Staff and resident perceptions of mental and behavioural health environments

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Staff and Resident Perceptions of Mental and Behavioral Health Environments

The purpose of this study was to explore clinical staff and resident perceptions regarding importance, as well as effectiveness, of environmental qualities and features in mental and behavioral health (MBH) facilities. The study evaluated inadequacies in environmental attributes, as perceived by staff and residents, in four MBH facilities in the United States. The Psychiatric Staff Environmental Design (PSED) tool and the Psychiatric Patient Environmental Design (PPED) tool were used to capture perceptions and facility assessments. We examined the importance of various environmental attributes, the differences between importance and how effectively these attributes were achieved, and the differences between psychiatric staff and resident responses. The most important qualities for residents were a well-maintained environment and suicide resistance. For staff they were staff safety and security and suicide resistance. Rated across all facilities, staff reported significant differences between importance and effectiveness of environmental attributes ($p<.0001$) whereas residents did not report differences. Significant differences were found between staff and patient ratings of existing facilities ($p=.004$), with staff reporting more inadequacies than residents. Findings suggest a strong need for more supportive physical MBH environments, particularly from the perspective of staff. Though residents reported fewer inadequacies, more evidence-based design guidelines for MBH environments are needed.

Keywords: Behavioral health; Mental health; Psychiatric facility design; Staff and patient perceptions, Psychiatric residents

Introduction

An increasing body of research, supported by the trend in evidence-based design (EBD) (Hamilton & Watkins, 2008), indicates a relationship between the built environment and outcomes for mental and behavioral health (MBH) staff (Haines et al., 2017; Shattell et al., 2015), and patients (Pyrke et al., 2017; Ulrich et al., 2018). As suicide rates in the U.S. continue to increase compared to decreases seen in other developed countries, and as community mental health facilities serve a demonstrated role in suicide prevention, it is important to know more about these facilities (Hedegaard, et al., 2018; Hung et al., 2020; OECD, 2015).

Considering the many unique restrictions, vulnerabilities, and challenges that mental health patients face, studies involving MBH patient populations attempt to understand their perspectives and relationships with the environment (Ahern, et al., 2016; Schröder et al., 2016). Expanded work within this area has bolstered the identification of features and qualities of the built environment that contribute to patient outcomes. Throughout this paper the term "patients" is used to refer to both inpatients and outpatients. The term "residents" refers to inpatients. The term "staff" refers to psychiatric clinical staff.

Recent Studies Involving Mental and Behavioral Health Facilities

An increasingly broad range of papers has been published on the topic of healthcare facility design research and a detailed summary is beyond the scope of this paper. Multiple theories serve as the foundation guiding the design of MBH facilities including anthroposophy (Steiner, 2002), generative design (Ruga, 2008), Planetree (Orr, 1995), and salutogenic design (Anotovsky, 1996). Literature published prior to this study on the design of MBH facilities is also ample and includes research on personal space and density (Salerno et al., 2012), choice and

control (Johansson et al., 2006), spatial clarity and organization (Eklund & Hansson, 2001), comfortable and homelike settings (Carr, 2011), positive distraction (Brown et al., 2020; Nanda et al., 2010; Sachs et al., 2019), social interaction (Gutkowski et al., 1992; Jovanović et al. 2019; Kidd et al., 2015; Smith & Jones, 2013; Southard et al., 2012; Ulrich et al., 2018), access to nature and daylight (Bakos et al., 1980; Kimball et al., 2018; Van der Schaaf et al., 2013; Shattell et al., 2008; Shattell et al., 2015;), safety (Salerno, et al., 2012), supervision (Ulrich et al., 2012), autonomy (Ahern, 2016; Southard et al., 2012), deinstitutionalization (Bayramzadeh, 2016; Brown et al., 2020; Kalagi et al., 2018; Seppänen et al., 2018; Smith & Jones, 2013; Ulrich et al., 2018), noise (Brown et al., 2020; Camuccio et al., 2019; Haines et al., 2017; Veale et al., 2019), light (Haines et al., 2017; Okkels et al., 2019; Sheaves et al., 2017; Veale et al., 2019), maintenance and cleanliness (Brunero et al., 2009; Cleary et al., 2009; Smith & Jones, 2013), and aesthetics (Wilkström et al., 2012).

The research described in this paper employed the PSED and PPED survey tools. In addition to using surveys, researchers working within MBH facilities have also conducted interviews (Mabala et al., 2019; Pyrke et al., 2015; De Ruysscher et al., 2020; Veale et al., 2019; Ulrich et al., 2018) and focus groups (Rose et al., 2013; Seppänen et al., 2018). Pre-and post-assessments, used in comparing outcomes in a new building or renovation, primarily utilize survey tools (Haines et al., 2017; Southard et al., 2012) but can also incorporate observations or interviews (Ahern et al., 2016).

Importance vs. Effectiveness

When evaluating environments, apart from identifying whether a specific design goal is achieved, researchers must also examine whether a design characteristic is important to occupants. Designers and project teams might approach a project with preconceived notions of

what is critical for incorporation. Facility evaluations may demonstrate that their goals have been achieved, but these goals might not reflect user needs. While effectiveness, per Frøkjaer (2000), may be independent of usability, as a component leading to satisfaction (Belanche et al., 2012; Brambilla et al., 2019) it is, along with efficiency and user satisfaction/experience, linked to usability (Alexander, 2006). The study described here addressed the evaluation of four facilities by considering both importance and effectiveness.

Existing literature has found a complicated relationship between staff and patient outcomes and evaluations in MBH facilities, revealing agreement concerning some features and qualities, but discrepancies between others. The majority of existing work examining perspectives of patients and staff within MBH environments has focused on clinical and demographic factors, with no direct reference to the built environment (Schröder et al., 2016). Unfortunately, even when aspects of the built environment are documented (Sheehan et al., 2013), there is still a gap in literature that examines the relationship between prioritized and present environmental qualities and features (Hedegaard et al., 2018).

Developed to address this gap, the Psychiatric Staff Environmental Design (PSED) (XXXX, 2017) tool and the recently developed Psychiatric Patient Environmental Design (PPED) tool provide methods to evaluate the built environment in connection with patient and staff preferences and satisfaction. The current study explores resident and staff evaluations at four MBH facilities in the U.S. with the use of the PSED and PPED. Particular attention is focused on: 1) the degree to which environmental qualities and features are considered to be important and effectively provided and 2) the impact on staff and patients. In our previous study (XXXX, 2017), the comparison of importance and effectiveness was limited to staff. The current study (2020) also includes the responses of staff.

Therefore, the aims of the current study are: 1) identify important environmental attributes and evaluate the effectiveness of these goals in existing facilities, 2) explore the similarities and differences between staff and resident views, and 3) make value-based recommendations for healthcare management, designers, researchers, and future influencers. We anticipated that there would be discrepancies between environmental attributes in MBH facilities that are perceived to be important and those that are presently available (Hypothesis #1). Additionally, we hypothesized that differences would emerge between resident and staff perceptions of the importance and effectiveness of features and qualities, suggesting a difference in priorities between residents and staff (Hypothesis #2).

Methods

This study used an updated version of the previously developed PSED tool and a newly created PPED tool. To develop the original PSED tool, the researchers began with a literature review and summarized the factors that were commonly cited as being important factors in MBH design. These factors were then vetted through interviews with psychiatric health and design practitioners and revised for the purposes of generating a facility evaluation survey (Mabala, et al., 2019). The intent of the survey tool was to explore both the importance and effectiveness of qualities and features of inpatient and outpatient psychiatric environments. Subsequently, the Psychiatric Staff Environmental Design (PSED) tool was piloted with a pool of psychiatric nurses (N=132) in the US, Canada, Australia, and the UK (XXXX, 2017). Based on their input, the PSED was further revised for staff. Additional adaptations were made for patients/residents as the Psychiatric Patient Environmental Design tool (PPED).

Settings

Four facilities served as sites for this study, three in California administered by a single healthcare entity (referred to here as CA1, CA2, CA3), and one in New York (referred to here as NY1). These facilities were selected because they were either recently renovated or planning renovations and the owners expressed an interest in obtaining information on the effectiveness of the facilities. Staff members at all four facilities participated in the PSED, and facilities who allowed us to recruit patients also participated in the PPED (CA1 and CA2).

Built in 2013, CA1 is a short-term facility with 14 beds, integrating individual as well as group counseling, psychiatric services, and introduction to community resources for 18 to 25-year-old individuals facing a mental health crisis. Recovery-based services and interventions last up to 90 days and provide youth with mental and physical health evaluations and services.

CA2, a 16-bed facility, is located in a complex with CA1. It is the newer of the two facilities and built to resemble a single-family home. It was completed in 2017 and staffed with 45 providers, including doctors, nurses, and counselors. CA2 provides up to 90 days of short-term acute psychiatric treatment to those age 18 to 59 years. This recovery-oriented facility provides an opportunity to individuals who could otherwise face hospitalization, either involuntary or voluntary, or even incarceration.

CA3 was built in 1996 and includes a secure 16-bed facility that provides acute care in order to help stabilize patients, offering services to individuals ranging from 11 to 17 years old. The programs include comprehensive services, including physical and psychiatric evaluation and treatment. This facility focuses on those who have endured intense trauma or challenges that necessitate treatment within a secure environment. These three CA facilities reflect the average size of residential treatment facilities in California. As of 2016 (the most recent inventory of

California psychiatric services), nearly 50% of residential psychiatric facilities had 15 or fewer clients (SAMHSA, 2017).

NY1, which was evaluated prior to a renovation and expansion of inpatient services, and currently includes 20 adult and 6 adolescent beds, provides assessment and evaluation in order to deliver comprehensive treatment including recreation therapy, individual and group therapy, and planning for care after discharge. NY1 reflects the size of typical New York residential treatment facility, as facilities in New York range from 14 to 56 beds (New York State Coalition for Children's Mental Health Services, 2013).

Survey Tools

Previous researchers have developed tools for the evaluation of MBH facilities. Among the most recent are ASPECT (Department of Health, 2008); Satisfaction AT Questionnaire (Müller, et al., 2002); Safety Risk Assessment Tool (Center for Health Design, 2015); AEDET (NHS Estates, 2013); and MHEOOC (Watts, et al.,2012). The PSED, which was used in this study, was intended to serve as a more traditional practitioner-focused occupancy evaluation tool.

The PSED was validated in a study of psychiatric nursing staff (XXXX, 2017), the data for which is used in this study as a means of comparing responses longitudinally. After being revised, the PSED was adapted to be used in parallel with patients (PPED). During development of the survey (via the literature review and the interviews), certain characteristics rose to the surface as being specifically pertinent to inpatient facilities and not pertinent to outpatient facilities. For the purposes of making the survey less complicated for the staff respondents (some of whom were not working in residential settings), the researchers created a separate section of the survey to address inpatient facilities that only those who worked in those environments

would see. An abridged summary of the questions is provided in Table 1. Participants that were

current residents or staff members at an inpatient facility were then asked about importance and

effectiveness of these elements are incorporated in their *current* environment.

Table 1

Abridged Summary of PPED/PSED Questions

| Environment	Environment Attributes	Question
All Facilities	Qualities	Please evaluate the following qualities (attractiveness, homelike, access to outdoors, orderliness and well-maintained) in terms of how **important** you feel they are to the support of patients, staff, and families in **all** MBH facilities.
		Please evaluate how **effectively** the following qualities (see above) are incorporated **in your current facility**.
	Characteristics	Please rank the following characteristics in terms of the degree to which they can contribute to an **attractive and aesthetically pleasing** environment in **all** MBH facilities. • abstract art • art depicting nature • Colorful furniture and finishes • visually interesting but relatively orderly • well-designed electric lighting and adequate daylight, and • window views of the outdoors
		Please rank the following characteristics in terms of the degree to which they can contribute to a **deinstitutionalized environment** in all MBH facilities • furniture and finishes similar to an apartment or house • furniture and finishes similar to a hotel • physical environments that allow for choice and control • spaces that support privacy • spaces that are comfortable and cozy • spaces that convey respect towards residents and/or facility's mission • an accommodating entry space • artwork or decor
		Please rank the following characteristics from in terms of the degree to which they can contribute to **access to nature and the outdoors** in **all** MBH facilities. • outdoor spaces that support patient/resident safety and security • outdoor vegetable or flower gardens for patient/resident gardening • outdoor plants, trees, bird feeders, fountains, and flowers • pleasant outdoor spaces for group activities • pleasant outdoor spaces for one-on-one conversations • pleasant outdoor spaces for sitting alone • unrestricted access to outdoor spaces
		Please rank the following characteristics from in terms of the degree to which they can contribute to an **orderly and organized environment** in **all** MBH facilities. • absence of clutter • all equipment has designated storage area(s) • navigable and readable layout • visually cohesive or matching furniture and finishes

		Please rank the following characteristics from in terms of the degree to which they can contribute to a **well-maintained environment** in **all** MBH facilities. • clean floors, walls, and other surfaces • furniture and finishes in good condition • properly operating electrical fixtures and heating/cooling systems • properly operating equipment
	Features	Please evaluate the following features (attractive furniture, comfortable furniture, damage resistant furniture, acoustics, daylight, electric lighting, staff safety, staff respite) in terms of how **important** you feel they are to the support of patients, staff, and families in **all** MBH facilities.
		Please evaluate how **effectively** the following features (see above) are incorporated **in your current facility**.
Inpatient Facilities	Qualities	Please evaluate the following qualities (autonomy, distraction, interaction, respite, suicide resistance) in terms of how important you feel they are to the support of patients, staff, and families in **all inpatient** MBH facilities.
		Please evaluate how **effectively** the following qualities (see above) are incorporated **in your current facility**.
	Characteristics	Please rank the following characteristics from in terms of their contributions to **autonomy and spontaneity** in an **inpatient** MBH facility. _____ Unrestricted access to exercise area • unrestricted access to outdoor spaces • unrestricted access to snack areas or kitchens • unrestricted access to technology/entertainment
		Please rank the following characteristics from in terms of their contribution to **positive distraction** in an **inpatient** MBH facility. • board games, playing cards, etc. • books, magazines, newspapers • facilities and equipment for exercise • music systems • television • spaces for therapy animals • video game systems • indoor plants and/or decorative water features • artwork
		Please rank the following characteristics from in terms of their positive contribution to **social interaction and community** in an **inpatient** MBH facility. • group therapy rooms • group activity rooms • dining spaces • outdoor spaces
	Features	Please evaluate the following features (therapy, observation, seating, smoking, counseling, enclosed/open nurse station, bathrooms) in terms of importance in **inpatient** MBH facilities.
		Please evaluate how **effectively** the following features (see above) are incorporated **in your current facility**

Environmental qualities are defined in this study as overarching conceptual design goals

(i.e., well-maintained, access to outdoors, attractive, homelike, and orderly). *Environmental*

features are defined as specific physical interventions (i.e., staff safety mechanisms, noise control, daylighting, comfortable furniture). *Environmental characteristics* are aspects of the environment that contribute to the effectiveness of the previously mentioned environmental qualities (i.e., unrestricted access to kitchen, spaces for therapy animals, board games). A significant calculated difference between ratings of importance and effectiveness is considered an *inadequacy* in the environment. The relationship between these variables is described in Figure 1. While the term "importance" was perceived to be readily understood, the term "effective" was less clear. An effective feature was defined as whether the feature was adequately present in the facility. Definitions for all these terms were integrated into the questionnaire.

Figure 1

PPED/PSED Framework (Source: authors)

Procedure

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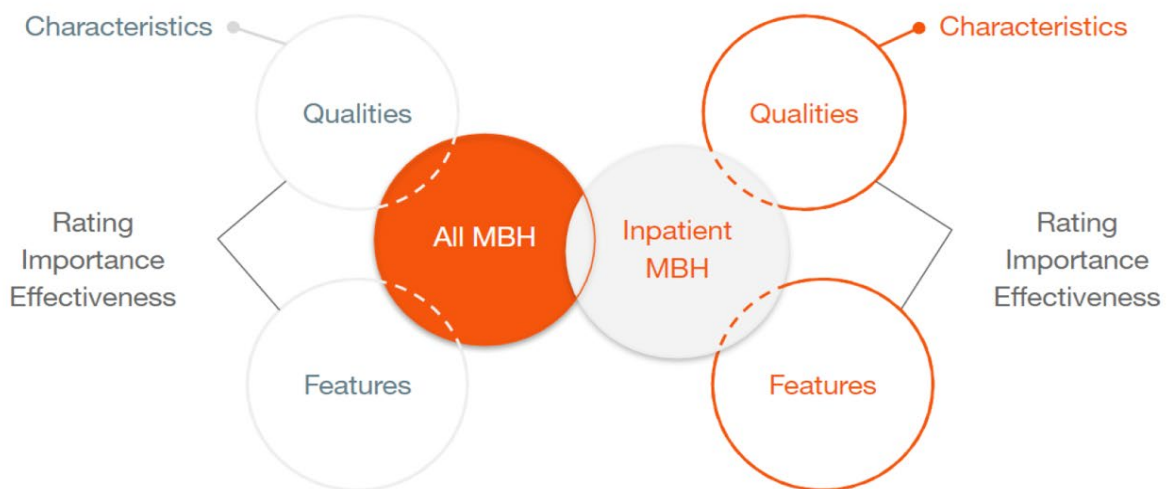
For CA1 and CA2, direct supervisors sent staff an e-mail with a link to the survey. Clinical staff participated in the online survey during their work shift, being relieved of their resident duties by team members and/or supervisors in order to allow time to complete the survey. At CA3, staff were recruited for completion of the online version of the PSED with an all-staff e-mail sent by the residential program director. Follow-up e-mails were sent to encourage participation to all staff in the middle and towards the end of the recruitment time period. In addition, reminders to staff were given about survey completion weekly during morning staff meetings and at departmental meetings. Staff responded to the PSED survey via an email link distributed by a unit administrator and were entered into a drawing for $50.

The PPED was completed by residents in a group environment at both CA1 and CA2. It was introduced to residents each day during group time called "individual goal setting." A group incentive was offered for completing the surveys to encourage high levels of participation, which entailed a pizza party that was given the week after survey completion. During the group time that was available for completion of the surveys at both programs, the lead therapists reviewed the instructions that are included on the first page of the survey and assisted patients with understanding the meaning of words and with questions/items that needed clarification. The lead therapists assembled the surveys in envelopes at the end of the administration week and forwarded the envelopes to the administrator who oversees both programs. The administrator scanned the completed patient surveys which were then securely e-mailed to the researchers. Residents in NY did not complete the survey due to hospital restrictions.

Participant Demographics

One-hundred and fifty-eight participants completed the PSED, including 34 staff members at CA1, 32 staff members at CA2, 50 staff members at CA3, and 32 staff members at

NY1 (see Table 2). Ten respondents did not indicate a facility name, so their results were excluded from any facility-specific analysis. Most respondents selected "Psychiatric Nurse" (n = 23) or "Program Staff" (n = 23) as their job title, though respondents included a wide range of staff positions, including administrative, clinical, and counseling staff. The majority of respondents had at least one year of experience in MBH (85.7%), with MBH experience ranging from less than one year to over 30 years. Similarly, most respondents had worked in their current facility for at least one year (67.9%). As the sample size was relatively small, other demographic data were not gathered as demographic analyses would be underpowered.

Twenty-four residents completed the PPED, including 12 residents at CA1 and 12 residents at CA2 (see Table 3). Only CA1 and CA2 facilities provided both resident and staff surveys. All residents at CA3 and some at NY1 were adolescents and thus not eligible for participation in this study. The NY1 facility opted not to allow access to their residents. Most residents were between the ages of 20-24 (n = 12), though participants ranged from 20 to 50+ years of age. Length of stay at current facility ranged from six days to 83 days (M = 33 days, SD = 23). As the sample size was relatively small, other demographic data were not gathered and demographic analyses would be underpowered.

Table 2

Frequency Statistics by Demographic Variables: Staff

Characteristic: Staff (PSED)	n	%
Site		
CA1	34	22.9
CA2	32	21.6
CA3	50	33.7
NY1	32	21.6
Job Title		

	n	%
Psychiatric nurse	23	15.5
Program staff	23	15.5
Psychiatric technician	8	5.4
Administrator	5	3.3
Educator	4	2.7
Psychiatric social worker	2	1.3
Other	47	31.8
Experience in MBH		
< 1 year	16	10.8
1-5 years	49	33.1
6-10 years	18	12.2
11-15 years	15	10.1
16-20 years	6	4.1
21-30 years	6	4.1
> 30 years	2	1.3
Experience at current facility		
< 1 year	36	24.3
1-5 years	50	33.8
6-10 years	13	8.8
11-15 years	7	4.7
16-20 years	6	4.1

Table 3

Frequency Statistics by Demographic Variables: Resident

Characteristic: Patient (PPED)	*n*	%
Site		
CA1	12	50.0
CA2	12	50.0
Age at time of questionnaire		
20-24	12	50.0
25-30	2	8.3
31-40	4	16.6
41-50	4	16.6
> 50	2	8.3
Current length of stay		

< 3 days	0	0
3-5 days	0	0
5-10 days	3	12.5
11-20 days	5	20.8
21-30 days	5	20.8
31-50 days	4	16.6
> 50 days	6	25.0

Analytical Methods

PSED and PPED participants were first asked to rate the importance of environmental qualities and characteristics across all MBH facilities, followed by a rating of the effectiveness of these elements in their current facility. To test Hypothesis #1, four sets of paired *t*-tests between importance and effectiveness were performed:

(1) Staff: Difference between ratings of importance and effectiveness of elements in all MBH facilities

(2) Residents: Difference between ratings of importance and effectiveness of elements in all MBH facilities

(3) Staff: Difference between importance and effectiveness in current inpatient facility

(4) Residents: Difference between importance and effectiveness in current inpatient facility

Although Wilcoxon's signed-rank test (a non-parametric approach) is often recommended for Likert-style ordinal data, t-tests can reduce Type II error in Likert data, even with small sample sizes when assumptions have been violated [37]. To protect from Type I error (a false positive when incorrectly rejecting a true null hypothesis) when conducting multiple comparisons, we used a more conservative alpha-value corrected with the Bonferroni statistical method.

To test Hypothesis #2, participants' difference scores between importance and effectiveness for all 15 inpatient environmental qualities and features were averaged to create a single "inadequacy" score for each individual. Inadequacy was calculated as *importance* minus *effectiveness* for each resident and each feature. Mean inadequacy of a facility was also calculated as the average inadequacy scores of residents within a facility. Two sets of independent samples *t*-tests were performed on these adequacy scores:

(1) Difference in inadequacy scores between residents and staff at CA1

(2) Difference in inadequacy scores between residents and staff at CA2

Only scores from CA1 and CA2 were included in the resident analysis because resident responses were not collected from CA3 or NY1.

Apart from the hypotheses described above we were interested in comparing the results from the 2017 study with psychiatric nurses to see whether there were consistencies in the responses.

Results

Importance and Effectiveness

When comparing most and least important characteristics, there are some consistencies between the 2017 PSED study and the current PSED study (see Figures 2 and 3). Staff safety and security in all settings and suicide resistance (design which reduces the opportunity for self-harm, such as features that avoid the opportunity for ligature) within inpatient settings ($M_{2020} = 6.41$; $M_{2017} = 6.71$) received the highest scores. Within all MBH settings, acoustical control and daylighting were also ranked highly in both studies. Attractive furniture was rated lowest in both studies ($M_{2020} = 5.13$; $M_{2017} = 5.53$), with deinstitutionalized/homelike environments receiving similarly lower ratings ($M_{2020} = 5.81$; $M_{2017} = 5.88$), although these ratings are still high compared

to inpatient settings, where the lowest feature was rated significantly less important (smoking = 3.23).

Figure 2

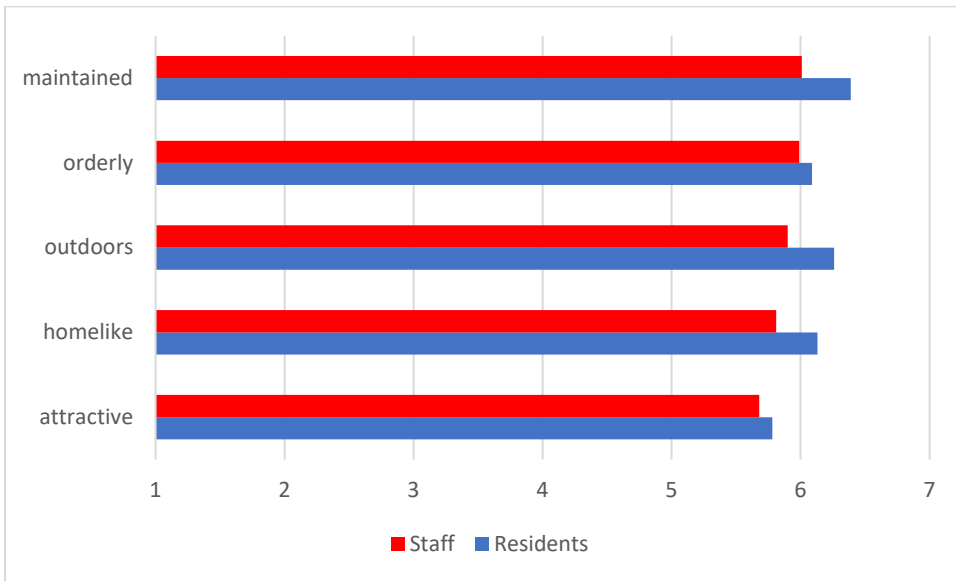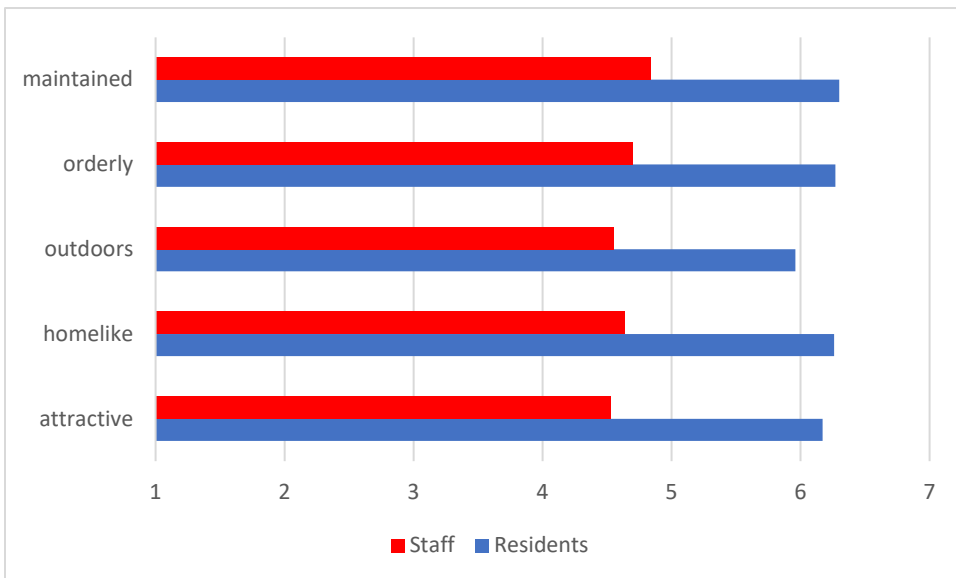*Importance of Environmental Qualities* (Likert Scale of 1 to 7)

Figure 3

Effectiveness of Environmental Qualities (Likert Scale of 1 to 7)

Adequacy of all MBH Environments

Overall, the facilities received relatively high ratings, particularly the CA units, in most categories on a 7-point Likert scale; however, the strength of the support varied across topics. Figures 2 and 3 summarize the staff and resident responses to the qualities of all MBH environments. The first section of the survey asked residents and staff to provide ratings based on their experience across *all* MBH facilities. When considering qualities that support staff, residents, and families across all facilities, there was a significant difference between staff ratings of importance and effectiveness across all five general qualities, $t(140) \geq 6.80$, $p < .0001$, where $\alpha_{adj} = (0.05/5) = 0.01$. In contrast, resident evaluations did not reveal any significant inadequacies (see Table 4).

Adequacy of Inpatient Facilities

Of the 23 inpatient qualities and features evaluated by staff, there were significant inadequacies among 17 elements, where $\alpha_{adj} = (0.05/23) = 0.002$ (see Table 4). Residents, however, did not report any inadequacies. In many cases, resident ratings of effectiveness actually exceeded ratings of importance.

To further investigate inadequacies reported by staff, participants were divided based on their parent organization, creating two groups: (1) CA1, CA2, and CA3 and (2) NY1. A one-way ANOVA (a statistical tool to analyze differences in variance between samples) revealed no significant difference between the three CA facilities, but a significant difference between CA facilities and NY1 in evaluations of all five environmental qualities (attractive, homelike, outdoor access, orderly, and well-maintained). Staff at NY1 reported significantly greater inadequacies across all five qualities compared to staff across CA facilities.

Table 4

Differences Between Importance and Effectiveness of Environmental Features/Qualities

|	Residents			Staff		
	M (SD)			M (SD)		
	Importance	Effectiveness	*t*	Importance	Effectiveness	*t*
General Qualities						
Attractive/aesthetic space	5.78 (1.24)	6.17 (0.98)	-1.62	5.68 (1.33)	4.53 (1.73)	6.80*
Deinstitutional/homelike space	6.13 (0.69)	6.26 (0.62)	-1.00	5.81 (1.31)	4.64 (1.74)	7.68*
Outdoor spaces and views of nature	6.26 (0.81)	5.96 (0.88)	1.67	5.90 (1.39)	4.55 (1.81)	7.31*
Orderly space	6.09 (0.92)	6.27 (0.88)	-0.85	5.99 (1.30)	4.70 (1.65)	8.50*
Well-maintained	6.39 (0.50)	6.30 (0.93)	0.46	6.01 (1.48)	4.84 (1.63)	7.69*
Inpatient Qualities and Features						
Autonomy/spontaneity	5.96 (1.22)	6.00 (1.09)	-0.16	5.64 (1.09)	4.98 (1.30)	5.00*
Positive distraction	6.30 (0.64)	6.39 (0.66)	-1.00	6.13 (0.86)	5.10 (1.24)	8.38*
Social interaction	6.26 (0.75)	6.39 (0.66)	-1.00	6.21 (1.01)	5.57 (1.11)	5.75*
Staff respite	6.36 (0.73)	6.09 (1.02)	1.55	6.22 (0.88)	4.55 (1.88)	8.62*
Suicide resistance	6.57 (0.51)	6.57 (0.51)	0.00	6.41 (1.09)	5.79 (1.16)	6.22*
Indoor therapy (PT, OT, music, etc.)	6.13 (0.92)	6.09 (0.79)	0.21	6.16 (0.89)	5.49 (1.36)	5.39*
Direct observation	6.04 (0.93)	6.17 (0.89)	-0.59	6.28 (1.05)	5.56 (1.37)	5.52*
Mix of seating	6.05 (0.85)	6.21 (0.71)	-1.37	5.40 (1.28)	5.10 (1.45)	2.21
Smoking	4.05 (2.24)	4.68 (1.67)	-1.23	3.23 (1.97)	3.86 (2.01)	-2.97
Staff-patient consulting	6.14 (0.77)	6.00 (0.93)	0.77	6.08 (1.06)	5.23 (1.57)	5.46*
Enclosed nurse station	5.73 (1.67)	6.14 (0.89)	-1.34	5.51 (1.49)	5.61 (1.30)	-0.75
Open nurse station	4.81 (2.04)	4.71 (2.03)	0.21	4.38 (1.88)	4.30 (1.71)	0.59
Small cluster of patients (1-12 per unit)	6.22 (1.17)	6.39 (0.66)	-0.75	5.78 (1.26)	5.01 (1.65)	4.42*
Private bedrooms	6.09 (1.13)	5.96 (0.98)	0.57	5.13 (1.56)	4.78 (1.66)	1.92
Private bathrooms	6.43 (0.59)	5.87 (1.14)	2.51	5.14 (1.53)	4.73 (1.67)	2.54
Attractive furniture	5.30 (1.15)	6.17 (0.83)	-3.54	5.13 (1.16)	4.69 (1.51)	3.20*
Comfortable furniture	6.00 (0.95)	6.30 (0.82)	-2.08	5.93 (1.02)	4.87 (1.54)	7.20*
Damage-resistant furniture	5.87 (0.97)	5.91 (1.08)	-0.17	5.93 (1.17)	4.80 (1.57)	7.15*
Good acoustical control	5.90 (0.94)	6.29 (0.64)	-1.79	6.17 (0.99)	4.50 (1.43)	11.34*
Good daylight	6.18 (0.66)	6.23 (0.97)	-0.20	6.17 (0.99)	4.47 (1.87)	8.70*
Good electric lighting	6.32 (0.65)	6.32 (0.72)	0.00	6.02 (1.08)	4.80 (1.66)	7.85*
Staff safety and security	6.48 (0.59)	6.30 (0.93)	0.89	6.52 (1.24)	5.02 (1.69)	8.62*
Space for staff respite	6.14 (0.83)	5.91 (1.02)	1.05	6.25 (0.96)	4.45 (2.01)	9.10*

* indicates a significant *inadequacy*, defined as the difference between importance and effectiveness (α adjusted with Bonferroni corrections)

Comparison of Staff and Patient Evaluations

When comparing CA1 and CA2, staff reported inadequacies ($M = 0.43$, $SD = 0.87$) while residents did not ($M = -0.15$, $SD = 0.50$), where a higher number indicates larger inadequacy scores (see Figure 4). A two-way ANOVA suggests a significant difference between staff and resident ratings, $F(1,77) = 9.01$, $p = .004$.

Figure 4

Mean Inadequacy by Facility
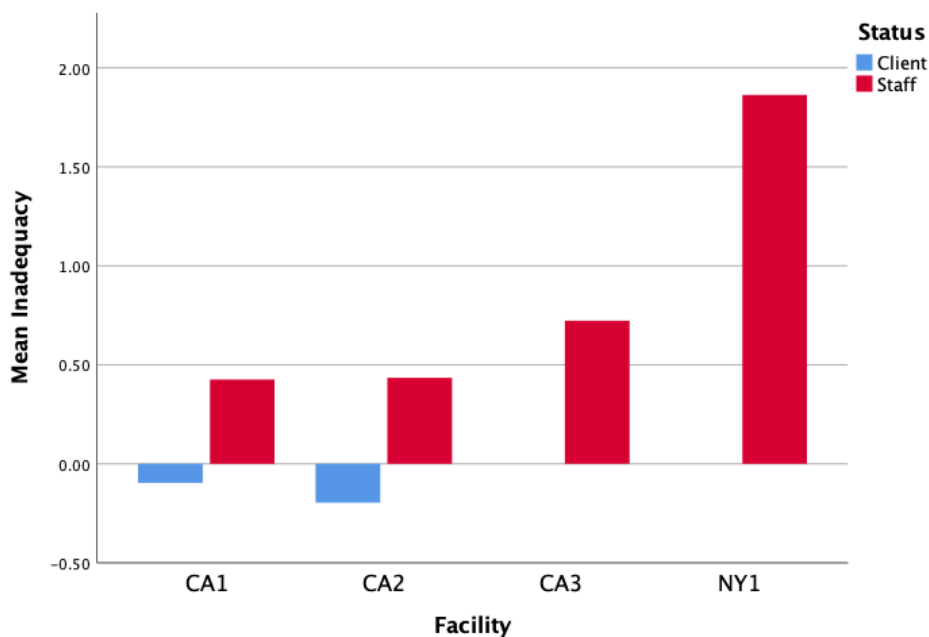
Note. Positive numbers indicate greater inadequacy, on average. Negative numbers indicate residents rated the environment as more effective than important, on average.

Discussion

Importance and Effectiveness

Hypothesis #1 was partially supported, as staff across all four facilities reported significant inadequacies in their environments. Residents, however, did not report the same inadequacies (see Table 4, Hypothesis #2). Inadequacies may be the result of long-standing design trends and practices in MBH facilities, with only a recent interest in optimizing these environments through patient-centered design and evidence-based design (EBD). Since there is still a lack of rigorous research in this area, researchers have suggested the use of best practices in order to inform design decisions (Karlin & Zeiss, 2006), although further examination of existing evidence has revealed a deficiency in systematized guidelines for best practices (XXXXX., 2016).

Considering the unique characteristics of MBH populations, special focus is often placed on safety components of patient/resident spaces and outcomes. Though these measures are critical in determining the success of psychiatric facilities in preventing injury or harm to patients and staff, an examination of all contributing environmental components is vital and often missing. For example, many studies ask patients about their satisfaction with broad concepts like cleanliness and privacy (Brunero et al., 2009; Cleary et al., 2009). While some staff surveys include environmental components (Pink, et al., 2020; Pyrke et al., 2017), they are often considered indirectly through the lens of staff safety, satisfaction, or well-being (Holmberg et al., 2015; Kelly et al., 2015).

Staff safety and security in all settings and suicide resistance within inpatient settings received the highest scores. These results are expected, as this population requires special consideration due to increased concerns of safety, both of patients and staff (Bayramzadeh, 2016). Suicide prevention is a mandate of the Joint Commission (JACHO) and a prominent consideration in the design of all psychiatric facilities. Rates of suicide per 100,000 inpatient

years have risen in recent years and may be attributed to characteristics of the facility design (Walsh et al., 2015).

Across all MBH settings, acoustical control and daylighting were also ranked highly. Previous research on the negative impact of noise in healthcare settings (Cunha & Silva, 2015) corroborates this finding as well as the importance of daylighting (Ulrich, 2012).

Comparing Staff and Resident Perspectives

There is likely an inherent difference between what residents need for therapy and what staff need for work, although staff tend to appreciate environments that promote healing. Additionally, staff's greater familiarity with the building might make them more aware of the shortcomings. There was a significant difference between resident and staff ratings, supporting Hypothesis #2. Post-hoc tests revealed staff at NY1 reported significantly greater inadequacies compared to staff at CA1, CA3 and CA2. Because NY1 was the site of greatest inadequacy among staff, we may expect that NY1 residents would report similar concerns if they had been included in the study.

Within MBH environments, a comparison of assessments between staff and patient groups contains complexities. Evaluations of an MBH patient room and private bathroom mockup found that patients and staff agreed on the importance of safety, as well as deinstitutionalization and homeyness, with access to daylight and control of lighting rated as the most positive characteristics (Sachs et al., 2019). Interviews discussing open-door wards with psychiatric nurses, psychiatrists, and patients revealed general agreement in their views of several strategies, including the importance of nature, the presence of seclusion rooms, and patient observation (Kalagi et al., 2018).

However, perhaps due to psychiatric patient characteristics and differing roles and responsibilities between staff and patients (Ulrich et al., 2012), other studies have revealed more pronounced differences in opinions (Rose, et al., 2013; de Vries et al., 2016). In assessing different themes found within focus groups of both patients and staff, Rose et al. (2013) summarizes that "the experiences of the two groups are characterized by different interpretations of the same themes" (p. 94).

When evaluating the ward climate of a secure facility, patient ratings of experienced safety and patient cohesion were higher than staff ratings, while staff evaluations were higher for the environment's ability to support therapy (de Vries et al., 2016). These findings for the safety and therapeutic environment dimensions were consistent with earlier ward climate studies (Dickens et al., 2014; de Vries et al., 2016). Other studies have found lower ratings by patients (De Ruysscher et al., 2020; Sachs et al., 2019). Though consideration of individual variables revealed significant differences only for staff control, where patients had higher ratings than staff, results of the Ward Atmosphere Scale (WAS) showed consistently higher scores by staff than patients (Nicholls et al., 2015). A comparison of views after remodeling a nursing station into an open station revealed varied opinions between patients and staff (Southard et al., 2012). While nurses expressed concerns about increased work interruption, privacy, and confidentiality, patients felt liberated by the change and expressed a higher perception of safety due to increased supervision as well as connection to staff.

The results of this study show little agreement regarding the effectiveness of qualities (see Figure 2) and more similarity regarding importance of these qualities (see Figure 3) between residents and staff. There was some agreement on the importance of the following features: social interaction, indoor therapy, staff-patient consulting, open nurse stations, comfortable

furniture, good daylight, and staff safety and security. Resident ratings were higher than staff ratings in this study, which could be explained by the nature of patient interactions with the ward environment. Specifically, resident exposure to the environment was short ($M = 33$ days), while most staff had worked at the site more than a year.

The ratings in this study are different than some previous MBH studies, where residents had lower ratings than staff (Cleary et al., 2009; Sachs et al., 2019). This could be a result of the lack of staff familiarity with the setting—one study was conducted two months after the move to a new facility, and the other used a mockup design.

Comparing Evaluations Between 2017 and 2020

When considering all settings, the 2017 and 2020 PSED studies had statistically similar ratings of all attributes. Additionally, there were consistently higher ratings of staff safety and security, good electric lighting, and well-maintained space and lower ratings of good acoustical control and staff respite. Several previous studies have highlighted a need for staff respite spaces (Shepley et al., 2016) and a lack of acoustical control, with the design of facilities contributing to noise levels (Brown et al., 2020; Veale et al., 2019). Similarly, an examination of inpatient settings revealed similarities on most attributes. Suicide resistance and social interaction received higher ratings in both studies, while space for staff respite and smoking received lower ratings.

Similar to ratings of importance, agreement on the effectiveness of certain attributes was mixed between the two studies (see Table 5, and Figures 5 and 6). Though ratings in the current study found staff safety and security, comfortable furniture, and well-maintained space as the most effective attributes in all settings, and suicide resistance, enclosed nursing stations, and social interaction receiving highest scores for the inpatient settings, these ratings were not wholly consistent the 2017 study results.

Table 5

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Importance and Effectiveness Ratings (Staff) Differ Between 2020 (current study) and 2017

		Importance			Effectiveness	
		M (SD)			M (SD)	
		2020	2017		2020	2017
All Settings Qualities and Features						
Staff safety and security	1	6.52 (1.24)	6.60 (0.84)	1	5.02 (1.69)	5.12 (1.50)
Staff respite	2	6.22 (0.88)	5.87 (1.33)	10	4.55 (1.88)	4.11 (1.73)
Good acoustical control	3	6.17 (0.99)	6.38 (0.74)	12	4.50 (1.43)	3.81 (1.83)
Good daylight	4	6.17 (0.99)	6.33 (0.75)	13	4.47 (1.87)	4.79 (1.61)
Good electric lighting	5	6.02 (1.08)	6.09 (0.74)	4	4.80 (1.66)	5.21 (1.33)
Well-maintained	6	6.01 (1.48)	6.26 (0.69)	3	4.84 (1.63)	4.98 (1.46)
Orderly space	7	5.99 (1.30)	5.80 (0.96)	6	4.70 (1.65)	4.71 (1.42)
Comfortable furniture	8	5.93 (1.02)	6.11 (0.78)	2	4.87 (1.54)	4.55 (1.38)
Damage-resistant furniture	9	5.93 (1.17)	5.90 (1.15)	5	4.80 (1.57)	5.15 (1.31)
Outdoor spaces and views of nature	10	5.90 (1.39)	6.01 (0.80)	9	4.55 (1.81)	4.22 (1.77)
Deinstitutional/homelike space	11	5.81 (1.31)	5.88 (1.03)	8	4.64 (1.74)	4.29 (1.77)
Attractive/aesthetic space	12	5.68 (1.33)	5.92 (0.95)	11	4.53 (1.73)	4.43 (1.64)
Attractive furniture	13	5.13 (1.16)	5.53 (1.00)	7	4.69 (1.51)	4.55 (1.48)
Inpatient Qualities and Features						
Suicide resistance	1	6.41 (1.09)	6.71 (0.61)	1	5.79 (1.16)	5.78 (0.98)*
Direct observation	2	6.28 (1.05)	6.08 (1.18)	4	5.56 (1.37)	4.81 (1.75)
Space for staff respite	3	6.25 (0.96)	6.11 (0.86)	13	4.45 (2.01)	3.46 (1.60)
Social interaction	4	6.21 (1.01)	6.00 (0.68)	3	5.57 (1.11)	4.90 (1.18)
Indoor therapy (PT, OT, music, etc.)	5	6.16 (0.89)	6.46 (0.82)	5	5.49 (1.36)	5.03 (1.52)
Positive distraction	6	6.13 (0.86)	6.47 (0.61)	7	5.10 (1.24)	4.85 (1.25)
Staff-patient consulting	7	6.08 (1.06)	6.35 (0.87)	6	5.23 (1.57)	4.79 (1.63)
Small clusters of patients (1-12/ unit)	8	5.78 (1.26)	6.13 (0.83)	9	5.01 (1.65)	*
Autonomy/spontaneity	9	5.64 (1.09)	5.84 (0.81)	10	4.98 (1.30)	3.92 (1.57)
Enclosed nurse station	10	5.51 (1.49)	3.68 (1.84)	2	5.61 (1.30)	3.57 (1.94)
Mix of seating	11	5.40 (1.28)	5.52 (1.19)	8	5.10 (1.45)	4.24 (1.68)
Private bathrooms	12	5.14 (1.53)	5.82 (1.07)	12	4.73 (1.67)	*
Private bedrooms	13	5.13 (1.56)	5.84 (0.95)	11	4.78 (1.66)	*
Open nurse station	14	4.38 (1.88)	5.27 (1.61)	14	4.30 (1.71)	4.62 (1.85)
Smoking	15	3.23 (1.97)	3.49 (2.39)	15	3.86 (2.01)	3.50 (2.14)

* Note: *Small number of patients* was added in 2020. *Private bathrooms* and *private bedrooms* were characterized as *shared bathrooms* and *shared bedrooms* in 2017 and bundled under "suicide resistance" for 2017 ratings of importance and effectiveness.

Figure 5

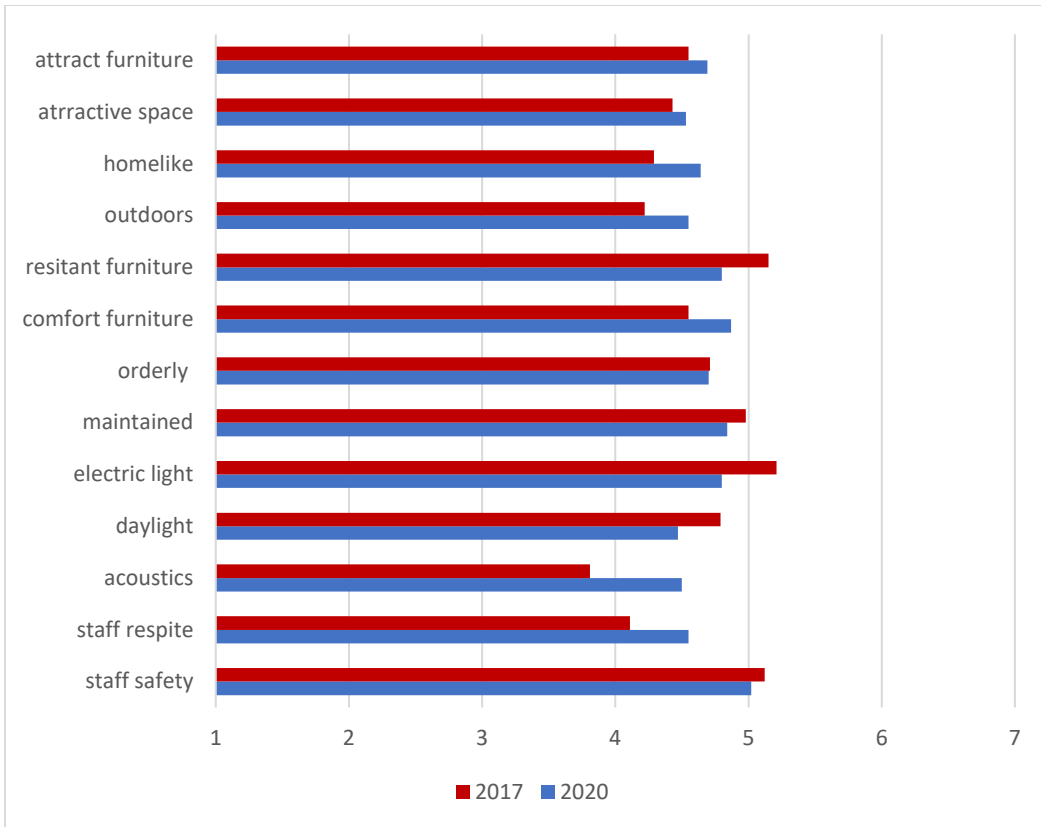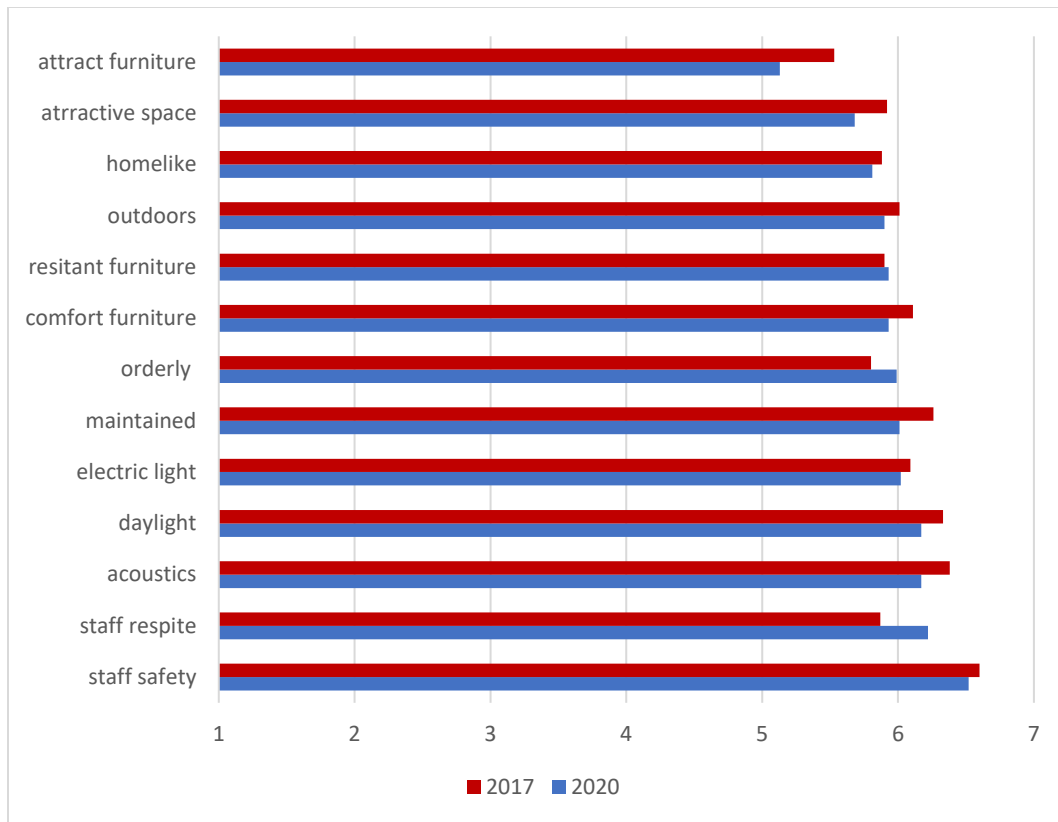*Staff Ratings of Importance Differ from 2020 (current study) and 2017* (Likert Scale of 1 to 7)

Figure 6

Staff Ratings of Effectiveness Differ from 2020 (current study) and 2017

Ratings of the effectiveness of all settings reveal a broader range of scores in the 2017 study (Δ= 1.70) than the current one (Δ= 0.55). Similar trends occur for inpatient attributes, although less stark (2017 Δ= 2.32; 2020 Δ= 1.93). Discussion of similar rankings, therefore, does not always indicate similar scores between the two studies.

Though there are many convergent findings among our studies (and others in the field), we were surprised by several results. When looking specifically at importance within residential MBH environments, there were some differences between the 2017 and 2020 studies. Though suicide resistance received the highest ratings in both 2017 and 2020, all other similarities were for the lowest-scoring attributes: private bathrooms, open nurse stations, and smoking. An examination of scores for private bathrooms, private bedrooms, and open nurse stations reveals a shift from higher scores in 2017 to lower scores in 2020 (see Table 5), while a reverse pattern occurs for enclosed nursing stations.

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Though most differences between survey years were not significant, enclosed nursing stations were viewed as significantly more important *and* effective in 2020 than 2017. For several years, health design literature has debated the influence of open vs. enclosed nursing stations on both residents and staff. In MBH facilities, open nursing stations may improve communication and satisfaction (Shattell et al., 2015) without risking aggression or affecting the therapeutic milieu compared to enclosed stations (Southard et al., 2012). Although recent literature on open nursing stations is promising, it is likely that design practices and occupant opinions do not reflect this evidence yet.

Across both the 2017 and 2020 studies, we also unexpected to see the importance of *deinstitutionalized/homelike environment* rated low compared to other qualities, given the importance placed on deinstitutionalization in previous literature (Christensen, 2015; Sachs et al., 2019; Tapak, 2012). It is worth noting, however, that the average ratings (M_{2020}= 5.81; M_{2017}= 5.88) are still quite high on a 7-point Likert scale.

Limitations

With only four facilities and two states represented, and with fewer resident participants than staff, we were limited in our ability to generalize the results to MBH facilities at large. Because two of the facilities were located on the same property, it is also possible that participants had experience in both facilities which could lead to non-independence of their evaluations. By comparing data from the current study and the previous study, we sought to increase the validity and generalizability of these results, despite sample size limitations.

Future studies using the PSED and PPED tools may be more generalizable if the number of participants was increased and included a more diverse population. A larger sample size and

improved demographic information would enable researchers to address the impact of racial and social determinants on perceptions of MBH environments.

As the purpose of this study was to focus on perception of the physical environment, outcome measures such as length of stay or staff retention were not gathered. Subsequent studies might examine highly evaluated facilities (i.e., facilities where importance and effectiveness are comparable) to measure these variables.

Conclusion

We examined the importance of various environmental attributes, the differences between importance and how effectively these attributes were achieved, and the differences between psychiatric staff and resident responses. The most important qualities for residents were a well-maintained environment and suicide resistance. For staff they were staff safety and security and suicide resistance. Rated across all facilities, staff reported significant differences between importance and effectiveness of environmental attributes ($p < .0001$) whereas residents did not report differences. Significant differences were found between staff and resident ratings of existing facilities ($p = .004$), with staff reporting more inadequacies than residents. Findings suggest a strong need for more supportive physical MBH environments, particularly from the perspective of staff.

Quantitative studies on the physical environment are almost exclusively correlational and often propose a "bundle" of changes, making it difficult to parse out which individual design components have impacts. Even when design changes are minimal and directed toward a certain component (Ulrich et al., 2018), changes to more than one feature or quality of the built environment is almost inevitable, requiring careful consideration and exploration of features and qualities in order to understand the contribution of each one. This quantitative study aimed to

overcome these limitations by utilizing the PSED and PPED tools to analyze specific qualities and features of MBH facilities.

Over the course of two studies, multiple years, and several different facilities in the US, MBH staff have reported significant differences between the importance and effectiveness of features in their environment, indicating design inadequacies. Additionally, staff have reported greater inadequacy in the environment than residents. These findings suggest a strong need for more appropriate physical MBH environments, particularly from the perspective of the staff who work in these spaces. While residents were less concerned about the quality of their facilities, staff, whose primary focus is to support their patients, were acutely aware of the need for improvement. Future research must consider the importance of quantitative and qualitative assessments from both patients and staff, to establish more effective evidence-based design guidelines for MBH environments.

Regarding specific recommendations for the design of MBH environments, facilities that focus on resident suicide prevention and staff safety and respite are essential, regardless of budget limitations or international geographic location. Most facilities address the resident issues carefully by specifying ligature resistant hardware and fixtures and shatterproof materials (e.g., polycarbonate glazing) in resident areas. Regarding staff safety, spaces to which a staff member can quickly withdraw from patient aggression, and lounge spaces with access to nature are essential.

For the next level of environmental support, the selection of materials and room configuration and proportions to address acoustic control and good daylighting are essential. Materials should be sound absorptive but resilient to vandalism and rooms should be laid out to reduce sound reverberation by avoiding high ceilings. Daylighting can be achieved via windows,

clerestories and skylights, and when the site is limited daylight simulating lighting systems that reflect diurnal variation can be implemented. Likewise, when views of nature are minimal, the introduction of indoor plants and nature art can be supplemental. Preliminary research suggests that these features might contribute to reduced patient aggression and therefore increased safety for all (Ulrich et al., 2018). For specific recommendations to achieve these goals, designers might consult the guidelines outlined by Hunt, Sine & McMurray (2018).

Based on this research it is difficult judge the hierarchy of the environmental factors. Staff safety and security and suicide resistance were prioritized, but other environmental interventions such as acoustical control and daylighting were also valued. Whether these items can be considered to be basic human rights (more so than other elements) raises an interesting discussion.

Design research on MBH environments is limited, although progress is being made to identify the components that should be considered, as new and remodeled building projects are contemplated. The results of this study can be applied to the design of future environments. One of the lessons learned is that the goals of the project team might not reflect the desires of the facility users and they should be queried as part of the design process. In that context, we recommend designers address those components of the environment that have been found to be most important to residents in this study: suicide resistance, easily maintained, staff respite and safety, good electric lighting, and positive distraction; and those components most important to staff: suicide resistance, ability to directly observe residents, staff safety and security, and staff respite.

Geolocation information: The study sites for this research were in California and New York.

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