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ORIGINAL RESEARCH ARTICLE

Reducing challenging behaviours with sensory modulation strategies: a quality improvement project in an acute mental health service

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Background: Challenging behaviours are common in acute mental health settings, causing strain on therapeutic relationships and increased use of restrictive practices. Sensory modulation offers a non-restrictive alternative but evidence of its effectiveness in high-acuity settings is limited. In 2023–2024, the 'Sensory Strategies' project was conducted on a female acute mental health ward where the average monthly rate of violence and aggression (VA) was 21.2 incidents in the three months prior. The project aimed to reduce the mean number of incidents by 10% over 12 months.
Method: Using quality improvement methodology, a sensory modulation intervention package was designed. Changes were implemented through iterative Plan-Do-Study-Act (PDSA) cycles during which staff and patient feedback was gathered to inform improvement. Monthly incidents of challenging behaviours were tracked using a Shewhart Individuals Chart.
Results: After 12 months, incidents of challenging behaviour had decreased: VA by 45.3%; other challenging behaviours (OCB) and self-harm by 28.4%. Three months later, reductions in VA and OCB were sustained while a 38.8% increase in self-harm incidents was probably linked to an increase in admissions of

individuals with personality disorders. Patients (n = 9) reported high satisfaction, highlighting improved emotional awareness and understanding of grounding techniques. Staff (n = 7) felt confident using sensory strategies but requested more hands-on training and easier access to materials.
Conclusion: The target for reducing challenging behaviours was exceeded, highlighting the strong potential to reduce restrictive practices and improve patient experience. Future work should explore strategies for long-term sustainability, including phased implementation.

Key words: challenging behaviours; violence and aggression; PICU; sensory modulation; quality improvement; occupational therapy

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Ethics: The Authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional guides on human experimentation and with the Helsinki Declaration of 1975, as revised 2008.
Declaration of interest: None

Introduction

Challenging behaviours, including aggression, self-harm and damage to property, are common in psychiatric inpatient settings (Bowers et al. 2011; Weltens et al. 2021). Whilst psychiatric symptoms contribute to these behaviours, environmental and systemic factors such as boredom, restrictive practices, and lack of autonomy also play a significant role (Lamanna et al. 2016; Jenkin et al. 2022).

These behaviours can destabilise ward environments and harm both staff and patients, undermining wellbeing, safety and therapeutic relationships (Rivett 2020; Jenkin et al. 2022). Evidence suggests that restrictive interventions such as seclusion, restraint and enhanced observations are frequently used to manage risk behaviours, despite clinical guidelines advising that they be a last resort after all other preventative strategies have failed (Dye et al. 2009; DH 2015; NICE 2015; Gerace & Muir-Cochrane 2019). Their use remains widespread: over 3000 patients in England were subjected to such interventions in July 2024 alone (NHS England 2024).

Restrictive practices are associated with lasting psychological harm. Patients often describe them as dehumanising and punitive, triggering feelings of fear, shame and rejection (Kontio et al. 2012; Mellow et al. 2017; Spinzy et al. 2018). These impacts have fuelled a growing movement toward trauma-informed and non-restrictive alternatives to de-escalation.

One such approach is sensory modulation, grounded in sensory processing theory. Many individuals with psychiatric disorders experience heightened sensitivity to stimuli, which can increase distress in overstimulating environments (Van den Boogert et al. 2022). Sensory modulation involves tools, activities and environmental adjustments that support self-regulation and reduce agitation (Moore 2016; O'Sullivan & Fitzgibbon 2018). These can include calming music, aromatherapy, tactile objects or weighted blankets (Scanlan & Novak 2015).

Research suggests that sensory interventions can reduce distress, build emotional resilience and improve service-user experiences (Sutton & Nicholson 2011; Novak et al. 2012; Lloyd et al. 2014; Barbic et al. 2019; Haig & Wagstaff 2024). They may also support staff–patient rapport and reduce reliance on restrictive measures (Lee et al. 2010; Lloyd et al. 2014; Molloy et al. 2024).

However, evidence remains limited on how effective these interventions are at targeting challenging behaviours and how they can be effectively delivered in high-acuity mental health settings. This is despite the clear need for alternative de-escalation approaches (DH 2014). Quality improvement (QI) offers a structured, evidence-based approach to addressing this gap. By iterative testing, using real-time data and frontline staff involvement, QI enables tailored interventions responsive to the unique challenges of specific wards. This project will apply QI methods to test and refine sensory modulation strategies to reduce challenging behaviours in inpatient psychiatric care, supporting safer, more therapeutic environments.

Problem

This 36-bed service comprises both acute and psychiatric intensive care (PICU) wards for women experiencing severe mental health crises. The service supports individuals with complex needs, including mood disorders, psychosis and trauma histories (Table 1). Many patients have also experienced multiple hospital admissions, disrupted community placements and social disadvantage.

Table 1. Patient characteristics.

ICD Category Description (Primary Diagnosis)	% ICD Category
F20–F29 Schizophrenia, schizotypal and delusional disorders	34.9%
F30–F39 Mood [affective] disorders	24.8%
*Not recorded	14.9%
F60–F69 Disorders of adult personality and behaviour	11.0%
F00–F09 Organic, including symptomatic, mental disorders	7.4%
F40–F48 Neurotic, stress-related and somatoform disorders	4.5%
F10–F19 Mental and behavioural disorders due to psychoactive substance use	1.2%
F80–F89 Disorders of psychological development	0.8%
F90–F98 Behavioural and emotional disorders with onset usually occurring in childhood and adolescence	0.2%
F99 Unspecified mental disorder	0.2%

The unit is staffed by a multidisciplinary team (MDT), including a consultant psychiatrist, psychologists, occupational therapists (OTs) and specialist mental health nurses. While the team is highly skilled in managing risk and supporting individuals in acute distress, the nature of the environment means incidents of violence and aggression are common. These behaviours are typically handled through restrictive interventions such as physical restraint, oral or intra-muscular medication and seclusion. Sensory resources were limited to a basic de-escalation room with mood lighting and a white-walled seclusion space. Opportunities for proactive, non-restrictive approaches to emotional regulation were minimal, and there was a limited understanding of these strategies across the wider MDT. As a result, staff often relied heavily on OTs to deliver sensory-based interventions, placing additional pressure on their workload and limiting the consistency and accessibility of these approaches across the service.

Measurement

The primary outcome measure for this project was the average number of total incidents of violence and aggression (VA) resulting in actual physical harm. Other forms of aggression were not included in the analysis. Process measures captured the type of incident which included self-harm incidents and other challenging behaviours (OCB). OCB were defined as attempted assault, deliberate damage to property, disruptive behaviour, inappropriate sexual behaviour, threatening use of weapon and verbal threats. Staff routinely record these incidents using the service's electronic reporting system.

Baseline data were gathered by retrospectively reviewing incident levels for the three categories (total VA, self-harm and OCB) from January 2023 to April 2023 over 3 months. The mean number of total VA incidents before the project commenced was calculated to be 21.25, self-harm incidents were 30.25 and other challenging behaviours were 22.5. Incident levels were then reviewed over a defined period at the end of every change cycle to inform evaluation and support decision-making. This allowed the team to track changes in frequency during each change cycle.

Additionally, qualitative feedback was collected through patient evaluation forms and staff surveys. These captured reflections regarding the proposed change ideas and the overall impressions of the project. A thematic analysis of the written responses was carried out to identify recurring patterns and ideas, which were then grouped into overarching themes. This mixed-methods approach helped to build a comprehensive picture of both the measurable outcomes and the lived experiences of those involved.

Data analysis

An individuals chart (i-chart), a type of statistical process control (SPC) chart, was created for each measure using RStudio. SPC charts are commonly used in QI to display time series data and assess variation. The i-chart tracked monthly incident reports over time, allowing patterns and potential causes to be identified. Due to the small number of data points, formal significance testing was not appropriate. The chart was divided into four phases: a pre-project baseline, two PDSA cycles during implementation, and a post-project follow-up to assess sustainability.

Design

Project governance & oversight

A dedicated working group and a local site project team were established to oversee the project. This core group comprised acute and PICU OTs from across England, including OT Directors, clinical service leads, an internal QI manager, and the hospital's project lead. The group met monthly to monitor progress, review data, and address barriers. Each member took responsibility for leading the creation of specific change ideas.

At the hospital level, the project lead formed a multidisciplinary site project team to guide local implementation. This dual approach, central oversight combined with regional leadership, ensured accurate standardisation and communication and allowed the hospital team to adapt

interventions to their specific context. It also promoted a bottom-up model, empowering frontline staff and giving them a greater voice.

Ethics

This QI project received formal approval from the organisation's QI board. Before participation, informed consent was secured from both patients and staff. All data was handled strictly, and measures were taken to minimise potential harm, including anonymising identifiable data. Participant autonomy was respected throughout the project, ensuring ethical standards were maintained at every stage.

Project aim

Using the baseline data collected, the working group developed a SMART (SMART Specific, Measurable, Achievable, Realistic & Timely) aim to establish a concise common goal for the project (Bjerke & Renger 2017). Consequently, the aim of this project was to achieve a 10% reduction in mean monthly incidents of challenging behaviours on the acute ward, over 12 months.

This overarching goal was underpinned by three key primary drivers (Figure 1): (1) enhancing sensory modulation awareness among staff and patients; (2) improving the accessibility of sensory modulation strategies and resources; and (3) establishing effective and consistent sensory modulation processes within the clinical setting. A driver diagram is a visual QI tool that maps the relationship between a project's primary aim, the high-level factors (primary drivers) essential for achieving that aim, and the more specific, actionable changes (secondary drivers) that influence those primary drivers (Cox & Sandberg 2018). This structured approach ensures a clear and logical framework for intervention design.

Overview of change ideas

The creation of change ideas Sensory Strategies was guided by learning derived from the *Sensory Modulation Brisbane* training delivered by Carolyn Fitzgibbons and Julie O'Sullivan. A comprehensive package of change ideas (see Supporting Information) was developed, which included:

- An interactive, MDT training package
- Patient screening using Sensory Intervention Checklists
- Group-based OT sensory intervention 'cheat sheets', later adapted using the *Vona du Toit Model of Creative Ability* (Du Toit 2009) to support patients with lower levels of creative ability
- Resource lists for personalised *Sensory Toolkits*
- *Seclusion Risk Indicators* and assessment forms to support the use of sensory strategies in high-risk situations.

Strategy

The project followed the Model for Improvement and a cyclical Plan-Do-Study-Act (PDSA) model to promote iterative learning and continuous improvement (Courtlandt et al. 2009; Taylor et al. 2014). Each cycle began with a defined period for implementing and testing change ideas. During this time, the site project team distributed evaluation forms and staff surveys and used a structured weekly template to record what was working well, what was not, and areas for improvement.

The site project lead also collected quantitative data regularly throughout the cycle. At the end of each test period, the core working group reconvened to review interim results, reflect on learning, identify areas for refinement and propose any new change ideas for the next cycle.

Results

Overview of PDSA cycles

Between May 2023 and May 2024, two full PDSA cycles were completed, constituting the project period (see Figure 2). The first cycle focused on introducing sensory modulation interventions, while the second refined the MDT training approach and expanded strategies into the PICU.

PDSA Cycle 1: Initial implementation & barriers

PDSA Cycle 1 highlighted several challenges, including low staff attendance at training sessions and difficulties managing resources. While sensory modulation strategies showed promise, particularly in the acute ward, in supporting patients with self-harming behaviours, these interventions were time-intensive and primarily facilitated by the occupational therapy team. Staff training was initially offered virtually, which resulted in limited attendance and a poor grasp of sensory modulation concepts.

Insights from this first cycle also underscored the need to tailor interventions better to meet the specific needs of the PICU patient cohort. New interventions were designed using the *Vona Du Toit Model of Creative Ability*. Personalised sensory toolkits were developed based on individual risk assessments and sensory profiles. Although a 'grab-and-go' sensory box was proposed to support ward staff, it was not implemented during this cycle.

PDSA Cycle 2: Training redesign & PICU integration

PDSA Cycle 2 focused on improving staff training in acute and PICU wards and expanding sensory strategies

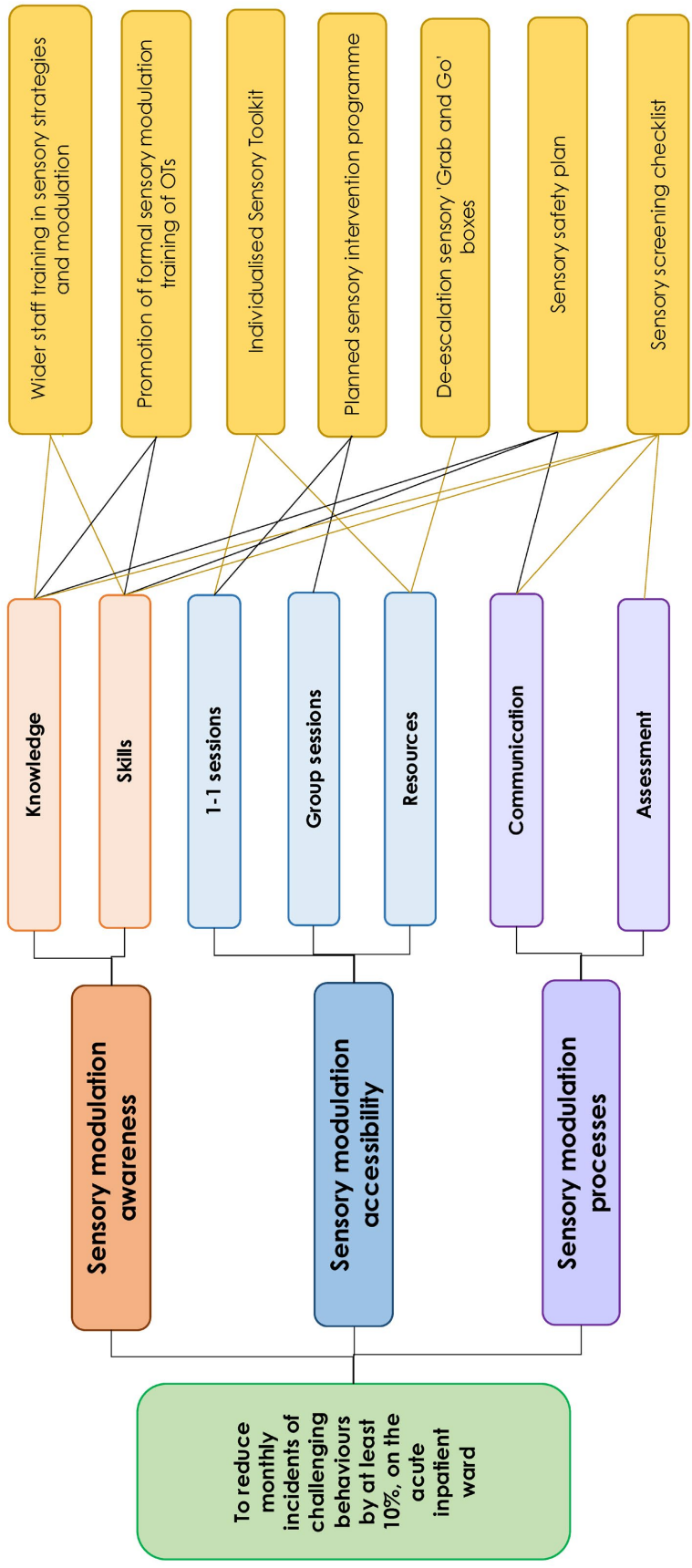

Fig. 1. Driver Diagram illustrating the strategy for reducing challenging behaviours through sensory modulation.

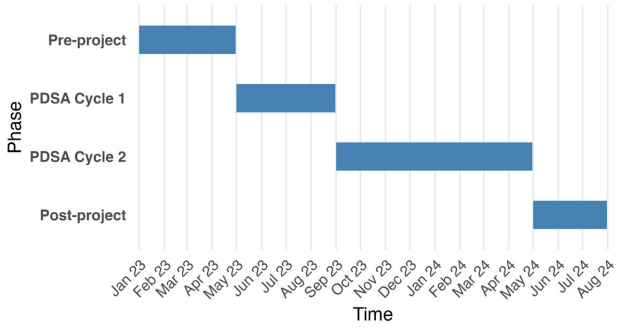

Fig. 2. Project Gantt chart. The timeline of the quality improvement project from baseline to post-project period.

into the PICU setting. In response to the shortcomings of virtual training, a new interactive in-person training model was developed. This training allowed staff to explore their sensory preferences, learn modulation techniques, analyse case studies and identify environmental triggers contributing to sensory processing difficulties for patients. To further support this, *Sensory Heat Maps* were created to highlight areas on the ward with varying levels of stimulation.

Sensory strategies were piloted within the PICU ward during this cycle. Due to patient acuity in the PICU ward, group occupational therapy interventions initially introduced were transitioned to one-on-one formats. However, group interventions continued the acute ward, aligned with the *VdTMoCA* and the higher creative ability levels were observed in that setting. *Seclusion Risk Indicators* and MDT risk assessment forms were also developed to identify behaviours during seclusion and corresponding sensory strategies that could be offered during these periods. Environmental enhancements were made through a sensory-informed lens. This included the development of a *Zen Den* (a dedicated sensory modulation space in the PICU) and a *Social Hub*; a co-produced, calming environment featuring interactive games, massage chairs, bookshelves, bean bags and comfortable seating. Additionally, restrictive spaces such as seclusion were reviewed and modified to include a large chalkboard (painted directly onto the wall), mood lighting (to create a low-stimulation environment) and a Bluetooth music speaker for personalised music options.

Quantitative outcomes

Incidents of violence & aggression. Figure 3 displays the number of VA incidents reported across the project timeline. Following the initial implementation of the intervention during PDSA Cycle 1, there was a substantial reduction in incidents of VA, decreasing from a pre-intervention baseline mean of 21.25 to 7.25 incidents, a 65.9% reduction. In PDSA Cycle 2, incident numbers increased compared to Cycle 1; however, the average remained below the original baseline at 11.65, representing a 45.3% reduction. During the post-project follow-up period, the mean number of VA incidents rose slightly to 16. Despite this increase relative to Cycle 2, the level remained below the initial baseline, reflecting a sustained overall reduction of 24.7%. A clear shift in the data and reduced variation were observed during the PDSA cycles, with a lower and more stable incident rate. This pattern was maintained post-project, suggesting sustained improvement and process stability.

Incidents of other challenging behaviours. Figure 4 displays the number of incidents of OCB reported across each phase of the project timeline. Following the introduction of the intervention during PDSA Cycle 1, a

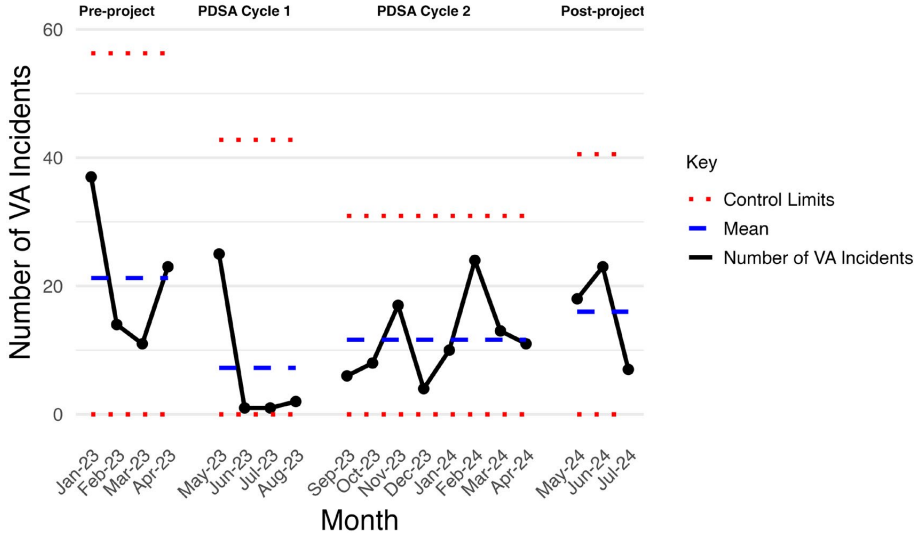

Fig. 3. Violence and aggression (VA) incidents. This graph displays the monthly total number of actual violence and aggression incidents within each project cycle.

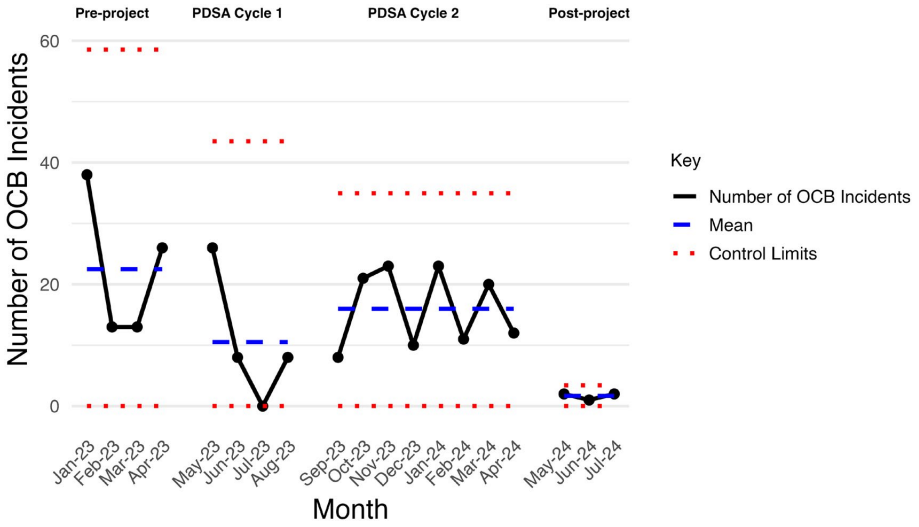

Fig. 4. Other challenging behaviour (OCB) incidents. This graph compares the monthly total number of other challenging behaviour incidents within each project cycle.

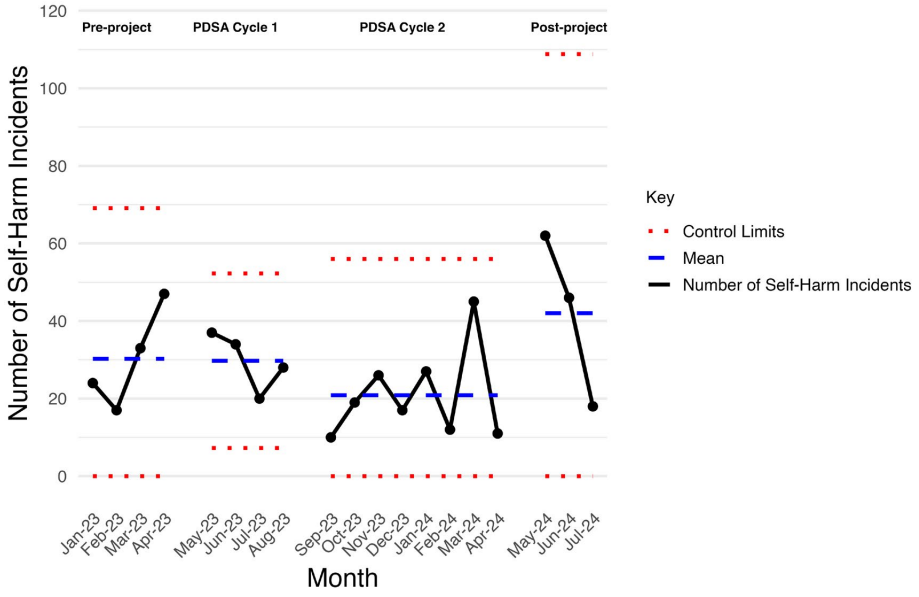

Fig. 5. Self-harm incidents. This graph compares the total monthly number of self-harm incidents within each project cycle.

notable reduction in OCB incidents was observed, with the mean decreasing to 10.5 incidents and a 53.3% reduction from the pre-intervention baseline. In PDSA Cycle 2, incident levels showed some variability, with an increase in the latter months of the cycle. Nonetheless, the overall mean remained below baseline at 16 incidents, reflecting a 28.9% reduction. In the post-project follow-up period, the mean number of OCB incidents dropped substantially to 1.6, representing a 92.6% reduction from baseline and indicating a substantial and sustained improvement. A reduction in variation and a downward shift in the mean occurred early in the project. Low, stable incident levels post-project indicate a sustained change and a highly controlled process.

Incidents of self-harm. Figure 5 displays the number of incidents of self-harm reported across the project timeline. The pre-intervention baseline for self-harm incidents was 30.25. Following the initial intervention during PDSA Cycle 1, there was a minimal reduction in incidents, with the mean decreasing slightly to 29.75, a 1.7% decrease. A more pronounced downward trend was observed in PDSA Cycle 2, where the mean number of incidents fell to 21.7, representing a 28.4%

reduction from baseline. However, during the post-project follow-up period, the number of self-harm incidents increased, with the mean rising to 42, an increase of 38.8% compared to the original baseline. Variation initially decreased during the intervention phases, with a downward shift in the mean. However, a spike in the post-project period suggests special cause variation, likely influenced by contextual factors, and indicates that changes were not fully sustained.

Patient feedback

Nine patients completed the evaluation forms. All of those surveyed (n = 9) enjoyed the sensory sessions and found them helpful (Figure 6).

The key themes identified were:

- The perceived effectiveness of grounding techniques, particularly those using smell identification
- Increased sensory awareness and its role in promoting mindfulness
- The value of self-care and relaxation techniques in enhancing emotional well-being
- Frequent references to the *Sensory Ladder* (Smith & Crowfoot 2001) and the concept of alertness levels, indicating a growing understanding of how sensory input influences emotional regulation
- Appreciation for the interactive group format, which was described as more engaging and relaxing compared to individual interventions.

Staff feedback

Staff surveys (n = 7) revealed generally positive attitudes toward the themes related to project implementation.

The key themes identified were:

- Increased confidence in using sensory modulation techniques, particularly for de-escalating agitated patients
- Specific tools such as weighted blankets, ice packs and sensory toys were identified as effective and valuable
- While most staff generally felt adequately trained, some desired more hands-on, practical training
- A noted challenge was the inconsistent use of sensory materials, often attributed to limited understanding of their therapeutic value
- Suggestions for improvement included increased training, greater accessibility of sensory materials, and consistent encouragement from ward leadership.

Contextual factors

Several contextual factors influenced both the implementation and effectiveness of the sensory strategies interventions. The high acuity of patients on the acute ward, many of whom present with complex trauma histories and self-harming behaviours, required tailored, individualised interventions to meet diverse and dynamic needs. Between May and July 2024, there was an increase in admissions of patients presenting with personality disorders and self-harming behaviours. During this period, staff lacked specific training in managing such complex presentations, highlighting the need for additional skill development and targeted training.

However, staffing challenges, including turnover, sickness absences, and a reliance on agency staff who may not have received adequate sensory modulation training, created barriers to consistent and sustained implementation. Additionally, limited access to sensory resources

Fig. 6. Patient Feedback. Quotes from patient feedback surveys.

during off-peak hours and changes in the incident management system further disrupted intervention delivery.

The inherently high turnover of patients in acute mental health settings also restricted opportunities for some patients to fully engage in the entire range of sensory strategies, such as personalised toolkits and participation in group-based interventions.

Discussion

Key findings

The results of this QI initiative strongly support the use of sensory strategies as a practical and effective approach to managing challenging behaviours in acute mental health wards. Implementing the sensory modulation package reduced VA incidents and OCB, exceeding the project's aim and maintaining improvements beyond the formal project period.

Although reductions in self-harm incidents were not sustained post-project, the initial impact observed during the PDSA cycles suggests the change ideas hold promise for influencing these behaviours. The lack of sustained improvement may, in part, be attributed to an increase in admissions of patients with personality disorders and self-harming behaviours during the post-project period, highlighting the influence of external contextual factors on outcomes.

These quantitative outcomes, supported by patient feedback, highlight the potential for sensory-based approaches to reduce behavioural and emotional dysregulation in high-acuity settings while also encouraging the development of self-management strategies (Smith & Jones 2014; Adams-Leask et al. 2018; Kandlur et al. 2023). Patients also reported increased motivation to engage in therapy due to the calming and enjoyable effects of personalised sensory toolkits and strategies.

Another positive development was the growing proactivity among MDT staff in recognising sensory needs and independently requesting tools such as radios, stress balls, and music; signalling a move away from sole reliance on OTs. This cultural shift contributed to a noticeable increase in sensory needs referrals, often based on ward staff observations. OT staff also reported greater confidence in using screening tools and intervention plans to guide sensory-based interventions. More broadly, staff reported increased knowledge of sensory behaviours and greater confidence in applying sensory modulation techniques. This improved staff engagement with patients, and led to a more therapeutic ward environment. Further enhancements included the creation of seclusion risk indicators and meaningful activities provision documents, leading to a revitalisation of the seclusion environment with features such as chalkboards, mood lighting and music as standard. In addition to 'expert by experience-led' social hub implementation across the company, patient co-production at this site informed the design of a calmer social hub, which incorporated massage chairs, music, and incense dispensers. The PICU also developed its sensory space into a *Zen Den* equipped with items such as a tactile wall panel and darker mood lighting to promote calming environments within the ward. This occurred following the Sensory Heat Map developed during a PICU MDT training session.

Strengths & limitations

While randomised controlled trials remain the gold standard for evaluating interventions, this project employed a PDSA approach, which supports the integration of interventions into real-world clinical and care settings. This method effectively addresses challenges posed by the evidence-to-practice gap; the disconnect between developing promising interventions and implementing them in practice (Lang et al. 2007). Historically, mental health services have faced difficulties embedding evidence-based practices, such as sensory modulation, into routine care (Chalmers et al. 2012). The flexibility of the PDSA approach enabled staff to identify and navigate implementation barriers, contributing to the development of an operationally feasible package.

A key strength of this project was the creation of a freely available Sensory QI Implementation Guide, which includes a 'Train-the-Trainer' video (see Supporting Information). These resources provide detailed guidance on change ideas and their application, supporting replicability and scalability, an often-missing component in QI projects. Evidence suggests interactive Train-the-Trainer interventions and educational materials improve clinical behaviour and patient outcomes (Yarber et al. 2015). These tools equip staff to independently lead sensory-based interventions, extending the reach of this project.

The change idea package was comprehensive and contextually adaptable across acute and PICU settings. This aligns with the findings of Quinn et al., who reported that multifaceted interventions can reduce seclusion events. However, this complexity is also a limitation. Because all components were implemented simultaneously, isolating the impact of individual change ideas was impossible. Therefore, the specific contribution of each intervention to the overall outcomes remains unclear.

Several contextual limitations must also be acknowledged. The reduction in self-harm incidents was not sustained in the post-project period. This may be due to unmeasured confounding variables such as ward acuity, staff skillset, patient characteristics and contextual changes. These include new management, increased staff leave and the introduction of a new incident reporting system, all of which could have influenced both practice and data accuracy.

Additional internal validity limitations include variability in staff interpretation of challenging behaviours and inconsistencies in incident recording due to the transition to a new management system. Staffing instability and high turnover further impacted the consistency of care and limited the effective implementation of interventions, particularly for new staff. The acute setting's transient nature, marked by frequent admissions and discharges, made it challenging to track a patient's progress over time.

The complex needs of the patient population, including histories of trauma and high levels of behavioural distress, posed further challenges to intervention delivery. While qualitative data offered valuable insights into staff and patient experiences, it remains subjective. Thematic analysis was used to interpret feedback and survey data, introducing potential bias. Moreover, small sample sizes for patient evaluations (n = 9) and staff surveys (n = 7) limit the generalisability of findings.

Implications for research

Future QI initiatives should build on the foundation established in this project by focusing on the sustainability of improvements beyond the initial testing cycles and over longer timeframes. Future projects might consider a phased implementation approach to understand better the effectiveness of individual components rather than introducing the entire change package at once. This would allow for more explicit attribution of outcomes to specific interventions. Analytical methods such as interrupted time series analysis could be used to assess causality and track impact over time.

Sensory strategies hold significant potential for reducing restraint and other restrictive practices in acute and PICU settings, supporting broader national policy goals (NICE 2015). While this project introduced changes aimed at supporting sensory modulation in seclusion, it did not specifically collect data on the direct relationship between sensory strategies and restraint reduction. Further research is needed to explore any potential correlation in greater depth.

Embedding sensory modulation techniques into routine care may help to reduce behavioural and emotional dysregulation, decreasing the need for restrictive interventions. In addition, developing structured documentation for seclusion and implementing MDT screening tools for sensory needs could support more consistent practice, reduce seclusion use, and enhance the overall experience.

Implications for policy & practice

Strong leadership and a supportive organisational culture are essential for sensory modulation strategies to be effectively embedded in acute and PICU mental health services. Leaders must recognise that while standardised protocols are necessary, they should remain flexible to accommodate the specific needs of different patient populations and staff teams. This adaptability is particularly important in high-acuity, fast-paced environments where one-size-fits-all approaches are unlikely to be effective or sustainable.

Senior management support enabled the broader cultural shift observed in this project, underscoring the importance of leadership buy-in for system-wide change. Sensory modulation strategies also present a viable, person-centred alternative to restrictive practices, aligning with national policy goals to reduce restraint and seclusion and to promote trauma-informed care.

From a policy perspective, these findings reinforce the need to move beyond reliance on OTs and Activity Coordinators as the sole implementers of sensory interventions. Sensory modulation must be integrated into the responsibilities of the wider MDT. This requires ongoing education and training, ensuring all staff understand the value of engagement in these approaches; particularly in settings where therapeutic intentions may be deprioritised due to operational pressures.

Investing in leadership development, staff training, and adaptable implementation frameworks will be key to scaling and sustaining sensory-based interventions across mental health services. Embedding these principles into policy can support long-term cultural change and improve outcomes for both patients and staff.

Conclusion

Using sensory strategies, this QI project effectively reduced challenging behaviours within the acute mental health ward. These findings support the implementation of sensory modulation interventions, aligning with existing evidence of their positive impacts on patient distress and well-being. The QI approach employed by this project provided an opportunity to integrate these change ideas into the service, ensuring their suitability for practice and successfully addressing the evidence-to-practice gap. Future research should focus on long-term sustainability and the impact of sensory strategies on restrictive interventions, as well as on broader MDT delivery.

Author contributions

TF, CC, NV, KM, SLP, CG, MvV, SD and VW contributed to the conception and proposal of this quality improvement (QI) project and its development and design, with support from EL-E, who provided QI coaching. TF served as the site project lead, with crucial implementation support from her Occupational Therapy team. TF and DK were responsible for data management, while EL-E

conducted the data analysis. All authors contributed to the drafting of this manuscript; TF and EL-E prepared it for publication.

Supporting information

The *Sensory Modulation Strategies for Challenging Behaviours Implementation Guide* created by the Cygnet Occupational Therapy Acute and Psychiatric Intensive Care Unit Service Line, is available here: https://doi.org/10.20299/jpi.2025.007.appendix.

References

Adams-Leask, K., Varona, L., Dua, C., Baldock, M., Gerace, A. and Muir-Cochrane, E. (2018) The benefits of sensory modulation on levels of distress for consumers in a mental health emergency setting. *Australasian Psychiatry*, 26(5): 514–519. https://doi.org/10.1177/1039856217751988

Barbic, S.P., Chan, N., Rangi, A., Bradley, J., Pattison, R., Brockmeyer, K. and Mathias, S. (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

Bjerke, M.B. and Renger, R. (2017) Being smart about writing SMART objectives. *Evaluation & Program Planning*, 61: 125–177. https://doi.org/10.1016/j.evalprogplan.2016.12.009

Bowers, L., Stewart, D., Papadopoulos, C., Dack, C., Ross, J., Khanom, H. and Jeffery, D. (2011) *Inpatient violence and aggression: a literature*. Report from the Conflict and Containment Reduction Research Programme, Kings College, London.

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. https://doi.org/10.1177/1039856211430146

Courtlandt, C.D., Noonan, L. and Feld, L.G. (2009) Model for Improvement – Part 1: a framework for health care quality. *Pediatric Clinics of North America*, 56(4): 757–778. https://doi.org/10.1016/j.pcl.2009.06.002

Cox, M. and Sandberg, K. (2018) Modeling causal relationships in quality improvement. *Current Problems in Pediatric & Adolescent Health Care*, 48(7): 182–185. https://doi.org/10.1016/j.cppeds.2018.08.011

DH (2014) *Positive and proactive care: Reducing the need for restrictive interventions*. Social Care, Local Government and Care Partnership Directorate. Department of Health. 43 pp. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/300293/JRA_DoH_Guidance_on_RP_web_accessible.pdf

DH (2015) *Mental Health Act 1983: Code of practice*. Department of Health. https://www.gov.uk/government/publications/code-of-practice-mental-health-act-1983

Du Toit, V. (2009). *Patient volition and action in occupational therapy*. 4th edn. Vona and Marié du Toit Foundation, Pretoria.

Dye, S., Brown, S. and Chhina, N. (2009) Seclusion and restraint usage in seven English psychiatric intensive care units (PICUs). *Journal of Psychiatric Intensive Care*, 5(2): 69–79. https://doi.org/10.1017/S1742646409001435

Gerace, A. and Muir-Cochrane, E. (2019) Perceptions of nurses working with psychiatric consumers regarding the elimination of seclusion and restraint in psychiatric inpatient settings and emergency departments: an Australian survey. *International Journal of Mental Health Nursing*, 28(1): 209–225. https://doi.org/10.1111/inm.12522

Haig, S. and Wagstaff, C. (2024) A mixed methods study into the effectiveness of sensory rooms in reducing agitation levels in a psychiatric intensive care unit. *Journal of Psychiatric Intensive Care*, 20(2): 67–77. https://doi.org/10.20299/jpi.2024.007

Jenkin, G., Quigg, S., Paap, H., Cooney, E., Peterson, D. and Every-Palmer, S. (2022) Places of safety? Fear and violence in acute mental health facilities: a large qualitative study of staff and service user perspectives. *PLoS One*, 17(5): e0266935. https://doi.org/10.1371/journal.pone.0266935

Kandlur, N.R., Fernandes, A.C., Gerard, S.R., Rajiv, S. and Quadros, S. (2023) Sensory modulation interventions for adults with mental illness: a scoping review. *Hong Kong Journal of Occupational Therapy*, 36(2): 57–68. https://doi.org/10.1177/15691861231204896

Kontio, R., Joffe, G., Putkonen, H., Kuosmanen, L., Hane, K., Holi, M. and Välimäki, M. (2012) Seclusion and restraint in psychiatry: patients' experiences and practical suggestions on how to improve practices and use alternatives. *Perspectives in Psychiatric Care*, 48(1): 16–24. https://doi.org/10.1111/j.1744-6163.2010.00301.x

Lamanna, D., Ninkovic, D., Vijayaratnam, V., Balderson, K., Spivak, H., Brook, S. and Robertson, D. (2016) Aggression in psychiatric hospitalizations: a qualitative study of patient and provider perspectives. *Journal of Mental Health*, 25(6): 536–542. https://doi.org/10.1080/09638237.2016.1207222

Lang, E.S., Wyer, P.C. and Haynes, B.H. (2007) Knowledge translation: closing the evidence-to-practice gap. *Annals of Emergency Medicine*, 49(3): 355–363. https://doi.org/10.1016/j.annemergmed.2006.08.022

Lee, S.J., Cox, A., Whitecross, F., Williams, P. and Hollander, Y. (2010) Sensory assessment and therapy to help reduce seclusion use with service users needing psychiatric intensive care. *Journal of Psychiatric Intensive Care*, 6(2): 83–90.

Lloyd, C., King, R. and 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. https://doi.org/10.1080/18374905.2014.11081887

Mellow, A., Tickle, A. and Rennoldson, M. (2017). Qualitative systematic literature review: the experience of being in seclusion for adults with mental health difficulties. *Mental Health Review Journal*, 22(1): 1–15. https://doi.org/10.1108/MHRJ-04-2016-0007

Molloy, L., Chidarikire, S., Pullman J., Havilla S., Patton, D. and Beckett, P. (2024) The impact of sensory modulation interventions on practice in acute inpatient mental health settings: a meta-ethnography. *Issues in Mental Health Nursing*, 45(6): 580–588. https://doi.org/10.1080/01612840.2024.2341034

Moore, K. (2016) *Following the evidence: Sensory approaches in mental health*. The Sensory Connection Program. https://www.sensoryconnectionprogram.com/pdf/follow_the_evidence.pdf

NHS England (2024) Restrictive Interventions Dashboard. https://tinyurl.com/4tre5h3d [accessed 19 July 2024]

NICE, (2015) *Violence and aggression: Short-term management in mental health, health and community settings* National Institute for Health and Care Excellence Guideline, NG10. https://www.nice.org.uk/guidance/ng10

Novak, T., Scanlan, J., McCaul, D., MacDonald, N. and Clarke, T. (2012) Pilot study of a sensory room in an acute inpatient psychiatric unit. *Australasian Psychiatry*, 20(5): 401–406. https://doi.org/10.1177/1039856212459585

O'Sullivan, J. and Fitzgibbon, C. (2018) *Sensory modulation: Resource Manual*. Sensory Modulation Brisbane. https://sensory-modulation-brisbane.com/sensory-modulation-resource-manual

Quinn, M.J., Jutkowitz, E., Primack, J. and Konnyu, K. (2024) Protocols to reduce seclusion in inpatient mental health units:

a systematic review. *International Journal of Mental Health Nursing*, 33(3): 600–615. https://doi.org/10.1111/inm.13277

Rivett, E. (2020) A qualitative exploration of acute mental health inpatient staff's experiences of working with high-risk behaviours, and the support they receive. Doctoral thesis, University of Essex. http://repository.essex.ac.uk/id/eprint/28530

Scanlan, J.N. and Novak, T. (2015) Sensory approaches in mental health: a scoping review. *Australian Occupational Therapy Journal*, 62(5): 277–285. https://doi.org/10.1111/1440-1630.12224

Smith, K. and Crowfoot, K. (2001) ASI Wise. (2001). *Sensory Ladders*. ASI Wise. https://sensoryproject.org/sensoryladders/

Smith, S. and Jones, J. (2014) Use of a sensory room on an intensive care unit. *Journal of Psychosocial Nursing & Mental health Services*, 52(5): 22–30. https://doi.org/10.3928/02793695-20131126-06

Spinzy, Y., Maree, S., Segev, A. and Cohen-Rappaport, G. (2018) Listening to the patient perspective: psychiatric inpatients' attitudes towards physical restraint. *Psychiatric Quarterly*, 89: 691–696. https://doi.org/10.1017/S1742646409001435

Sutton, D. and Nicholson, E. (2011) Sensory modulation in Acute Mental Health wards: a qualitative study of staff and service user perspectives. The National Centre of Mental Health Research, Information and Workforce Development (Te Pou). https://hdl.handle.net/10292/4312

Taylor, M.J., McNicholas, C., Nicolay, C., Darzi, A., Bell, D. and Reed, J.E. (2014) Systematic review of the application of the plan–do–study method to improve quality in healthcare. *BMJ Quality & Safety*, 23(4): 290–298. https://doi.org/10.1136/bmjqs-2013-001862

Van den Boogert, F., Klein, K., Spaan, P., Sizoo, B., Bouman, Y.H., Hoogendijk, W.J. and Roza, S.J. (2022) Sensory processing difficulties in psychiatric disorders: a meta-analysis. *Journal of Psychiatric Research*, 151: 173–180. https://doi.org/10.1016/j.jpsychires.2022.04.020

Weltens, I., Bak, M., Verhagen, S., Vandenberk, E., Domen, P., van Amelsvoort, T. and Drukker, M. (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

Yarber, L., Brownson, C.A., Jacob, R.R., Baker, E.A., Jones, E., Baumann, C., Deshpande, A.D., Gillespie, K.N., Scharff, D.P. and Brownson, R.C. (2015) Evaluating a train-the-trainer approach for improving capacity for evidence-based decision making in public health. *BMC Health Services Research*, 15: 547. https://doi.org/10.1186/s12913-015-1224-2