The Impact of Natural Light on Human Beings in Clinics: Designing of Wellness

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Abstract:
Natural light has been demonstrated to improve mood and reduce anxiety and depression among patients. This research investigates the impact of natural lighting on the health of human beings and wellness in healthcare facilities due to the lack of clear evidence-based guidelines to improve patient and staff outcomes. The goal is to determine how different levels of natural light impact patient health outcomes, including recovery rates and mental well-being, as well as health and productivity. The major purpose of this study is to examine how different amounts of natural light affect patient recovery rates, mental wellbeing, and staff productivity in clinical environments. The study applies an analytical study to analyze data from healthcare facilities with variable degrees of natural light. Surveys and interviews give qualitative information about perceived patients and staff well-being in environments with variable light levels.

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The findings indicate an important connection between natural light and improved patient outcomes, such as shorter hospital stays and higher satisfaction rates. Patients in clinics with ample natural light reported lesser anxiety and improved mood, resulting in a more pleasant atmosphere for treatment. Employees also said that natural light increased their morale and productivity, leading to better patient care. These findings show that incorporating natural light into clinic architecture improves patient care and staff well-being. The study recommends that healthcare architects and planners prioritize natural light in their designs, emphasizing its role in creating a healing environment. Furthermore, clinical administrators should consider the benefits of natural light while designing new buildings.

Keywords:

Natural lighting; healthcare clinics; patient satisfaction; staff well-being.

1. I**ntroduction:**

The main objective of this research is to:

- Build a clinic complex that combines clinics for several fields and places with a calm design that highlights natural lighting and its importance to patients and workers, and this is from the perspective of:

Emphasizing the importance of natural light on employee productivity, mental health, and patient recovery rates in healthcare environments and suggesting that healthcare architects and planners prioritize it in their designs. The results confirmed a direct relationship between natural light and improved patient outcomes, including reduced length of hospital stay and increased satisfaction.

- Patients in clinics with adequate natural lighting reported feeling more comfortable and less anxious, which helped create a more healing atmosphere. In addition, workers reported that natural light enhanced patient care, productivity, and morale.

1.2 **Research Objective:**

- The aim is to study how natural light affects clinicians and patients in clinics and to find out how natural lighting affects clinic staff and patients on a physiological and psychological level.
- In addition, it studies how natural light affects clinicians' mental health and productivity in clinical settings. As well as how it affects patients' stress levels, recovery rates, and overall happiness with their clinical experience. Suggest incorporating natural light into clinic architectural designs to enhance patient health and well-being.

1.3 **The importance of research:**

Research into the effects of natural light in clinics is important for several reasons, It impacts staff and patient outcomes, reduces stress levels, and improves circadian rhythm control. And to maintain the mental health and efficiency of healthcare workers.

Studies have linked exposure to natural light to reduced rates of depression in patients (Figure 1). According to studies, patients are more satisfied with the care they receive when they have access to windows and natural light

- Improved staff well-being: Healthcare workers find their workplace more comfortable when natural light is present. It can reduce stress and fatigue, which improves job satisfaction and reduces burnout.

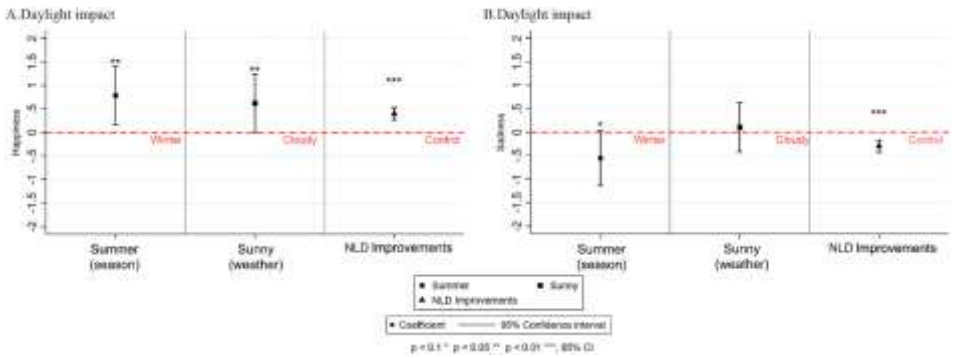


Fig. 1 Shows the Daylight Impact in happiness and sadness moods

2. **Field of Research:**

Adding natural light to a clinic's architecture can save a lot of energy from an operational standpoint. A significant amount of energy is used in healthcare facilities for lighting. Clinics can save money on energy and reduce their reliance on artificial lighting by using sunlight as ((Edwards & Torsellini, 2002)., n.d.) mentioned. Furthermore, natural light makes areas more aesthetically pleasing, increases visibility, and promotes a friendlier attitude.

.3 **Research Methodology:**

The study adopts a mixed-methods approach, integrating quantitative and qualitative research techniques to evaluate the effects of natural light thoroughly. The study's scope, observational and experimental methods, and comparison of clinics that primarily use artificial lighting against those with plenty of natural light Pay particular attention to clinics in Egypt's rural and urban locations. Techniques for gathering data include utilizing light meters to measure the amount of natural light present at various times of the day, thermometers to measure temperature variations brought on by sunlight, and electricity consumption monitoring for lights in both naturally and artificially lit areas. Equipment and tools like these are essential, such as energy monitoring systems, thermal comfort sensors, and light intensity meters.

For data analysis and quantitative analysis: Examine light intensity, energy use, and clinical results using statistical tools like SPSS. Establish a connection between exposure to natural light and staff productivity and patient recovery rates. Qualitative analysis is the objective examination of survey data and observational observations to find recurring themes and perspectives about natural light. By highlighting how natural light enhances energy efficiency and health outcomes in clinics, sustainability considerations match the findings with Sustainable Development Goals (SDG) 3 (Good Health and Well-Being) and SDG 7 (Affordable and Clean Energy)

4. **Previous studies:**

- Natural light is often recognized to have a significant impact on productivity, well-being, and health. Given its significant impact on patients, healthcare workers, and the environment in general.

- Physiological effects Natural light regulates the circadian rhythm, which governs sleep-wake cycles and other biological processes. According to (Stough et al., 2017), . In clinical settings, this regulation is particularly beneficial for patients recovering from illness or surgery, as it enhances their recovery process. Additionally, research has shown that exposure to natural light can reduce symptoms of seasonal affective disorder (SAD) and other mood disorders as mentioned (Hawary & Arafa, 2018). Patients treated in rooms with adequate daylight often report lower stress levels and improved mood, which may speed recovery and reduce hospital stays (Choi et al., 2012).

4.1 Impact on Patients:

- A therapeutic environment that promotes staff productivity and patient well-being is as important as medical advances in pursuing the best possible healthcare. Despite its apparent simplicity, natural light significantly impacts how doctors and patients perceive clinics and medical facilities.

- -Since studies regularly show a significant association between exposure to natural light and lower stress levels, patients may experience reduced stress and anxiety as shown in (Figure 2). Compared to patients in hospital rooms without windows, those with windows reported feeling happier, recovering faster, experiencing less anxiety as shown in (Devlin & Arneill, 2003.)

4.2 Impact on Physicians.

Fig 2, shows the levels of stress before and after natural light

- Enhanced focus and productivity: Natural light helps physicians make better decisions in any field (Figure 3) by improving cognitive function, attention, and concentration. Research suggests that physicians who work in brightly lit spaces report higher levels of job satisfaction, less burnout, and better patient care (Wang et al., 2019).
- Reduced fatigue and improved mood: Physicians exposed to natural light report feeling less tired and happier, creating a happier and more effective workplace. This may lead to improved communication with patients and a

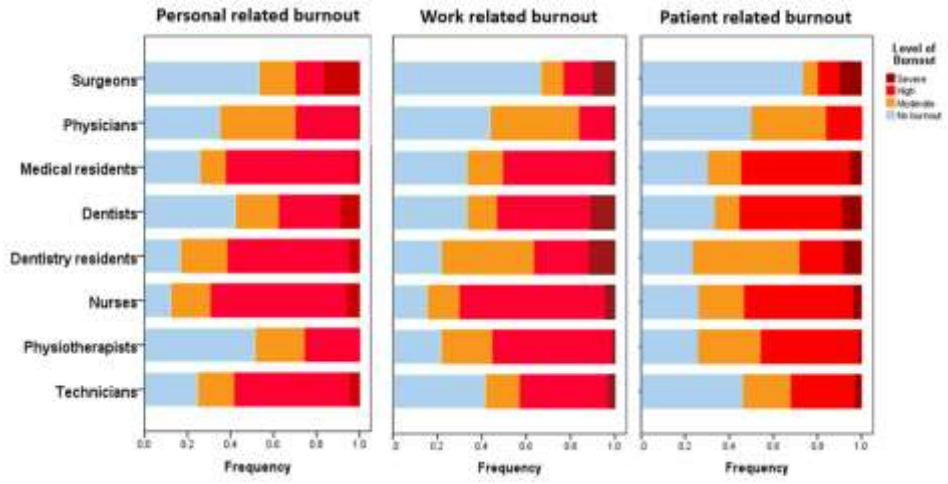


Fig 3, shows levels of doctor thinking personally and at work

more patient-centered approach to care (O'Donnell et al., 2005).

5. Discussion

5.1 Problems.

Some clinic areas that lack natural light face different challenges that can impact patients, staff, and operations in general, such as

- Mental health issues: Lack of natural light can contribute to feelings of anxiety, stress, or depression in patients, especially those who have long visits or treatments.
- Fatigue and exhaustion: Prolonged exposure to artificial light can disrupt circadian rhythms, leading to employee stress and decreased productivity.
- Low morale: Employees may feel frustrated when working in an environment without windows or access to natural light.

- Vitamin D deficiency: Employees and patients who spend long hours in clinics without sunlight may develop vitamin D deficiency, which has been linked to a variety of health problems.
- Eye strain: Prolonged exposure to artificial lighting can lead to discomfort and eye strain.
- Operational challenges include high energy costs: Relying on artificial lighting increases energy consumption and utility bills.
-And, fundamentally, lack of design flexibility: Windowless clinics limit the ability to create more attractive and patient-friendly environments.

5.2 .Identifying clinics.

Natural light has a significant favorable impact on patient outcomes, staff performance, and overall quality of care in some hospital settings. The following clinics will be located within your clinic complex:

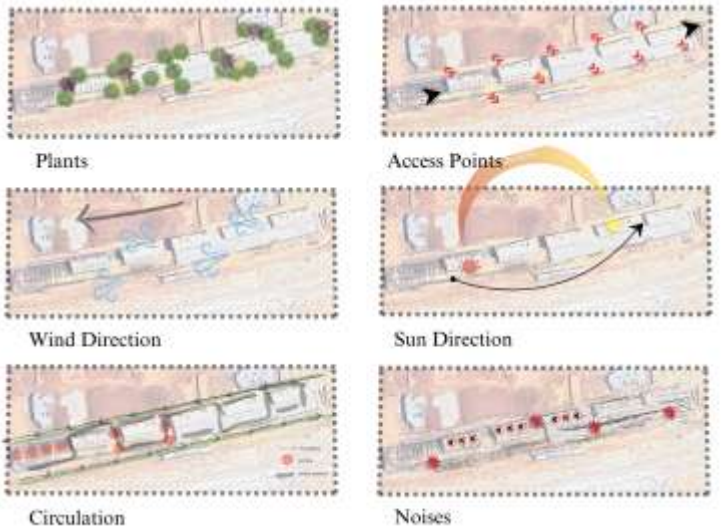
1. Mental Health Clinics: Natural light has a significant impact on mental health by reducing symptoms of depression, anxiety, and seasonal affective disorder. Types of rooms include treatment rooms, waiting areas, and staff break rooms.
2. Pediatric Clinics: Children often feel anxious during medical visits, and natural light creates a calmer, more inviting atmosphere in these spaces. Examples include examination rooms, play areas, and waiting rooms.
3. Maternity and Obstetrics Clinics: Natural light can reduce stress and promote positive emotional states, and pregnant women and new mothers benefit from its calming effects. Examples include consultation rooms, delivery suites, and postpartum recovery areas.
4. Rehabilitation Clinics: Patients recovering from surgery or injury may experience faster recovery and better mental health when exposed to natural light.
5. Geriatric and Long-Term Care Clinics: Elderly patients benefit from natural light, which supports circadian rhythm regulation and reduces confusion and anxiety.
6. Dermatology and Cosmetic Clinics: Adequate natural lighting is essential for accurate diagnosis of skin conditions and cosmetic procedures.
7. Dental clinics: Natural light helps create a calming environment and allows for better vision during procedures.
8. Physical and occupational therapy clinics: Exposure to natural light can stimulate patients during treatment and improve mood and concentration.

5.3. Choosing Location.

Choosing a location is the most important step to starting a medical clinic or building a medical center, so City Hall Mall (Figure 4) was a great choice for a building with a natural lighting design. City Hall Mall is located in the investor's area in the heart of the New Administrative Capital, making City Hall New Administrative Capital close to the most important landmarks in the New Administrative Capital.

-After research, these high sun angles lead to long and intense daylight hours as in (Fig,5), especially in summer, resulting in strong solar radiation that greatly affects the building design and site planning. The area has a desert climate with hot summers and mild winters.

Fig ,4 The City Hall, New Capital



Fig,5 Site analysis for the plan

5.4 Design Strategy.

Design strategies should incorporate passive cooling techniques and sustainable materials to reduce energy consumption. The site should also include natural elements such as nearby water bodies or green belts. Incorporating these features into the design can enhance aesthetics and promote biodiversity. (Abdelkader et al., 2021)

5.5Client Review:

Some of the client reviews,

- - The building will serve as a health and wellness center in the new capital, so it should adopt biophilic design concepts that promote harmony between humans and nature and showcase modern architectural aesthetics. To provide a calm and efficient environment for both guests and employees,
- - The facility will include functional facilities, including treatment areas, clinics, rest areas, and a restaurant. Specifically, functional areas could include:

-- Treatment area, clinics, and relaxation area.

- - Cafeteria: A social center with natural light, open views, and sustainable materials. A specific space should be provided to ensure a logical flow between treatment areas, clinics, rest areas, and the cafeteria.

- Provide dedicated entrances for employees and visitors to improve accessibility. For natural elements, we encourage vertical gardens, green roofs, and courtyards. Large windows and skylights to maximize natural light and outdoor views.

- - And sustainability, taking advantage of energy-efficient technology and environmentally friendly materials. Install water-saving measures (such as greywater reuse and rainwater harvesting).
- -Safety and accessibility: Create universally accessible areas (such as large hallways, elevators, and ramps). Adhere to safety regulations and ensure that areas are safe and welcoming for all users.
- - (Figure 6) It is impossible to overstate the importance of designing clinics and medical facilities with people with disabilities in mind, both inside and out.
- - In addition to adhering to legal requirements such as the Americans with Disabilities Act (ADA), these designs are essential to creating an inclusive environment that maintains dignity and accessibility. Wide doors, ramps.

Fig 6 shows a sample of the designs of natural light in spaces.

- For older adults, security and safety are of utmost importance, and this dimension entails designing spaces that make them feel safe while minimizing risks such as falls or accidents. The quality of life of older adults in clinics is significantly influenced by five interrelated factors: independence, physical mobility, control, social interactions, emotional well-being, access to healthcare services, and safety.

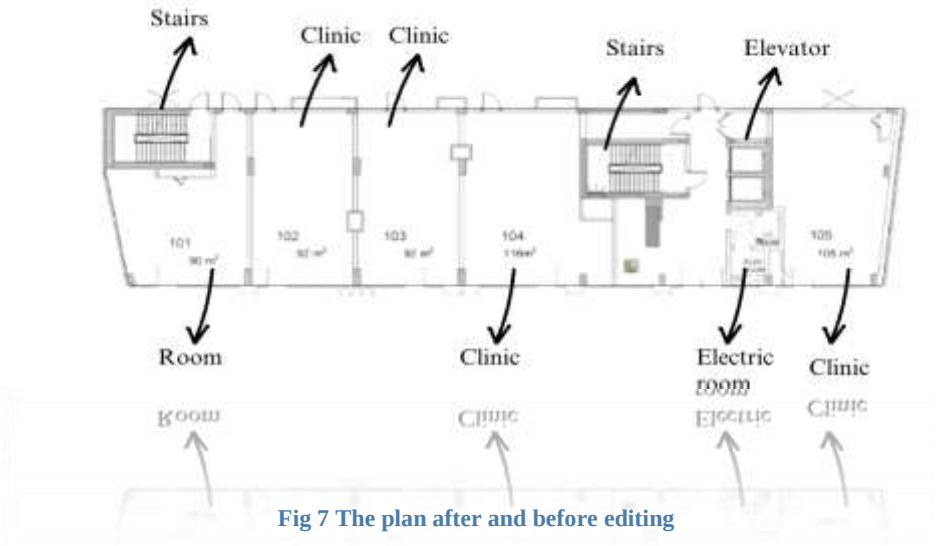


Fig 7 The plan after and before editing

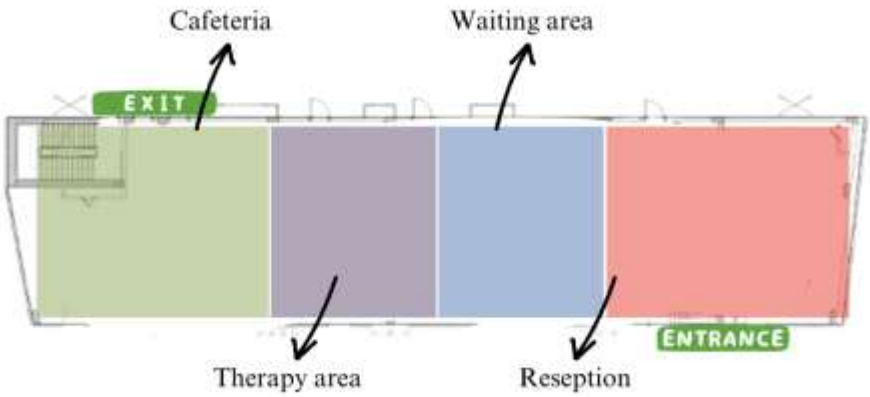


Fig 8 The Design Before and after

Fig 9 Sketch for the Design

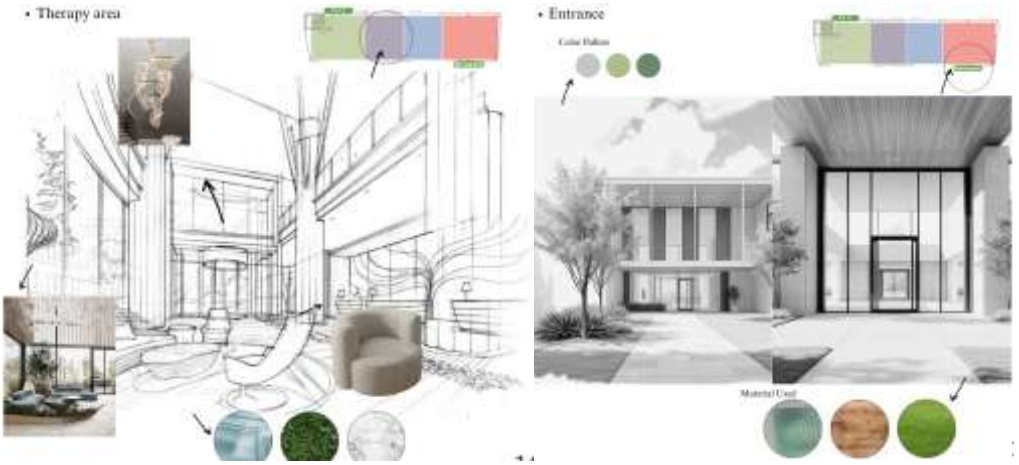


Fig 10 Sketches by me

7. Results

According to research, creating a modern, minimalist, and vibrant clinic complex that promotes healing, comfort, and efficiency while seamlessly integrating with the surrounding environment will make the design emphasize natural light and greenery by adding gardens or roof terraces for recreational and therapeutic activities, as well as landscaped courtyards that serve as outdoor waiting areas.

- Clinical environments with natural light benefit patients and healthcare workers. Shorter hospital stays and less grief have been associated with exposure to natural light. Compared to patients in dim or windowless rooms, healthcare workers with access to windows and daylight at work report higher levels of quietness, leading to better performance and fewer errors.
- Although this area may be on the ground floor, it needs adequate natural ventilation via light shafts or skylights. The importance of incorporating natural light into healthcare facility architecture is significant.

Large windows and skylights are examples of features that can enhance daylight exposure and promote a healing atmosphere. Healthcare facilities can reduce energy costs and promote healing by prioritizing natural light when designing their clinics. To optimize the benefits of natural light while addressing any potential problems, careful planning and design techniques are essential.

8. Conclusion

The following succinctly describes the research gap that the study on the effects of natural light in clinics addressed:

Insufficient attention to Egypt's Healthcare environments Research on the advantages of natural light in healthcare facilities is expanding worldwide. Still, few studies concentrate on Egyptian clinics because of the country's very different cultural, environmental, and architectural circumstances.

The Sustainable Development Goals (SDGs) are important. Few studies examine how the SDGs—such as enhancing health and well-being (SDG 3), guaranteeing sustainable cities and communities (SDG 11), and encouraging responsible energy use (SDG 7)—align with natural light in healthcare settings.

particular attention to outpatient clinics There is

a knowledge gap about the function of natural light in outpatient clinics, where patient interactions and time spent fluctuate, as a large portion of current research focuses on hospitals or inpatient facilities.

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تأثير الضوء الطبيعي على البشر في العيادات: تصميم العافية

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المستخلص:

لقد ثبت أن الضوء الطبيعي يحسن الحالة المزاجية ويقلل من القلق والاكتئاب بين المرضى. يبحث هذا البحث في تأثير الإضاءة الطبيعية على صحة الإنسان في مرافق الرعاية الصحية بسبب عدم وجود إرشادات واضحة قائمة على الأدلة لتحسين نتائج المرضى والموظفين. والهدف هو تحديد كيفية تأثير مستويات مختلفة من الضوء الطبيعي على نتائج صحة المريض، بما في ذلك معدلات التعافي والرفاهية العقلية، وكذلك الصحة والإنتاجية. الغرض الرئيسي من هذه الدراسة هو فحص كيفية تأثير كميات مختلفة من الضوء الطبيعي على معدلات تعافي

المرضى والرفاهية العقلية وإنتاجية الموظفين في البيئات السريرية. تطبق الدراسة دراسة تحليلية لتحليل البيانات من مرافق الرعاية الصحية بدرجات متفاوتة من الضوء الطبيعي. تقدم الاستطلاعات والمقابلات معلومات نوعية حول رفاهية المريض والموظفين المتصورة في بيئات ذات مستويات ضوء متغيرة. تشير النتائج إلى وجود صلة مهمة بين الضوء الطبيعي وتحسين نتائج المرضى، مثل تقصير فترات الإقامة في المستشفى وارتفاع معدلات الرضا. أفاد المرضى في العيادات ذات الضوء الطبيعي الوفير بقلق أقل وتحسن في الحالة المزاجية، مما أدى إلى جو أكثر متعة للعلاج. وقال الموظفون أيضًا إن الضوء الطبيعي يزيد من معنوياتهم وإنتاجيتهم، مما يؤدي إلى رعاية أفضل للمرضى. وتُظهر هذه النتائج أن دمج الضوء الطبيعي في هندسة العيادات يحسن رعاية المرضى ورفاهية الموظفين. وتوصي الدراسة بأن يعطي المهندسون المعماريون والمخططون في مجال الرعاية الصحية الأولوية للضوء الطبيعي في تصميماتهم.

الكلمات المفتاحية:

الإضاءة الطبيعية؛ العيادات الصحية؛ رضا المرضى؛ صحة الموظفين