilised the sensory rooms. Psychotic disorders, bipolar disorder and substance abuse are all well-known risk factors for inpatient violence, whereas depression may actually be a protective factor (Weltens et al., 2021). Frequently aggressive patients are less likely to have depressive symptoms than non-aggressive patients (Bader & Evans, 2015). Moreover, the risk of experiencing coercive measures is reduced for patients with higher levels of depressive symptoms (Kalisova et al., 2014). This may be reflective of clinical guidelines that state, in New Zealand at least, that seclusion should not be used for people who self-harm or have low mood (Jury et al., 2019). What we do not know, from the studies in this review, is the reason that people with a diagnosis of depression utilise sensory rooms, nor the outcomes that are achieved. It is possible that for these people at least, sensory rooms may not lead to reductions in rates of seclusion, restraint or violence, but they could lead to reduced distress and possibly the other positive outcomes of sensory modulation such as improved behaviour and fostering recovery (Craswell et al., 2021).

Sensory rooms do appear to improve levels of patient distress and associated patient behaviours as well as reducing the physiological responses associated with aggression, in some patients at least. We did, however, identify that in a small group of patients, distress increased and they experienced negative experiences when using the sensory room. Further consideration of who the room is useful for is required, and procedures that should be in place to prevent clinicians from causing harm, e.g., patient autonomy to engage, and to end the session at any point. Further intervention studies that record adverse effects are needed to understand any negative outcomes for patients further.

There was noticeable variation in what constituted a sensory room. Few studies catered for all seven senses in the sensory rooms, and in those that did the patients were supported by a staff member to access and use the space. As sensory modulation interventions are designed to support individuals to develop an understanding of their sensory preferences and responses, and use this enhanced self-awareness to aid emotional regulation and alertness levels, then it is possible that some of the rooms described in this review are unlikely to achieve this aim without provision of a broader range of equipment in place to stimulate each sensory system, or without appropriate staff support. What equipment needs to be available in a sensory room however, needs more clarity. We have found no current standards for sensory rooms within psychiatric settings, and therefore, further evidence is needed to understand what equipment works for patients within sensory rooms, and why. Services should modify and tailor sensory rooms for the population they serve (Champagne & Pfeiffer, 2019). Whether this means that they need to provide equipment to cater for all seven senses in order to provide an effective sensory modulation intervention, is as yet unknown.

The facilitation and staffing of sensory room sessions also varies. Without staff presence the element of the sensory room being an engaging intervention, offering the opportunities for facilitating interactions and positive therapeutic relationships, is reduced. The ability to use the sensory room to improve interactions and positive therapeutic relationships between patients and staff, in turn leading to further engagement opportunities, was identified by patients and staff. There is evidence that restrictive interventions can harm staff-patient relationships; patients report that interactions with staff can change after restrictive interventions due to a fear of further coercion and feelings of distrust (Tingleff et al., 2017). As the nurse-patient relationship is at the heart of effective inpatient care (Theodoridou et al, 2012), if sensory rooms do reduce the need for restrictive interventions and also strengthen relationships, their benefits could be far-reaching. Conversely, some participants found it stressful when staff were in the room with them. Furthermore, unfacilitated use may increase opportunities for patients to learn to self-regulate, which could be beneficial in the longer term. Further empirical evidence is needed to draw any substantiated conclusions.

Since 2015, when Scanlan and Novak reported a lack of experiential data from staff and patients regarding sensory room use, studies have focused primarily on obtaining the patient and staff experiences of sensory rooms as interventions. This has brought a greater depth of understanding to how sensory rooms are experienced, the qualitative outcomes for staff and patients, and the challenges which can negatively impact its usage. We found that negative experiences of the sensory room were generally linked to implementation and facilitation barriers such as the environmental positioning of the sensory room on the unit impacting noise and disturbances, sufficient staff training to understand and explain the use of a sensory approach in practice, and the importance of patient autonomy to decide when to access and terminate sensory sessions appropriately for their needs. Training in sensory awareness for the multi-disciplinary team, and education of patients, may be important for the successful adoption of sensory rooms in practice. There is evidence that staff education increases the use of sensory rooms (Martin & Suane, 2012), whether training is associated with efficacy is yet to be seen.

Strengths and limitations

This review used a good range of databases to identify published literature on the topic, however, the findings may be limited by the exclusion of grey literature. It is possible that we missed good quality, but unpublished literature because of this. The findings are further limited by the poor quality and serious risk of bias in the included studies. The inclusion of qualitative literature does add some strength to our findings as it was of higher quality than the other studies. The generalisability of the results is limited due to insufficient participant

demographic information. Only English-language studies were included in the review which limits the applicability of the findings to non-English speaking countries. The studies in this review were conducted in a wide range of countries, and within different health care systems, which may account for some of the variations and inconsistencies that we identified.

Conclusion

This review provides an overview of evidence to inform considerations for services implementing sensory rooms in psychiatric settings. Sensory rooms provide an alternative therapeutic intervention to traditional interventions such as PRN medication, or 1:1 nursing, for patients and staff to utilise within inpatient psychiatric settings, and are likely to support a reduction in patient distress and improvement in the overall patient admission experience. Individual sensory preferences need to be incorporated into the sensory room intervention, with a wide range of multisensory equipment available to personalise the patient's sensory experiences. Patient education and staff training in using the sensory room as an intervention is important to promote autonomy and self-management, alongside ensuring the intervention is accessible and encouraged as a whole team approach.

A clear definition of what constitutes a sensory room needs to be established, as the inconsistencies in delivery of sensory room sessions could contribute to some of the inconsistent findings related to the outcomes for the use of sensory room interventions. High quality, rigorous research into the use of sensory rooms is required to gain a proper understanding of the benefits, as well as the potential risks, of sensory room use. Future research should also explore sensory rooms in a wider variety of inpatient psychiatric settings, such as PICU and forensic units.

Relevance for clinical practice and research

The findings of this review can be used to inform health care professionals, managers and commissioners when considering service development and redesign within mental health settings, with focus given to the design and location of sensory rooms on units, training provision for staff in sensory room usage, and education for patients to gain a greater understanding of how the sensory room can support their recovery.

This review highlights the importance of robust data collection around assaults, seclusion and restraints as well as other clinical outcomes, e.g., PRN medication usage, to provide a greater understanding of the impact of sensory rooms on restrictive practices and violence in psychiatric inpatient settings. This is true whether the evaluations are at service level or as part of future research designs.

References

- Bader, S.M. & Evans, S.E. (2015). Predictors of severe and repeated aggression in a maximum-security forensic psychiatric hospital. *International Journal of Forensic Mental Health*, 14, 2, 110-119, <https://doi.org/10.1080/14999013.2015.1045633>
- Baker, J., Berzins, K., Canvin, K., et al. (2021). Non-pharmacological interventions to reduce restrictive practices in adult mental health inpatient settings: the COMPARE systematic mapping review. *NIHR Journals Library*. <https://doi.org/10.3310/hsdr09050>
- Barbic, S.P., Chan, N., Rangi, A., et al. (2019). Health provider and service-user experiences of sensory modulation rooms in an acute inpatient psychiatry setting. *PLoS ONE*, 14 (11), e0225238. <https://doi.org/10.1371/journal.pone.0225238>
- Beghi, M., Peroni, F., Gabola, P., Rossetti, A. & Cornaggia, C.M. (2013). Prevalence and risk factors for the use of restraint in psychiatry: A systematic review. *Rivista di Psichiatria*, 48, 1, 10-22. <https://doi.org/10.1708/1228.13611>
- Bjorkdahl, A., Kent-Inge, P., Samuelsson, M. & Lindberg, M.H. (2016) Sensory rooms in psychiatric inpatient care: Staff experiences. *International Journal of Mental Health Nursing*, 25, 472-479.
- Bramer, W. M., Rethlefsen, M. L., Kleijnen, J. & Franco, O. H. (2017). Optimal database combinations for literature searches in systematic reviews: a prospective exploratory study. *Systematic Reviews*, 6 (1), 245.
- Campbell, M., McKenzie, J.E., Sowden, A., et al. (2020) Synthesis without meta-analysis (SWiM) in systematic reviews: reporting guideline. *BMJ*. 368 :l6890. Available at: <http://dx.doi.org/10.1136/bmj.l6890>
- Central and North West London NHS Foundation Trust (2020). Discussion piece: Sensory rooms. [Accessed 11 June 2022] Available from URL: <https://www.cnwl.nhs.uk/news/discussion-piece-sensory-rooms>
- Chalmers, A., Harrison, S., Mollison, K., Molloy, N., & Gray, K. (2012). Establishing sensory-based approaches in mental health inpatient care: A multidisciplinary approach. *Australasian Psychiatry*, 20 (1), 35-39.
- Champagne, T. & Sayer, E. (2003). The effects of the use of the sensory room in psychiatry. [Accessed 23 April 2019] Available from URL: https://www.ot-innovations.com/wp-content/uploads/2014/09/qi_study_sensory_room.pdf
- Champagne, T. & Pfeiffer, B. (2019). Sensory Integration Approaches with Adults with Mental Health Disorders. In Bundy, A. & Lane, S. (eds.) *Sensory Integration: Theory and Practice* (3rd edition), Philadelphia: F.A. Davis. 513-521.
- Cheng, S. C., Hsu, W. S., Shen, S. H., Hsu, M. C., & Lin, M. F. (2017). Dose-Response Relationships of Multisensory Intervention on Hospitalized Patients with Chronic Schizophrenia. *Journal of Nursing Research*, 25 (1), 13-20.
- Craswell, G., Dieleman, C. & Ghanouni, P. (2021). An Integrative Review of Sensory Approaches in Adult Inpatient Mental Health: Implications for Occupational Therapy in Prison-Based Mental Health Services. *Occupational Therapy in Mental Health*, 37 (2), 130-157. <https://doi.org/10.1080/0164212X.2020.1853654>
- Cummings, K. S., Grandfield, S. A., & Coldwell, C. M. (2010). Caring with comfort rooms. reducing seclusion and restraint use in psychiatric facilities. *Journal of Psychosocial Nursing*, 48 (6), 26-30.

- Department of Health and Social care (2021) Mental Health Units (use of Force) Act 2018. [Accessed: 7th July 2022] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1038725/Mental-Health-Units-Use-of-Force-Act-2018-statutory-guidance.pdf
- Dorn, E., Hitch, D., & Stevenson, C. (2020). An evaluation of a sensory room within an adult mental health rehabilitation unit. *Occupational Therapy in Mental Health, 36* (2), 105-118.
- Espinosa, L., Harris, B., Frank, J., et al. (2015). Milieu improvement in psychiatry using evidence-base practices: The long and winding road of cultural change, *Archives of Psychiatric Nursing, 29*, 202-207.
- Forsyth, A. & Trevarrow, R. (2018). Sensory strategies in adult mental health: A qualitative exploration of staff perspectives following the introduction of a sensory room on a male adult acute ward. *International Journal of Mental Health Nursing, 27*, 1689-1697.
- Health Service Journal (2018). Violence against NHS staff: a special report by HSJ and Unison. [Accessed 21 April 2022] Available from URL: <https://guides.hsj.co.uk/5713.guide>
- Herefordshire and Worcestershire Health and Care Trust (2020). Mental health patients to benefit from new state of the art sensory room. [Accessed 11 June 2022]. Available from URL: <https://www.hacw.nhs.uk/news/mental-health-patients-to-benefit-from-new-state-of-the-art-sensory-room-2091/>
- Hong, Q.N., Pluye, P., Fabregues, S., et al. (2018) *Mixed methods appraisal tool (MMAT)*, Version 2018. Canadian Intellectual Property Office, Industry Canada. [Accessed 9 March 2021] Available from URL: http://mixedmethodsappraisaltoolpublic.pbworks.com/w/file/attach/127916259/MMAT_2018_criteria-manual_2018-08-01_ENG.pdf
- Jang, S.J., Son, Y.-J. & Lee, H. (2022). Prevalence, associated factors and adverse outcomes of workplace violence towards nurses in psychiatric settings: A systematic review. *International Journal of Mental Health Nursing, 31*, 3, 450-468. <https://doi.org/10.1111/inm.12951>
- Joanna Briggs Institute (2002). Physical Restraint - Part 1: Use in Acute and Residential Care Facilities Systematic Review. *Best Practice, 6*, 3.
- Joanna Briggs Institute (2022). 8.3 The JBI approach to mixed method systematic reviews. [Accessed 1 July 2022] Available from URL: <https://jbi-global-wiki.refined.site/space/MANUAL/4689234/8.3+The+JBI+approach+to+mixed+method+systematic+reviews>
- Jury, A., Lai, J., Tuason, C., et al. (2019). People who experience seclusion in adult mental health inpatient services: An examination of health of the nation outcome scales scores. *International Journal of Mental Health Nursing, 28*, 1, 199-208. <https://doi.org/10.1111/inm.12521>
- Kalisova, L., Raboch, J., Nawka, A., et al. (2014) 'Do patient and ward-related characteristics influence the use of coercive measures? Results from the EUNOMIA international study'. *Social Psychiatry and Psychiatric Epidemiology, 49*. 1619-1629.
- Knight, M., Adkison, L. & Kovach, J.S. (2010). A comparison of multisensory and traditional interventions on inpatient psychiatry and geriatric neuropsychiatry units. *Journal of Psychosocial Nursing & Mental Health Services, 48* (1), 24-31.
- Lepping, P., Masood, B., Flammer, E. & Noorthoorn, E.O. (2016). Comparison of restraint data from four countries. *Social Psychiatry and Psychiatric Epidemiology, 51*, 1301-1309.

- Lindberg, M, Samuelsson, M, Perseus, KI & Bjorkdahl, A. (2019). The experiences of patients in using sensory rooms in psychiatric inpatient care. *International journal of mental Health Nursing*, 28, 930-939.
- Lloyd, C., King, R., & Machingura, T. (2014). An investigation into the effectiveness of sensory modulation in reducing seclusion within an acute mental health unit. *Advances in Mental Health*, 12 (2), 93-100.
- Machingura, T., Shum, D., Molineux, M. & Lloyd, C. (2018). Effectiveness of sensory modulation in treating sensory modulation disorders in adults with schizophrenia: A systematic literature review'. *International Journal of Mental Health Addiction*, 16, 764–780. <https://doi.org/10.1007/s11469-017-9807-2>
- Martin, B.A. & Suane, S.N. (2012) Effect of training on sensory room and cart usage. *Occupational Therapy in Mental Health*, 28, 2, 118-128. <https://doi.org/10.1080/0164212X.2012.679526>
- Mion, L.C., Minnick, A. & Palmer, R. (1996). Physical restraint use in the hospital setting: Unresolved issues and directions for research. *Milbank Quarterly*, 74, 411-33.
- National Health Service (2020) *NHS Staff Survey Results*. [Accessed 22 May 2021] Available from URL: <https://www.nhsstaffsurveyresults.com/homepage/national-results-2020/trends-questions-2020/>
- National Mental Health Commission (2022). *Reducing restrictive practices*. [Accessed 1 July 2022] Available from URL: <https://www.mentalhealthcommission.gov.au/lived-experience/contributing-lives-thriving-communities/reducing-restrictive-practices#:~:text=In%202005%2C%20all%20Australian%20Governments,people%20want%20something%20done%20about>
- NICE (2015a) *Safeguarding NHS staff from violent and aggressive patients*. [Accessed 14 April 2022] Available from URL: <https://www.nice.org.uk/news/article/safeguarding-nhs-staff-from-violent-and-aggressive-patients>
- NICE (2015b) *NG10 Violence and aggression: short-term management in mental health, health and community settings*. [Accessed 9 March 2021] Available from URL: <https://www.nice.org.uk/guidance/ng10>
- Novak, T., Scanlan, J., McCaul, D., MacDonald, N., & Clarke, T. (2012). Pilot study of a sensory room in an acute inpatient psychiatric unit. *Australasian Psychiatry*, 20 (5), 401-406.
- Oostermeijer, S., Brasier, C., Harvey, C., et al. (2021). Design features that reduce the use of seclusion and restraint in mental health facilities: a rapid systematic review. *BMJ Open* 11, e046647. <https://doi.org/10.1136/bmjopen-2020-046647>
- Page, M. J., McKenzie, J., Bossuyt, P., et al. (2020). *The PRISMA 2020 statement: An updated guideline for reporting systematic reviews*. [Accessed 12 August 2021] Available from URL: <https://doi.org/10.31222/osf.io/v7gm2>
- Reddon, J. R., Hoang, T., Sehgal, S., & Marjanovic, Z. (2004). Immediate effects of Snoezelen[®] treatment on adult psychiatric patients and community controls. *Current Psychology: A Journal for Diverse Perspectives on Diverse Psychological Issues*, 23, 3, 225-237
- Ryan R (2013). *Cochrane Consumers and Communication Review Group: data synthesis and analysis*. Cochrane Consumers and Communication Review Group. [Accessed 16 May 2022] Available from URL: <https://cccr.org/sites/cccr.org/files/public/uploads/Analysis.pdf>

- Scanlan, J. N. & Novak, T. (2015). Sensory approaches in mental health: A scoping review', *Australian Occupational Therapy Journal*, 62, 277-285.
- Sivak, K. (2012). Implementation of comfort rooms to reduce seclusion, restraint use, and acting-out behaviors. *Journal of Psychosocial Nursing & Mental Health Services*, 50, 2, 24-34.
- Smith, S., & Jones, J. (2014). Use of a sensory room on an intensive care unit. *Journal of Psychosocial Nursing & Mental Health Services*, 52, 5, 22-30.
- Sterne, J. A. C., Hernán, M. A., Reeves, B. C., et al. (2016). ROBINS-I: a tool for assessing risk of bias in non-randomised studies of interventions. *BMJ*, 355, i4919.
- Sutton, D. & Nicholson, E. (2011). *Sensory modulation in acute mental health wards: A qualitative study of staff and service user perspectives*. Auckland, New Zealand: Te Pou o Te Whakaaro Nui.
- Sutton, D., Wilson, M., Van Kessel, K., & Vanderpyl, J. (2013). Optimizing arousal to manage aggression: A pilot study of sensory modulation. *International Journal of Mental Health Nursing*, 22, 6, 500-511.
- Theodoridou, A., Schlatter, F., Ajdacic, V., Rössler, W. & Jäger, M. (2012). Therapeutic relationship in the context of perceived coercion in a psychiatric population. *Psychiatry Research*, 200, 2, 939-944.
- Tingleff, E. B., Bradley, S. K., Gildberg, F. A., Munksgaard, G. & Hounsgaard, L. (2017). "Treat me with respect". A systematic review and thematic analysis of psychiatric patients' reported perceptions of the situations associated with the process of coercion. *Journal of Psychiatric and Mental Health Nursing*, 24, 9-10, 681-698.
- Weltens, I., Bak, M., Verhagen, S., et al. (2021) Aggression on the psychiatric ward: Prevalence and risk factors. A systematic review of the literature. *PLOS ONE*, 16, 10, e0258346. <https://doi.org/10.1371/journal.pone.0258346>
- Wiglesworth, S., & Farnworth, L. (2016). An exploration of the use of a sensory room in a forensic mental health setting: Staff and patient perspectives. *Occupational Therapy International*, 23 3, 255-264.
- Wright, L., Bennett, S. & Meredith, P. (2020). 'Why didn't you just give them PRN?': A qualitative study investigating the factors influencing implementation of sensory modulation approaches in inpatient mental health units. *International Journal of Mental Health Nursing*, 29, 608-621.