

ABSTRACT

Humanizing Where We Heal: An Examination of Healthcare Aesthetics and Evidence-Based Hospital Design

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This thesis explores how the aesthetics and overall design of a patient's healing environment affects his/her healthcare experience. The industrialization of the modern hospital and the business of medicine has polluted what it means to provide holistic, patient-centered care. The emergence of evidence-based design provides a chance to re-center medicine by adopting a humanistic understanding of medicine that thoroughly examines patients' needs and the specific design factors that are supportive to these needs. Through a meta-analysis, the themes consistent among the current literature are synthesized to clarify the role healthcare aesthetics and hospital design have on patient experience. While patient experience is often a complex, ambiguous factor in medicine, evidence-based design ultimately fosters a healthcare environment that integrates the patient into the fabric of the healing space.

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HUMANIZING WHERE WE HEAL: AN EXAMINATION OF HEALTHCARE
AESTHETICS AND EVIDENCE-BASED HOSPITAL DESIGN

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DEDICATION

To my friends, professors, and mentors these past four years that have challenged me to think critically, lead courageously, and live compassionately.

CHAPTER ONE

Introduction

Introduction of Purpose

What if the waiting room became a place of contemplation or rest? What if the operating room was transformed from a sterilized, artificially lit space into a personalized healing environment? Today, hospitals have become obsessively concerned with the day-to-day clinical and administrative operations. While healthcare cannot exist without the former two, limiting the scope of healthcare to the institutional and economic functions of a hospital diminishes what it means to offer holistic care to patients. After all, the purpose of healthcare is the people the system seeks to help, not the economic incentives or profits that the system is often exploited for. When we think about it, some of life's most important experiences occur in these clinical spaces, from the birth of a child to the loss of a loved one. Hence, there is an immense weight that should be placed on the environments in which we seek and provide care. From hospital aesthetics to design factors, understanding the dynamics that shape a healing healthcare environment demonstrates the importance of patient experience in healthcare delivery and equips healthcare professionals to provide more patient-centered care.

Aesthetics and Design in the Context of Healthcare

Hospital aesthetics and design offer a way to radicalize patient care by honing in on patient experience. Broadly defined, aesthetics is a philosophical that deals with the subjective and is known as a kind of judgment, attitude, or experience.¹ Moreover, German psychologist, Gustav Fechner describes aesthetics as an experimental perception that is empirically comprehensible by considering the characteristics of the subject undergoing the experience.² Applying these notions to the clinical environment, we can begin to navigate what aesthetics might mean for patients and patient care. Patients are inherently at the mercy of the environment where they receive care and are affected— physically, psychologically, mentally, and spiritually— by the aesthetics of their surroundings.³ Health facilities have historically focused on the functional delivery of healthcare, which produces clinically operative spaces, but simultaneously fosters uninspiring and almost foreboding environments.⁴ Thus, the functionality of healthcare has led to a purely clinical healing environment, which is to say that the design is the embodiment of all things sterile— bleak, relatively featureless, and devoid of supportive aesthetics. Research has shown that the poor design of hospitals actually has negative consequences for patients, such as anxiety, delirium, elevated blood pressure, and increased intake of pain

¹Shelley, J. (2017, October 17). The Concept of the Aesthetic

² Fechner, G. T. (1860), *Elemente der Psychophysik* ("Elements of psychophysics"), Breitkopf & Härtel, Leipzig

³ Caspari, S., Eriksson, K., & Nåden, D. (2011). The importance of aesthetic surroundings: a study interviewing experts within different aesthetic fields. *Scandinavian journal of caring sciences*, 25(1), 134-142.

⁴ Ulrich, R. S. (1991). Effects of interior design on wellness: Theory and recent scientific research. *Journal of health care interior design*, 3(1), 97

drugs.⁵ Therefore, hospital aesthetics and design play a crucial role in the delivery of healthcare, and the goal of such factors should be to better patient experience and promote wellness by creating physical surroundings that are supportive.

Statement of Purpose

This thesis examines healthcare aesthetics and evidence-based hospital design in order to better understand how these factors influence patient experience and satisfaction, as well as how clinicians can better optimize healthcare environments to meet the needs of patients. By analyzing the current literature, I am hoping to synthesize the current themes in healthcare design to emphasize the impact design plays in fostering a healing environment and its ability to offer revolutionary patient-centered care. Through a historical discussion of hospitals and the emergence of evidence-based design, I intend to express the urgent need for a framework of medicine that puts the spotlight back on the patient and humanizes our current healthcare system. The crux of patient care is the ability to authentically connect with and support patients during any clinical encounter, and healthcare design provides an excellent starting point for redirecting medicine back to the patient.

Healthcare As Industry

Healthcare, hospitals, and even providers are experiencing the direct effects of the commercialization of medicine that permeates through our system today. It's almost ironic that the institution of a hospital, which seeks to help others by offering medical care, is actually harming our patients as healthcare becomes exploited for its economic

⁵ Ulrich, R. S. (1984). View through a window may influence recovery from surgery. *science*, 224(4647), 420-421; Wilson, L. M. (1972). Intensive care delirium: the effect of outside deprivation in a windowless unit. *Archives of Internal Medicine*, 130(2), 225-226.

potential. The ideal of a “corporate hospital” and quick trip medical visits is illustrative of the detrimental effects that the commercialization of medicine has had on our healthcare system. Efficiency, productivity, and cost control measures have become the values of healthcare as patients are cast aside and treated not as human beings, but as mere consumers in the process. This view of the hospital as an industry is toxic to the sanctity of medicine and pollutes our understanding of what it means to offer care to patients. In fact, the business approach to hospitals and medicine views health care as a “commodity relying on cultivation of desires instead of satisfaction of needs, even as many basic needs go unmet.”⁶ Moreover, the doctor-patient relationship is completely diminished from a role of patient advocacy to a purely transactional relationship. Thus, medicine needs to push back against the industrialization of healthcare and find ways to instill humanism amidst the commercialized version of healthcare we have created. The exploration of evidence-based design highlights patients and their healthcare experience, which offers us the chance to adopt more patient-centered practices.

Emergence of Evidence-Based Design

People say the effect is only on the mind. It is no such thing. The effect is on the body, too. Little as we know about the way in which we are affected by form, by color, and light, we do know this, that they have an actual physical effect. Variety of form and brilliancy of color in the objects presented to patients are actual means of recovery.

— Florence Nightingale

What is evidence-based design? Essentially, evidence-based design is the judicious utilization of evidence from current research to improve the design of certain environments. Inside the hospital, this means implementing research on how health is

⁶ Dougherty, C.J. The costs of commercial medicine. *Theoretical Medicine* 11, 275–286 (1990).

affected by the built environment to create what has been deemed as a healing environment. The development of evidence-based design stems from the influential research of Roger Ulrich (1984) who assessed recoveries in surgical patients in the absence and presence of a room with a window view of nature. Ulrich's study found that patients with views of nature went home three-quarters of a day sooner, had a \$500 lower cost per case, used fewer medications in recovery, had fewer minor complications, and exhibited better emotional wellbeing.⁷ Since Ulrich's pioneering study, research on evidence-based design has slowly grown as researchers seek to define the role of more design factors and the aesthetics of a hospital overall. However, the roots of evidence-based design can be traced back to well before the invention of the modern hospital. In fact, the positive effects of our surrounding environments were known long before the scientific revolution, and were seen in the temples to the God Asklepios in ancient Greece, which were designed to surround patients with nature, music, and art to restore harmony and promote healing.⁸ Even in the Middle Ages, monastic infirmaries were designed to contain elements that would facilitate both physical and spiritual or emotional healing, such as a central courtyard that offered direct views of nature that often sought to mirror images of the Garden of Eden.⁹ In 1978, a nonprofit organization called Planetree was started by a patient that strives for the transformation of healthcare settings into healing environments and led to the development of the Model Hospital Unit.^{8, 10}

⁷ Ulrich RS. View through a window may influence recovery from surgery. *Science*. 1984, 224(4647):420e1.

⁸ Schweitzer, M., Gilpin L, Frampton S. Healing Spaces: Elements of Environmental Design that make an impact on Health. *The Journal of Alternative and Complementary Medicine*. 2004, Vol 10, Supplement 1, 71-83

⁹ *History of Evidence-Based Design*. www.british-gypsum.com/evidence-space/heal/history-of-evidence-based-design.

¹⁰ Martin, D. P., Hunt, J. R., Conrad, D. A., & Hughes-Stone, M. (1990). The Planetree model hospital project: An example of the patient as partner. *Hospital & health services administration*, 35(4), 591-602.

Moreover, a more recent initiative led by the Center for Health Design called the Pebble Project equips healthcare providers with the evidence-based design knowledge to optimize their health environments.¹¹ All in all, evidence-based design research has expanded rapidly since the Ulrich study (1984) and mirrors some of the historical models of care that existed before the Westernized creation of hospitals.

Fostering a Supportive Environment Through Design

The development of a supportive healthcare environment is centered around the needs of the patient. These needs have been outlined in existing research as 1) a sense of control with respect to physical-social surroundings, 2) access to social support, and 3) positive distractions in physical surroundings.¹² First, because hospital experiences are often moments of extreme vulnerability for patients, a sense of control over the physical environment not only provides patients with comfort, but can actually act as a source of empowerment over their health and experience of care. Design factors shown to facilitate a sense of control for patients include: access to privacy, controllable television/features in patient rooms, access to gardens or outdoor spaces, and designated areas to pursue interests/hobbies.¹¹ Second, social support during healthcare stays is consistently associated with positive patient experiences and improved wellness. In fact, studies report that low social support is linked with higher rates of rates of illness and more severe recovery times.¹³ Specific design factors, like floor plans and the spatial arrangement of furniture, are also important in relation to social support in the healthcare environment.

¹¹ Joseph, A., & Kirk Hamilton, D. (2008). The Pebble Projects: coordinated evidence-based case studies. *Building Research & Information*, 36(2), 129-145.

¹² Ulrich, R. S. (1991). 99-100.

¹³ Berkman, L. F., & Syme, S. L. (1979). Social networks, host resistance, and mortality: a nine-year follow-up study of Alameda County residents. *American journal of Epidemiology*, 109(2), 186-204.

For example, studies have demonstrated that a side-by-side chair layout inhibits social interaction as well as unmovable furniture in patient rooms, which restricts movement and flexible groupings around the patient.¹⁴ Lastly, environmental psychology research describes that the ideal physical surrounding involves a moderate degree of positive stimulation.¹⁵ Positive distractions include things such as art or natural light, yet, depictions of or access to nature yields perhaps the most evidence on reducing stress and fostering a healing environment in the hospital.¹⁶ In general, a supportive healthcare design promotes wellness by fostering a sense of control, boosting social support, and creating positive distractions.

Thus, incorporating aesthetics and evidence-based design into healthcare delivery offers a more intentional, patient-centered healthcare experience that drastically impacts how patients are cared for in medicine and defines the need for a more humanized approach in medicine. Continuing with the elements of a supportive healthcare design, hospital aesthetics and design factors will be further reviewed using existing research in the field and synthesized via a comparative analysis to better understand how they affect patient experience and what role they have in healthcare delivery.

¹⁴ Sommer, R., & Ross, H. (1958). Social interaction on a geriatrics ward. *International Journal of Social Psychiatry*, 4(2), 128-133.; Holahan, C. (1972). Seating patterns and patient behavior in an experimental dayroom. *Journal of Abnormal Psychology*, 80(2), 115.

¹⁵ Wohlwill, J. F. (1966). The physical environment: A problem for a psychology of stimulation. *Journal of Social Issues*, 22(4), 29-38.

¹⁶ Coss, R. (1990). Picture perception and patient stress: A study of anxiety reduction and postoperative stability. *Unpublished paper, University of California, Davis.*

CHAPTER TWO

How to Humanize Medicine

Identifying the Issue

As noted, the commercialization and modernization of healthcare shifted medicine away from patients and towards the economic factors and market forces that reap the greatest reward, or monetary profit for the system. Eugene Gallagher suggests that “the modern notion of healthcare as a commodity emphasizes its calculability.”¹⁷ Meaning, the byproduct of this drastic shift towards scientific medicine has been the over-rationalization in a sense of all aspects of healthcare. This easily permitted for an environment that sought to streamline services and increase efficiency by adopting a business focus to patient care. Yet, this preoccupation with a version of medicine that views medicine as a mere industry becomes more mechanical and less human each day.¹⁸ So, how do we begin to weave humanism back into medicine in an environment that increasingly pushes to make healthcare even more calculable, commodified, and in the best interest of the institution as a whole? The rise of medical humanities and the philosophy of humanism offer a starting point for refocusing medical care on the patient and away from the dehumanizing forces that infiltrate healthcare.

¹⁷ Gallagher, E. (1993). Modernization and Medical Care. In Conrad P. & Gallagher E. (Eds.), *Health and Health Care In Developing Countries: Sociological Perspectives* (pp. 285-306). Temple University Press.

¹⁸ Crawshaw, R. (1975). Humanism in medicine—the rudimentary process.

Humanism in Medicine

From the Hippocratic Oath to the ethics and teachings of William Osler, medicine is inherently rooted in humanistic principles, which is to say that it places the value of healthcare in the interests of the patients it seeks to serve. However, today's medicine has become clouded by dehumanizing forces including: the corporatization of the practice of medicine, the increasing role of business and finance in medicine, the fragmentation of patient experiences, the reduced time for clinical encounters, the increasing reliance on technology as a substitute for human interaction, and a de-emphasis on the humanities in the education of physicians.¹⁹ Restoring a philosophy of humanism back into clinical practice is necessary to push back against the dehumanizing aspects of medicine that have lost sight of the true purpose of medicine and negatively impacted patients and physicians in the process. In a way, embracing humanism is a chance to return medicine to its roots. Therefore, the attempt to humanize medicine means adopting humanistic principles, such as patient-centered care, respect for the human experience, and wielding science as a powerful tool to better patients' lives, all of which lie in the foundation of medical humanities.

What Are the Medical Humanities?

Medical humanities is an interdisciplinary field that emerged in the late 1970s in response to the growing sentiment that there was something inadequate

¹⁹ Thibault, George E. MD Humanism in Medicine: What Does It Mean and Why Is It More Important Than Ever?, *Academic Medicine*: August 2019 - Volume 94 - Issue 8 - p 1074-1077.

about medicine's understanding of the patient as human. The field incorporates a vast array of disciplines, from literature to anthropology, with the unifying goal to unveil the meaning of medicine. Medical humanities, as historian Daniel Fox implies, is in direct opposition to the 'depersonalization' and 'molecular reductionism' that permeates the medical field.²⁰ By reflecting on the meaning of health and healing, medical humanities has fostered humanism back into medicine. In a way, medical humanities add a dimension of artistry to our understanding of medicine. It asks us to consider the multifaceted nature of medicine and explore what it means to complement the scientific, technical side of learning medicine with the art of practicing it.

Humanizing the Hospital

With an understanding of medical humanities and how it seeks to humanize medicine, we can then ask the question: How do we go about humanizing hospitals that are consistently treated as nothing more than objects of the industry? How can we transform these commercialized institutions into places that cultivate healing? Researcher Victoria Bates argues that the humanization of hospitals lies "in opposition to particular features of modern medicine, particularly technologies and practices that diminished the patient's voice or individualism."²¹ Reevaluating the aspects of a hospital that place limitations on the patient's experience becomes a crucial part in humanizing healthcare spaces. Hence, Bates points to three ways in which healthcare and the design of hospitals

²⁰ Fox, D. M. (1985). Who we are: the political origins of the medical humanities. *Theoretical medicine*, 6(3), 327-341.

²¹ Bates, V. (2018). 'Humanizing' healthcare environments: architecture, art and design in modern hospitals. *Design for Health*, 2(1), 5-19.

can be humanized by placing the emphasis back on the patient's humanity:

1) human as not-institutional, 2) human as not-technology, and 3) human as not-biomedical. Bates summarizes the humanization of hospitals into these three broad categories to demonstrate the ideals that opposed the modern, dehumanized hospitals and led to the development of healthcare design as an implementation of humanism in medicine, and more importantly, the evidence-based design methods that transform hospitals into patient-centered healing environments. Thus, evidence-based design arises as a critical subject in the attempt to humanize healthcare and provides us with the opportunity to better understand patient experience and needs in the healthcare environment.

Evidence-Based Design Fulfills an Urgent Need

The principles that guide healthcare aesthetics and design, which we have defined as evidence-based design, are a turning point in medicine because they grant us the ability to restructure the way in which we offer patient care; moreover, evidence-based design acts as an intersection between art and medicine. It operates scientifically as a branch of the evidence-based practices that now dominate medicine and artistically as an innovative field in architecture and design. For these reasons, evidence-based design is the perfect outlet for incorporating humanism into healthcare environments because it turns the focus of healthcare delivery back on patients rather than the science, technology, or institutional aspects of medicine. Thus, these design practices are an open invitation to humanize the places in which we heal.

As mentioned earlier, humanizing medicine relies upon diminishing the so-called industrial noise that has overcrowded our healthcare spaces. John Weeks cautions that “we should not assume that the architectural celebration of the high technology aspects of medicine will provide a reassuring environment in most people's perception.”²² Weeks calls into question current hospital design, construction, and the overwhelming prevalence of technology-driven healthcare environments. Thus, a dichotomy forms between the existing healthcare spaces, which are technology-driven, commercialized, and unconcerned with aesthetics, and patient-centered healthcare spaces that consider the human needs in the healing process. More broadly, this reflects a divide between holism and reductionism, the two competing forces in today's medicine. Evidence-based design instills humanism back into the very fabric of the hospital and restores a more holistic, patient-centered care. Hence, hospital design and aesthetics respond to the contemporary trend of centering medical care on a patients as whole persons, rather than the tendency of medicine to reduce patients to their specific illnesses.²³ Design is then a crucial aspect in the humanization of medicine and provides the opportunity to make healthcare environments more patient-centered.

Understanding the benefits and critical role of evidence-based design, a meta-analysis of the existing research on healthcare aesthetics and design can be used to dissect the specific elements that optimize a healing space and to synthesize the themes that unveil how design contributes to patient experience and satisfaction.

²² Weeks, J. (1985). Hospitals for health. *British Medical Journal (Clinical research ed.)*, 291(6511), 1815.

²³ Bates, V. (2018). ‘Humanizing’ healthcare environments: architecture, art and design in modern hospitals. *Design for Health*, 2(1), 5-19.

CHAPTER THREE

Meta-Analysis

Topic of Interest

Given that health is influenced by a wide range of factors, many of which fall outside the conventional boundaries of medical science, consideration of hospital aesthetics and a patient's overall healing environment prompt the question: Does hospital design affect patient experience and the quality of healthcare? If hospital design does indeed influence a patient's healthcare experience, how do we go about improving care experiences and transforming the clinical space from its stark, sterile nature into one that is patient-centered, both ideologically and operationally?

Various studies on the relationship between hospital design and patient experience suggest that certain design indicators, such as comfort, privacy, and visual aesthetics, increase patient satisfaction and can serve as models for designing supportive patient-centered care environments. A comparative analysis of the existing literature can be utilized to determine the efficacy of different hospital design indicators at improving patient experience and satisfaction.

Defining Themes in Evidence-Based Design

In my review of the literature, two main themes emerged that highlight the potential ways in which design influences healthcare experience: 1) ambience of a healing environment and 2) architectural design and spatial layout. By synthesizing the

studies into these two broad categories, my aim is to better classify how certain aspects of hospital design affect patient experience and discuss how each theme has been developed by existing evidence in the literature.

Ambience of a Healing Environment

The advancement of medicine and the development of the modern-day hospital has led to clinical spaces that are excessively sterile and unwelcoming to the patients they seek to serve. While these state-of-the-art institutions no doubt deliver high quality medicine, they tend to ignore the many other dimensions of health that influence patient experience, satisfaction, and even clinical outcomes. With their emphasis on diagnosing, curing, and treating patients, they have become noisy, cluttered, institutional environments with little regard for the potentially detrimental effects these environments have on patients' physical or psychological well-being.²⁴ There is growing research that suggests how the overall ambience of a patient's physical environment affects the healthcare experience. Thus, an overview of the hospital environment and design can help determine which factors create the most optimal healing environments and can provide designers or clinicians with the evidence to develop more patient-centered environments.

In a review of the literature, there were six studies that focused primarily on how the ambient environment of healthcare spaces affected patient experience. The studies are briefly summarized below, identifying their purpose and outcomes and then analyzing the specific ambience variables that each study stated as affecting patient experience.

²⁴ Hesselink, G., Smits, M., Doedens, M., Nijenhuis, S., van Bavel, D., van Goor, H., & van de Belt, T. H. (2020). Environmental Needs, Barriers, and Facilitators for Optimal Healing in the Postoperative Process: A Qualitative Study of Patients' Lived Experiences and Perceptions. *HERD*, 13(3), 125–139.

LaVela, et al.'s (2016) study explored patients' perceptions on their environment of care (EOC) by comparing patient reports from patient-centered pilot facilities (PCC) and control healthcare facilities (non-PCC) in a VA hospital network. Using a mailed cross-sectional survey that garnered a 65% response rate, the researchers assessed patients' perceptions of their healthcare facilities. The survey was designed by tailoring an existing Perceived Hospital Environment Quality Indicators (PHEQI) inventory to the VA hospital system, which resulted in the Perceived VA Environment Quality Indicators (PVEQI) survey. The PVEQI measured three areas: 1) exterior space, 2) interior space, and 3) privacy. The results of the survey indicated that in both PCC and non-PCC healthcare facilities patients rated exterior space as the greatest factor affecting their patient experience. Looking at PCC versus non-PCC facilities, there was a significant difference in patient ratings for interior space and privacy, although not for exterior space. PCC facilities reported higher ratings in interior space, specifically for factors such as cleanliness, furnishing, and design components like nicely colored paint schemes.

Furthermore, the research conducted by LaVela, et al. (2016) illustrates that valuable information can be gained from patient perceptions on their environment of care. An understanding of how patients interact with their surroundings allows healthcare facilities to foster environments that can address the psychological and social needs of patients. The study demonstrates that hospital design modifications enhance patient experience and suggests that healthcare aesthetics play a crucial role in the delivery of healthcare by reinforcing patient wellness. The takeaway then is that the ambience of a healing environment is something that can be adequately constructed and fine-tuned in order to properly care for patients.

In a study exploring the relationship between a high-tech hospital environment and patients' perception of care quality, Grøndahl et al. (2018) investigated perceived changes in care during the relocation of hospital services from an older facility to a new, high-tech hospital construction by using The Quality of Care from the Patient's Perspective (QPP) questionnaire. The QPP model suggests that patients' perceptions of what constitutes quality of care are formed by their system of norms, expectations, and experiences and by their encounter with an existing care structure.²⁵ Each item was assessed by the patient respondents in two ways: the perceived reality (PR) and the subjective importance (SI). The study included four dimensions of quality; however, the primary object of interest remains the environment of care. The scores on the PR and SI reports for the older facility showed a quality of care deficit, which did not exist in the reports from the high-tech facility. The PR scores were significantly higher for the high-tech facility, as well as the SI scores for the physical-technical dimension of the report. It is important to note that no significant differences in relation to health care personnel were found. Thus, only perceived changes in the quality of care related to the hospital environment were documented. In general, the study demonstrated that there is a statistically significant difference in the patient's perception of care between older and newer hospital facilities.

By highlighting the changes to perceived care from the patient's perspective, the Grøndahl et al. (2018) study provides evidence that the environmental conditions of a healthcare space affect patient experience. More importantly, this research illustrates how

²⁵ Grøndahl, V. A., Kirchhoff, J. W., Andersen, K. L., Sørby, L. A., Andreassen, H. M., Skaug, E. A., ... & Helgesen, A. K. (2018). Health care quality from the patients' perspective: a comparative study between an old and a new, high-tech hospital. *Journal of Multidisciplinary Healthcare*, 11, 591.

specific design changes are associated with higher patient satisfaction ratings. Meaning, healthcare design can be easily manipulated to transform healthcare spaces from dreary institutions into healing environments, and by doing so, can better patient care by integrating design components that are perceived by patients as supportive to their health during hospital stays. The design component addressed here is primarily concerned with both the exterior and interior ambience of a healthcare environment. This research continues the narrative that healthcare aesthetics and hospital design exist to support the patient, whether that be by increasing a sense of control through improved spatial layouts or adding ornamental interior design elements that serve as positive distractions for the patient.

The effects of sound absorption and the role of acoustics in patient experience were explored in the Harris (2015) study, which looked at the impact of flooring materials in patient units. Understanding that environmental stressors, such as noise, in clinical spaces have negative effects on patients, this study collected patient experience data on three different floorings— terrazzo, rubber, and carpet tile— using the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS). The research revealed that patient preference aligned with the sound meter data for each of the floorings, meaning that the patient's preferred the flooring that led to the largest reduction in environmental noise. Carpet tiling demonstrated a statistically significant difference in the sound meter data, and thus subsequently, patients' rankings via the HCAHPS showed that the flooring with the lowest perceived noise level equated to the most patient satisfaction with their healthcare experience.

Thus, the Harris (2015) study indicates that design modifications as rudimentary as flooring have the ability to influence patient experience. The examination of environmental stressors, such as noise, in this research strengthens the idea that a patient's surroundings are a direct component of healthcare delivery and can negatively affect patients if health facilities remain ignorant to hospital design. Therefore, in the discussion of different flooring materials and their associated effects in the hospital setting, the researchers explicitly adopt a patient-centered approach to hospital design that focuses on things such as patient safety, sense of comfort, and autonomy over healthcare spaces. In this manner, the research continues to develop the sentiment that healthcare aesthetics are supportive in nature and offers substantial evidence that even minor changes improve patient experience.

Hesselink et al. (2020) sought to assess the environmental needs of postoperative patients based on each patient's lived experience and individual perceptions. Utilizing context-mapping exercises, the data collection method included providing patients with a diary and disposable camera. In addition to these so-called first-person perceptions, narrative interviewing was conducted to assess better patients' perceptions of their environment during the healing process. Coding of patient context-mapping data and data from the narrative interviewing was used to compile the data into groupings for a qualitative format in data analysis. Three themes were identified by the researchers: 1) sense of control, 2) positive distractions, and 3) an interpersonal healing environment. Control was broken down into categories such as "control over ambient features" and "control over privacy." Moreover, positive distractions included aesthetics like connection to the external environment, personalization of the room, and activities.

Lastly, an interpersonal healing environment consisted of meaningful connections with caregivers and relatives during the healing process. Overall, the three themes explored in this study provided a basis for interpreting the optimal environment of care for patients during hospital stays.

Once again, the themes of control and positive distraction are key elements outlined in the ambience of a healing environment. Hesselink et al. (2020) emphasize these two aspects of healthcare aesthetics while also considering how interpersonal design components optimize the healing space. The study expresses that an optimal environment of care is one which fulfills the needs of patients, which is to say it provides patients with distractions and the ability to have control over their ambient surroundings, whether that be something as simple as privacy or as radical as personalized patient rooms. Nevertheless, healthcare aesthetics and design are yet again placed at the center stage for their effects on patients' healthcare experiences.

Furthermore, patient perception of decorative aesthetics in a radiology clinic were evaluated in the Marcos et al. (2012) study. The decorative elements consisted of art in the form of "magic windows" that depicted scenes of nature. A questionnaire was given to patient respondents to assess their emotions and perception of the aesthetic environment. Results of the study indicated that patients' sensations of the decorative elements in their healthcare environment were positive and led to higher patient satisfaction.

Sjölander, et al. (2019) examined the effects of redesigning an operating room with nature films to reduce stress in colonoscopy patients. The study operated as a clinical interventional trial and was single blind, with only the investigator having

knowledge of the intervention design. The redesign of the endoscopy room used for the trial included the mounting of a large digital screen, which projected a soft, green light color and contained a speaker with sounds of nature. Pain and anxiety were measured prior to and immediately following the patients' procedures using the Visual Analogue Scale (0 = no pain/anxiety; 10 = severe pain/anxiety). Physiological parameters such as pulse and pulse oximetry were also included in data acquisition. The results demonstrated no significant statistical difference for pain and anxiety between the control and intervention groups of the study. The physiological parameters revealed that cortisol levels were significantly lower in first time colonoscopy patients for the intervention group; oxygen saturation was also shown to be higher in the intervention group. The results of the study suggest that the presence of calming, nature films reduces stress in certain patient groups and that design interventions can positively alter the patient environment and experience.

Moreover, by utilizing nature films, this study provides more insight on how positive distractions in the healthcare environment influence patient experience. As previously noted, positive distractions in healthcare settings have been shown to diminish some of the anxiety associated with receiving medical care. Access to nature has consistently provided the most evidence that a positive distraction improves the wellbeing of patients. Thus, by adapting healthcare spaces to include a greater sense of connection with nature, whether that be artificially as done in this research or by increasing the quantity of windows or say adding a courtyard to the hospital design, the ambience of the healthcare environment becomes better equipped to support and care for patients.

Discussion. From interior aesthetics to acoustics, each of the studies discussed above included unique variables about the ambience of the healthcare environment. Regardless of the specific components of the study, the overarching theme in the studies remained constant and clear— patients’ perceptions of their environment. In order to measure patient perception, the LaVela, et al.’s (2016), Grøndahl et al. (2018), Harris (2015), and Marcos et al. (2012) all utilized standardized survey/questionnaires. The use of surveys allowed researchers to communicate directly with patients about their healthcare environment to quantify better which characteristics create the optimal patient experience. Unlike the other studies, the Sjölander, et al. (2019) sought to interpret beyond just patient perception and measures how patient health outcomes were related to the environment of care by accounting for physiological changes, such as cortisol levels and oxygen saturation levels. A comparison of the Lavela, et al.’s (2016), Marcos et al. (2012), and Sjölander, et al. (2019) studies develops a strong case for how aesthetic changes to the environment improves patient experience with the inclusion of calming art pieces and interior paint schemes. Moreover, the Hesselink et al. (2020) provided an innovative way for assessing the specific environmental needs of patients during hospital stays, and aligns closely with the results of the LaVela, et al.’s (2016) study. Both of these studies yielded a thorough analysis into the healthcare environment and outlined broad categories that influenced patient experience the most, including privacy, changes to the patient space, and a sense of control. In general, all of the studies provide evidence that the overall ambience of a healthcare environment is a crucial factor to consider in understanding patient experience and satisfaction with the quality of care they receive.

Architectural Design and Spatial Layout

The design, construction, and adaptation of our healthcare environments not only allows for the streamlining of healthcare services, but also contributes to patient experience and has been shown to affect patient care outcomes, as well as patient stress, satisfaction, dignity, privacy, confidentiality, and safety.²⁶ Understanding how architectural design and the spatial layout of healthcare spaces affects patient experience generates evidence-based design knowledge that can be applied to facilitate a more patient-centered healthcare environment.

In a review of the literature, there were six studies that focused primarily on how physical design and spatial layout influenced patient experience. The studies are briefly summarized below, identifying their purpose and outcomes and then analyzing the specific design variables that each study stated as affecting patient experience.

Compiling data from two decades of the *Critical Care Nursing Quarterly*, Rashid (2014) examines the physical design features of award-winning adult intensive care units (ICUs) in relation to construction type, unit layout, and patient room size and design. The study compared an existing review of ICU design from the years 1993-2002 with a content analysis of ICU design from the years 2003-2012. All data was analyzed from materials submitted by ICUs to the following organizations: the Society of Critical Care Medicine (SCCM), the American Association of Critical Care Nurses (AACCN), and the American Institute of Architects/Academy of Architecture for Health (AIA/AAH). The evidence-based design features that led to positive outcomes included: patient rooms that

²⁶ Rashid M. (2014). Two decades (1993-2012) of adult intensive care unit design: a comparative study of the physical design features of the best practice examples. *Critical care nursing quarterly*, 37(1), 3–32.

exceeded the size recommended by *FGI Guidelines*; patient privacy/private rooms; the presence of more sliding glass doors; access to natural light and views of the external environment; common family waiting spaces built-in to the unit floor plan.

The MacAllister, et al. (2019) study evaluated patient satisfaction surveys in reference to the spatial layout of patient rooms in a large academic teaching hospital. Four spatial measures were investigated using satisfaction measures from a third party source and the HCAHPS: average distance to nurse station, room handedness, location of bed, and location of first encounter. Results of the survey indicated that a statistically significant relationship existed for each of the four spatial measures. Findings of the study allowed researchers to better understand the link between patient satisfaction and the spatial layout of healthcare environments in order to achieve higher outcomes in the perception of care.

The role of the physical environment in influencing outcomes for patients was assessed by Trochelman et al. (2012). Utilizing data from the HCAHPS, researchers looked at patients' and their family members' perceptions of evidence-based design features to determine patient satisfaction with the environment. Five topics— privacy, space, noise, light, and overall atmosphere— were observed in the study as having the largest effect on patient experience.

Anåker et al. (2019) explored patients' experiences with the physical environment in a newly constructed stroke unit. The perception of a standard stroke unit layout, single-room design, was analyzed using semi-constructed interviews. Results of the study identified two main themes: 1) incongruence between community and privacy and 2) connectedness with the outside world allows for positive distraction. Stroke patients

reported the single-room design as feeling isolated, which illustrates the importance of connectedness and social support in hospital design, especially for long-term patients. In general, the study expressed that the physical environment is significant for stroke patients and their experience of care. The study highlights the potential downside of the single-room design and that changes including communal areas and a connection to the external environment improve patient experience.

Nielsen and Overgaard (2020) researched women's experience in the delivery room environment. Applying principles of healing architecture, an alternative delivery room was assembled to assess how physical design affects patient experience and senses, such as pain and stress. The Snoezelen-inspired environment included audial and visual scenery on three walls providing positive distractions. The central meaning of women's experiences in the alternative delivery room were synthesized using semi-structured interviews, and the results indicated that the redesign of the obstetric unit was associated with an increased sense of emotional support, family involvement, and physical comfort.

Surveying patients and their families' needs, Patterson et al. (2019) looked at how hospital designs that incorporated family zones affected patient satisfaction. Features that improved the experience of family and visitors consisted of changes that increased comfort and allowed for easier visitation with the patient. Design interventions that support the needs of the patient and family members are outlined, which include things such as comfortable furnishings, adequate space, visual privacy, and increased accessibility in the patient room.

Discussion. While previous literature focused on how environmental aesthetics and design factors affected patient experience, all of these studies evaluated the

connection between the physical layout of a healthcare environment and patient satisfaction. The physical design is directly linked to patient-centered care in that design factors and changes to the physical layout of the hospital allow for greater patient satisfaction. The Trochelman et al. (2012) and Patterson et al. (2019) studies both included perspectives of patients and their family members in their research to demonstrate the significance of creating a supportive, healing environment. Likewise, the Nielsen and Overgaard (2020) study revealed how spatial changes facilitate a more welcoming and emotionally-satisfying environment. In a similar manner, Anåker et al. (2019) highlighted the importance of connectedness in the patient environment and how design changes that are community-focused increased patient satisfaction. The studies conducted by Rashid (2014) and MacAllister, et al. (2019) further support the idea that hospital designs must support the needs of the patients and provide a general outline of factors that patients seem to satisfy patients the most during hospital stays. While each study focused on a specific outlet of physical design, there seems to be a consistent amongst the research that the construction of a patient-centered environment requires architectural changes or spatial rearrangements that satisfy the patient's psychological and emotional needs during a hospital visit or clinical encounter. Thus, the studies outlined above overwhelmingly suggest that the physical design and spatial layout of healthcare environments can improve patient experience by fostering a more supportive environment that meets the needs of patients it intends to serve.

CHAPTER FOUR

Discussion and Conclusion

Discussion

This thesis served to introduce and expand upon a topic that is both complex and quite underdeveloped in the current literature. By synthesizing the themes from various studies on evidence-based design in healthcare environments, I was able to study how healthcare aesthetics and design affect patient experience by fostering a more supportive healing environment. This research serves as both a testament to the benefits of evidence-based design, as emphasized by the existing research, and as an introduction to the unique role evidence-based design has in the humanization of our healthcare system. There is plenty of room for new research to further develop the ideas discussed here.

Implications of Study

The purpose of health care design then becomes not to necessarily revolutionize our medical environments, but to simply bring attention back to these healing spaces and counterbalance the effects of our practice of medicine, which is often seen for only its scientific and institutional benefits. By adopting a more humanistic understanding of what it means to care for patients, it becomes apparent that evidence-based design not only supports this mission but allows us to effortlessly blend the evidence-based

principles of medicine with a careful consideration to design. Of course, there is inevitably a tension between the ways medicine and art are thought about, however, healthcare aesthetics and design unite the two by concentrating on the foundation both are built upon: humanity. Humanizing these institutions where we seek to heal others and where we ourselves go to be healed is the definition of patient-centered, or what could even be labelled as human-centered medicine. I identified that medical humanities exposes the cracks in the current delivery of healthcare and the very need to introduce humanism into evidence-based medicine. While science and technology often guide evidence-based medicine, this thesis demonstrates that priority should not be given to just these aspects of medicine, and evidence-based design is a fundamental aspect of providing quality care to patients via supportive healing environments.

The previous analysis section sought to outline the major themes that are consistent with supportive aesthetics and design elements in healthcare settings. Both the ambience of the healing environment and architectural design of healthcare spaces play a key role in fostering a supportive environment that considers the patients' needs of control, social support, and positive distractions. Although the specific elements varied throughout the studies, each contributed to the research trend that design impacts healthcare and can be measured by patient experience and satisfaction reports. In fact, each study examined the aspects of healthcare aesthetics and design that facilitate a healing environment by meeting the patients' needs of control, comfort, and positive distractions. Yet, perhaps one of the major limitations in healthcare aesthetics and design is the inability to cater towards specific patients in a personalized methodology. While a few studies explored the ways in which environments can be personalized for patients,

the methods of personalizing healthcare spaces are primarily confined to these studies and remain impractical to implement in hospitals with large patient turnover rates. Nevertheless, this limitation should not be viewed as impersonal or ineffective at fostering a supportive healthcare environment. Humanizing the hospital vis-à-vis design takes into account that the human in the hospital is not a homogeneous one, and thus, evidence-based design indicates how a healthcare environment can be transformed into a true healing space that is supportive of patients.

Conclusion

Overall, this research focused on the role healthcare aesthetics and evidence-based hospital design play in turning our hospitals into patient-centered healing spaces, and more importantly, the role evidence-based design has in the humanization of today's medicine. The interaction patients have with these healthcare environments has important implications for the current practice of medicine, as it sheds light on the many aspects of medicine which are dehumanizing the way in which we heal our patients. While there is still more research to be done on the topic, especially on how to incorporate these changes to healthcare aesthetics and design into a healthcare system that is increasingly exploited for its industrial benefits, this research exposes the issues within our current healthcare system and suggests ways in which medicine can become more patient-centered and humanizing as a whole.

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