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An Assessment of Levels of Safety in Psychiatric Units

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Abstract

Objectives: This article aims to understand the incident patterns in relation to different types of spaces within a psychiatric unit, which are discussed using the five levels of safety framework. **Background:** Implementing measures to improve patient safety is essential particularly in a psychiatric hospital, where limited research has been conducted on inpatient safety. Therefore, this article aims to understand the incident patterns from the lens of the five levels of safety framework, which categorizes spaces according to the level of patient supervision in psychiatric facilities, as follows: service areas, corridors, dayrooms, patient rooms and bathrooms, seclusions and admissions. **Methods:** In an 81-bed psychiatric hospital, this mixed-method study drew 7 years of incident reports and caregivers' perceptions gathered through focus groups. Incident reports on physical safety were analyzed based on the five levels of safety framework ($N = 1,316$). Focus groups ($n = 9$) explored the caregivers' viewpoints on patient safety and five categories of spaces. **Results:** Overall findings support the five levels of safety pattern, confirming that most incidents occurred in patient rooms and bathrooms; moreover, relatively fewer incidents happened in dayrooms and corridors. Elopements are higher in hallways and dayrooms. Suicide is most common in patient rooms and bathrooms, and violence is more frequent in dayrooms. Focus groups results yielded insightful recommendations. **Conclusions:** Levels of safety framework can be adapted to seven categories where seclusion room and admission area would be two of the spaces with least incidents.

Keywords

behavioral health, mental health, patient safety, patient-centered design, psychiatric hospital

Introduction

The National Institute of Mental Health has reported that about 26% of American adults suffer from mental disorders in any given year. However, the Institute also found that only about one third of those individuals with mental health disorders receive any form of professional treatment (National Institute of Mental Health, 2013). Fortunately, this situation is likely to improve in upcoming years, as the Affordable Care Act requires coverage for mental health and substance abuse in any new healthcare plans (New York Times, 2013). By alleviating financial issues for patients, this change in healthcare coverage should encourage more individuals who suffer from mental health concerns to seek access to treatment (Beronio, Po, Skopec, & Glied, 2013).

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More patients seeking care will lead to greater pressures on treatment facilities. In this context, there is an urgent need to invest additional resources in developing psychiatric facilities that are well designed to promote patient safety and well-being. Strangely, there has been a relative lack of systematic empirical efforts to improve the design of mental healthcare facilities and to study the contributions of facility design to patient safety and effective care. The scarce literature on psychiatric hospital design begs for more research into this subject matter and for the development of new conceptual frameworks to help designers and healthcare workers better serve the needs of the public.

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Recently, a report titled ''Common Mistakes in Designing Psychiatric Hospitals'' (Hunt & Sine, 2009) proposed a framework for categorizing different locations within psychiatric units according to the safety concerns in each area. The report also provided an initial exploration of the relevance of these safety concerns for facility design. Although this approach to psychiatric design seems promising, there is virtually no empirical research that has been conducted to verify the accuracy of the framework in relation to actual safety incidents that have occurred in psychiatric hospitals. The current article helps to fill this gap in our knowledge by empirically evaluating the predictions of Hunt and Sine's (2009) levels of safety model, based on data gathered through patient incident reports and focus groups with mental healthcare staff. Ultimately, this analysis will help to improve psychiatric facility design by providing solid evidence about patient and staff needs and will therefore contribute to better outcomes for patients, family members, and healthcare workers.

Five Levels of Safety

Hunt and Sine (2009) argued that the level of safety concern varies in different locations within psychiatric facilities, based primarily on the degree of patient supervision. They categorized different areas in the facilities into five safety levels, with Level 5 indicating the highest degree of concern:

- Level 1: Staff service areas, where patients are not allowed.
- Level 2: Corridors, counseling areas, and interview rooms, where patients are always under direct observation and supervision.
- Level 3: Lounges and activity rooms, where patients interact with less direct supervision.
- Level 4: Patient bedrooms and bathrooms, where patients are often alone or under minimal supervision.
- Level 5(a): Admission areas, where staff and new patients often interact with unknown potential risks.
- Level 5(b): Seclusion rooms, where patients who have extreme conditions are placed.

Level 5 is divided to two subcategories, admissions areas and seclusion rooms, due to the significant differences in the nature of these two spaces and the types of risk involved (unknown risk vs. known risk).

By identifying the types of spaces that are more prone to safety incidents, Hunt and Sine (2009) initiated a discussion about safety and psychiatric hospital design. This approach emphasizes the relationship between architectural design and treatment practice. It can therefore lead to improved outcomes through designs that are tailored to the needs of particular treatment areas as well as to better predictions of and preparedness for potential incidents in the corresponding locations. Because of these advantages, the framework of safety levels has been incorporated into Safety Risk Assessment Toolkit developed by the Center for Health Design (2015). However, there has been little empirical work done to assess this framework against actual data related to incident reports in existing psychiatric facilities.

Physical Safety Concerns in Mental Healthcare Facilities

According to the National Patient Safety Agency, the physical safety of patients can be defined and measured objectively through the frequency of incidents (Brickell et al., 2009). There are a variety of safety incidents that need to be considered, including suicide and other forms of self-harm, attempts to harm others, and inadvertent harm through falls and other accidents. There is only a very limited scholarly literature that investigates the specific relationship between such incidents and the built environment of psychiatric facilities, even though most mental healthcare practitioners do agree that the environment plays a significant role in patient safety (Joint Commission, 2015).

One important study that did address the role of the built environment in promoting or hindering safety in psychiatric facilities was conducted by Johnson and Delaney (2006). These researchers sought to identify broad facility features that contributed to safety; the issues they discussed included the size of the facility in relation to the number and types of patients, the noise level in the facility, visibility toward patients, the proximity of the nurses' station to activity rooms and to patient bedrooms, the availability of private rooms for patients who need them, and the presence of boundaries between public and private areas. Broad safety concerns were also analyzed by Shepley and Pasha (2013) who approached the topic from an evidence-based design (EBD) perspective. Although Shepley and Pasha concluded that there was not enough existing evidence to generate EBD guidelines for psychiatric facilities, they did indicate three specific safety themes that emerged from the literature during their research: suicide, harming, and elopement.

Suicide is a serious and perennial concern in mental healthcare. Despite the most vigorous efforts of healthcare workers to keep patients safe from suicide, researchers estimate that roughly 1,500 hospitalized psychiatric patients take their own lives each year (Bowers, Dack, Gul, Thomas, & James, 2011; Busch, Fawcett, & Jacobs, 2003). A study analyzing inpatient suicide attempts at Veterans Affairs psychiatric units between 1999 and 2011 found that the principle methods of suicide included hanging, cutting, strangulation, and overdoses. This same study indicated that certain environmental features can play a role in suicide attempts, such as the use of doors as anchor points for hanging and the use of bedding materials to create improvised cords or lanyards (Mills, King, Watts, & Hemphill, 2013).

Additional environmental features can contribute to the risk of patients harming either themselves or others. Some aspects of the built environment can be repurposed as weapons, including shower heads and breakaway towel hooks (Carr, 2011; Geddes, 1999; Jeffers, 1991; Watts et al., 2012). Other features of the environment can contribute to violent behaviors due to the way in which they shape patient interactions. Some researchers have associated the existence of large, shared spaces in psychiatric facilities with increased incidences of physical harm among patients (Perkins, Prosser, Riley, & Whittington, 2011). These same environmental elements have also been mentioned as concerns in studies of staff safety in psychiatric facilities (Forster, Cavness, & Phelps, 1999; Lynch, Plant, & Ryan, 2005; Martin, 1995; Salerno, Forcella, Di Fabio, Figà Talamanca, & Boscolo, 2012), which in return can empower staff to maintain the overall unit safety.

Elopement or absconding, which is defined as an attempt to leave the facility without the approval or awareness of the staff, is also regarded as a safety consideration. Elopement can jeopardize treatment plans and put the patient and others at risk outside of the facility; it is also possible for patients to injure themselves while trying to escape. The extent to which psychiatric facilities employ locks and other physical security measures is a sensitive topic, and these elements of the environment may vary significantly based on the specific patient population and the culture and policies of each facility (Muir-Cochrane, Mosel, Gerace, Esterman, & Bowers, 2011).

Moreover, falls are a threat to patient safety in all healthcare settings (Ulrich et al., 2008) and psychiatric hospitals are not no exception. Notably, falls are prevalent among psychiatric patients due to the side effects of psychotropic

medications (Howland, 2009). Nevertheless, falls are affected by environmental factors as well. Such factors include but are not limited to flooring material, presence of grab bars, and adequate lighting (Ulrich et al., 2008).

The literature discussed in this section indicates some of the major safety concerns in psychiatric facilities and indicates how they may be related to the aspects of the physical environment. However, this is only a bare starting point for designers who wish to contribute to better patient outcomes through their work. To further analyze the relationship between design and patient safety, it is important to empirically investigate the physical context of safety incidents. Ultimately, this knowledge can be used to improve facility design and operational procedures by allowing for predictions of incidents and their locations and preparedness for such incidents.

Research Questions

The purpose of this article was to gather empirical evidence to test the validity of Hunt and Sine's (2009) framework of differing safety levels among different locations within psychiatric facilities. The two central research questions were

> **Research Question 1:** Do patient incident reports and staff perceptions confirm the differences in safety levels among different areas in the facility?
>
> **Research Question 2:** Do specific types of safety incidents occur more frequently in specific areas of the facility?

Research Methods and Study Design

This article used a mixed-methods approach, incorporating both quantitative and qualitative data from a single psychiatric healthcare facility. The site selected for the study was a 26-year-old institute for mental health, located in the southeast region of the United States. The 81-bed hospital hosted four distinct units serving different patient populations; these units included substance and alcohol abuse, adult

psychiatry, child and adolescent patients, and geriatric patients. Before undertaking the study, the researchers obtained institutional review board approval to ensure that the study design met ethical considerations for research involving human participants.

The quantitative data collected in the study consisted of hospital records on patient safety incidents. Archived patient incident reports from January 2007 to December 2013 were obtained from the hospital and were categorized according to the location of each incident, using the framework developed by Hunt and Sine (2009). The reports were then analyzed to determine if the relative number of safety incidents that had occurred in each location corresponded to Hunt and Sine's evaluation of different safety levels for those in different locations. The researchers also analyzed the different kinds of safety incidents that were reported in each location, in order to account for their relative severity. The typology of safety incidents was based on the hospital's own incident-reporting schematic, and it consisted of the following categories:

- contraband (any objects with potential to be used for harm, such as razors, cords, or environmental components, such as glass, bedding items, and ceiling tiles);
- elopement (attempts to leave the facility without staff approval);
- falls (including falls from chairs, falls from beds, falls from walking, and patients found on the floor);
- improper behavior (a broad category that ranged from attempted self-injury to inappropriate sexual contact);
- violence (attempts to injure other patients or staff members or environmental violence, such as throwing furniture and punching walls);
- suicide (both successful and unsuccessful attempts); and
- other (incidents not covered by the other categories, such as noncompliance, missing items, and dietary issues).

The 7 years of records obtained from the hospital yielded a total of 2,536 incident reports, each

containing a narrative explaining the event. These records did not include a formal indication of the event's location; however, in the majority of the reports the location could be determined from the event description. Reports in which the incident location could not be determined were omitted from the study, leaving a total of 1,316 categorized records.

The qualitative data collected in the study consisted of semistructured focus groups with staff members at the facility. Invitations to participate in a focus group were printed and posted at the psychiatric hospital under study. A total of nine participants volunteered and attended the focus groups. Two focus groups were scheduled to accommodate for staff who worked at different shifts. One focus group included three participants and the other included six participants. The length of each session was 1 hr, and the discussions were held in a conference room at the psychiatric hospital. The sessions were audio recorded and transcribed to facilitate the data analysis of the responses. To minimize any bias in responses, no identifiers were recorded at the session and participants were informed about the confidentiality of the procedure. The focus group participants were asked to share their perspectives on the prevalence of safety concerns in different locations within the facility, to determine if their experience corresponded to Hunt and Sine's (2009) evaluation of different safety levels in those different locations. In this procedure, flash cards with labels of each location category were used. Participants were asked to sort the flash cards based on their perception of incident frequencies in each location. The assorted flashcards were photographed for later analysis. After this exercise, participants further described and discussed their perception on incident frequencies in regard to location.

Analysis of Incident Reports (Quantitative Results)

Table 1 indicates the frequency of incident reports in different locations proposed by Hunt and Sine's (2009) levels of safety framework. The locations designated as Safety Level 4 (patient bedrooms and bathrooms) were by far the largest source of incidents, with a frequency of 747 of 1,316 total events, or 57% of all incidents studied. The locations designated as Safety Level 3 (lounges and activity rooms) were the next highest, with a frequency of 318 incidents or 24% of the total. Locations designated as Safety Level 2 (corridors, counseling rooms, and interview rooms) accounted for 173 or 13% of the total incidents. Interestingly, locations designated as Safety Level 5 were the source of only 65 incidents, or 5% of the total. This breaks down into 45 incidents (3.5%) for Level 5a (admissions areas), and 20 incidents (1.5%) for Level 5b (seclusion rooms). The lowest number of incidents occurred in locations designated as Safety Level 1 (staff service areas), which accounted for 13 incidents or 1% of the total.

Figures 1 through 7 illustrate how the distribution of specific types of incidents compares with the overall incident distribution. Figure 1 shows that contraband incidents largely mirror the overall pattern. Most contraband incidents occurred in locations designated as Safety Level 4, followed by Safety Level 3, Safety Level 2, Safety Level 5, and Safety Level 1.

Figure 2 indicates that elopement has a different pattern compared to the overall distribution of incidents. Most reports of elopement attempts occurred in locations designated as Safety Level 2 (corridors, counseling rooms, and interview rooms). This is probably to be expected, since the exits from the facility are located in the corridors, and most elopement attempts were probably identified as patients moved toward these exits.

Figures 3 and 4 show that the categories of falls and improper behavior both mirror the overall distribution pattern of incident reports. In Figure 5, however, it can be seen that suicide has an anomalous pattern. While the locations designated as Safety Level 4 (patient rooms and bathrooms) are the source of the most suicide attempts, the next largest number occurs at Safety Level 5a (admissions areas). This is a very important finding, due to the extreme gravity of suicide-related incidents.

Figure 6 shows that incidents of violence also have a different pattern compared to the overall distribution. Violence occurs most often in locations designated as Safety Level 3 (lounges and

Table 1. Frequency of Incidents by Locations.

Incidents	Level 1	Level 2	Level 3	Level 4	Level 5a	Level 5b	Total, n (%)
Suicide	0	0	0	9	1	0	10 (1)
Elopement	0	29	8	1	3	0	41 (3)
Other	1	9	30	58	19	2	119 (9)
Improper behavior	2	22	38	88	3	0	153 (12)
Contraband	0	3	20	133	1	0	157 (12)
Violence	9	61	87	68	12	17	254 (19)
Fall	1	49	135	390	6	1	582 (44)
Total, n (%)	13 (1)	173 (13)	318 (24)	747 (57)	45 (3.5)	20 (1.5)	1,316
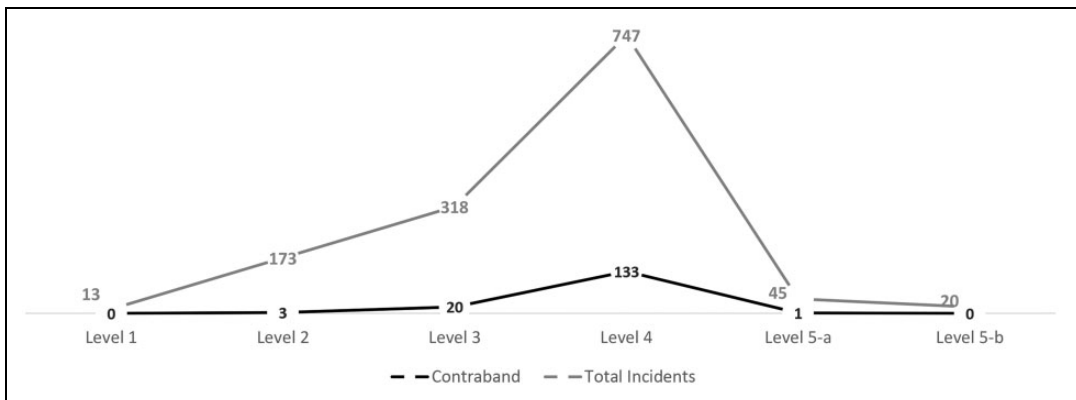
Figure 1. Contraband versus total incidents.
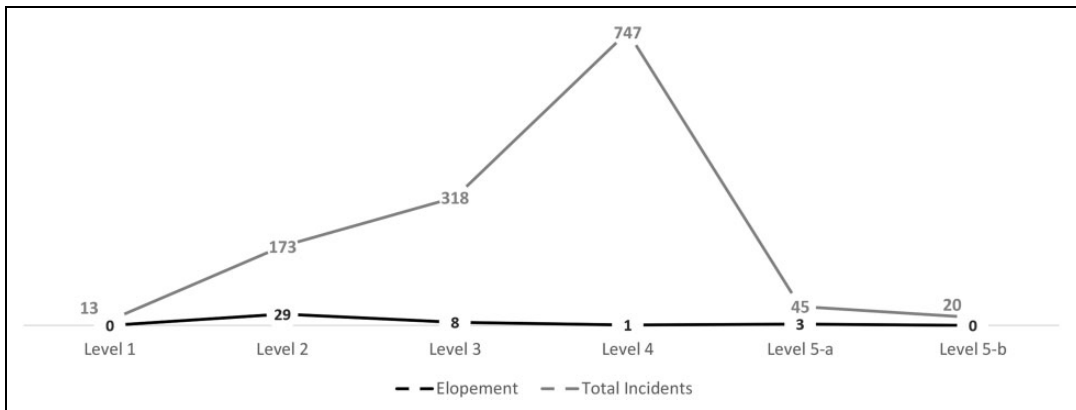
Figure 2. Elopement versus total incidents.

activity rooms), which is where patients most commonly interact with each other. In Figure 7, it can be seen that the category of other mostly follows the overall distribution pattern, but with a slight increase in frequency in locations designated Safety Level 5a (admissions areas).

Figures 8 to 13 show the frequency of different types of incidents at each safety level. As can be seen in Figure 8, incidents occurring in locations designated as Safety Level 1 (staff service areas) were mostly violence related (69.23%, $n = 9$), with a very small number of improper behaviors
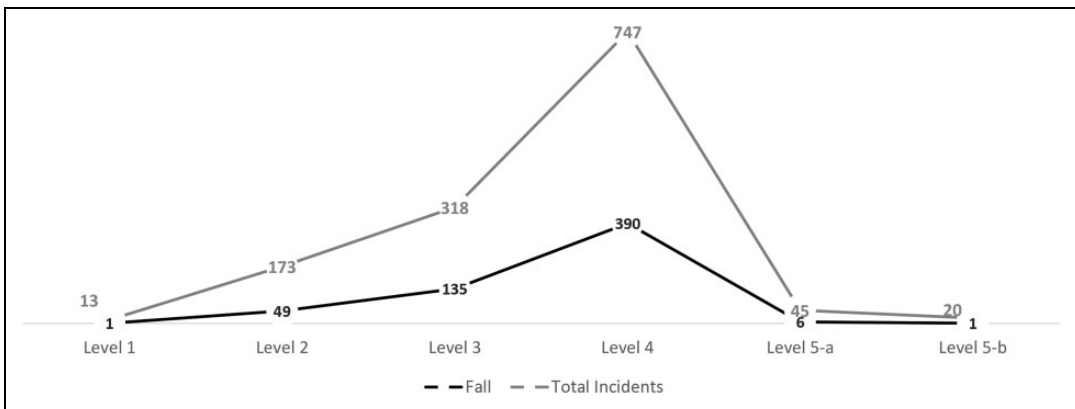
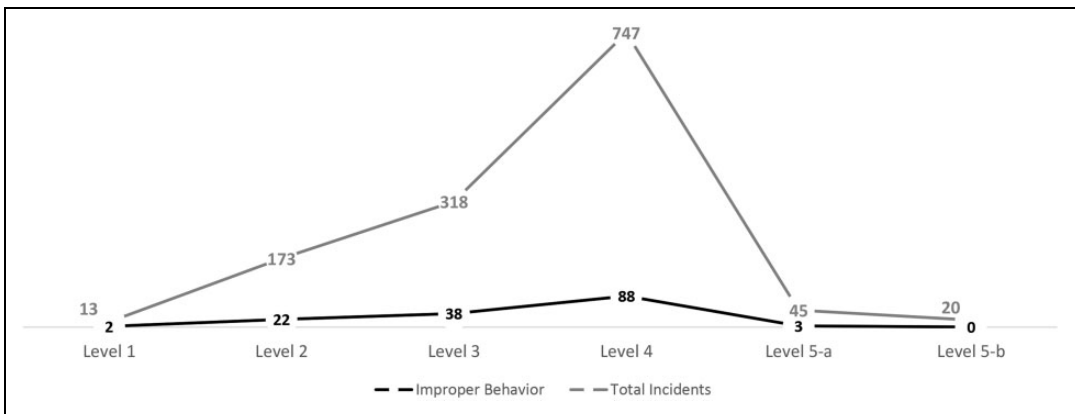**Figure 3.** Falls versus total incidents.

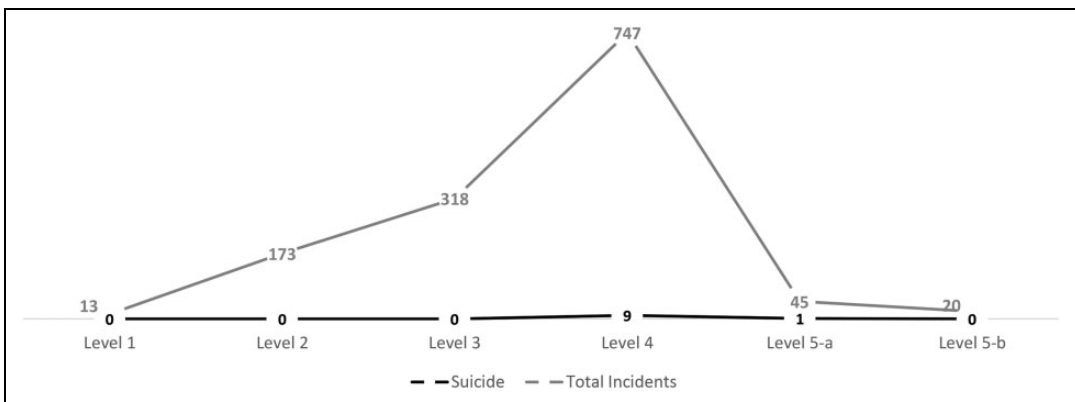**Figure 4.** Improper behavior versus total incidents.

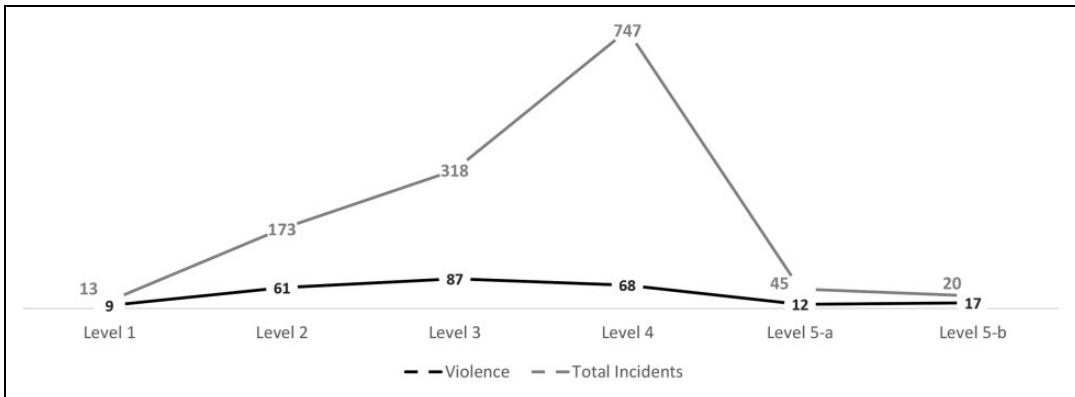**Figure 5.** Suicide versus total incidents.

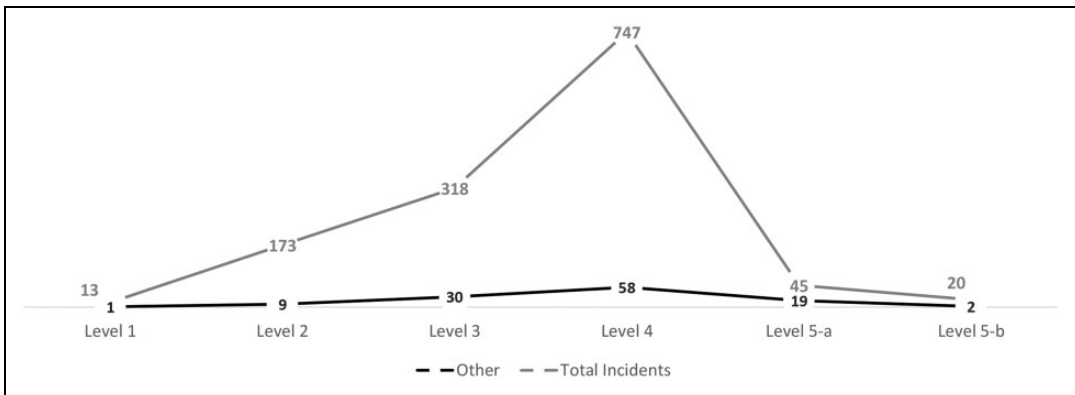**Figure 6.** Violence versus total incidents.

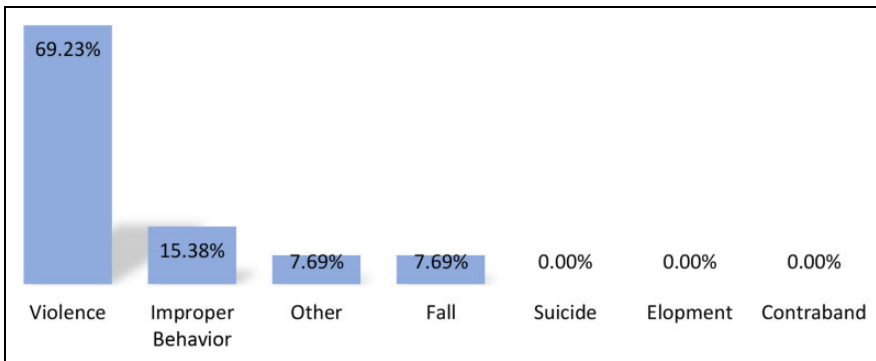**Figure 7.** Other versus total incidents.

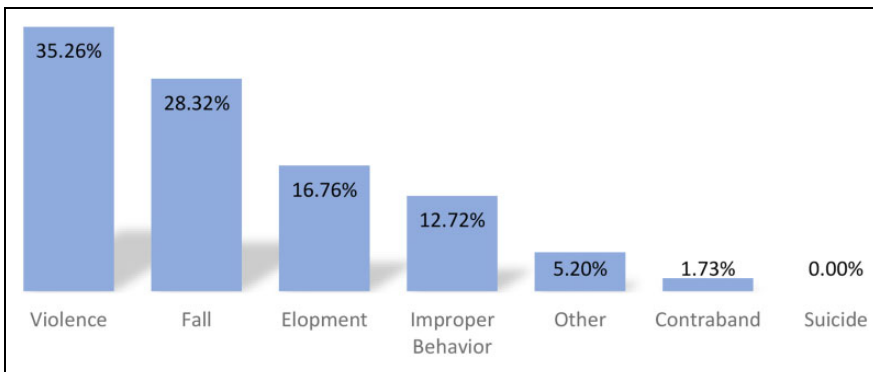**Figure 8.** Level 1: Staff service areas.
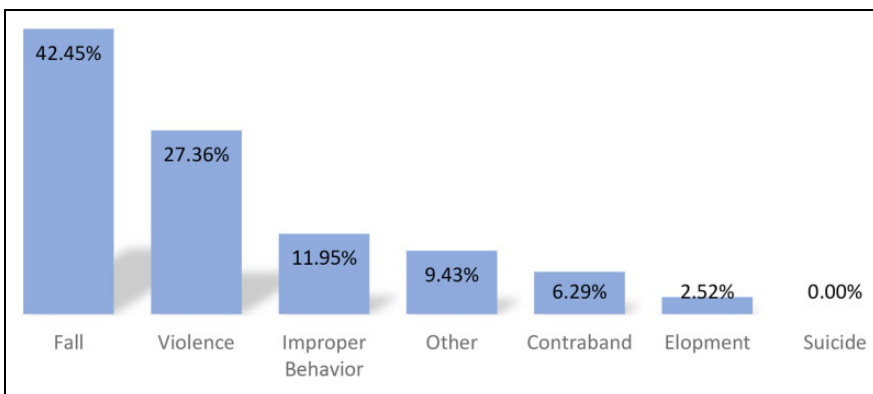
Figure 9. Level 2: Corridors.

Figure 10. Level 3: Dayroom, lounges.

(7.69%, $n = 2$), falls (7.69%, $n = 1$), and other (7.69%, $n = 1$). Overall, very few incidents occurred in these locations.

Figure 9 indicates incidents that occurred in locations designated as Safety Level 2 (corridors, counseling rooms, and interview rooms). The greatest number (35.26%, $n = 61$) of these incidents was violence related. Falls were the second most frequent category (28.32%, $n = 49$), followed by elopement (16.76%, $n = 29$), improper behavior (12.72%, $n = 22$), other (5.2%, $n = 9$), and contraband (1.73%, $n = 3$).

Figure 10 shows the types of incidents that occurred in locations designated as Safely Level 3 (lounges and activity rooms). In these locations, falls were predominant (42.45%, $n = 135$), followed by violence (27.36%, $n = 87$), improper behavior (11.95%, $n = 38$), other (9.43%, $n =$

30), contraband (6.29%, $n = 20$), and elopement (2.52%, $n = 8$).

Figure 11 indicates the most common incidents that occurred in locations designated as Safety Level 4 (patient bedrooms and bathrooms). Again here, falls were predominant (52.21%, $n = 390$). The other incident categories followed well behind, including contraband (17.80%, $n = 133$), improper behavior (11.78%, $n = 88$), violence (9.10%, $n = 68$), other (7.76%, $n = 58$), suicide (1.20%, $n = 9$), and elopement (0.13%, $n = 1$).

Figures 12 and 13 show the most common incidents in locations designated as Safety Level 5a and 5b. Both of these locations experienced a very small number of incidents overall. For locations designated as Level 5a (admissions areas), other was the most common category (42.22%,
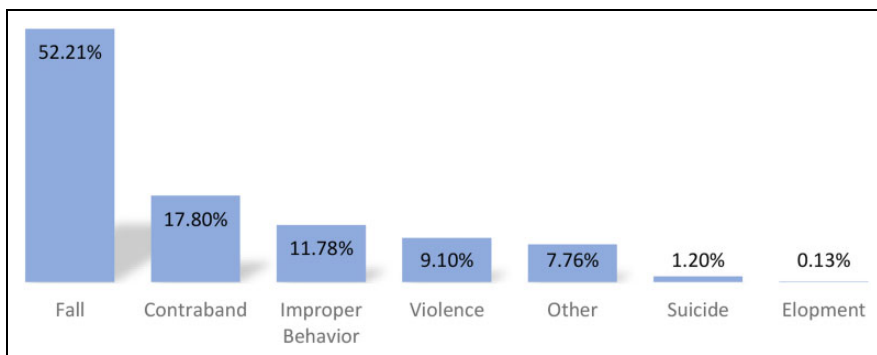
Figure 11. Level 4: Patient rooms and bathrooms.
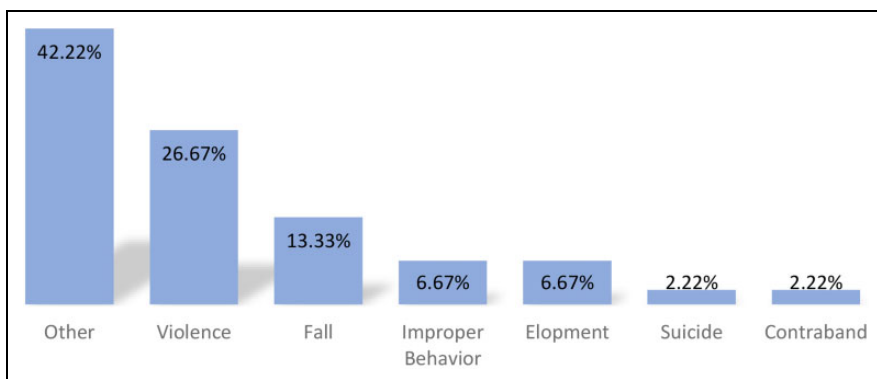

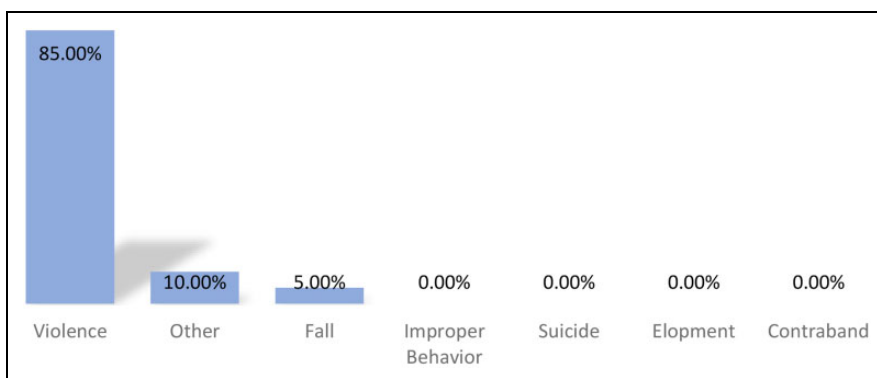**Figure 12.** Level 5a: Admission.

Figure 13. Level 5b: Seclusion.

$n = 19$), followed by violence (26.67%, $n = 12$), falls (13.33%, $n = 6$), improper behavior (6.67%, $n = 3$), elopement (6.67%, $n = 3$), suicide (2.22%, $n = 1$), and contraband (2.22%, $n = 1$). Those locations designated as Level 5b (seclusion rooms) had a very high incidence of violence

Table 2. Staff Rankings of Levels of Safety.

Participants	Least Incidents					Most Incidents
1	Level 1	Level 3	Level 5b	Level 5a	Level 2	Level 4
2	Level 1	Level 2	Level 5a	Level 3	Level 5b	Level 4
3	Level 1	Level 2	Level 5b	Level 5a	Level 3	Level 4
4	Level 1	Level 5a	Level 3	Level 2	Level 5b	Level 4
5	Level 1	Level 2	Level 5a	Level 5b	Level 4	Level 3
6	Level 1	Level 5a	Level 5b	Level 3	Level 2	Level 4
7	Level 1	Level 5b	Level 3	Level 5a	Level 2	Level 4
8	Level 1	Level 3	Level 5b	Level 2	Level 5a	Level 4
9	Level 1	Level 2	Level 5b	Level 5a	Level 3	Level 4

(85%, $n = 17$), followed by other (10%, $n = 2$) and falls (5%, $n = 1$).

Focus Group Perceptions (Qualitative Results)

During the focus group sessions, when the staff members were asked to rank the safety level locations in regard to their degree of concern, they clearly indicated that locations designated as Safety Level 4 (patient bedrooms and bathrooms) were the most problematic, followed by locations designated as Safety Level 3 (lounges and activity rooms). These findings are fully consistent with the results from the analysis of hospital incident reports. The full focus group rankings for the various locations are presented in Table 2.

The primary concern that the focus group participants expressed about locations designated as Safety Level 4 was being unable to observing patients when they were in the bathrooms. The staff participants largely agreed that this situation of decreased visibility was a primary cause of safety incidents. For example, one nurse explained:

> It bothers me when they're in the bathroom. If they're in the bathroom and they're not talking to me. That bothers me. Then I get closer where I can hear them moving around and I insist on them talking to me. We've changed a lot of our bathroom doors to kind of partial doors.

As this quote indicates, one of the design strategies used in this particular hospital is the installation of sentinel event reduction doors for patient bathrooms. This is a patented type of door that can provide adequate privacy for patients while still allowing the staff members to make partial observations. The door has a trapezoidal shape, which also has the benefit of preventing any attempt to use the top of the door as an anchor point for hanging.

In addition to these specialized doors, the focus group participants explained that the hospital maintains an open-door policy in regard to patient bedrooms. They indicated, however, that this policy was difficult to enforce in practice:

> We have patients who are noncompliant and want to shut their doors. We have an open-door policy, but it is very hard to keep them open. And there is not a good way to keep them open. Not for activities, not for regulatory rounds. But yet they need to stay open. That's a problem because not only do you lose the visual, but you lose the hearing too.

A closed door not only hinders visual access to patients inside their rooms but also impedes audio access. While the staff members expressed a great concern about this, they were also sympathetic to patients' desires to close their doors in order to evade the light and potential noise from outside. Despite the proactive efforts of the hospital to increase patient safety in bedrooms and bathrooms, the focus group participants all agreed that these locations would continue to be a primary concern.

The focus group participants were more ambivalent in their rankings of the other locations. A significant number of participants agreed that the locations designated as Safety Level 3

(lounges and activity rooms) were of second greatest concern, while other participants rated Safety Level 2 (corridors, counseling rooms, and interview rooms) or Safety Level 5a (admissions areas) as being the second greatest after patient bedrooms and bathrooms. In relation to all of these other areas, the participants did agree that visual access from the nursing station that allowed them to observe patents in corridors, activity rooms, and other areas was of fundamental importance:

> One of the things I think is beneficial is that the nurses' station is centrally located and we can see. All the patient activity revolves around the nurses' station, which I think helps because then you have a visual of what's going on. . . . I think that's really helpful.

The staff in this facility seemed to concur that open lines of visibility provided a crucial means of enhancing safety in any part of the hospital.

The participants were also in agreement with their limited concern for locations designated as Safety Level 1 (staff service areas). They all indicated that these locations had the least incidents, which is again consistent with the quantitative data from the hospital's records. Somewhat in contradiction to Hunt and Sine (2009), the staff members also indicated a low level of concern for locations designated as Safety Level 5b (seclusion rooms). The staff members' view of this is consistent with the hospital's records, which show few safety incidents occurring in seclusion rooms.

Discussion

Overall, the results from the study show an increasing level of safety concerns from Safety Level 1 through Safety Level 4, which is consistent with the framework proposed by Hunt and Sine (2009). However, the results related to Safety Level 5a (admissions areas) and 5b (seclusion rooms) did not follow Hunt and Sine's framework; both the hospital records and the staff focus groups indicated a lower level of concern for these areas than Hunt and Sine's framework would predict.

Overall, the results from the study show an increasing level of safety concerns from Safety Level 1 through Safety Level 4, which is consistent with the framework proposed by Hunt and Sine (2009).

The numerical analysis of hospital incident reports needs to be tempered with the consideration that some incidents are more severe than others. For example, the most common type of incident reported in locations designated as Safety Levels 3 and 4 were patient falls. In contrast, the locations designated as Safety Level 5a and 5b had far more incidents of violence than of falls. Thus, the relatively low number of total incidents in Safety Level 5a and 5b should be balanced with a consideration for the severity of those incidents and the potential difficulty of containing them. Even considering these divergent severities, however, the extremely low-incident rate in admission areas and seclusion rooms, combined with the staff members' agreement that patient bedrooms and bathrooms are of far greater concern, provides a note of caution in regard to Hunt and Sine's (2009) categorization of admission areas and seclusion rooms as the greatest safety priority.

Another factor that should be considered is the ability of staff members to address safety incidents when they do occur. This is likely the reason that the focus group participants rated seclusion rooms as being a very low-safety concern, even though the hospital records showed a moderately high incidence of violent behavior in those locations. Such incidents of violence are to be expected in seclusion rooms; in fact, violent behavior is one of the main reasons that patients are assigned there. The rooms are specifically designed to accommodate such incidents (often to the detriment of other healing priorities). The patients in seclusion are constantly monitored, and the potential for harm is minimized through environmental features such as padded walls and the rigorous elimination of any environmental component that could present a danger. From a practical standpoint, therefore, seclusion rooms can be regarded as having a lower level of safety concern in comparison with other kinds of

treatment areas in the facility where safety incidents may be harder to contain and address.

Based on the results of this study, it may be possible to propose a tentative revision to Hunt and Sine's (2009) categorization of safety levels within psychiatric facilities. If the framework is adjusted to account for the empirical evidence gathered here, with an emphasis on practical safety concerns and design improvement priorities, then it would look similar to the following:

- Level 1: Staff service areas
- Level 2: Seclusion rooms
- Level 3: Admissions
- Level 4: Corridors, counseling areas, and interview rooms
- Level 5: Lounges and activity rooms
- Level 6: Patient bedrooms and bathrooms

Conclusions, Study Limitations, and Recommendations for Future Research

Mental healthcare is an urgent issue in today's society. Continuing, robust efforts are needed to better address the needs of patients with mental disorders. Designers can contribute to the safety and well-being of psychiatric patients as well as the safety and well-being of mental healthcare workers, by helping to provide the best possible built environment to support treatment efforts. Gathering empirical evidence about safety concerns and design needs in psychiatric facilities is a vital part of this process.

The current article examined the patterns of safety incidents in a psychiatric hospital and analyzed those incidents in relation to the specific locations where they took place. The study was designed to test the categorization framework proposed by Hunt and Sine (2009), which divides the areas within psychiatric facilities into five different levels of safety. While the framework proposed by Hunt and Sine has the potential to help design practitioners make informed decisions, there have been no previous efforts to empirically measure the accuracy of the framework in relation to existing facilities. The current article helped to fill this knowledge gap by gathering and analyzing data drawn from hospital safety incident records and focus group interviews with healthcare workers.

The results of the study generally supported the framework proposed by Hunt and Sine (2009), with the exception that the two locations given the highest level of safety concern in Hunt and Sine's framework were determined to be of lower safety concern in the empirical data. These locations were admission areas and patient seclusion rooms. The results of the study indicate a tentative revision to Hunt and Sine's framework in which admission areas and patient seclusion rooms are lowered in priority, leaving patient bedrooms and bathrooms as the areas of greatest safety concern and the highest priorities for design improvements.

There are several limitations that should be noted in regard to the study. First, the data gathered here are from one individual psychiatric facility and may not be fully generalizable to other hospitals. Second, since the incident reports collected during this study go back almost a decade, there is a possibility of confounding variables arising from changes in the facility or in different treatment practices over time. This particular hospital based their efforts in environmental improvements for safety on design guidelines suggested by the National Association of Psychiatric Health Systems (NAPHS). Although, a list of renovations based on NAPHS guidelines were obtained from the hospital, these variables proved not to be appropriate for further statistical analysis, due to the lack of control over confounding variables.

Finally, another limitation was the lack of direct interviews with patients and their families. The use of a mixed-method approach and data triangulation helps to offset some of these limitations; however, further research is needed to verify the study results and expand our knowledge.

To continue gathering vital information about the relationship between the built environment and psychiatric patient safety, future research should focus on measuring environmental differences between various facilities, particularly between facilities with different kinds of patient populations (e.g., adult patients vs. children). This would provide knowledge about the areas

of greatest safety concern in specific types of psychiatric units, allowing designers to further target their efforts. Future studies could also benefit by better controlling for confounding variables such as the length of patient stay or the number of patient beds.

Implications for Practice

- Patient rooms and bathrooms provide the greatest opportunity for safety incidents. Therefore, providing better visibility and accessibility for staff is necessary.
- Although staff-designated areas are only for staff activities, some unauthorized access to these areas may be attempted, due to patient noncompliance. For this reason, design considerations that accommodate safety in such occurrences are recommended.
- Most elopement incidents occur in hallways where the entrances are located. In other words, elopement usually occurs when the locked entry door opens due to groups of people entering or exiting the unit. Providing visibility in such areas may reduce the rate of elopement.
- Admission or intake units should be conveniently located where quick access from an ambulance or outside can be provided. Due to the unknown status of patients before evaluation, ample safety measures should be taken.

Declaration of Conflicting Interests

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