



Design in  
Mental Health  
Network  
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# Design with People in Mind: A Review of the Evidence

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## introduction

In Spring 2017, Design in Mental Health launched a research brochure, showcasing key evidence relating to mental health and the built environment. In this more comprehensive review of the literature, we have assembled evidence from psychology, nursing, psychiatry, architecture and design, to explore the relationship between environments and people. Our purpose in doing so is simple: we want to provide a weightier research repository, so that all members of the DiMH network can access key information, to inform decision-making.

In this report, we provide a comprehensive, rather than exhaustive review of current evidence and thinking on a number of topics relevant to built environments. We examine a wide range of spaces found in care settings, where people live and work, including bedrooms, seclusion, nursing stations and ward areas. In addition, we consider the effects of those spaces on emotion and behaviour, as well as consider their overall impact on well-being and recovery. We know care settings can be challenging, so we have balanced coverage of patient or service user perspectives, with broader issues relevant to risk and safety management. Most importantly, we have endeavoured to examine how spaces might work to increase choice, restore hope, and simply make people feel better.

The personalisation agenda within health services put forward by the UK government promotes the tailoring of services to individual needs and proposes that 'every person who receives support should have choice and control, regardless of the care setting' (Department of Health, 2011, p.32).

A study to evaluate a psychiatric intensive care unit refurbishment by Payne and May (2009) found that opportunities which enabled individuals to exercise choice and control over the environment such as the provision of openable windows, a choice of alternative social spaces and a range of DVD and music options were perceived to have a positive impact on service users' sense of well-being. In the same study however, the issue of temperature control was identified as an unaddressed staff concern resulting from a cost decision not to install air conditioning. The situation presented an unsatisfactory choice between the use of noisy hired air conditioning units and uncomfortable levels of heat on the wards.

In research examining service user and staff perceptions of existing and new build inpatient mental healthcare facilities, Lawson, Phiri and Wells-Thorpe (2003) found that aesthetic and spatial enhancements were identified by service users within the new facility, however, there was limited perception of improvement regarding individual control over environmental elements including temperature, ventilation, window treatments and noise.

Issues of choice and control are also considered by Karlin and Zeiss (2006) in a review of environmental and therapeutic issues in mental healthcare inpatient settings and research findings suggest that zoned seating areas in communal spaces can provide flexibility and enable service users

to control their levels of social contact. Affording a sense of privacy is understood to contribute to individual perceptions of wellbeing and research by Sclafani, Phillips and Caldwell (2009) highlighted that service users moving into a new psychiatric facility perceived the provision of private spaces to be a positive element of the new environment. Other key positive environmental factors identified within the new facility included the application of colour, lighting and natural light.

In examining the use of colour and lighting within hospital environments Dalke, Littlefair, Loe and Camög (2004) report that enclosed environments with strong colours may be over-stimulating or threatening to people experiencing mental distress. The authors recommend that lighting and colour are used to make spaces appear as open and light as possible and propose that muted colours which are 'greyed-off' with a small percentage of black can be relaxing and reduce stress. Similarly, Karlin and Zeiss (2006) report that people experiencing agitation may be over-stimulated by bright colours and suggest that the use of colours which are close in terms of tone and intensity can be calming. Additionally, whilst certain blue tones are reported to be relaxing, it is also suggested that blue-green colours can have a negative impact on people experiencing low mood.

The benefits of natural daylight to mental health are reported in a study which found a reduction of 3.67 days in the mean length of hospital stay for service users with a diagnosis of bipolar disorder who had East-facing bedrooms with direct morning sunlight (Benedetti, Colombo, Barbini, Campori, & Smeraldi, 2001). Similarly, in a psychiatric inpatient unit where

half the bedrooms were sunny and half were dull, Beauchemin and Hays (1996) studied the impact of bedroom sunlight on the average length of stay for people with a diagnosis of depression. The study found that service users experienced a significantly shorter average length of stay in sunny rooms (16.9 days) than those in rooms which were not (19.5 days).

Lewy et al. (1998) undertook a controlled study to examine the impact of morning or evening exposure to bright light treatment on levels of depression in people with seasonal affective disorder. The authors found no existing research demonstrating evening light to be more anti-depressant than morning light and found existing research to be mixed between studies suggesting morning light to be more effective than evening exposure and those suggesting no difference between the two. The results of the study found morning light exposure to be at least twice as anti-depressant as evening light in the treatment of seasonal affective disorder.

The impact of bedroom sunlight on recovery was studied by Walch et al. (2005) in research with patients recovering from spinal surgery in a general hospital setting. Bedrooms on the brighter side of the unit were exposed on average to 46% higher-intensity sunlight than the rooms on the less bright side of the same unit. The findings showed that patients who had been exposed to higher-intensity sunlight perceived less stress, slightly less pain and took 22% less analgesic medication per hour than those exposed to the conditions with less natural sunlight. As a result, the costs of analgesic medication were also reduced by 21% for patients in rooms on the brighter side of the unit.

In addition to facilitating exposure to natural light, bedroom windows may also afford restorative views, however, research findings highlight the importance of designing windows such that cill heights enable service users to appreciate views from bed (Douglas & Douglas, 2005; Lawson et al., 2003).

In a comparison between an old intensive care unit (ICU) and a new ICU in the same general hospital, Shepley, Gerbi, Watson, Imgrund and Sagha-Zadeh (2012) examined the impact of window views and natural light on patients' length of stay and pain levels, in addition to staff errors, rates of staff vacancy and absence from work. The research findings suggested that window views and high levels of daylight might have a positive impact of levels of staff absence from work and staff vacancy. Between the old unit and the new unit, there was a mean decrease in absenteeism from 38 to 23 hours per person and the average rates of staff vacancy decreased by 25%. The findings were inconclusive regarding the impact of increased daylight and window views on patient length of stay, perception of pain and medical error.

The impact of smell on well-being is also identified in a review of research relating to design in mental healthcare settings by Connellan et al. (2013) in which commonalities across the literature suggest that "pleasing aromas may reduce blood pressure, slow respiration, and lower pain perception levels; unpleasant odors stimulate anxiety, fear and stress" (p.145). Accordingly, Mazuch and Stephen (2007) note the importance of installing appropriate ventilation within mental health environments to control unpleasant odours which might induce negative emotional responses.

Research suggests that perceiving a sense of environmental control can contribute positively to a sense of well-being, however, opportunities for service users to exert control over their everyday environments within mental healthcare settings are limited (Lawson et al., 2003; Papoulias, Csipke, Rose, McKellar, & Wykes, 2014). Research also highlights the significance of light quality to well-being and following a multidisciplinary review of studies examining the impact of lighting in healthcare environments, Joseph (2006) concludes that, "natural light should be incorporated into lighting design in healthcare settings, not only because it is beneficial to patients and staff, but also because it is light delivered at no cost and in a form that most people prefer" (p.1).

# therapeutic space

Whilst there is a growing body of research examining the impact of evidence-based design within inpatient healthcare settings on clinical outcomes (Ulrich et al., 2008), research focusing specifically on relationships between the design of mental health wards and service user outcomes or experience is more limited (Papoulias, Csipke, Rose, McKellar, & Wykes, 2014).

Papoulias and colleagues' systematic review identified no clear causal connections between clinical outcomes and environmental design in psychiatric facilities, however, findings showed the provision of private spaces and homely design to be associated with increased well-being and social interaction (Papoulias et al., 2014). Connellan et al. (2013) similarly found home-like comfort to be a particular focus across the literature within a systematic review of research examining the impact of design on the therapeutic experience of mental health facilities.

The impact of a homely environment on well-being is also reported by Payne and May (2009) in an evaluation of a psychiatric intensive care unit refurbishment undertaken as part of the King's Fund grant supported 'Enhancing the Healing Environment' initiative (Department of Health, 2008). Within the new ward, service users perceived the experience of homeliness to be associated with a number of features, including the overall quality and cleanliness of the new environment as compared with the original ward, comfortable furniture, natural light, openable windows to provide fresh air, indoor plants, private spaces for visitors, high quality food and staff attitudes. The new environment was described by staff as being calmer and having a greater sense of 'openness' and light than the original ward. Following the refurbishment, the average length of service user stay reduced by 20% and a significant reduction in physical assaults on staff and other service users was reported.

Lawson, Phiri, & Wells-Thorpe (2003) also studied the effects of the architectural healthcare environment on well-being and compared service user outcomes between an existing facility and a new build medium secure mental health environment. Whilst the number of instances of physical and verbal aggression remained the same in the two sites, the severity of incidents was reduced in the new facility and there was also a two thirds reduction in service user self-harm. Rates of seclusion also reduced by 70% and there was a 14% reduction in service user length of stay in the new unit. Tactility and texture within environmental finishes and variation in lighting were also reported to provide greater perceptions of homeliness in contrast to smooth clinical finishes and uniform lighting.

Stichler (2008) describes the holistic approach of the non-profit organisation 'Planetree' towards developing healthcare environments using a relationship-based philosophy which includes nine key considerations: "human interaction; consumer and patient education; healing partnerships with patients' family and friends; food and nutritional nurturance; spirituality; human touch; healing arts and visual therapy; integration of complementary therapies; healing environments created in the architecture and design of the healthcare setting" (p. 506). Staff culture and attitudes are integral to the relationship-based approach and have been shown to have a positive effect on both service user and staff satisfaction. Particular environmental design recommendations also include natural lighting, natural finishes including timber and stone,

water features, plants and 'homelike' elements with the aim of creating calm environments.

Csipke et al. (2016) used participatory methods to examine service user and staff perceptions of the physical environment in a psychiatric inpatient setting. A questionnaire to assess the impact of the ward design contained service user generated measures and service users were also invited to take two photographs to illustrate their perception of the best and the worst physical aspect of the ward. Service user researchers carried out the literature review and collected the data, in addition to undertaking a large part of the data analysis. Both staff and service users describe the overall environment as being 'institutional' and 'bland' and their accounts suggest a 'brightening up' of the ward environment to be associated with perceptions of an improved sense of well-being (p.118). Other shared concerns include perceptions of environmental disrepair or poor levels of hygiene and 52% of the negative images produced by service users related to concerns about poor maintenance and hygiene on the wards. The photographic data contained bathrooms, dayrooms and private bedrooms predominantly, with the majority of bathroom images being negative (88%) and the majority of dayrooms and bedrooms being positive (85% and 83% respectively). Service users also described privacy and a sense of space as being important to well-being and both staff and service users expressed a wish for more artwork to be displayed on the wards.

A qualitative study by Donald, Duff, Lee, Kroschel and Kulkarni (2015) examined service user perspectives regarding the therapeutic impact of a psychiatric inpatient environment on their sense of well-being. Participants reported valuing time spent with staff members and staff participation in ward activities, although the perception of staff being too busy to attend to service users' needs was a recurring concern. The physical environment was described as being 'confused', 'sterile' and also lacking in privacy, with specific reference to full height glazing to the treatment rooms. Limited

amenity and sources of distraction on the ward were also reported as a concern in relation to service users' experiences of boredom and sense of meaningful activity. Service user suggestions for environmental enhancements included creating a community garden in the existing outdoor space to increase a connection with nature and provide a source of activities. The authors propose that conceiving the therapeutic potential of psychiatric environments as 'collective spaces of care' could attempt to capture the ways in which both the physical and social aspects of psychiatric care might contribute to service users' sense of well-being.

A pilot research project undertaken by (Curtis, Gesler, Fabian, Francis, & Priebe, 2007) produced a post-occupancy assessment of a new mental health facility based on discussion groups and unstructured interviews with staff and former service users. The study draws on the notion of 'therapeutic landscapes' (Gesler, 1993), in which it might be proposed that, "the therapeutic value of hospitals is related to their physical, social and symbolic design" (Gesler, Bell, Curtis, Hubbard, & Francis, 2004, p.117). Participants' accounts in the case-study research included positive and negative appraisals of physical aspects of the environment, such as light, materials, quality of food, air quality and green spaces, however, the authors highlight that social and symbolic aspects of the environment were referred to with equal frequency by participants. Social aspects included reflections about issues of privacy and the empowerment of service users to make more decisions in regards to their treatment and environment. Aspects of the symbolic environment included references to specific features of the design, such as the hospital being situated on a waste site adjacent to a busy road and the high perimeter fencing to the secure unit which was perceived to have prison connotations.

Staff perspectives on design in mental and behavioural healthcare settings were also examined by Shepley et al. (2017) who describe the development of survey tool to evaluate the importance and effectiveness of environmental qualities as perceived by staff. Topics in a draft version of the Psychiatric Staff Environmental

Design tool (PSED) were generated based on a literature review and analysis of staff interviews from an earlier study. One of the key study findings revealed a statistically significant difference between staff perceptions of important environmental features and the existence of these elements in their place of work. Other findings also indicated staff support for private patient rooms alongside staff recognition of the importance of positive distraction and aesthetics within the environment.

Whilst spatial tensions exist between the mitigation of risk and the creation of deinstitutionalised environments, the literature suggests that facilitating a balance between achieving the required levels of safety and creating homely non-sterile spaces should be a key consideration in mental healthcare design (Shepley et al., 2016). Research findings also suggest that perceptions of the physical, social and symbolic aspects of mental healthcare environments are intertwined and equally pertinent to service user and staff experiences (Curtis et al., 2007; Donald et al., 2015).



Connections between mental health and the natural environment have long been recognised and features of 19th century asylum design which included providing views of natural landscapes from indoors and opportunities for patients to actively engage with nature were considered beneficial to the therapeutic process (Hickman, 2009).

More recently a body of research evidence undertaken within general healthcare settings similarly suggests that window views, particularly those containing nature, can have restorative effects on health and well-being (Ulrich et al., 2008), including reduced service user recovery time (Ulrich, 1984) and reduced service user stress (Ulrich, Zimring, Quan, & Joseph, 2006) and a sense of connection with life beyond the hospital (Douglas & Douglas, 2005; Lawson et al., 2003).

Within a new build mental health inpatient facility, Connellan et al. (2011) examined relationships between internal and external space and observed that the full-height glazing in communal ward areas overlooking garden spaces provided natural light and a sense of openness and indoor-outdoor connection. The authors also highlighted that windows on a secure ward presented service users with views of inaccessible outdoor spaces and suggest that the potential for glazing to simultaneously offer up and provide a barrier to natural spaces is deserving of ethical design consideration in acute mental health settings. Similarly, in another study the provision of views towards an inaccessible rooftop garden within a refurbished psychiatric intensive care unit where service users did not have direct access to outdoor space was a concern expressed by staff, describing the service users' experience as being, 'you can look but you can't touch' (Payne & May, 2009, p. 82).

Providing free access to outdoor space is also highlighted by Dvoskin et al. (2002) who outline the design approach to planning a new build secure forensic mental health facility. In the design a direct adjacency was created between day areas and outdoor space to form indoor-outdoor day rooms which could be fully observed by staff from indoors, but were also accessible to service users at any time. Movement through outdoor space has also been recognised to have therapeutic benefit to people experiencing mental distress and research suggests that a desire for free movement through open space often expressed by people experiencing acute psychosis or crisis can be a mechanism for easing mental distress perceived to be overwhelming within the confines of indoor space (McGrath & Reavey, 2015).

Access to therapeutic outdoor environments with multiple functions such as vegetable gardens, sports and recreation facilities is also highlighted in a study to identify key aspects of psychiatric inpatient environments believed to have a positive effect on service users and staff (Shepley et al., 2016). A design framework relating to outdoor space within healthcare settings drawn from a review of peer-reviewed literature and best practice design guidance by Shukor, Stigsdotter and Nilsson (2012) also recommends the provision of transitional space between indoors and outdoors, shelter to allow use in different seasons, variety and choice including different seating types and sensory stimuli including plants which attract birds and insects.



Wood et al. (2013) examined carers' perspectives of new build and existing inpatient mental health facilities in relation to their environmental qualities and identified the importance of affording privacy to service users and visitors in a variety of spaces, including gardens. Whilst participants reported an absence of private visiting rooms and uncomfortable levels of ambient noise within the common areas of the new building, the garden was described as affording a peaceful and private meeting space.

Bringslimark, Hartig and Patil (2009) undertook a review of experimental studies examining the effect of passive experiences with indoor plants on psychological functioning and identified that studies focused mainly on the impact of visual experiences with plants. The findings of several studies reviewed suggested that flowering plants may have greater impact than foliage plants in terms of stress-reduction, pain tolerance and perceived attractiveness of a room. Although certain findings such as improved pain management in the presence of plants were repeated across the literature, overall the findings of the review were mixed. The authors attribute this in part to the differences in experimental processes and measures used and therefore express reservation about more general claims that indoor plants can produce positive psychological change.

The use of natural finishes within healthcare environments was examined by Nyrud, Bringslimark and Bysheim (2014) who undertook a survey in a Norwegian general hospital to examine staff perceptions of the use of timber finishes within a typical patient bedroom. Participants responded to ten computer generated images of the same interior, depicted with varying extents of applied timber finishes, ranging from no timber, to a version with timber on the floor, walls and ceiling. The most preferred design contained an intermediate amount of timber, applied only to the floor, the loose furniture and a single feature wall. The rooms at both ends of the continuum were the least preferred.

The therapeutic value of active physical engagement with nature has also been studied and a critical review of research evaluating gardening-based interventions in mental healthcare found that all reviewed studies reported positive benefits associated with the interventions, including significant reductions in symptoms of anxiety and depression (Clatworthy, Hinds, & Camic, 2013).

Granerud and Eriksson (2014) examined the use of interventions described as 'green care services', designed to promote improved mental and physical health through nature-based activities and work with animals. Participants in the qualitative research included people with mental health needs or drug related difficulties and the study examined their accounts of participating in farm work and their experiences in relation to recovery. The findings suggest that working in a social context within nature and with animals increased perceptions of personal growth and meaning in life. Participants describe perceiving value in the uncomplicated nature of being in contact with animals and taking responsibility for the animals' welfare contributed to participants' perceptions of providing care and mastering new skills. Accounts also suggest that the physical tiredness associated with working in nature can provide an enriching sense of satisfaction and aid relaxation.

In a multistudy analysis of 10 UK studies examining physical activity in nature, or 'green exercise', Barton and Pretty (2010) assessed the optimum amount of exposure to green exercise for improving self-esteem and mood as measures of mental health. The study found that levels of self-esteem and mood were improved by activity in all the green environments and that the presence of water produced greater effects. One of the greatest improvements to self-esteem following physical activity within nature was found with people experiencing mental distress.

Moxham, Liersch-Sumskis, Taylor, Patterson and Brighton (2015) describe a pilot 5-day recovery camp intervention undertaken with 26 mental health service users in cabin-based accommodation in the Australian bush. The

camp offered a series of mentally and physically stimulating outdoor experiences described as 'challenge-by-choice' therapeutic recreation, alongside daily tai chi sessions and shared meals. At the start participants each listed ten expectations held about participating in the camp and on the last day rated the extent to which their expectations had been met. The expectation statements were analysed by the researchers to produce a set of 16 expectation themes. Participants expressed satisfaction in areas of expectation including, breaking from routine, meeting new people, connecting with nature, improving sleep quality, having fun and taking on new challenges. Expectations that the camp experience would be confidence building, de-stressing or relaxing were described as being less fulfilled for some of the participants. The findings suggest that the pilot recovery camp was a success overall, with the majority of participants' expectations rated as having been met, strongly met, or completely met and only 5.63% of expectations rated as not met or strongly not met.

Research findings suggest that natural spaces in healthcare settings can be restorative resources which may enable service users, staff and visitors to reduce stress (Ulrich et al., 2006). It is also suggested that gardens can save costs, due to reduced length of service user stay and reduced turnover of staff (Gordon, 2001). Furthermore, research findings suggest that the provision of opportunities for active and social experiences in green outdoor environments within healthcare settings and in the community can have a positive impact on service users' physical and mental health.

# aesthetic space

A growing body of research examining the impact of arts, design and environment on well-being and clinical outcomes in mental healthcare was identified by Daykin, Byrne, Soteriou and O'Connor (2008) in a systematic literature review. The authors found very few existing studies that examined arts interventions directly however and none that specifically studied the impact of artwork on service users and staff within mental healthcare settings. The review also highlighted that arts interventions do not always address the lack of control experienced by service users in healthcare settings (Lawson et al., 2003) which can be limiting to their potential benefits.

Daykin, Byrne, Soteriou and O'Connor (2010) considered the subjective impact of visual arts in a qualitative evaluation of an arts project designed to enhance service user and staff experiences within NHS mental healthcare environments. The three-year project within 16 new mental health units included 36 individually commissioned artworks which were developed in consultation with service users, staff and other stakeholders. Reported benefits of the art interventions included reinforcement of positive environmental elements such as nature, particularly with the use of natural and handcrafted materials, such that in turn the more negatively perceived clinical and institutional aspects of the environments were minimised.

The findings reported that staff and service users who perceived a sense of control through the process of developing the art interventions and in some cases participating in their construction were generally supportive of the artworks created. It was also suggested that service user participation provided opportunities to re-engage with alternative positive and creative identities (Spandler, Secker, Kent, Hacking, & Shenton, 2007) such as 'artist', 'critic' or 'expert' and exercise a sense of control through actively shaping the aesthetic environment. The study revealed some tension between issues of 'authenticity' and 'prestige' in relation to preferences for 'service user art' versus

'professional art' and a sense of dissatisfaction amongst some participants that the selection of 'service user artists' had not been made a priority. For some service user/artists the potential for participation in the project had therefore not been fully met.

Stickley and Duncan (2007) report on the implementation of a community-based arts initiative to promote mental health in a deprived inner city area and draw attention to the distinction between art therapy as a specific professional practice and the more widely accessible use of art as a therapeutic activity for mental health service users. Working alongside statutory services, the 'Art in Mind' project facilitated creative expression for people with lived experience of mental distress, with the purpose of promoting social inclusion and community networks. Participants reported experiencing reduced stress, increased confidence and forming new authentic relationships through their involvement in the project.

A study by Margrove, Pope and Mark (2013) examined artists' experiences of running participatory arts projects in the community, in which mental health service users worked with a variety of media including paint, clay and textiles. The artists described perceiving artwork creation to be especially beneficial for people with mental health needs and suggested that the process could enable the expression of complex feelings through non-verbal media. The participants

reported witnessing positive changes in service users' well-being and behaviour over the duration of the courses and observed the development of sustained friendships between students.

A critical review of research examining visual art-based practices and recovery within adult mental health undertaken by Van Lith, Schofield and Fenner (2013) found that participation in arts projects can be highly beneficial to the process of psychological and social recovery in areas including relationships, social identity, self-discovery and self-expression. Benefits of arts-based practices were also identified in relation to occupational recovery and included the development of organisational skills, working towards goals and a sense of contribution to society. Environmental attributes which are supportive to individual recovery are described as contributing to contextual recovery and the facilitation of a psychological 'safe place' was found to be a predominant concept across the literature. The authors suggest that mixed-methods studies involving both qualitative and quantitative components provided the most complete insights into this field of research and suggest that further mixed-methods studies would be helpful to provide additional validation to the existing evidence-base.

Stacey and Stickley (2010) raise the debate surrounding appropriate methodological approaches to studies examining the relationship between art and health and argue that a qualitative paradigm may be best aligned with the experiential nature of participatory arts. Accordingly, the authors describe undertaking a qualitative study in which the research methods and research question were developed in collaboration with service users. The research examined mental health service user narratives about the significance of art activities following their participation in arts-based workshops and the findings suggest that creativity may constitute a significant part of self-concept. Overall, service users reported multiple benefits resulting from art-based practices, which support the need to provide creative resources within mental health services.

Within an inpatient setting, a study by Nanda, Eisen, Zadeh and Owen (2011) examined service users' responses to different styles of artworks displayed on a rotational basis on the wall of the lounge on an acute psychiatric assessment ward. Their findings showed a significant reduction in incidents of pro re nata (PRN) treatment (medication which is dispensed as needed) for agitation and anxiety, when an image of a naturalistic landscape was displayed versus an abstract image, or the control condition in which no art was displayed.

Whilst staff observed that service users frequently looked at the artwork displayed, though in general did not comment on it or react to it physically, they also reported specific reactions to the abstract art piece, including service users either throwing it, asking it to be turned around, or re-orienting it. The findings suggest support to previous studies which report positive responses from service users to natural images and negative responses to abstract, surreal or ambiguous art in both a psychiatric hospital setting (Ulrich, 1991) and general hospital setting (Nanda, Eisen, & Baladandayuthapani, 2008). The authors present a financial case for the use of artwork in mental health environments based on the potential for significant cost savings associated with reduced administration of PRN medication, although acknowledge the requirement for further research in additional sites with varied demographics to test the validity of the research findings.

Although research to evaluate the impact of art interventions specifically within mental healthcare settings is limited, the findings of existing studies suggest that environmental enhancements can positively impact on the health and well-being of service users and staff (Daykin et al., 2008).

Whilst there is debate surrounding appropriate methodologies for examining perceptions about art-based practices and a limited evidence-base, existing studies suggest that participation in arts projects can play a significant part in mental health recovery (Van Lith et al., 2013).

As a central hub of activity and often tension, the nursing station forms a key interpersonal space for service users, staff and visitors on mental health wards. Accordingly, a systematic literature review by Connellan et al. (2013) found nursing stations to be the most significant element in the physical and spatial design of mental health facilities.

Andes and Shattell (2006) argue the importance of nursing station design to therapeutic staff-service user relationships and propose that enclosed nursing stations may contribute to a sense of power imbalance between staff and service users. It is observed that whilst service users are required to attract staff attention by knocking on the glazing, staff members have the power to choose when to engage. A glazed barrier separating service users from staff is also argued to inhibit interaction and reinforce an impression of service users being unable to respect boundaries.

Research undertaken on two psychiatric wards by Edwards and Hults (1970) used time study observations, surveys and interviews to assess the impact of 'open' nursing stations on staff and service user behaviour and perceptions, following the removal of existing glass partitions. After removing the glazing, it was found that staff spent more time outside the nursing station interacting with service users and that service users spent less time visiting the nursing station. With the open station, fewer service users reported feeling concerned about seeing staff talking or laughing in the station and fewer service users felt that visiting the nursing station was a disturbance to staff. Survey findings indicated that 84% of staff and 88% of service users preferred the station open rather than closed. Studies by Southard et al. (2012) and Shattell et al. (2015) examined service user and staff perspectives on an acute psychiatric unit before and after the glazed enclosure to the nursing station was

removed. Whilst Southard and colleagues found no statistically significant differences in service user or staff perceptions of the therapeutic milieu before and after the station alterations, their perceptions did not worsen and the open station did not result in any increase of aggression towards staff by service users, as had been predicted by some staff. There was also a reported decrease in incidences of seclusion or restraint by 26% in the year after the enclosure was removed.

In the same context, Shattell and colleagues found that the open station was unanimously preferred by service users, who reported feelings of 'freedom and togetherness' and a greater sense of safety, including the perception that staff could respond more quickly to emergencies. Both service users and staff viewed the enclosure to be a barrier to interaction and service users described associating the glazing with prisons and a sense of punishment. Staff also perceived that the enclosed station elevated service user frustration and reported that the open station had assisted with service user de-escalation.

The research findings highlight spatial tensions between the dual demands of the station environment to be both a place of therapeutic staff-service user interaction and a space for often confidential administrative tasks. When considering the open nursing station, issues around confidentiality were raised by staff and whilst some nurses perceived their ability to speak freely with colleagues to be inhibited, others felt the open station encouraged staff to be more conscious when speaking. Some staff also reported that

frequent service user interruptions when working in the open station affected their ability to complete administrative tasks (Shattell et al., 2015).

Studies suggest the benefits of providing additional discrete spaces for nurses to carry out administration away from the nursing station and also to relax (D. Brown, 2009) and an increase in positive nurse-service user interaction was reported in a study following a ward re-design which included more private space for nurses and service users (Tyson, Graham, Lambert, & Beattie, 2002). Planning for social or therapeutic service user activity around the nursing station, such as seating, is also recommended to facilitate improved interaction (Hunt & Sine, 2017).

Whilst empirical research is limited, the findings presented suggest that open nursing stations might lead to greater service user satisfaction through improved staff accessibility and service user-staff interaction. It is also suggested that improved staff satisfaction may be achieved through greater provision of separate private spaces for administration and relaxation.

Noise is commonly defined as 'unwanted sound' and whilst there is little empirical research which focuses specifically on the impact of noise within mental healthcare environments, there is much evidence to suggest that excessive noise can be detrimental to service users' physical and psychological well-being in general hospital settings (Ulrich et al., 2006).

A paper by Choiniere (2010) exploring the impact of noise on service users and staff within general hospital environments highlights the derivation of the word 'noise' from 'nausea' and describes the nervous system responding to noise in similar ways to its response to stress, such that exposure to excessive noise and sleep disturbances can have a negative effect on health, including the immune system.

The potential health impact of noise is also highlighted by Holmberg and Coon (1999) who undertook an exploratory study to measure noise levels within a psychiatric hospital environment. The study found that the levels of noise recorded were equal to or higher than those which have been shown to impact on cardiovascular and cognitive functioning in community or workplace settings with high noise levels.

The effects of intrusive background noise on an older adult mental health ward were studied by Brown et al. (2016) who measured decibel levels and service user distress and agitation as expressed by incidents of violence. Simple interventions including applying felt pads to the base of furniture legs achieved reduced decibel levels and during the study period it was found that violent incidents on the ward decreased. As other measures which aimed to reduce levels of violence were being undertaken simultaneously, the authors reported that a direct impact of the noise reduction on the number of incidents recorded could not be

determined, however, it was perceived by staff to constitute part of the overall effect. Instances of staff absence from work were also reported to have reduced by 40% during the study period.

As mental distress is frequently associated with sleep disturbance (Abad & Guilleminault, 2005), the reduction of noise which may compound sleep disruption is particularly significant to mental healthcare settings. A study examining the prevalence of sleep disturbance amongst forensic mental health service users in the Netherlands found that close to 30% of the participants experienced one or more sleep disorders, particularly insomnia and that 49.1% reported poor quality of sleep (Kamphuis, Karsten, de Weerd, & Lancel, 2013). A further study within the same clinical population examined the relationship between sleep and aggression and found sleep difficulties to be correlated with higher levels of self-rated aggression and impulsivity, in addition to higher levels of hostility as rated by clinicians (Kamphuis, Dijk, Spreen, & Lancel, 2014).

A body of research has focused on the impact of noise on service users within healthcare settings, however, studies examining effects on staff in these environments are more limited (Blomkvist, Eriksen, Theorell, Ulrich, & Rasmanis, 2005; Choiniere, 2010). Research examining staff well-being at work in a coronary critical care setting found that the installation of sound absorbing ceiling tiles led to a positive acoustic impact on the environment which included reverberation times and speech clarity. Staff also reported reduced pressure and strain at work and the findings suggest that risk of conflict



and clinical errors may be mitigated through noise reduction (Blomkvist et al., 2005).

Staff conversation contributes significantly to noise in healthcare environments, however, it is suggested that incorporating appropriate acoustic design into the physical environment may be more effective than interventions to modify staff culture. Architectural recommendations for sound reduction include sound-absorbing finishes, single bedrooms and removing or attenuating noise sources (Ulrich, 2006). It is also suggested that the creation of highly reverberant spaces or corridors which are long and echoic should be avoided in the architectural design of mental healthcare settings due to perceptual distortions which may be felt by people experiencing mental distress (Karlin & Zeiss, 2006).

Whilst research examining hospital sound is predominantly focused on the measurement and impact of sound levels, a qualitative study examining the subjective responses of patients and nurses to sounds in a cardiothoracic ward undertaken by Mackrill, Cain and Jennings (2013) draws empirical attention to the overall ward 'soundscape' and the ways in which sounds may communicate meaning or evoke emotional responses. The ward soundscape was found to contain a varied mix of sound sources and the perception of sound was not only associated with specific sounds, but also with the physical, social and temporal context in which the sounds may be heard. The findings report both positive and negative subjective perceptions of sound and interpretation of sounds influenced perception and coping behaviour, such that an understanding of sound sources and habituation to sounds resulted in perceptions that were more positive. Positive responses to the soundscape were associated with sounds such as birdsong heard through the hospital windows and occupational activity on the ward including the sound of the tea trolley. Intervening environmental conditions including temperature and lighting were also found to affect patient and staff mood and thereby influence perceptions of the soundscape.

Mackrill, Jennings and Cain (2014) further develop the premise that improving perceptions of sound in healthcare settings is more complex than simply reducing sound levels and used a series of interventions to examine the ways in which a positive soundscape might be 'designed'. In a sound lab setting, healthy participants listened to recordings of an existing ward soundscape into which natural sound (birdsong and flowing water) and steady state sound (a uniform, nondescript sound of sterilising equipment) were incorporated separately as sound interventions. Participants also received written information about the various sources of sounds within the ward soundscape and rated their perceived levels of 'relaxation' and 'interest and understanding' in response to the interventions. The interventions produced a small but significant effect in the 'relaxation' dimension, in which the natural sound and written sound source information had greatest impact on perception of the soundscape and steady state sound showed a smaller effect. Natural sound generated a 10.1% positive change in perception of the soundscape, however, less positive responses, including comments that the birdsong "could get too much if 'piped in'" and that "the sound of running water didn't fit" (p. 1457) suggest that visual context is significant to the acceptance of sound.

Research undertaken by Watts, Khan and Pheasant (2016) examined the combined influence of the soundscape and interior design in a student health centre reception area on patients' self-reported anxiety levels and perceived tranquillity. The study compared perceptions of the existing environmental conditions with perceptions of the same interior following interventions, which included replacing music radio with the sound of gentle waves and replacing health-related leaflets on noticeboards with large-scale photographs of natural scenes. Findings showed a significant improvement to reported rates of perceived tranquillity in the adjusted condition and participants who had experienced the environment under both conditions reported a reduction in anxiety.

Brown, Rutherford and Crawford (2015) note that the limited sensory stimulation which may be provided by the overall environment in hospital settings may make the acoustic landscape especially significant. Their interdisciplinary literature review highlights the social function of sound and the ways in which sounds may communicate meaning to enable individuals to make sense of their environment. On the basis that positive perception of sound may contribute to healing, the authors suggest that an optimal soundscape in healthcare settings might not require silence, but might contain sounds that are clear and understood. The review findings suggest that further research should therefore not only focus on sound level reduction and the negative impact of noise, but on examining the interpretation of the overall soundscape in healthcare settings.

Although further research is required to examine the effects of noise within mental healthcare environments, existing research shows that noise levels can affect the health and behaviour of service users and staff, which in turn highlights the importance of appropriate acoustic design. Further research is required to examine how emotional responses to sound might reflect an individual's feelings towards the environment and how the soundscape might be 'designed' as a part of an integrated environment, alongside other elements such as temperature and light.

# sensory space

Recent years have seen rapidly increasing interest in the therapeutic use of sensory environments and approaches within mental healthcare settings. Also described as 'snoezelen' or 'comfort rooms', sensory rooms may typically contain sensory elements such as optic lamps, bubble tubes, scenic pictures, comfortable furniture, music, aromas, flavours and sensory objects, to create an environment which can be tailored according to the user (Costa, Donna, Morra, Solomon, Sabino, & Call, 2006).

Within this emerging field, a scoping review of existing research examining the use and impact of sensory approaches within mental healthcare environments by Scanlan and Novak (2015) identified that studies have predominantly examined interventions in terms of either reduction in levels of service user distress or rates of seclusion and restraint.

Focusing on staff perceptions of service users' well-being, Björkdahl, Perseius, Samuelsson and Lindberg (2016) examined staff expectations and experiences of new sensory rooms on ten psychiatric wards. Whilst participants reported initial concerns about service users using the rooms alone and the potential for vandalism, self-harm or increased anxiety, it was found that service users typically chose to be alone and staff reported observing an increase in service users' self-confidence. Whilst 92% of participants perceived predominantly positive effects of the sensory rooms on service users' well-being, the experience of negative feelings including increased anxiety, claustrophobia, louder auditory hallucinations and urge to self-harm by some service users was also observed.

A significant reduction in service user distress levels following use of a sensory room, as rated by service users and staff, was reported by Chalmers, Harrison, Mollison, Molloy and Gray (2012) in a

study examining the implementation of a series of sensory-based approaches within a psychiatric unit. The intervention included the development of individualised 'personal safety plans' by service users which incorporated sensory strategies to reduce levels of distress. Other research findings also suggest that sensory approaches can support a person-centred approach to co-creating care strategies based on individuals' needs and lived experience (Champagne & Stromberg, 2004). It is also argued that sensory strategies can be effectively and inexpensively integrated into personal care plans following discharge (Scanlan & Novak, 2015).

Wiglesworth and Farnworth (2016) studied service user and staff perceptions of a sensory room with adjoining outdoor courtyard within a forensic mental health unit. The research examined 50 sensory room sessions and included evaluation of service users' stress levels before and after using the space and a focus group with staff. Whilst increased stress was reported after three sensory room visits, including one instance when two service users used the room simultaneously, the study overall found a mean reduction in service user stress following use of the sensory room. Although service users could request access at any time, they could not use the space unsupervised as originally intended, due to concerns that some design features could potentially facilitate self-harm. Staff therefore perceived that the requirement for supervision limited the therapeutic potential of the space to promote independence

and support self-initiated coping strategies.

Whilst a hypothesis that sensory rooms might reduce rates of seclusion and restraint has been supported by some research findings, (Champagne & Stromberg, 2004; Lloyd, King, & Machingura, 2014) the results across the literature have been mixed. Smith and Jones (2014) studied seclusion rates before and after the implementation of a new sensory room within a psychiatric intensive care unit and found that there was no significant reduction in rates of seclusion. In interviews however, staff reported perceiving a reduction in seclusion and positive effects in service user de-escalation. The sensory room was generally perceived as a positive therapeutic intervention which had improved service user-staff communication and service users' overall experience of the unit. Within the restricted environment of the intensive care unit, service users also perceived the sensory room positively as a space where they were able to play their own choice of music.

Novak, Scanlan, McCaul, MacDonald and Clarke (2012) studied the introduction of a sensory room to an acute inpatient psychiatric setting and its impact on rates of seclusion, levels of distress as perceived by service users and instances of disruptive and disturbed behaviour as observed by staff. Staff and service users received education about the room and service users were encouraged to use the room at the earliest sign of feeling distressed. Staff and service user evaluations of 75 sensory room sessions supported the researchers' hypotheses that the use of the sensory room would reduce service user distress and reduce disruptive or disturbed behaviour, however, there was no reported reduction in aggression or incidence of seclusion. The study found weighted blankets to be especially useful in enabling service users to self-soothe and the authors suggest that use of this particular sensory resource may be a valuable approach in instances where a full sensory room is not available.

Within a psychiatric intensive care setting Lee, Cox, Whitecross, Williams and Hollander (2010) also studied the impact on rates of seclusion following the 6 month pilot use of sensory modulation strategies and a tool for sensory and risk assessment called the 'safety tool'. The study reported on the use of the safety tool with 43 service users and found that whilst 65% had been secluded previously, only 26% were secluded following completion of the safety tool. Staff received training in the use of sensory resources and 76% of the 30 staff members who completed an evaluative questionnaire proposed that the safety tool should become part of standard care on the ward.

Cummings, Grandfield and Coldwell (2010) studied the impact of a new sensory room which was designed using suggestions from staff and service users on a psychiatric ward and found that its use led to a significant reduction in the use of seclusion and restraint. Additionally, 89% of the 105 service users who rated their distress levels before and after using the sensory room over a 3 month period reported that it had helped reduce levels of distress and no increase in distress was reported following its use. Service users had control over environmental features such as the lighting level and were able to use the room alone, although were advised that staff would monitor the session remotely via video camera.

A qualitative study by Sutton and Nicholson (2011) examining the implementation of sensory environments in a number of acute mental health wards found service user and staff experiences to generally be positive and some participants reported that use of the sensory room had reduced the incidence of pro re nata (PRN) medication usage. Participants proposed that the sensory room interior design should be as warm and homely as possible and suggested that the inclusion of visual imagery, colour, sound and objects from nature may promote positive associations and reduce perceptions of a clinical environment. In addition to its location on the ward, the size and shape of the room is described as being a significant consideration, such that the space should ideally

be large enough to accommodate flexible seating options and storage, yet be sufficiently small to provide a sense of safety and containment.

Smith and Jones (2014) propose that the provision of designated spaces to promote well-being, such as sensory rooms, should be viewed with as great a priority as seclusion areas when considering the design of mental healthcare environments. In addition to spatial provision however, research suggests that adequate and ongoing staff education and training is vital to the effective use of sensory approaches (Björkdahl et al., 2016; Chalmers et al., 2012; Champagne & Stromberg, 2004; Smith & Jones, 2014).

The majority of studies report service users and staff perceiving a positive effect of sensory rooms on the overall ward environment and in general service users have reported sensory interventions being associated with reduced levels of distress. The inconclusive evidence regarding impact on rates of seclusion and restraint through the introduction of sensory approaches suggests that further research is required to test initial findings (Scanlan & Novak, 2015).

Seclusion is one of the oldest interventions still used within mental healthcare settings and is commonly perceived as a controversial practice (Muir-Cochran & Holmes, 2001). Whilst there is international variation in the definition and implementation of seclusion practices (Steinert et al., 2010), the Mental Health Act 1983: Code of Practice (2015) in the United Kingdom refers to seclusion as:

[T]he supervised confinement and isolation of a patient, away from other patients, in an area from which the patient is prevented from leaving, where it is of immediate necessity for the purpose of the containment of severe behavioural disturbance which is likely to cause harm to others (Department of Health, 2015, para. 26.103).

The theoretical rationale for the practice of seclusion put forward by Gutheil (1978) is founded on the basis of providing service users with containment, isolation and a reduction in sensory input. These three interconnected principles are argued to provide safety, respite and relief from sensory overload, based on the supposition that a heightened sensitivity to external stimuli may be present in those experiencing acute mental distress. This assumed theoretical foundation for the use of seclusion has, however, received little subsequent critical investigation and lacks substantiation through controlled empirical studies (Sailas & Fenton, 2000).

Studies examining the use of seclusion and other coercive measures have focused on service users' experiences and proposals for improvements in practice or alternative interventions (e.g., Haw, Stubbs, Bickle, & Stewart, 2011; Kontio et al., 2012; Larue et al., 2013; Mayers, Keet, Winkler, & Flisher, 2010) and staff experiences and perceptions of restrictive practices (e.g., Exworthy, Mohan, Hindley, & Basson, 2001; Moran et al., 2009). Researchers have also examined the impact of interventions designed to reduce the incidence of seclusion and restraint use (for reviews of the literature see

Gaskin, Elsom, & Happell, 2007; Goulet, Larue, & Dumais, 2017; Scanlan, 2010).

No controlled studies to evaluate seclusion and restraint practices within mental health services were found in the Cochrane Review undertaken by Sailas and Fenton (2000), however, the authors note that serious negative effects associated with these interventions are reported in qualitative reviews. Accordingly, the systematic review of qualitative research examining the experience of seclusion, undertaken by Mellow, Tickle and Rennoldson (2017), found service users' experiences to be predominantly negative, with the potential to be both physically and psychologically harmful for many (Frueh et al., 2005). Study findings also suggest that witnessing others receiving coercive treatment may contribute to service user distress (Mayers et al., 2010). Negative feelings associated with seclusion have been reported by nursing staff and research has found that implementing restrictive measures can be a distressing and dissatisfying experience (Duxbury & Whittington, 2005; Moran et al., 2009).

Research findings demonstrate that service users who are secluded may experience a variety of negative feelings, including anger, fear, shame, (Frueh et al., 2005; Kontio et al., 2012), sadness and a sense of abandonment (Holmes, Kennedy,

& Perron, 2004). Seclusion practice which also involves service users being stripped and required to wear rip-proof clothing is described as being especially difficult for people who have experienced abuse (Haw et al., 2011). Limited contact with staff during seclusion can also amplify feelings of abandonment, exclusion and rejection which may pre-exist for some service users and a lack of human contact may contribute to a sense of isolation and negative perceptions of seclusion experiences (Holmes et al., 2004). Disruptive behaviours in response to seclusion might therefore be interpreted as strategies for coping with the experience of isolation and as a means of being noticed by staff (Holmes et al., 2004; Sambrano & Cox, 2013).

Whilst the Mental Health Act 1983: Code of Practice (2015) states that, "seclusion should not be used as a punishment or a threat, or because of a shortage of staff" and that "it should not form part of a treatment programme" (Department of Health, 2015, para. 26.107), the literature highlights differences in staff and service user perceptions of its application or therapeutic value. The majority of respondents to a questionnaire examining UK forensic psychiatrists' attitudes towards the use of seclusion articulated clearly that it was not a form of punishment, although participants were ambivalent regarding perceptions of seclusion as a therapeutic or non-therapeutic practice (Exworthy et al., 2001). Likewise, seclusion was not perceived to be a punitive measure by the majority of nurse participants surveyed by Meehan, Bergen and Fjeldsoe (2004) in an Australian study, however, most considered seclusion to be highly therapeutic and very necessary. By contrast, within the same study by Meehan and colleagues, the majority of service user participants perceived their experience of seclusion to be a form of punishment with minimal therapeutic value. Similar service user perceptions are also reported elsewhere in the literature (e.g., Haw et al., 2011; Holmes et al., 2004; Keski-Valkama, Koivisto, Eronen, & Kaltiala-Heino, 2010; Mayers et al., 2010).

Although service user experiences of restrictive interventions are commonly negative (Brown & Tooke, 1992), some positive accounts are also reported and suggest there may be instances where seclusion might provide opportunities for reflection, helpful separation from others, or a sense of protection (Haw et al., 2011; Larue et al., 2013). Other more positive aspects of service users' experiences are described in the context of perceiving clear and compassionate communication and interaction with staff (Hoekstra, Lendemeijer, & Jansen, 2004; Kontio et al., 2012; Larue et al., 2013). Studies also suggest that human contact and positive staff relationships can help service users cope with the experience of being secluded (Hoekstra et al., 2004; Olofsson & Norberg, 2001). One study undertaken in Norway by Iversen et al. (2011) found that service users generally perceived seclusion as a positive experience, based on receiving staff support, respectful treatment and feeling safe within the seclusion area. The research also highlights the distinction, however, between typical seclusion procedures in other countries and Norwegian segregation practices, in which service users are always accompanied by staff within a locked area, such that they are never left alone in a seclusion environment.

The significance of staff-service user communication and interpersonal relationships is also highlighted in the study by Larue et al. (2013), in which the majority of participants reported that alternatives to seclusion had not been offered by staff, despite it being viewed as a 'last resort' measure and that they had not received a de-brief with staff following the event. The same participants also made suggestions for possible ways to reduce the incidence of seclusion and restraint which might include a mix of relational, pharmacological and environmental interventions. In their synthesis of the qualitative literature reviewed, Mellow et al. (2017) conclude that whilst the use of seclusion and restraint has the potential to cause iatrogenic harm, the role of staff and the nature of their communication can be critical to whether the experience of seclusion is helpful or harmful to those involved.



Empirical research examining the impact of seclusion environment design is very limited (Kaar, Walker, Sethi, & McIvor, 2017), however, service users have identified environmental characteristics to be significant to their experiences of seclusion (Kontio et al., 2012; Larue et al., 2013). Service user accounts include perceptions of seclusion rooms as unpleasant, uncomfortable physical environments, which can feel claustrophobic and cold (Haw et al., 2011). The research by Kontio et al. (2012) includes accounts of instances in which seclusion environments have fallen short of accommodating basic human needs, including ready access to toilets and washing facilities. Participants in the same study also suggest that simple measures, such as the use of homely colours or comfortable furnishings, could improve the experience of being secluded. Furthermore, service users suggest that enabling access to comforting items, such as books, music, films, or safe favourite objects might help to ameliorate feelings of abandonment which may often be experienced (Larue et al., 2013). Kaar et al. (2017) draw attention to the currently limited evidence-base informing seclusion facility design and provide a synthesis of the design guidance available within mental health legislation, architectural specifications and environmental design theory. The authors highlight a need for further empirical research evidence on which to base design practice and call for the creation of a standard baseline specification for seclusion environments.

A study on an acute psychiatric ward compared differences between two differently decorated seclusion areas in terms of the impact on the symptoms, behaviour, treatment and satisfaction of service users (Vaaler, Morken, & Linaker, 2005). The two areas had an almost identical footprint with one decorated sparsely as a traditional seclusion area designed to reduce external stimuli and the other decorated like an ordinary home to include wainscoting, wallpaper and artwork to the walls. The results found no negative effects or increased length of stay associated with the homely area and

notably, although there was evidence of vandalism in the stark seclusion environment, none occurred within the homely setting. A continuation of this pattern was observed for two years following the research period.

Findings from a study examining the impact of the built environment on the incidence of seclusion identified that ward design features associated with a decreased risk of seclusion included, "more 'total private space per patient', a higher 'level of comfort' and greater 'visibility on the ward'" (van der Schaaf, Dusseldorp, Keuning, Janssen, & Noorthoorn, 2013, p. 147). Although the findings highlight the significance of features related to service users' perceptions of privacy and autonomy, the authors argue that visibility on the ward can provide a sense of security and may be perceived by service users as less intrusive than other safety measures. It is therefore also argued that implementation of the least obtrusive safety measures is preferable in order to facilitate the most comfortable and homely environment.

Borckardt et al. (2011) examined the impact of several therapeutic measures aimed to reduce incidence of seclusion and restraint, including staff training in trauma-informed care, changes to the use of rules and language, service user involvement in treatment planning and changes to the physical ward environment. The environmental alterations were found to be uniquely associated with the reported significant reduction of 82.3% in the use of seclusion and restraint and enhancements included, replacing worn-out furniture, rearranging furniture to facilitate interaction and introducing warm paint colours, decorative rugs and plants.

Taxis (2002) also reports a significant reduction of 94% in the incidence of seclusion and restraint on a psychiatric unit, following a series of educational, procedural and environmental initiatives. Physical adjustments to the ward environment involved renovating a formerly cold and sterile 'quiet room' into a carpeted 'oasis room' with comfy furniture and reading material, which offered service users a more pleasant space in which to retreat from disturbance on the ward or self-manage distress.

The therapeutic use of sensory approaches is an emergent area within mental healthcare practice and sensory environments may offer service users resources to assist with self-management of distress (Cummings, Grandfield, & Coldwell, 2010; Scanlan & Novak, 2015). Notwithstanding that the outcomes of studies evaluating the impact of sensory approaches on rates of seclusion have been inconsistent and require further empirical investigation (Scanlan & Novak, 2015), some studies have found an association between a reduction in incidence of seclusion and the use of sensory environments (Champagne & Stromberg, 2004; Lloyd, King, & Machingura, 2014).

Initiatives aimed towards the full elimination of seclusion and restraint have also been examined and Ashcraft and Anthony (2008) describe how a combination of strategies including, strong leadership direction, staff training, procedural changes, service user debriefing and introduction of peer workers, led to the full abolition of seclusion and restraint use within two short-stay mental health crisis centres. The authors also report that eliminating these restrictive practices did not lead to an increase in incidence of staff injury.

The predominantly negative perceptions of seclusion experiences reported by service users in existing studies highlight the need for measures to improve staff-service user communication and minimise service user isolation and distress (Mayers et al., 2010). Whilst the literature suggests strong support for the use of procedural, relational and environmental initiatives designed to reduce incidence of seclusion, it is noted that effective reduction typically requires the implementation of several interventions (Gaskin et al., 2007). Research examining the design of seclusion room environments is scarce, however, existing studies suggest that enhancements to the design of the overall ward environment can also contribute to reducing rates of seclusion and restraint (Borckardt et al., 2011; Taxis, 2002).

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