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Commentary on Jeffrey Voigt et al.'s Article, "Private Rooms in Low Acuity Settings: A Systematic Review of Literature"

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Doctor Voigt's et al. article, *Private Rooms in Low Acuity Settings: A Systematic Review of Literature*, is an important analysis of 37 years of research on the effects of single-patient rooms (SBRs) and their generalized implementation in hospital settings.

The fact the authors' backgrounds are rooted in disciplines not directly connected to architectural and engineering sciences, such as statistics, medicine, and economics, adds quality to the outcomes of this systematic review of the literature (SRL). On one hand, the article shows the weaknesses of a research stream that for several reasons still has difficulty in establishing itself as a proper scientific discipline (evidence-based design [EBD]). On the other hand, the article offers a serious opportunity to critically evaluate the positions of academia and practitioners toward EBD as a scientific discipline, rather than "something" whose blurred boundaries leave space to manipulations and uses for marketing purposes. In this study, the authors have considered design as a medical therapy; and for this reason, high reliable tools (grading of recommendations, assessment, development, and evaluation [GRADE] and the center for evidence-based medicine [CEBM] level of evidence [LOE] grading system) normally used to evaluate medical therapies and clinical outcomes have been used for the evaluation of 47 selected studies on 1,400 records identified.

The outcomes show that no strong clinical evidence justifies the generalized implementation of SBRs, exception made for high-acuity and maternity care settings. However, this study needs to be understood in a constructive critical perspective, rather than an attempt to diminish the importance of a young scientific discipline as EBD. Lastly, the study, based on the low LOE concerning the impact of SBRs on patient clinical outcomes, attempts to problematize the Facility Guidelines Institute (FGI) recommendation about the general adoption of SBRs in new hospital constructions and after renovations. However, in order to proceed with a clearer stance toward the FGI recommendations for SBRs, this SRL needs to be integrated with a solid costs analysis and financial operational evaluations.

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In the Healthcare Architecture-Engineering and Construction (AEC) industry, many claim healing design and environment solutions, spatial strategies impacting clinical outcomes, and original solutions based on the latest scientific evidence (EBD). The power of this study lies on the decision of considering design as a medical therapy and on the backgrounds of the authors: statistics, medicine, and economics.

The concepts of *Health* and *Care* are of crucial importance for our society, and the impact of the built environment on those sectors is very serious. In this SRL, considering design as a medical therapy is an important standpoint, allowing the authors to use high reliable tools, such as CEBM and GRADE, commonly used and validated in clinical sciences to evaluate the impact of medical therapies. Such a choice is fundamental because it is in line with the statements commonly made in the healthcare architecture sector, where claiming the therapeutic effects of architecture has become a too normal practice, above all for practitioners: a position that often hides marketing speculative goals.

Beyond, the clearly poor and weak LOE supporting the use of SBRs in low-acuity care settings as positively impacting several clinical outcomes, the results of this study offer unique causes for reflection:

- the way the current academic community, operating within the field of EBD, conducts research;
- the need for setting-up clear and distinctive boundaries between who conducts EBD research and who uses it or promotes its implementation;
- the way the implementation of EBD research findings are promoted, considering that generalized extensions of findings are not always possible, above all in a heterogeneous context such as the hospital environment;
- understanding the outcomes of this study in a constructive critical way, taking the critics as a starting point to optimize EBD research on the impact of low-acuity SBRs;
- defending the importance of patient experience, satisfaction, and operational efficiency in hospital settings, included SBRs;
- strengthening the use of SBRs in high-acuity care settings and maternity/obstetrics departments.

To consider EBD as a scientific discipline, rather than a process in the hands of practitioners who rarely have serious officially recognized experience in research, is a necessary step for the future development of a field still struggling to take off. Excellent studies have been performed since the first definition of EBD, and very promising young scientists are currently involved in high-level EBD research projects.

However, the problem for the development of the field is 2-fold:

On the one hand, the architectural academic community opposes resistances to the change of a traditional design culture that identifies in empirical testing and rigorous scientific methodology a threat for the free spirit of creativity, rather than an opportunity for improvement. On the other hand, the industry speculates over the acronym EBD and healing environment using it as a marketing tool to acquire more shares of the market.

As the authors correctly state, there is a traditional lack of research in the field of architecture, and most importantly, there's also an internal communication problem between who defends the power of intuition and creativity and who, instead, wants to go further and give to creativity a scientific structure, by using tools that other scientific disciplines normally use. This is a cultural barrier still hard to tear down also for the most promising EBD scientists, who have had to defend a position which needs to be necessarily cross-disciplinary (i.e., building upon architecture, statistics, economics, public health sciences) and subjects to the adoption of rigorous scientific methods, such as psychometrically validated surveys, relevant statistical analysis, relevancy of the representative samples of the population analyzed, and so on.

Voigt et al., when discussing the findings of their study, outline a difference between self-developed surveys and surveys psychometrically validated. In that paragraph, there is an important message for EBD researchers, with exceptions

made for few cases, who make extensive use of nonpsychometrics-based questionnaires: a mistake that may compromise the reliability of the findings in other scientists' eyes, as it might be the case for those belonging to medical sciences, economics, psychology, and statistics.

It is appropriate to make a clear distinction between those conducting EBD research in healthcare settings and those selecting the evidence to implement it in their design projects.

Such a clarification between EBD and RID is of fundamental importance to avoid confusion of roles and responsibilities that often leaves enough space for market speculations by the healthcare design practitioners, who often launch themselves in risky suggestions for generalized implementation of EBD findings within hospital settings.

Behind this explication, apparently banal, there is the reason why a generalized extension of EBD research findings pertaining specific characteristics of specific hospital environments is not possible, unless properly legitimated by high reliable studies, largely recognized by the scientific community (ideally not only belonging to the architectural field). This represents a crucial node for the study of Voigt et al., that if on one hand recognizing the role of SBRs in high-acuity and maternity/obstetrics care settings, but on the other hand, questioning the LOE of the studies that justify the implementation of SBRs in low-acuity care settings due to their impact on several patient clinical outcomes. The study, while challenging the generalized adoption of SBRs in low-acuity hospital settings, highlights very clearly that as for the reduction in infection rates, in nonsevere conditions, the respect of simple hygiene protocols such as handwashing has a greater impact than the implementation of SBR. No strong evidence, indeed, justifies the implementation of the SBRs typology in general medical–surgical wards as seriously impacting the reduction in infection rates, and the same is true for patient falls and medication errors.

If there is currently no doubt about the weak and conflicting LOE supporting the therapeutic effect of the SBR typology in low-acuity care settings on patients' clinical improvements (infection rates, patient falls, medication errors, and medication usage), it is important not to underestimate the positive impacts registered at the level of operational efficiencies (length of stay [LOS] and costs), staff preferences, and patient satisfaction.

Voigt et al. ask policy makers which is more important in designing/building a hospital: improving patient outcomes or patient satisfaction and operational efficiency.

Patient satisfaction acquires an obvious important role in those countries where the healthcare system is private, such as the United States. If healthcare institutions compete in a free market, there is indeed interest in using all the possible means to attract the broadest number of patients.

However, there is more than this consumeristic view of architecture and SBR solutions, beyond patient satisfaction. Patient satisfaction is strictly connected to comfort, and comfort is synonymous of well-being, which in turn is in its three forms (physical, mental, and social) associated to the definition of health (WHO, 1948). Health, indeed, is not merely the absence of disease or infirmity, as the WHO clarifies (WHO, 1948). Therefore, any contribution at the level of patient comfort is to be read as a contribution to his or her health status.

Patient experience, which today can be planned scientifically, acquires in this context a crucial importance. The patient experience is a pillar of quality of care and plays an important role during the hospitalization process, and its impact is considered at the physical, mental, and social level. It is an intangible factor of the SBR built environment that does not play a secondary role within the hospital settings and which should not be underestimated only because of the current lack of reliable research.

The fact is that just because research is still needed and the way measurements are performed need to be more reliable, the intangible aspects, such as patient experience, should not be considered as secondary in hospital environments, SBRs included.

It is difficult to think about patient clinical improvements, while questioning the relevance of the impact of operational efficiencies, above all when LOS is identified as one of the parameters. Maybe the impact at the LOS level

(i.e., shortening) is directly linked to the health status of patients? In other words, in the presence of a shortening of a LOS, we might take into account what has contributed to reduce it. And if there is trace of evidence, weak or not, supporting the shortening of LOS via the implementation of SBRs compared to multibed rooms, we must acknowledge it, while delving deeper into the matter.

Operational efficiency is not only measured with LOS and costs. There is also another important aspect: the clinical workflow operational efficiency. At this level, besides any other considerations concerning clinical protocols, the space articulation plays a crucial role with its power of shaping the way people move within a space or environment. This is not a secondary importance aspect and it is surprisingly omitted in the analysis of de Voigt et al. The reasons behind the positive evaluations of the staff preferences relating the implementation of SBRs may very well be based on such operational considerations as well.

In times of financial restrictions, besides the implications for patient outcomes, which remain the essence of healthcare facilities, costs and impacts on the operational budgets should be carefully considered when building a hospital or part of it. Voigt et al. underline the fact that the FGI guidelines concerning the recommendation of SBRs in low-acuity care settings has led to several billions of dollars of expenditure for their construction. They also stress the fact that the FGI Health Guidelines Revision Committee (HGRC) committee which in 2018 will proceed to the review of the guidelines are all members belonging to the AEC industry, almost letting the reader think to a sort of lobby that does the interests of his members. However, the reasons that motivated the FGI committee to recommend the implementation of SBRs across all the hospital facilities go surely beyond the implications for the patient outcomes.

Costs depreciation occurs over years, so it is incremental. In order to evaluate the convenience to extend the implementation of all SBRs across new hospital facilities, it might be necessary to analyze the one-time construction costs and the yearly operational costs after construction versus the yearly operational costs of the old premises made of a broad variety of patient room typologies (i.e., SBRs, multibed rooms, acuity-adaptable rooms). An evaluation of the return on investment of the construction costs across a time span of at least 5 years needs to be taken into account as well. Since all these details are missing in the study of Voigt et al., there are not the conditions to move a strong critique to what has become law in 35 states of the United States with the implementation of the FGI guidelines.

The observations concerning the impact of SBRs on patient clinical outcomes, their LOE, remain appropriate, solid, and shed light on weaknesses of the EBD field that certainly needs to get stronger. EBD scientists need to interpret the outcomes of this SRL in a constructive way and proceed to generate more empirical reliable evidence to validate design choices relating to SBRs.

However, the article, beyond the licit critique to the LOE supporting patient outcomes improvements (infection rates, patient falls, medication errors, medication usage) as consequence of the SBRs implementation, results subject to a selective interpretation of the reader for too many aspects, above all those concerning the position toward operational efficiency, staff preferences, and patient satisfaction.

This represents a major weakness for this SRL, and even though it opens a serious debate relating the SBRs' impact on the patient clinical outcomes, it certainly doesn't create the conditions to take an unambiguous stance toward the recommendations for the adoption of SBRs in low-acuity care settings as suggested by the FGI. The FGI through its recommendations addresses both the needs of the facilities final users and those of the healthcare AEC industry (i.e., design processes, construction costs, and project management). Therefore, an analysis aimed at challenging an FGI recommendation cannot exclude detailed technical considerations of purely construction-design and management natures.

Reference

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