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A Case Study on the Effects of the Inner Garden at Medicana International İzmir Hospital on Users

Medicana International İzmir Hastanesi İç Bahçesinin Kullanıcılar Üzerindeki Etkilerine İlişkin Bir Vak'a Analizi

Öykü Soybelli[1], Zeynep Sevinç Karcı[2]

Öz

Sağlık yapıları, hasta ve yakınları üzerinde olumsuz etki yaratabilecek stresli iç mekanlardır. Hastaneler tasarlanırken, hem fiziksel hem de psikolojik olarak konforlu mekanlar oluşturmak amacıyla stresi azaltan tasarım teknikleri dikkate alınmalıdır. Yapılan araştırmalar yeşil unsurların, örneğin iç bahçeler, ve doğal ışık ve malzemelerin iç mekanda kullanımının insanları olumlu yönde etkilediğini göstermektedir. Aynı zamanda stres seviyelerini düşürerek kişilerin yaratıcılıklarını, üretkenliklerini ve refahlarını arttırdığını da göstermektedir. Bir mekanda yeşil unsurların ve doğal faktörlerin kullanımı birçok kamu binasında görülmektedir. Doğal tasarım öğelerinin biyofilik tasarım prensipleri ile sağlık yapılarına dahil edilmesi, mekanın atmosferini ve kullanıcıların iç mekan konforunu olumlu etkilemektedir. Bu çalışmanın amacı, hastane iç mekanlarında bulunan iç bahçelerin kullanıcılar üzerindeki etkilerini incelemek ve biyofilik tasarım stratejilerinden hangilerinin tercih edildiğini ortaya koymaktır. Bu doğrultuda, İzmir'deki Medicana International Hastanesi vaka olarak seçilmiştir. Çalışmanın amacı doğrultusunda, seçilen bekleme alanında hastane yönetimi ile yapılan görüşmeler sonrası açık uçlu ve Likert ölçekli sorulardan oluşan bir anket 55 hasta ve hasta yakınına uygulanmıştır. Elde edilen bulgulara göre, kullanıcılar hastane bekleme alanlarında iç bahçe olmasını tercih etmektedir. İç bahçelerin, hastaların iyileşme süreçleri ve zihinsel sağlıklarını olumlu yönde etkilediği görülmektedir. Genel olarak sonuçlar, kullanıcılar arasında tutarlı olup, elde edilen nicel veriler analiz edildiğinde güvenirlik katsayılarının (korelasyon analizi) .48 - .57 aralığında olduğu görülmüştür.

Anahtar Kelimeler: İç Bahçe, Biyofilik Tasarım, Hastane Tasarımı, Yeşil Tasarım, Anket Çalışması

ABSTRACT

Healthcare facilities are among the stressful interiors that are likely to negatively affect patients and visitors. When designing hospitals, design techniques that reduce stress and create a positive environment for users should be taken into account. Studies show that the use of green elements and the inclusion of natural factors in indoor spaces reduces people's stress levels and positively increases their psychological state, creativity, productivity, mood and well-being. Biophilic design, which includes the use of both green elements and natural factors which has been frequently used in many public buildings in recent years and has been included in many studies, appears to have positive effects on the environment and people. Incorporating natural design elements into healthcare environments with biophilic design principles positively affects the atmosphere of the place and the indoor comfort of the users. The purpose of this study is to examine the effects of the existing interior garden on the users of Medicana International hospital in Izmir and to reveal which biophilic design strategies they prefer in the hospital interior. In line with the purpose of the study, a survey consisting of open-ended and Likert scale questions was applied to 55 people in line with the interviews held with the upper management at the selected location. According to the

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findings, it is seen that users generally prefer indoor gardens in hospitals and that a green space has a positive impact on their healing processes and mental health. Lastly, the results were generally consistent among users, when the obtained quantitative data were analyzed, it was seen that the reliability coefficients (correlation analysis) were in the range of .48 - .57.

Keywords: Inner Garden, Biophilic Design, Hospital Design, Green Design, Survey Study

INTRODUCTION:

Incorporating green spaces within healthcare facilities enables patients to engage with their surroundings, catering to their physical, mental, and spiritual well-being. These spaces afford privacy and serve as sanctuaries, offering individuals an opportunity to retreat from their immediate concerns and rest (Weerasuriya, Henderson-Wilson & Townsend, 2019). They create visually pleasing and tranquil spaces that lower stress levels. Interiors with natural design features influence people's actions and reactions (Moya, Dobbelsteen, Ottele & Bluyssen, 2019). A study shows that being close to indoor plants and directing focus towards greenery reduces stress levels. Brief exposures to small-scale green spaces deliver significant immediate benefits in stress reduction. Overall, small-scale greening has been shown to have a positive impact on stress reduction (Gu, Liu & Lu, 2022).

A glance at the historical evolution of hospital gardens reveals their significance throughout various periods. In Europe, monasteries constructed gardens during the Middle Ages to provide distraction for patients. By the 1800s, gardens had become a prominent feature in both American and European hospitals. However, their prevalence declined in the 1900s, coinciding with heightened stress levels within hospital settings. In recent years, there has been a growing recognition within the healthcare community of the necessity to design environments that are not only functional and hygienic but also conducive to stress reduction (Ulrich, 2002).

According to Beuzelin (2023), designing inner gardens and incorporating natural design elements and patterns inside to create a bond between users and nature is called biophilic design. This term comes from the word "biophilia." It represents humans' biological bond with nature and improves creativity, well-being, cognitive function, and healing process (Browning, Ryan, Clancy, 2014). It has been demonstrated that implementing this technique in hospitals improves the healing process for patients and the efficiency of medical staff (Weerasuriya et al., 2019). Interior gardens affect the inside environmental conditions as well. According to Moya et al. (2019), evaporation in the vicinity of plants lowers the temperature in that area. This regulates the temperature of the surroundings and controls the humidity inside. Additionally, interior green spaces are beneficial for sound observation. Another source also addresses indoor environmental conditions by mentioning how transpiration helps plants control humidity and air temperature. They increase comfort and lessen indoor air pollutants, such as VOCs, CO2, and CO. In addition, they also improve the mental health of those with mental illnesses and aid in patients' recovery after surgery (Liu, Yan, Meng, & Zhang, 2022).

A variety of design aspects, including colors, natural features, furnishings, and material usage, can have a positive or negative impact on people (Sadek & Nofal, 2013). Han and Ruan (2019) assert that indoor plants can elevate mood, reduce negative emotions, and alleviate physical discomfort. The study suggests that exposing people to little or medium-sized inner plants for about 20 minutes can improve psychological well-being.

This case study starts with a review of the use of biophilic design and inner gardens in healthcare settings, from online articles and websites. Similar experimental research and reviews are analyzed. After that, it will present a survey that is conducted with patients and visitors of Medicana International İzmir Hospital located in İzmir, Turkey. The survey will focus on the use of the inner

garden, its effects on their healing and mood, and their overall preferences. To determine whether the results of this survey are consistent with existing research, the first section of the article examines previous experiments and reviews. In the end, this research will make contributions to the subject of inner gardens, natural and green design elements, and biophilic design use in healthcare environments.

1. Literature Review

Many studies have investigated natural elements and biophilic design usage in healthcare settings through many methods such as; literature reviews, surveys, questionnaires, VR experiments, or observation methods. According to Laursen, Danielsen, and Rosenberg (2014), hospitals' physical environment, especially certain audible and visual features, significantly impacts patient outcomes. Music, plants, sunlight, and shapes can alleviate post-surgery discomfort and anxiety. Another study analyzes the impact of green and non-green hospitals on patients. It examines data from a survey of healthcare facilities. According to the survey, patients treated in environmentally friendly buildings had higher satisfaction ratings and were more likely to recommend the hospital to others (Sadatsafavi, Walewski, & Taborn, 2015). An additional investigation supports this theory through experimental research, examining how biophilic enhancements in indoor environments affect people. Participants were placed in four different rooms with different degrees of biophilic additions (none, low, medium, and high). When compared to non-biophilic interventions, biophilic ones enhanced the results positively in hospital quarantine settings. The influence was strongest in more green-used areas and weakest in low ones. (Lan & Liu, 2023). Tekin, Corcorani, and Gutiérrez (2023) researched on patients who can and cannot go outside during their stay at the hospital. They found that patients who can go outside prefer natural light, colors, materials, plants, water, privacy, and soothing spaces. Patients who stay indoors recommend comfort, light, view, calming locations, natural materials, colors, temperature management, and green usage. Another experimental research indicated that incorporating biophilic nature imagery in hospital rooms boosted patient satisfaction levels and their room ratings. The positive opinions of patients were about; brightness, colors, daylight, art with natural visuals, cleanliness, large windows, and comfort. Some of the negative aspects they highlighted were loudness, the hall being excessively bright, noise, heat, and a lack of privacy. (Wichrowski, Corcoran, Haas, Sweeney, & Mcgee, 2021). An additional study focuses on patients with migraines, chronic pain, and depression. It demonstrates that incorporating biophilic features, smart lighting, and calming music can yield clinical advantages. Interior design for healthcare facilities can benefit from promoting a healthy lifestyle, bringing people closer to the outdoors, and encouraging self-care practices. (Huntsman & Bulaj, 2022). Green areas are important for encouraging human-nature interactions, improving accessibility, and providing a place for family members of the patients and employees to spend time. They also enable social interactions between users (Dinu Roman Szabo et al., 2023).

1.1. Effects on Stress and Anxiety

Hospital environments inherently induce stress and anxiety as they cater to individuals with diverse health conditions. The very nature of these spaces, even for minor check-ups, can evoke discomfort. Design elements, including building materials, furnishings, natural features, and colors, play a pivotal role in shaping the well-being and happiness of individuals in these settings. These design aspects have the potential to impact people's health levels either positively or negatively (Sadek and Nofal, 2013). Because of their effectiveness, hospital management, and designers must collaborate to understand the characteristics of patients in a variety of mental and physical conditions during the design process (Chang & Chien, 2017). Indoor features like wooden materials and green plants can help reduce physiological stress, while sunlight and a view of natural environments can help with anxiety. Areas with indoor plants have been shown to improve attitudes and behaviors. The study

shows that conditions with an outside view reduced anxiety and seeing landscapes, particularly via windows, can shift people's focus. Research suggests that including biophilic design components inside might effectively reduce stress and anxiety (Yin et al, 2020). A study employs electroencephalogram (EEG) and virtual reality (VR) techniques to assess interactive emotions in an experimental setting. It investigates how biophilic design elements affect emotional and cognitive responses. It demonstrates those elements such as a green wall or digitally generated nature when direct nature is not available have an impact on happiness and it reduces anxiety. In terms of material use, having a small use of wood in a hospital room increases overall liking, and improves the patient experience. (Jung, Kim, and Kim, 2023).

2. Methodology

In this study, in order to observe and analyze the features and applications of biophilic design strategies in healthcare settings, after observation of multiple hospitals in the city of İzmir, as a case study, Medicana International İzmir Hospital was selected due to its various biophilic applications and intentions. In addition, after an interview of the upper management of Medicana hospitals, Medicana International İzmir Hospital was chosen as a case study since it has the largest inner garden with various biophilic design elements. During literature review phase, multiple sorts of data are collected through a combined strategies methodology. A mixed-method approach is used throughout the article, which combines both qualitative and quantitative methodologies. In the qualitative part of the research, a review of internet sources is provided by using online publications and websites. Later, for the quantitative part of the study, a survey with open-ended and Likert scale questions were conducted to patients and visitors at Medicana International İzmir Hospital in İzmir, Turkey. The survey explores the inner garden usage in terms of its effects on their mood, and health. It also analyzes the reasons why they use the area and their overall preferences. It was conducted with 55 patients who visited the inner garden of the hospital for various reasons on December 28, 2023. The answers to the survey were collected in "Google Forms", which is a system that graphs the answers statistically. After that Reliability Analysis were calculated between questions that are related with each other. Finally, the survey results are analyzed by comparing them with the published paper data. The results are examined to see if it remains compatible with the reviewed literature. The data is displayed via text, images, and graphics.

2.1. Case Study Area

Medicana Health Group was established in 1992. It offers health services to patients at 16 hospitals around Turkey. It provides services in Istanbul, Ankara, Izmir, Konya, Samsun, Sivas, and Bursa ("Hakkımızda", n.d.). Medicana International Izmir Hospital was established in 2020 and offers health services using current medical equipment and systems ("Medicana International İzmir Hastanesi", n.d.). The area of the building encompasses an overall 36270 m². As a design idea, it is designed with live, breathing, open spaces that also include green gardens. In this case study area, biophilic design features can be seen around the hospital with geometrical nature motifs, plants in waiting areas, nature paintings, nature view in some of the rooms, material use, and a large inner garden waiting area on the basement floor. The hospital is located on a main transportation axis and can be easily accessible due to its proximity to the metro and taxi station. Figure 1 shows the study area location and the views from the street. It also shows the green areas near the site, the traffic flow, and walking paths from the metro station and the back of the hospital.

Figure 1. Medicana International Location (Google Maps, 2024) (Designed by Author, 2024)

2.1.1. Inner Garden

The inner garden is designed with artificial design elements covering 169 m² of the basement floor. It takes up most of the area, allowing visitors to walk and sit inside the garden and interact through visual and touch connections. It gives patients the illusion of spending time in a natural setting. The color green is frequently used and influences the user's moods positively. Even though there are wide openings on the west façade of the building, the space location within the building prevents the area from getting enough natural light and air. Figure 2 and 3, below the paragraph, shows its view from the second floor of the hospital. The circulation path between natural elements and the linear sitting areas can be seen in the figure 2 and 3. The escalator is located on top of the green elements and allows users a visual connection while using the vertical circulation. Area below the escalator is also covered with artificial natural elements. The figure 4 shows the view under the escalator. On the left side of the escalator, as the figure 5 shows, there are sitting areas with small tables for 2 people that have a view of the garden. The door that can be seen from the Figure 2, opens to the radiology department. It is one of the most active areas of the hospital due to the wide period of appointment hours. While there are other departments such as the ophthalmology department and laboratory areas on the floor, most of the users of the inner garden are people who have radiology appointments.

Figure 2. Inner Garden View (Source: Authors Archive)

Figure 3. Inner Garden View from the Escalator (Source: Authors Archive)

Figure 4. View Under the Escalator (Source: Authors Archive)

Figure 5. Left side of the Escalator (Source: Authors Archive)

Figure 6 shows the ground floor schematic plan of the hospital with a view of the inner garden on the basement floor. The highlighted area on the plan shows the gallery space that views the inner garden. The inner garden can be seen from the ground floor, first floor, and second floor of the building due to the gallery space. The view can be seen clearly, when the escalator is being used. In addition, the waiting areas assigned around the gallery space create a visual connection with the users.

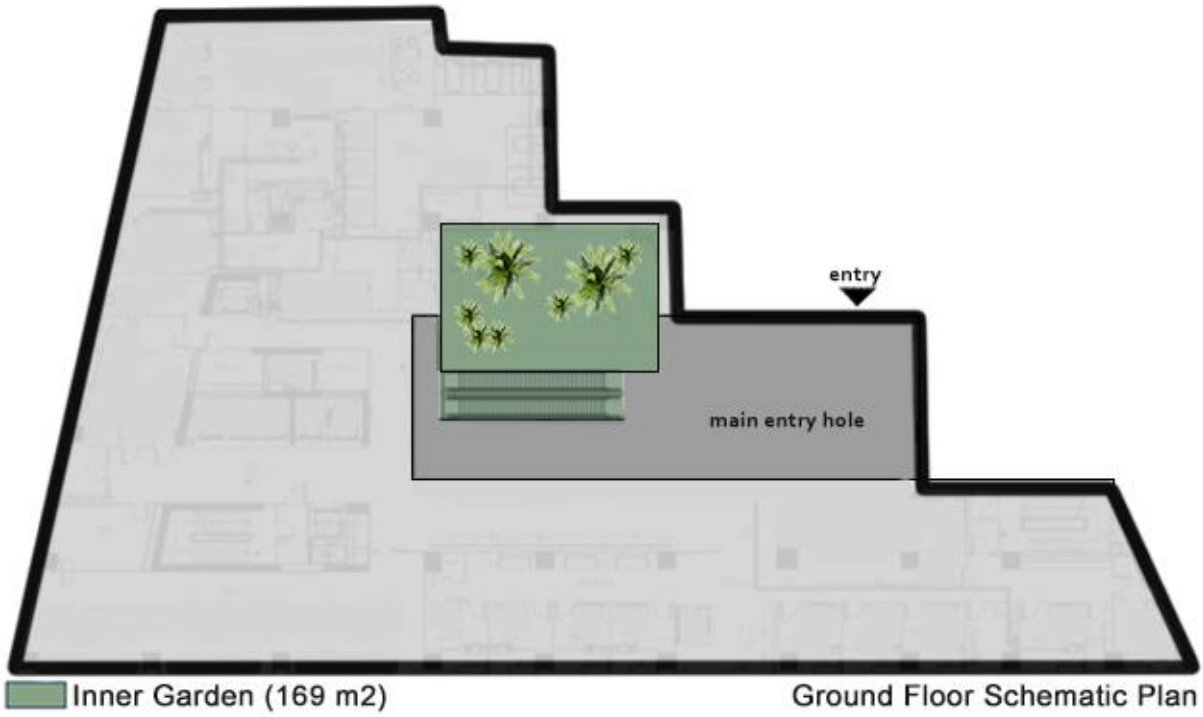

Figure 6. Ground Floor Schematic Plan (Designed by Author, 2024)

2.2.Survey Questions and Their Connections to the Literature

Survey questions were chosen after viewing the case study area and observing the daily routine and mental state of the users, environmental and architectural conditions, and overall atmosphere of the space. Reviewing literature on the topic also showed the effects of the inner garden that can be explored. Questions were constructed in four parts. The first part discovers the demographic information of participants. The second part questions the participants use of the space by examining if they choose to visit the indoor garden and how much time they spent during their visit.

After a study of the literature and determination of the areas that needed further investigation, the third part was organized. As a result of deep literature review, the survey aims to examine the effect of inner garden's on the users' mood, and healing process. Under the mood part, firstly the natural interior design's effects on users were explored by questioning the use of green color and its effect on their wellbeing. Later their stress levels and feelings were questioned. Then, in the healing part, participants were questioned whether the inner garden could affect their healing process. The literature review also directed the research into examining their thought on the inner garden's effect on their physical and psychological healing process. Finally, the preferences part was included to explore their ideas to see if the case area could be further developed. This part is added to

understand users thoughts and ideas about the space better, and enhance the effectiveness of the biophilic and natural design elements.

Table 1. Survey Questions

SURVEY

3.1. Participant Information
- Gender
- Age
- Education

3.2. Use of the Inner Garden
- Do you visit the indoor garden during your visit to the hospital?
- How much time do you spend in the indoor garden?

3.3. Effects of the Inner Garden

3.3.1. Effects on Mood
- Does the green color affect your mood?
- How much does the indoor garden affect your stress level?
- How does the indoor garden in this hospital make you feel?

3.3.2. Effects on Healing
- Do you think the indoor garden enhances your healing process?
- Do indoor gardens improve your physical health?
- Do indoor gardens improve your psychological health?

3. 4. Preferences of The Participants
- Do you prefer a natural or an artificial indoor garden?
- Do you prefer a hospital with or without an indoor garden?
- Which other sense organ would you like it to appeal to?

3. Survey Data Analysis

3.1. Participant Information

The survey was conducted in Medicana İzmir International Hospital on December 28, 2023. It was applied to the people who came to the hospital's inner garden area and agreed to fill out the survey throughout the day. At the end of the day, overall 55 users have participated in the survey. The figures below give information on the main details of the users which are; gender, age, and education level. Figure 7 shows the gender distribution of the participants. While thirty-four (63%) of the participants were women, twenty (37%) were men. Results also show that one person has skipped this question.

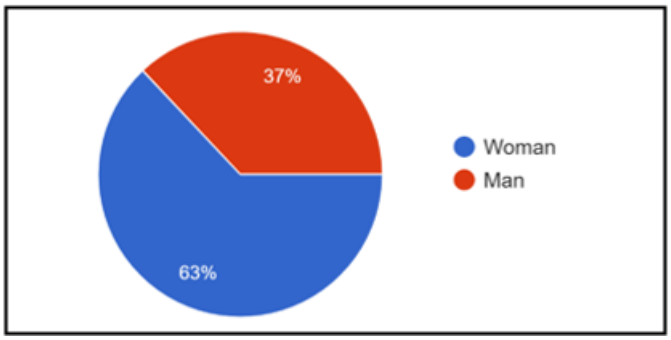

Figure 7. Gender Distribution of Participants (Google Forms, 2024)

To further understand the participants' identities, Figure 8 and Figure 9 provide general information on participants. They show the age distribution and the education levels of the users. Most participants were between the ages of 23-33 which encompasses 48,1% of them. One person has skipped this question. Then the closest age group to them was between the ages of 34-44. As can be seen in Figure 9, the majority (71,2%) of the people have a bachelor's degree. Seven of the users had Master's (13,5%) and one of them (1,9%) had Ph.D. degree. Five of the users were high school (9,6%) and 2 people were primary school graduates (3,8%). Three people have not answered this question.

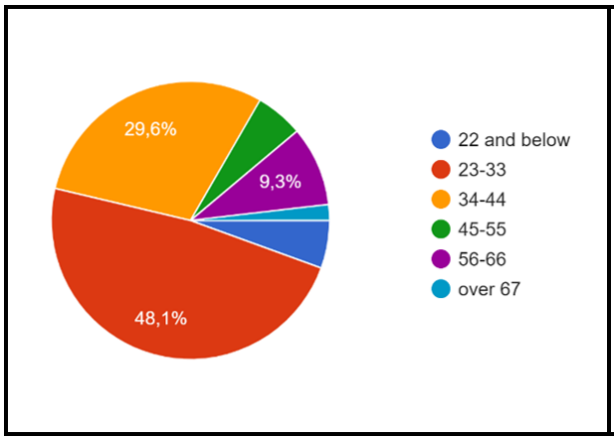

Figure 8. Age Distribution of Participants (Google Forms, 2024)

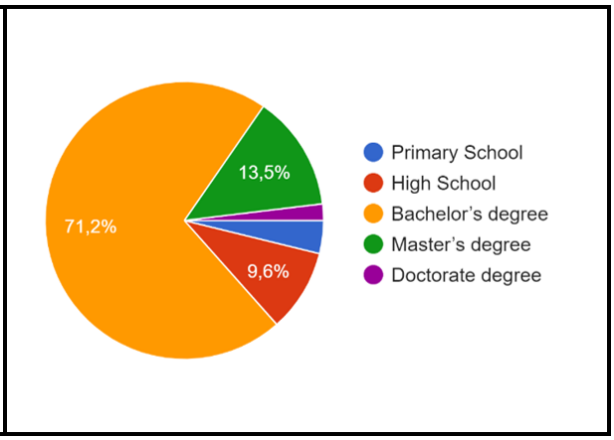

Figure 9. Education Levels of Participants (Google Forms, 2024)

3.2. Results on the Use of the Inner Garden

In this section, questions about the use of the inner garden that were investigated are; "Do you visit the indoor garden during your visit to the hospital?", and "How much time do you spend in the indoor garden?" Figure 10 shows the percentages of the users whether they prefer to visit the indoor garden during their visit. All 55 of the participants answered this question and 74,5% of them answered "yes". In this section, we also examine the primary motivations behind participants' utilization of the inner garden and summarize their overall perspectives on its role within healthcare environments. Out of the participants, 34 answered the short-answer question regarding their reasons for using the inner garden. The findings reveal that 44.1% utilize the setting while waiting for their appointments or accompanying others to the hospital. This shows that one of the main reasons they use the space is for waiting purposes. Another answer they provide is that 32,4% of them use it to rest. While resting and waiting seem to be the main two reasons why the inner garden is used, few of the users provided different answers. Four of them said that they use the space to relax. Three people say that they use it to chat and socialize. Two of them said that they spend their time there to get away from the stressful environment of the hospital. Another two users wrote that they spend their time there to feel positive. One person said that they use it while taking pictures. However, this minority of the answers can be included under the categories resting and waiting because they seem like small activities that can be done during those activities. Figure 11 illustrates the amount of time participants spend in the indoor garden. This section was completed by only 52 of the participants. The results show that 46,2% of the participants spent less than fifteen minutes, 25% spent fifteen minutes, and 28,8% spent more than fifteen minutes. According to the previous answers on the reason why they use the space, the amount of time most of them spend in the inner garden must be determined by their appointment waiting time.

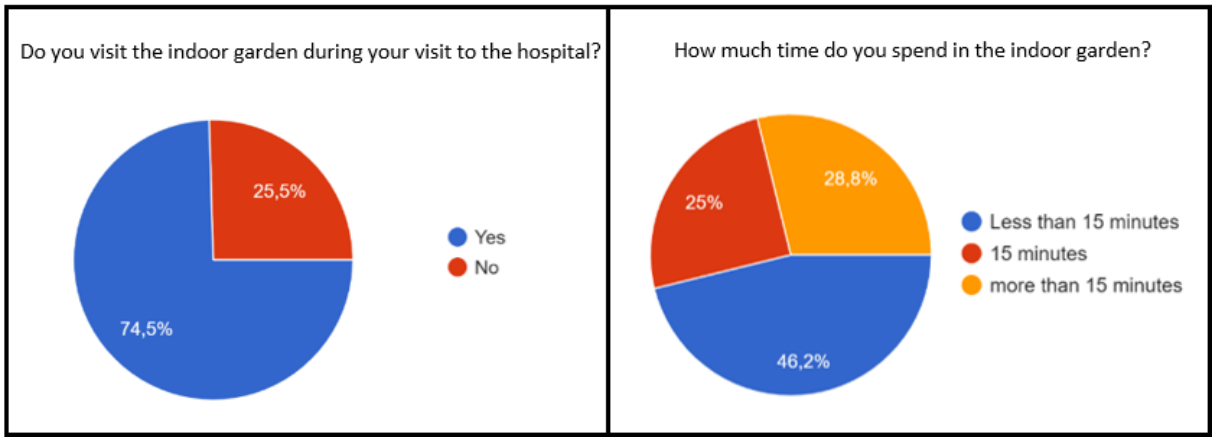

Figure 10. Inner Garden Use (Google Forms, 2024) **Figure 11.** Usage Time (Google Forms, 2024)

3.3. Results on the Effects of the Inner Garden

This section investigates the inner garden's effects on people's mood and healing process. In the section where the effects on mood are investigated the questions that are used were; "Does the color green affect your mood?", "How much does the indoor garden affect your stress level?", and "How does the indoor garden in the hospital make you feel?" As for the healing section, the questions were; "Do you think the indoor garden enhances your healing process?", "Do indoor gardens improve your physical health?", and "Do indoor gardens improve your psychological health?"

3.3.1. Effects on Mood

Figure 12 presents the analysis of individuals who believe that the color green influences their mood. The results indicate that the majority, comprising 94.5 percent, hold this belief. According to Cherry, K. (2023), Colors create psychological responses, influencing mood and emotion. She also mentions some of its effects such as; being calming, healthful, motivating, and optimistic. It also brings nature to people's minds.

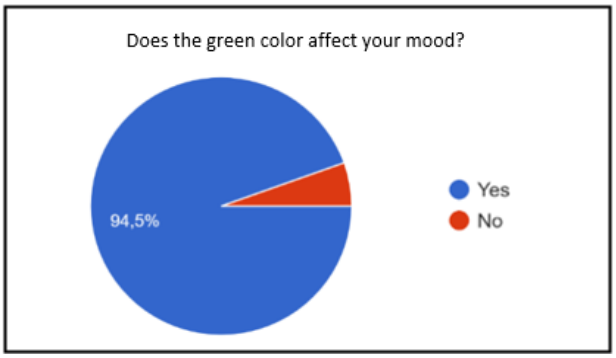

Figure 12. Effects of Color Green (Google Forms, 2024)

Figure 13 explores the impact of the inner garden on stress levels, a topic previously discussed in the literature review section of the article. The findings align well with claims from other articles and are reflected in the survey results of this study. The diagram indicates that the majority of users rated the effect, between level 3 (medium) to level 5 (maximum) regarding its impact on stress. Specifically, 18 participants selected level 4 as their choice, followed by 15 participants who chose level 3. Additionally, 11 participants opted for level 5, while 8 participants selected level 2 and 2

participants chose level 1. These results indicate that most participants believe that inner gardens can affect their stress levels.

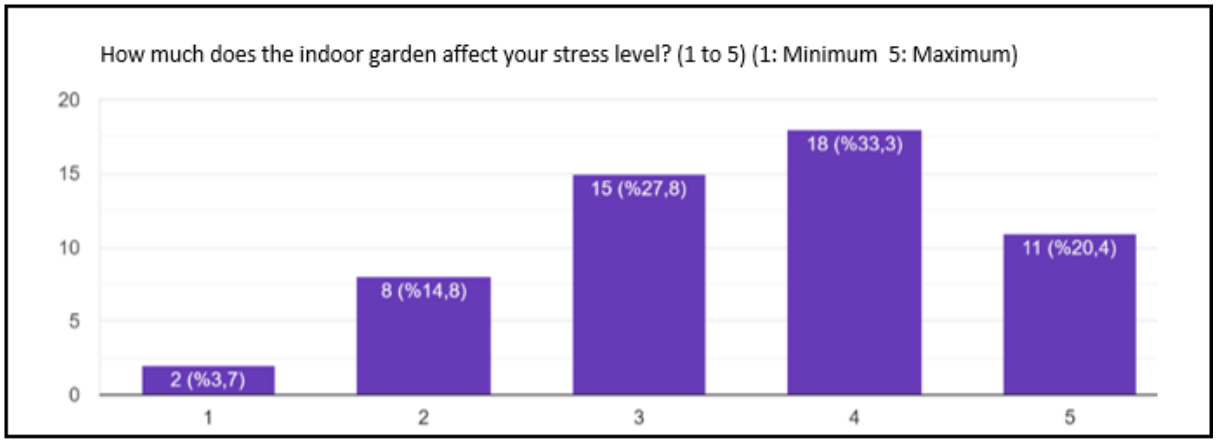

Figure 13. Effects of Indoor Gardens on Stress (Google Forms, 2024)

As depicted in Figure 14, 35 participants (68.6%) reported feeling relaxed, while 10 participants (19.6%) expressed feeling happy. A person wrote that they feel hopeful. While another person was indifferent, the rest of the participants expressed negative emotions. Negative outcomes were most likely from the people who were still feeling affected by the negative atmosphere of the hospital environment, people who were feeling ill, or the people who claimed that the indoor garden's design and effects could be improved. Four of the people have skipped this question.

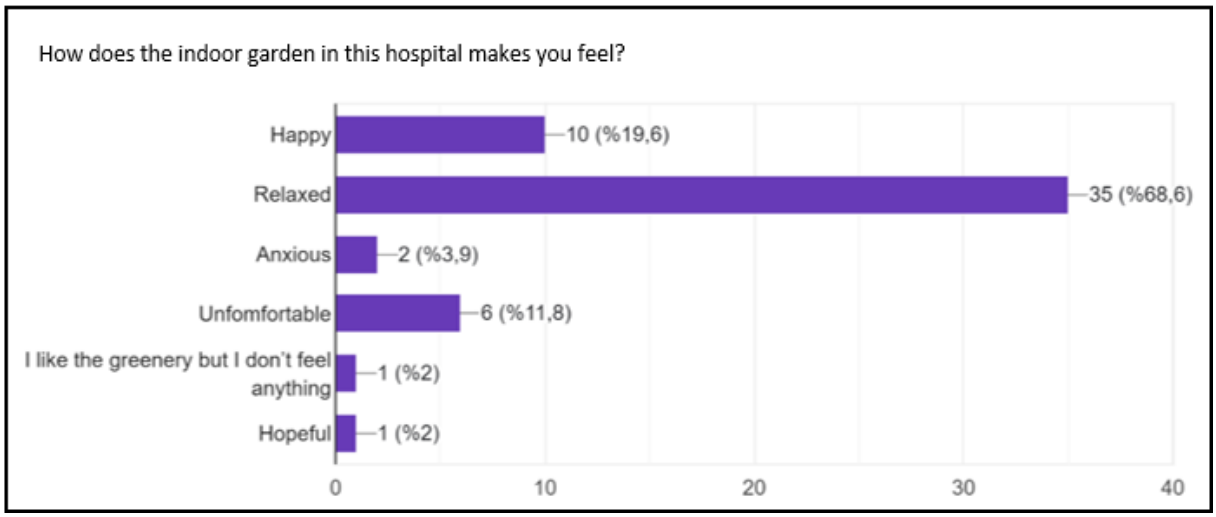

Figure 14. Effects of Indoor Gardens on Feelings (Google Forms, 2024)

3.3.2.Effects on Healing

This part of the research explores whether using greenery and an inner garden in a hospital can improve the users' healing process. According to the survey results, Figure 15 indicates that the majority of participants believe that interacting with greenery in a healthcare setting enhances the healing process to some extent. Specifically, 18 people (34%) perceive it to have a significant impact. Meanwhile, 12 participants (22.6%) consider it to have a moderate level of effect. Conversely, 5 participants do not believe they can influence the healing process of patients. Two of the participants have skipped this question.

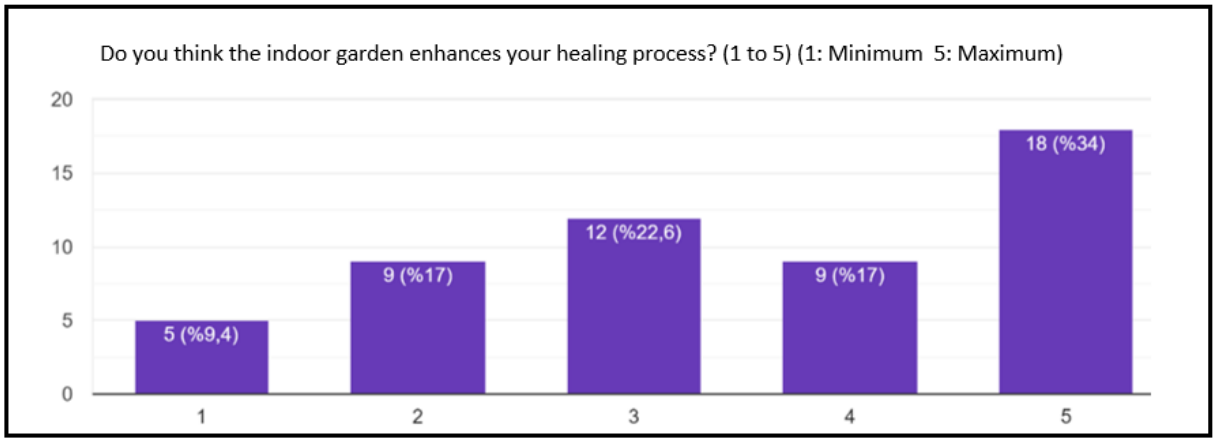

Figure 15. Effects of Indoor Gardens on the Healing Process (Google Forms, 2024)

Figures 16 and 17 examine the effects of the inner garden on the physical and psychological well-being of its users. The percentages demonstrate that, while most users believe it helps improve both conditions, the majority of participants believe it has a greater impact on psychological health. According to the findings, just 34 people (65,4%) believe inner gardens may promote physical health, while 48 people (87,3%) feel they can improve psychological health. While just 7 people (12.7%) stated that the inner garden does not influence psychological health, 18 users (34.6%) believe that the inner garden does not affect physical health issues.

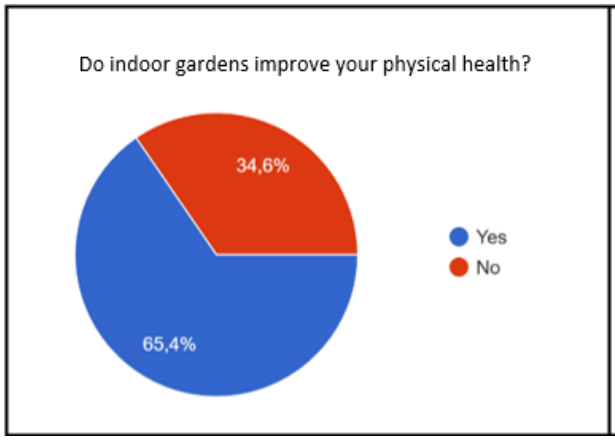

Figure 16. Effects on Physical Health (Google Forms, 2024)

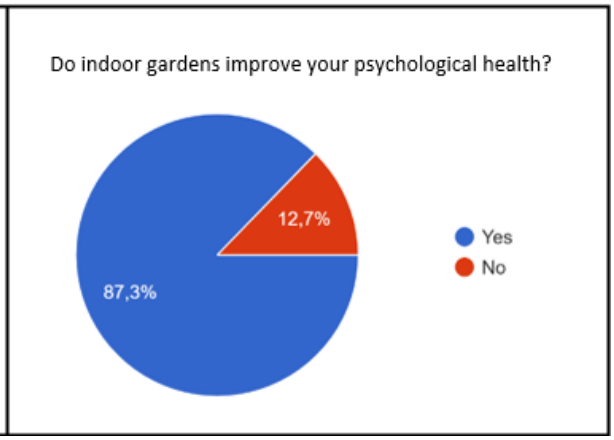

Figure 17. Effects on Psychological Health(Google Forms, 2024)

3.4. Results on the Preferences of the Participants

The concluding section of the survey centers on the users' thoughts and preferences regarding inner gardens in hospitals. It addresses the following questions: "Do you prefer a hospital with or without an indoor garden?", "Do you prefer a natural or an artificial indoor garden?", and "Which other sense organ would you like it to appeal to?" Through these inquiries, participants' overall viewpoints on the integration of natural elements within indoor hospital environments are examined. Additionally, participants were invited to provide their opinions on the current design of the inner garden and suggest potential enhancements to maximize its effects. Most of the users answered that the effects could be felt better if it was a natural garden instead of an artificial one. Also, many of the users suggested natural additions such as; flower smells, water use (artificial pool, aquarium, fountain), the sound of waves and birds, animal figures, sunlight and daylight, fresh air, landscape views, and

nature pictures. Several opinions centered on design choices. Some individuals proposed incorporating different color options for walls and seating elements. A few respondents also highlighted natural ventilation. Additionally, users recommended the inclusion of vending machines for access to take-out coffee or snacks, as well as the introduction of soft background music to promote relaxation. One suggestion involved the creation of small libraries to enhance relaxation further. While some participants favored specific flower types such as roses and ivy, another user proposed the use of seasonal flowers. When all the results are analyzed in the scope of biophilic design technologies, it has been seen that the suggestions such as integration of natural elements, color usage and natural ventilation are some of the primary landmarks of biophilic design.

As depicted in Figure 18, the majority of participants (50 people) expressed a preference for a natural inner garden. Only four individuals opted for artificial gardens. Several reasons were provided by those who favored a natural garden, including its perceived ability to offer relaxation and comfort, provide oxygen, allow for the enjoyment of natural flower scents, promote better health, facilitate easier breathing, and offer a genuine connection to nature rather than it being merely decorative.

According to Figure 19, almost all of the users prefer hospitals with inner gardens. 51 Participants (98,1%) chose the option to have inner gardens while one person chose the opposite. The other three people have skipped this question. This shows that even though they find the effects of the current artificial inner garden design of the hospital, they would rather have a natural garden.

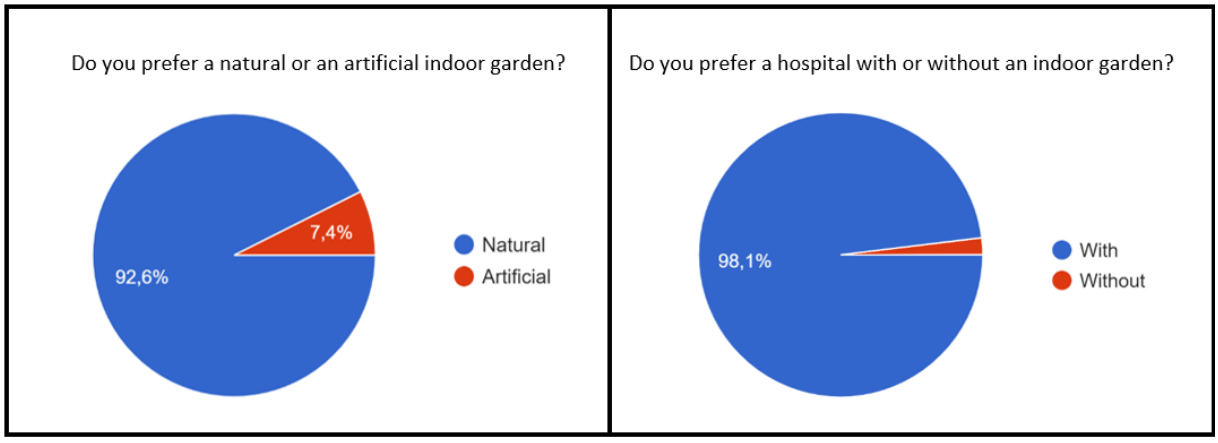

Figure 18. Preference on the Type (Google Forms,2024)

Figure 19. Preference on the Inclusion (Google Forms,2024)

Finally, the last question of the survey is about the different sense organs the inner garden can satisfy and how these additions can improve the effects on people and the environment. Figure 20 shows the results of other senses (sight, hearing, touch, taste, and smell) the inner garden can affect, which will ultimately improve the overall experience of patients and the effectiveness of the artificial setting. Out of the 53 respondents to this question, their choices were mostly evenly distributed. Participants were permitted to select multiple answers, with the majority opting for smell, hearing, and sight. Specifically, 30 individuals chose smell as their preference, indicating its prominence among the respondents. Based on their responses, the "smell" category primarily encompasses scents from flowers, plants, and fruits, as chosen by 22 participants. "Hearing," selected by 22 people, pertains to nature sounds such as wind, rain, water, waves, and animal sounds. "Sight," the third most popular choice with 19 participants, includes natural views through paintings, photos, or openings on walls displaying landscapes, as well as interior additions of plants and flowers. Additionally, nine participants chose "touch," while four participants selected "taste." Touch can

refer to a design that includes a more physical connection with natural elements. Finally, taste refers to some fruits that can be included that people can eat while waiting or vending machines that could provide people with their needs.

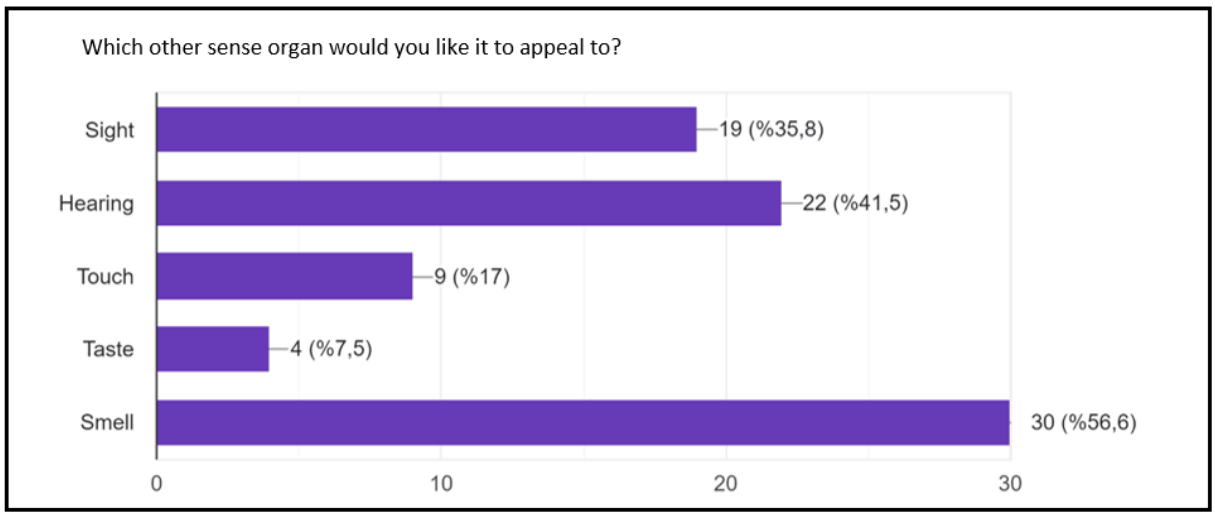

Figure 20. Preference On The Other Sense Organs Users Would Like It To Appeal (Google Forms, 2024)

4. Survey Reliability Analysis

Reliability analysis allows users to investigate the qualities of measurement scales and the components that make them up. The Reliability Analysis process determines the reliability of several widely used scales and offers details on the connections between the scale's components. Interclass correlation coefficients can be used to compute interrater reliability estimates. ("Güvenirlik Analizi", 2023)

The value of r between two test administrations is called the reliability coefficient. A correlation of at least $p < 0.05$ indicates the reliability of the test (Karras, 1997). According to Bobbitt (2020) dependent on the value of r, the degree of the link between two variables shows that if $r < 0.25$, variables has no relation. If it is $0.25 < r < 0.5$, they have weak connection. If $0.5 < r < 0.75$, they have Moderate relation. Finally, if $r > 0.75$, they have strong connection. In this study, the reliability coefficient will be determined between survey questions that are connected.

Table 2. Correlation Between Related Questions

			Correlation
1	**Figure 13.** How much does the indoor garden affect your stress level?	**Figure 15.** Do you think the indoor gardens enhance your healing process?	0,54
2	**Figure 12.** Does the green color affect your mood?	**Figure 14.** How does the indoor garden in this hospital make you feel?	0,57
3	**Figure 16.** Do indoor gardens improve your physical improvement?	**Figure 17.** Do indoor gardens improve your psychological improvement?	0,51
4	**Figure 18.** Do you prefer a natural or an artificial indoor garden?	**Figure 19.** Do you prefer a hospital with or without an indoor garden?	0,48

According to table 2, it has been observed that the correlation values between the questions are within the range of moderate relation ($0.5 < r < 0.75$) except the final correlation analysis ($0.25 < r < 0.5$) between the figure 15 and 16. This one shows weak connection. However, it is still very close to moderate level. These results show that the related questions answers are cohere with each other.

CONCLUSION:

One of the most crucial things that healthcare designers should take into account is the presence of stress-free zones, as stress can be a very dangerous emotion that can have an impact on people's health. Patients and guests in hospitals can gain from the design of spaces that lessen stress in one of the most stressful indoor environments. Numerous studies demonstrate the beneficial and relaxing effects of the color green and the addition of natural elements to interior spaces. Hospital inner gardens and biophilic design features can aid in people's relaxation and stress reduction as they wait for their appointments or results. This article investigates the effects of inner gardens on patients and visitors, in healthcare settings. After a literature review of similar studies, the paper demonstrates a survey that was done with patients of Medicana International İzmir Hospital located in İzmir, Turkey.

The survey findings align with the literature review segment of the study, which explores previous research on the utilization of natural elements and the integration of biophilic design in healthcare settings. Collectively, the study underscores that users express a preference for hospitals equipped with inner gardens, primarily attributing to their calming, relaxing, and stress-reducing effects. Most of the participants would rather have a natural inner garden that provides air, smells, sounds, and light. However, the results show that even though the Medicana International Hospital's garden is artificial, it still positively affects the users compared to a hospital without an inner garden. Participants of the survey believe that the inner garden improves the effects on their mood and healing process. Even though they believe it affects the psychological conditions more than the physiological ones, they still think it affects the overall conditions positively.

To sum up the statistical results; the general information on participants shows that out of 55 people, 63% were women. 26 individuals were between the ages of 23 and 33, and 16 were between the ages of 34 and 44, according to the age distributions. One person was over 67, three were between 45–55, another three were 22 and under, and five were between 56–66. Seventy-one percent of the population had a bachelor's degree. One user held a Ph.D. degree, and the other seven had master's degrees. Two individuals had completed primary school, and five of the users had completed high school. During their stay or visit to the hospital, 74,5% of them generally visit the hospital's inner garden. Nevertheless, it's essential to acknowledge that a significant portion of the responses originated from participants who were already situated in the garden area. Another question was about how much time they spent in the inner garden. The responses in this section reveal closely distributed answers, with 46.2% of participants selecting less than 15 minutes, 25% choosing 15 minutes, and 28.8% spending more than 15 minutes. The next part explored its effects. 94,5% believe that the color green affects their mood. The impact of the inner garden on stress levels is covered in the next one. Regarding their impact on stress, the majority have selected values ranging from 3 (medium) to 5 (highest). 18 participants selected level 4. Level 3 was the second most popular with 15 people. Eleven then selected level 5. Two people selected level 1, and eight selected level 2. The findings indicate that the majority of individuals think their stress levels are impacted by the inner gardens. In terms of emotional response, the majority of participants, accounting for 68.6%, reported feeling relaxed, while 19.6% expressed feelings of happiness. The next section of the

study looks into whether green usage and an inner garden in a hospital might improve the healing process of patients. According to the survey results, 18 persons (34%) believe it has a significant impact on them. Twelve of the individuals (22.6%) appear to believe it has a moderate level of influence. Five of the participants do not believe they can influence the patient's healing process. The next section investigates the effects of the inner garden on the physical and psychological well-being of its visitors. The percentages show that, while most users believe it helps with both, the majority of participants believe it has a higher influence on psychological health. In terms of preferences, 92.6% of participants preferred natural inner gardens and 98.1% said they would rather have a hospital with an inner garden. For the final question, participants were tasked with selecting additional senses that could enhance the garden's effects. The responses indicate that 56.6% chose smell, 41.5% selected hearing, and 35.8% chose sight.

In the healing part of the survey, when asked about the impact of indoor gardens on their healing process, participants aged 23-33 rated it an average of 3.54 out of 5. Participants between the ages of 34-44 picked an average of 3,1. Participants aged 56-66 gave the highest rating of 5, while those aged 22 and below had the lowest average of 2. These findings suggest that while individuals aged 23-44 perceive indoor gardens as moderately beneficial to health; those aged 45-66 are more inclined to believe in their healing properties.

In the stress section of the survey, participants aged 22-33 and 34-44 reported similar average ratings of 3.5 and 3.6, respectively. However, participants aged 55-66 had the highest average rating of 4.6, while those aged 45-55 averaged a score of 3. The youngest age group, 22 and below, had the lowest average rating of 2.3. These results indicate that age groups 22-33, 34-44, and 45-55 share comparable responses.

In the mood section of the survey, participants aged 22-33 expressed the highest average satisfaction level with the indoor garden, scoring 4.1 out of 5. Meanwhile, participants aged 34-44 and 45-55 rated their satisfaction slightly lower, with averages of 3.7 and 3.5, respectively. Notably, both the 56-66 age group and the 22 and below age group reported the same and highest average satisfaction score of 5.

This study demonstrates that the data appear to have a positive conclusion, showing the numerous advantages of green use and biophilic design in healthcare settings. Its tranquil, peaceful, and stress-relieving qualities promote the usage of inner gardens in medical settings. Additionally, it includes participant recommendations for enhancing the study area's positive effects, which are beneficial aspects to take into account for any inner garden design intended for a healthcare facility. Based on their responses, although the hospital's inner garden is artificial and lacks natural elements, enhancing its positive effects remains feasible. By incorporating more natural elements such as flower scents, animal and nature sounds, water features, and simulated wind effects through ventilation systems, the garden can be made to feel more natural and thus enhance its positive effects. Additionally, amenities like vending machines and classical music can encourage individuals to spend more time in the inner garden, thereby increasing its utilization and effectiveness.

Future Studies

To gather diverse perspectives on the utilization of inner gardens and their impact on users within healthcare environments, it would be advantageous to administer the survey across multiple hospitals situated in various cities throughout Turkey. Previous studies have shown that several other Medicana hospitals have embraced biophilic design principles and incorporated inner gardens into their facilities. For instance, while Medicana Hospital in İzmir boasts the largest inner garden, Medicana Bursa Hospital also features one within its first-floor gallery space. Moreover, Medicana

Ataköy Hospital, situated in Istanbul, presents an opportunity to investigate the effects of its natural façade design on the hospital's interior environment. Therefore, conducting future studies at Bursa and Ataköy Medicana hospitals could provide valuable insights into the relationship between inner gardens, biophilic design, and user experiences in healthcare settings.

Compliance with Ethical Standard

Conflict of Interest: *The author(s) declare that they do not have a conflict of interest with themselves and/or other third parties and institutions, or if so, how this conflict of interest arose and will be resolved, and author contribution declaration forms are added to the article process files with wet signatures.*

Ethics Committee Permission: *The article complies with national and international research and publication ethics. Ethics Committee approval was obtained with the decision of Yaşar University Rectorate Graduate Education Institute Directorate dated 01.12.2023. Ethical principles were followed throughout the process.*

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EXTENDED SUMMARY

Research Problem:

The purpose of the study was to explore the use of inner gardens and biophilic design elements in healthcare settings. Hospitals are among the most stressful structures that should take into consideration stress-free areas in spaces such as waiting and resting zones. The article aims to review some literature and survey users in Medicana International İzmir Hospital regarding their experience with the use of the inner garden. The goal of the study is to learn what customers thought about inner gardens in terms of the effects on their mental and physical health conditions and compare the results with previous research from the literature review.

Research Questions:

Do inner gardens and biophilic design use in hospitals affect patients and visitors positively? Do inner gardens affect patients' and visitors' stress levels in healthcare settings? Do users prefer hospitals with inner gardens?

Literature Review:

The purpose of the literature review was to investigate similar research on the effects of natural design elements and inner gardens in healthcare settings to see if the results were compatible with the survey that was conducted for this article. Some experimental research and some previous literature reviews about the topic were explored and mainly the different effects on patients were reviewed. Review shows that a healthcare facility's green areas enable patients to engage with their surroundings and use them to meet their physical and mental needs. Additionally, they give people an alternative setting in which to concentrate on themselves and take a break (Weerasuriya et al, 2019). They are calming, aesthetically beautiful environments that reduce stress. Natural design elements in interiors affect people's behavior and emotions (Moya et al., 2019). People can be affected positively or negatively by a range of design elements, such as colors, natural elements, furnishings, and the use of materials (Sadek & Nofal, 2013).

Methodology:

A mixed-method approach is used with qualitative and quantitative approaches. Firstly, a review of online resources was investigated. Later, a survey was conducted with 55 patients and visitors at Medicana International Hospital located in İzmir, Turkey on December 28, 2023. The study area has an artificial inner garden that is located on the basement floor of the building. It is a wide space where guests can stroll, sit, and engage. Despite the building's south façade having large openings, the region inside the structure is unable to receive enough natural light and fresh air. Individuals who visit the inner garden for radiological appointments make up the majority of its users. The study investigates the impact of using an inner garden on participants' health and mood throughout the day. It also examines their general preferences and the reasons they use the area.

Results and Conclusions:

The survey's findings align with the literature review, which highlights studies on the application of natural elements and the integration of biophilic design in hospital environments. The study's overall findings indicate that patients favor hospitals with inner gardens because of their ability to reduce stress and promote calmness. The majority of participants would prefer to have an indoor natural garden that lets in light, fresh air, and natural sounds and scents. In contrast to a hospital without an interior garden, the results demonstrate that the Medicana International İzmir Hospital's artificial garden has a beneficial impact on the users even though it is designed with artificial design elements. According to study respondents' opinions, the inner garden has a positive impact on their healing process and attitude. They think it has a beneficial effect on the general health conditions. The majority of respondents said that a natural garden would have a greater impact than one created artificially. Many users also recommended adding natural elements, such as the scents of flowers, the use of water, the sounds of waves and birds, daylight and sunshine, clean air, landscape views, and images of nature. Some individuals recommended using different colors for the walls and seating components. Users also recommended playing background music to help people relax and using vending machines to get takeout. Furthermore, although some people recommended using particular flower varieties, like ivy and roses, another user recommended using seasonal flowers.

This study shows that the data seem to point toward a positive conclusion, highlighting the many benefits of eco-friendly design and biophilic architecture. The results of the survey and the literature review of similar articles are consistent with each other. The conclusion of the research shows that creating stress-reducing zones such as inner gardens in healthcare settings and using natural and green design elements should be more common because of their calming, serene, and stress-relieving effects on patients and visitors.