

Peer Review File

Article information: <https://dx.doi.org/10.21037/jhmhp-23-93>

**Reviewer A**

1. "The survey was internally distributed through the Qualtrics online survey platform, employing a convenient sampling method, and was accessible for three weeks" - did only employees have access to the system - how? did they log into the system? was anonymity preserved?

Reply: We added additional information: See page 11, lines 250, 251, line, 258: "To collect responses, a convenient sampling approach was employed, involving the distribution of the survey to all employees within the healthcare network. This distribution was coordinated internally and took place over three weeks in 2022. While the exact number of employees approached was not disclosed to the research team, it was approximately 2000 individuals. To obtain a representative sample with a 95% confidence level and a 5% margin of error, the target sample size was determined to be around 384 employees. Anonymity was maintained as participants were not required to log in to complete the survey. Data security measures, including encryption and IP address tracking restrictions, were implemented to ensure the protection of participants' information."

2. please describe/detail the purpose of the study.

Reply: The purpose of the study has been revised in page 10, sub-chapter 1.3 Purpose. Changes in text: We connected our objective to the JDCS model, identified the existing gaps, and outlined the researchers' aspirations for their contributions to the healthcare design and safety domain.

3. is it not worth referring to the answers of people broken down by functions/tasks/professional groups? didn't a group of e.g. manager speak very differently than e.g. nurses? There is no exact description of the responding groups-answers. their specificity, in my opinion, can contribute a lot to the assessment of the answer.

Reply:

The decision not to refer to the answers of different professional groups based on functions or tasks in the paper may have been made for several reasons. One possibility is that the research focus was more on general trends and perceptions within the organization rather than specific variations between professional groups. Additionally, the paper might have been limited in length or scope, which could have made it challenging to include a detailed breakdown of responses from various professional categories. However, recognizing the potential value in assessing responses by specific groups is a valid point, and it could be considered for future research or a more extensive study to provide deeper insights into the nuances of different perspectives within the organization. To streamline clarity, given that participant characteristics were not the primary focus of this study, we incorporated demographic information in supplementary files.

## Reviewer B

The authors deserve credit for investigating the facility design attributes that are perceived to impact satisfaction and patient outcomes.

Comment 1: Please indicate whether this study was IRB approved

Reply: we have added this information on page 11, line 249.

Changes in the text include stating that the formal Institutional Review Board (IRB) approval was not required; however, the survey underwent an internal informal review process.

Comment 2: In your methods, please expand on how you obtained open ended feedback. Was this obtained through open-ended questions in a survey, a focus group, one-on-one interviews?

Reply: Please refer to page 11, line 244.

Changes in the text outline that we included the open-ended questions in the online survey link.

Comment 3: Was there cross over between those that gave department specific feedback and generalized feedback?

Reply: We provided this information in page 14, lines 305-310: The results revealed that there was an overlap between individuals who provided department-specific and generalized feedback, as a portion of respondents offered both department-specific and generalized feedback. This overlap suggests that some participants shared broader insights while also providing input specific to their departments. However, it is important to note that most respondents tended to focus on either department-specific or generalized feedback, with only a smaller subset offering both.”

Comment 4: What methodology did you use to ensure thematic saturation from your open-ended feedback?

Reply: See page 12, lines 264-268.

Changes in the text: We explain how thematic saturation was attained using a systematic coding process, during which recurring themes were identified and resolved through team discussions. This method yielded a comprehensive coding framework encompassing all recognized themes. As coding progressed, new responses consistently reinforced existing themes, signifying the achievement of thematic saturation. The resulting key themes and findings provided a robust qualitative understanding of the data. To further enrich the depth and comprehensiveness of the analysis, we employed a directed content analysis approach, guided by the critical safety predictors identified through the regression analysis.

Comment 5: You are not actually measuring safety outcomes, so I am confused regarding the application of regression analysis to this data. I would recommend including a statistician in the analysis of your data.

Reply Thanks for this feedback, See page 13, line 281 or 289 (as examples).

Change in text: we have modified the verbiage from safety outcomes to staff satisfaction

with patient and visitor safety or staff safety.

Comment 6: For each theme you give a number (n=). I don't understand where this number is coming from and why you are including it. Also, the numbers you give have a wide range, so it implies that some themes may be perceived as less important than others (please clarify).

Reply: We have included a description in the text on what n represents and how we interpreted the wide range of counts page 14, line 321-329: "The counts (n) represent the number of coded responses for each theme. The variation in the counts reflects the diversity in participants' responses, rather than implying the relative importance of themes. It's important to emphasize that the numbers are not indicative of the significance of a theme but rather demonstrate the prevalence of certain topics within the data. The wide range is a result of the participants' diverse perspectives and the richness of the qualitative data. Each theme contributes uniquely to our understanding of the subject matter, and none should be perceived as less important than others. Our intention is to provide a comprehensive overview of the various aspects raised by the participants in their feedback."

Comment 7: You make quite a large jump in your conclusions that perceptions of staff are patient safety predictors, yes you do not have data that demonstrates this correlation. These are perceptions around the topic of patient safety – these results do not demonstrate actual risk mitigation.

Reply: This terminology has been modified, page 2, line 659-

Changes in the text: the conclusion paragraph has been modified. We have removed the word "outcome" and replaced it with "perceptions".

There is quite a lot of evidence-based design data in the literature that clearly demonstrates the impact of the factors you describe on patient safety outcomes. I am not convinced that this study fills a gap in the literature. I am interested to know if this data was analyzed before or after you completed master planning. What would fill a gap is describing how this end user information guides and changes your approach to master planning.

Reply: In the discussion section, pages 19-27, we have discussed how the reported information was integrated into our planning and design.

In your limitations, you state that sample size is a limitation. Did you conduct a power calculation to determine effective sample size to detect difference in perceptions – please include this in your methodology.

Reply: we removed this statement from the limitation after discussing with a statistician, The effective sample size calculation showed 384 employee response represent adequate sample size (see page 11, lines 254-255).

These is a lot of time spent in your discussion restating what is already evident in the literature – I would recommend re-writing this section, focusing on how this information changed your approach to facility design. How did you use this information to change your process? Did you use this information to inform design – if so, how? What have you learned and what you will

do differently in future projects.

Reply: In the discussion section, pages 19-27, we have discussed how the reported information was integrated into our planning and design. Additionally, we included representative figures to illustrate typical changes.

Page 28 lines 647-657 explains the lessons learned from this study and how we used this modification for future master planning projects.

## **Reviewer C**

This is an interesting topic, and will be useful for those planning how best to design / develop hospital working environments. The methods section needs much more detail on how the study was undertaken, to facilitate replication. It is also not clear what approvals were obtained for the study / if an ethics waiver was in place. The discussion and conclusion need reviewing and re-structuring, but the content is well written, and will be useful for others working in this field.

### **Abstract**

- Line 26, review sentence - ? “understanding the environmental factors” might read better. It would also be helpful to know what you are referring to by environmental factors in this opening sentence

Reply This terminology was replaced by “physical environmental qualities”, line 2. Further, we included examples such as” as privacy, adjacency, cleanliness, security, or visibility.”

- Line 32 – consider changing the order of this so as not to start with a number. This should also be in the results rather than methods.

Reply this was modified and the number is in the text, page 1, line 7.

- Include study site in the methods

Reply: we included information about the site pages 10-11, lines 230-234. Due to word-count limitation this information was not included in the abstract.

- How was the survey developed? Is it validated?

Reply: This data is included in page 11, lines 234-241. We describe the content validity process through expertise feedback and literature review. Further, we had previously used the survey in prior projects, However, formal reliability tests could not be obtained from the participants.

- Line 33 – how were your data analysis?

Reply: we included the data analysis process for quantitative and qualitative data in page 12, lines 259-272. This included Qualtrics XM Stats IQ platform, and Qualtrics XM Text IQ and Excel. In the abstract we provided the information about the data analysis approach as “regression analysis directed content analysis” (See page 1, line 10).

- Line 38 – were these also significant predictors?

Reply: Yes, these variables were significant predictors. We added the terminology “significant” in lines 12 and 14.

- What are the safety outcomes you are looking at?

Reply: We understand this terminology was confusing. Thus, we replaced “safety outcome” to “Safety perceptions” or “staff satisfaction of safety” throughout the text.

- I think you could strengthen your conclusion, stating the implications of the results more clearly

Reply: The conclusion paragraph has been revised to inform about the implications for policymakers and designers (See page 1, lines 18-26)

### Highlight Box

- Needs to define the outcomes more clearly – what is the implication for patient or staff safety?

Reply: The highlight Box was modified, and implications explained (See page 2): “By addressing the identified factors collectively, they contribute to creating healthcare spaces that adhere to regulatory standards and prioritize the safety, satisfaction, and effectiveness of staff and patients, ultimately improving the quality of care and minimizing adverse incidents in healthcare settings.”

### Introduction

- Lines 65-72, This is a great introduction, would benefit from examples of how patient and staff safety are enhanced – e.g. reduced incidents of patient harm, patient experience etc

Reply: The introduction section was modified to provide explanation and examples of different studies that link physical environment characteristics to safety (page 3-7).

- Same for lines 73-78 – how does these measures ensure safety?

Reply: This paragraph was removed from the text as it was not relevant to the emerging themes from the regression analysis. We further explained the other physical event factors in the subsequent sub-sections.

- Are there any models (e.g. Karasek’s Job demand model) that can underpin your rationale for this study?

Reply: Thanks for the suggestion, we discussed the JDCS model as a rationale for the study (See page 9, lines 198-207).

- Objective – this section felt much more like study recommendations and should be moved to the discussion, and supported by your findings. For study objectives – this section should clearly outline the research questions and the objectives / research aims of the study.

Reply: we modified the objective section to outline the research questions. Page 10, line 209-211 clearly defines the objective: “The primary aim of this study was to assess how various physical environment attributes impact staff satisfaction with safety,

encompassing staff, patients, and visitors, and to elucidate the integration of these findings into our facility planning and design approach.” We further explain about the gap of knowledge and how we want to contribute to the field of healthcare design strategies that improve safety.

#### Methods

- More detail needed on how the survey was developed – what sources were used, how was it validated? What were the results of the validation exercise?

Reply: we included information about the survey development and validation on page 11, lines 234-241.

- Information on study setting required – what was the nature of the setting?

Reply: we included this data in page 10, lines 230-234.” The Healthcare System being examined is a prominent healthcare network in Central New York. It encompasses a vast network of healthcare facilities, including more than 40 outpatient clinics and six regional hospitals. This comprehensive system provides diverse medical services, covering acute care, specialty care, primary care, mental health services, and preventive dental care for children, among other healthcare offerings.”

Which participant groups were targeted? How were these groups targeted with your convenience sampling method?

All employees working within the healthcare network were targeted. This is stated on page 11, lines 251-254.

- How many participants were approached, what was the target sample size and how was this determined?

Reply: page 11, lines 253- 255, describes the target sample size and how it was determined: “While the exact number of employees approached was not disclosed to the research team, it was approximately 2000 individuals. To obtain a representative sample with a 95% confidence level and a 5% margin of error, the target sample size was determined to be around 384 employees.”

Did you consider achievement of thematic saturation for your qualitative analysis?

Reply: Page 12, lines 264-268 we described our thematic saturation approach: “Thematic saturation was achieved through a systematic coding process, where recurring themes were identified and resolved through team discussions. This approach resulted in a comprehensive coding framework covering all identified themes. New responses consistently reinforced existing themes as coding continued, indicating that thematic saturation had been reached. The key themes and findings provided a robust qualitative understanding of the data.”

- What approvals were obtained for the survey? Clinical governance / ethics?

Reply: page 11, lines 249-250 describes the internal approval process: “. It should be noted that formal Institutional Review Board (IRB) approval was not required; however, the

survey underwent an internal informal review process.”

## Results

- What was the response rate for the survey?

Reply: We computed a response rate of approximately 57.25%. The approximation arises from the lack of precise information regarding the total number of staff to whom the survey was distributed, as detailed on page 12, line 275.

- Section 3.1 – it would be useful to display this as a table

Reply: We excluded this information from the article as it did not bear relevance to our analysis and subsequent discussion. The demographic data has been provided in the supplementary Figures section for reference.

- It would be useful to include participant quotes to support your qualitative findings.

Reply: we included examples of participant quotes in Table 5.

- Overall, the qualitative results are very well written, but it would be good to see more clarity in what you mean by “safety outcomes” for each section (as you have done for the cleanliness section).

Reply: The terminology “outcome” was replaced by perceptions as it was confusing.

- More explanation needed as to “positive distraction”

Reply: we included further explanation for positive distraction in the introduction section 1.1.8, page 8, line 177-181:” Due to illness-related factors, healthcare environments often induce stress and anxiety in patients and staff (60,61). The relationship between positive distractions in healthcare settings and patient safety outcomes has been a topic of interest among researchers (62–64). Positive distractions refer to stimuli intentionally designed to enhance the sensory experiences of patients, produce positive feelings, and hold attention without burdening or stressing the individual, blocking worrisome thoughts (61,65). “

## Discussion

- It would be good to have a strong opening paragraph summarising the key message from the study, before you have the more detailed key findings

Reply: The summarizing paragraph has been incorporated into the discussion section, precisely on page 19, spanning from lines 437 to 449. Additionally, the key findings have been relocated following the "4.1. Comparison with Similar Research" section.

- I don't think you need the words “known factors” and “new contributions” – this is clear from the subsequent text.

Reply: We have removed these words from the key findings.

- Section 4.3 is very long and doesn't highlight the interesting and novel findings of your study well. I suggest revisiting this and condensing it, with more focus on summarising your findings,

demonstrating where they correspond to existing work, highlighting the gaps, and clearly stating the implications of your study.

Reply: Section 4.3 is now section 4.1. (page 20-26). We have created sub-sections for each of the themes, linking them to prior research, possible future directions, and implications for policy. We discuss how we incorporated these findings into our planning and design process.

- What are the implications for policy?

Reply: Section 4.3 is now section 4.1. (page 20-26). We have created sub-sections for each of the themes, linking them to prior research, possible future directions, and implications for policy. We discuss how we incorporated these findings into our planning and design process. Further we explain how the identified physical environment factors can provide actionable insight for future designers and policy makers in the strength section (Page 27, line 631-635).

- What are the opportunities for future research?

Reply: In addition to the discussion sub-chapters, we discuss future research opportunities in the strengths and limitation sub-section, page 28, lines 634-646.

Conclusion

- This is also very long – I suggest some is moved into the discussion (such as future research), and your conclusion is a much shorter paragraph that summarises your key findings.

Reply: The conclusion section was summarized into one paragraph, page 29, lines 659-672. We summarize key findings and implications for practice.

## **Reviewer D**

This article requires a major renovation. I have comments attached to a PDF version of the article for your review and comment. I am concerned that the manuscript suggests that it is providing new information. It does support previous findings and in fact aligns with other types of studies that measure actual safety indicating that perceptions of staff are in sync. The study would benefit from a concise list of design interventions aside from the narrative that is easy to access and understand.

Comment 1: If you are going to start a sentence with a number, it needs to be written out.

Reply: the number is now inside the page 1, line 7: “A diverse sample of 1,145 clinical and non-clinical staff participated in an online survey, assessing their satisfaction with various attributes of the physical environment.”

Background: Need to address other studies with more detail, specifically those that measure actual safety (environmental interventions including stress, aggression, violence, medical errors, security, visibility, privacy, staff communication, infection transmission, and falls, cleanliness, patient privacy, adequate lighting, flooring type, security, and team visibility) aside from self-reported perceptions. This provides an anchor for the survey data that you substantiate



how those interventions impact user experience in the discussion. Currently, your background is a listing of studies without any substance.

Reply: The background section was modified to include existing literature that connects physical environment factors to safety outcomes (pages 3-8).

Objective: Maybe change title to purpose. The purpose of the study should be concise. It is written like the conclusion telling us all the things it does, rather than set up the study with a purpose statement and study Aims (or objectives).

Reply: the title was changed to "purpose". The purpose statement was revised and clearly defined in lines 209-211, page 8: "The primary aim of this study was to assess how various physical environment attributes impact staff satisfaction with safety, encompassing staff, patients, and visitors, and to elucidate the integration of these findings into our facility planning and design approach."

Is there a calculation for this analysis? If so, then you should include the calculation here (be sure to use the journal's formatting requirement). If you are comparing standardized regression coefficients, then you need to describe here with more detail/accuracy.

Reply: We described the regression analysis method described as "relative importance" which is calculated in the Qualtrics interface. Page e 12, line 259-262: "The collected data underwent analysis using descriptive and regression techniques within the Qualtrics XM Stats IQ platform. Descriptive analysis was used to calculate each variable's frequencies, means, and medians. Regression analysis employed the "Relative Importance" method, recommended for survey data analysis, especially when addressing multicollinearity issues common in survey research."

Nice. can you add more detail about the content analysis tool used. What is it? Is it part of Qualtrics or Excel?

Reply: we provided more detail for the content analysis tools that was a combination of Qualtrics and Excel (page 12, line 263-268): "Microsoft Excel. Thematic saturation was achieved through a systematic coding process in Qualtrics, where recurring themes were identified and resolved through team discussions. This approach resulted in a comprehensive coding framework covering all identified themes. New responses consistently reinforced existing themes as coding continued, indicating that thematic saturation had been reached. The key themes and findings provided a robust qualitative understanding of the data."

Please clarify - In the text it was stated that these are staff perceptions of patient safety. The title does not align with the description in the text. Which variable are these variables tested against to get significance? same for Table 4.

Tables 3 and 4 were modified and text was revised (see page 13, line 282): "The results, as presented in Table 3, indicate that patient privacy, space adjacency, positive distraction,

clear signage, cleanliness, and flooring quality emerged as significant predictors for satisfactory patient and visitor safety”. Also, Page 13, lines 289-292: “Additionally, the regression model evaluating satisfaction with staff safety perceptions included all variables detailed in Table 2. As indicated in Table 4, the relative importance regression analysis identified several significant predictors: security, staff privacy, team visibility, and comfortable furniture”

This sentence is confusing. I have not read anything up to this point that suggest that visitors are a part of this study and I am not sure that staff perception of patient perceptions/ranking is justified. Generally, narrative descriptions of tables and figures are not aligned with titles and descriptions.

Reply: The complete paragraph has undergone revision to align with the referenced tables. Furthermore, we have consistently incorporated the terminology "visitor" throughout the text to accurately represent that staff assessed environmental qualities for both patients and visitors (see page 13, lines 281-295).

What does the model tell us? What about the other 76.9%?

Reply: Page 13, lines 285-288, we further explain what the Adjusted R-Square of 23.1 tell us: “Furthermore, it is noteworthy that staff’s perception of patient or family satisfaction with privacy and room adjacency accounted for 23% of staff satisfaction with patient safety perceptions, suggesting that while these factors play a substantial role, other unexplored variables may influence safety perceptions.”

Is this a secondary set of data? There are more participants in this group than the test group. Confusing.

We have amended this paragraph to provide a more comprehensive explanation of the qualities assessed. See page 13, lines 297-302: “In our study, we collected insights from 393 respondents regarding potential improvements to the physical environment, focusing on enhancing team efficiency and patient safety (Question 1). Furthermore, 433 staff members shared insights specific to their respective departments (Question 2). Given that two separate questions were employed, which resulted in varying participant counts, it was necessary to combine these responses to gain a deeper understanding of the emerging themes”

It is more relevant to list the p value than the number of participants at this point. I guess the other concern is why are there so many participants, but only 145 answered questions related to patient privacy.

Reply: The subsequent subsections present the participant counts for each specific theme. It's important to note that these findings are qualitative in nature, and as such, no p-values have been assigned. The reason that only 145 individuals mentioned privacy is because it emerged as a thematic element from the "optional" open-ended question responses. Consequently, not all participants responded to this question or identified privacy as a pertinent concern.

Generally, you only want the results in the results section. Most of the rest of these paragraphs contain information that would be more relevant to the discussion section and tied to other studies that have data about these variables. to show that perceptions are aligned or not with the data.

Reply: we modified the subsequent paragraphs reporting only the summary of the open-ended comments.

This is not true. You cannot say you can predict patient and staff safety outcomes with a subjective perception survey.

Reply: this paragraph was modified. We revised safety outcomes to perceptions of safety. See page 27, line 616-623.

Unless limited by the journal's formatting requirements, limitations are usually written in paragraph form. Sometimes, it is relevant to list Design implications in numerical time, but it should be concise and easy for the reader to see what the author believes are the interventions to improve occupant outcomes.

Reply: The strengths and limitations sub-section was reformatted into a paragraph format (see page 27, lines 625-646).

This is an important section. The studies discussed here should be introduced in the background and then discussed in more detail relevant to your outcomes.

Reply: we have included more literature review information and examples in the introduction section and linked it to study findings in discussion section 4.1.