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DESIGNING A MENTAL HEALTH INSTITUTE FOR ADOLESCENTS IN KINGDOM OF SAUDI ARABIA

(HEALING ARCHITECTURE)

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DEPARTMENT OF ARCHITECTURE

ROCHESTER, NEW YORK

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COMMITTEE APPROVAL

Designing A Mental Health Institute for Adolescents in Kingdom of Saudi Arabia (Healing Architecture)

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ACKNOWLEDGMENTS

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My father, although he is no longer with me, the memories of him helped me to always give the best. God bless your soul.
ABSTRACT

The society in the Kingdom of Saudi Arabia obstructs people who want to see a psychiatrist, especially adolescents. Based on the lack of mental health support in Saudi Arabia, this thesis will introduce a mental health institute project for adolescents that puts more attention on specific design factors, such as daylighting, color, and green roofs. These aspects provide help for the recovery process by supporting healing according to many psychological studies. This psychiatric institute will be specialized for teenagers 10-19 because the early intervention at this critical period has the possibility for the potential for making a lifelong difference. by providing a supportive structure to the psychiatric profession the goal is to reduce the incidence of mental disorders in adulthood making a significant difference in the lives of the next generation. This proposed project is located in Makkah city because of its lack of mental hospitals. the goal of the architecture is to provide a welcoming location for a mental health facility that aids in reducing the stigma of seeing a psychiatrist in Makkah. The creation of a high-quality place for mental health stresses that mental health is an essential part of a teenager's overall health and that the emotional wellbeing of them is as important as their physical health.

Key Words: Mental Health, Psychiatry, Psychiatric, psychiatrist, Healing Architecture, Healing Design, Daylight, Color, Green Roof, Teenagers, Adolescents.
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## ABSTRACT

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1. **Introduction**

1.1 Adolescent’s Mental Health

Adolescence (10-19 years old) is a unique and formative stage. In this stage, the teenagers pass through multiple changes physically, socially, and emotionally. Based on these sensitive shifts, the adolescent needs superior attention as they exposed and vulnerable to mental health problems. Hence, enhancing adolescent psychological well-being and provide protection from any harmful experiences and risk factors is essential as it affects their safety during adolescence, and also affect their physical and psychological health in adulthood.

Adolescents are exposed to mental health problems not only due to the swings they suffer from but also according to some other factors. According to the World Health Organization (WHO), these factors are:

1- The desire to obtain greater independence.
2- The impact of the media and gender-based norms where it can increase the contrast between the teenage reality and its perceptions or future aspirations.
3- The quality of the teenager’s life and his/her relationship to his/her parents, family, and peers.
4- The Violence (including father and mother cruel treatment and harassment) and social and economic problems are recognized risks to mental health. Adolescents are particularly vulnerable to sexual violence, which is clearly related to harmful consequences for mental health.
5- The living conditions. Some adolescents are at greater risk of mental health disorders because some aspects, such as, the discrimination, the exclusion, or their lack of support and quality

---

1 World Health Organization.
services. This includes adolescents in fragile and human situations, more specifically, adolescents with chronic disease, autism spectrum disorder, intellectual disability or other neuropathies, pregnant adolescents, adolescent parents / teenage mothers, adolescent married couples early and / or forced, orphans, drug addicts, and adolescents belonging to racial, sexual, or other minorities who suffer from discrimination. Adolescents with mental health disorders, in turn, are particularly vulnerable to social exclusion, discrimination, stigmatization (which affects willingness to seek help), education-related difficulties, risky behaviors, poor physical health and human rights violations.

1.2 Facts About Adolescent’s Mental Health

Usually, the emotional disorders appear during adolescence, often including depression and/or anxiety. Teenagers with emotional disorders may also feel irritable, frustrated, or angry. According to WHO, symptoms can interfere with healthy mental growth and are characterized by rapid and unpredictable mood changes and an emotional eruption. Younger teens may also have physical symptoms caused by psychological distress such as headache, or nausea. The following are some statics facts regarding Adolescent’s Mental Health:

1- One in six people is between 10 and 19 years old.

2- Mental health disorders represent 16% of the global burden of disease and injury among people between 10 and 19 years old.

3- Half of mental health disorders begin to appear at 14 years of age, but most of these cases are undetected and untreated.

4- Globally, depression is one of the leading causes of disease and disability among adolescents.

5- Suicide is the third leading cause of death in people between 15 and 19 years old.
6- The consequences of adequacy of adolescents' mental health disorders extend into adulthood, causing both physical and mental health to be impaired and reducing the chances of enjoying a satisfactory adult life.

These facts stress the necessity and the importance of taking care of teenagers' mental health well-being.

1.3 Current State of Psychiatry in Saudi Arabia

Figure 1. Map Of Saudi Arabia Showing The Locations (In Red Circles) Of The Mental Health Hospitals In The Cities, Regions, And Governorates Of The Kingdom Of Saudi Arabia According To The Ministry Of Health Of Saudi Arabia (Picture of The Map from Israj Website, Modified By The Author).

Based on a study conducted, most psychiatric patients commonly receive care in private or public psychiatric hospitals that have well-developed inpatient and outpatient services. The people with chronic mental disorders reside in psychiatric hospitals. In 2006, the number of

---

2 Koenig, Harold G., Al Zaben, Sehlo, Khalifa, and Al Ahwal. "Current state of psychiatry in Saudi Arabia” Pg.226
psychiatric outpatient clinics had increased to 44 and were usually connected to general or psychiatric hospitals. In 2016, Saudi Arabia included 21 mental health hospitals in different cities (See Fig.1) with a clinical capacity of 4046 beds, in addition to 99 psychiatric clinics attached to general and specialized hospitals. None of these mental health hospitals had an inpatient unit for children nor adolescents except at the ones that specialized in the addiction treatment for teenagers as well as adult. Nonetheless, children and adolescents are welcomed to see a psychiatrist at the psychiatric outpatient clinics only according to a call interview with a psychiatrist who preferred to be anonymous. Yet in January 2020, a new an inpatient care department has been opened for children suffering from mental illnesses at the Irada Center for Mental Health in Riyadh. Irada is the first an inpatient care department for children in Saudi Arabia in psychiatry.

1.4 Saudi Position Toward Psychiatry

Some people in Saudi Arabia ignore the importance of their mental health. They are not aware that mental health is the key to enjoy a peaceful, healthy, and balanced life. On the other hand, many people familiar with it, but they just feel ashamed to admit it. Mental health and seeking psychiatric and psychological services are still misunderstood. Mental illness is a serious public health problem in many countries. Mental disorders are one of the largest causes of lost years and of quality of life in the world. Also, "It estimated that five of the leading causes of disability worldwide are psychiatric in nature with depression ranking first." Depression, symptoms of mental distress, and anxiety among teenagers are common in many countries. Kingdom of Saudi Arabia

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5 Albarqawi, “Ministry of Health, 21 “psychiatric hospitals” in the Kingdom.”
4 Alqarni” The inauguration of the first psychiatric Inpatient department in the Kingdom of Saudi Arabia in "Riyadh".
5 AlAteeq, ALDaoud, AlHadi, AlKhalaif and Milev, “The experience and impact of stigma in Saudi.”.
6 Sharheeli, Alsaidi and Mandil,” Characteristics of Mental Illnesses among Psychiatric.” pg.1
7 A.Almoshawah, “An Evaluation of Psychiatrist View Towards the Mental Health Services in Saudi Arabia.”pg.37
Arabia (KSA) is one of these countries, however, the attitude of the Saudi people toward psychiatry a big obstacle in gaining treatment, especially for adolescents.

Essentially, this obstacle has been created due to two major reasons, which are, the stigma to mental health and the fear of the psychiatry hospitals.

1- The Stigma Toward Mental Illness

The stigma toward mental illness is defined as the “negative feelings people have towards people with a mental illness”. One study defines this problem further; The Stigma toward mental illnesses is a great concern in the field of mental health. Stigma toward mental illnesses often isolates people with mental illness from close relationships and prevents them from following treatment plans and participating in psychoeducation. This stigma is considered one of the biggest hurdles in providing treatment. Basically, there are several factors impact the public attitudes towards mental health which created this stigma.

According to the study The experience and impact of stigma in Saudi people with a mood disorder conducted in 2018, attempted to determine the extent and impact of stigma experiences in Saudi patients. They found that more than half of all the Saudi participants reported trying to hide their mental illness to avoid situations that might lead to being stigmatized. The factors that lead those people to hide their situation was "traditions, cultural norms, the way people were raised, and a lack of community awareness". In addition, the core belief regarding mental health in the Muslim community "is centered around destiny, in which the predominant attitude is positive "

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8 Koenig, Al Zaben, Sehlo, Khalifa And Al Ahwal,” Current State Of Psychiatry In Saudi Arabia.” pg.224
9 Khalil, I Ibrahim. "Stigma versus mental health literacy: Saudi public knowledge and attitudes towards mental disorders." pg. 60.
10 AlAteeq, AlDaoud, AlHadi, AlKhalaf, and Milev. "The experience and impact of stigma in Saudi people,”
acceptance of God’s will and high levels of optimism towards healing," which is a serious misunderstood concept that needs awareness.

According to *Attitudes toward mental illness, mentally ill persons, and help-seeking among the Saudi public and sociodemographic correlates* paper by Abolfotouh, Mostafa A., Adel F. Almutairi, Zainab Almutairi, Mahmoud Salam, Anwar Alhashem, Abdallah A. Adlan, and Omar Modayfer, it has been reported that most of the individuals with Mental Illnesses (MIs) do not seek help. Indeed, the nation of Saudi Arabia reacts poorly and negatively toward people with MIs in relation to treatment, work, marriage, and recovery and toward seeking professional help. Again, the lack of awareness in the Saudi culture was the likely factor behind negative judgments about mentally ill persons.

2- The Fear of the Psychiatry Hospitals

![Pictures Of A Mental Health Hospital In Al-Taif City In Saudi Arabia](Images By Al-Riyadh Newspaper).

A major factor that stops adolescents in Saudi Arabia from getting a mental and spiritual therapy is the fear of aggression and violence from psychiatric patients. Most of the mental health

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11 Abolfotouh, Mostafa A., Almutairi, Almutairi, Salam, Alhashem, Adlan, and Modayfer. "Attitudes toward mental illness, mentally,"
12 Abolfotouh, Almutairi, Salam, Alhashem and Adlan, "Attitudes toward mental illness,“.
hospital designs in Saudi Arabia do not reassure the patient. According to patient’s opinions, psychiatric hospitals look unwelcoming and unsettling. Indeed, some of the patients, who preferred to be anonymous, complains that “psychiatric hospitals in Saudi Arabia look more like a prison than like a hospital”. Unsurprisingly, very recent, in 2020, a famous local newspaper reveled an escape of 4 psychiatric patients from Taif Psychiatric Hospital \(^{13}\). According to Okaz, the four patients justified that what pushed them to escape is “what they described as psychological fatigue resulting from the "boredom" inside the hospital according to the lack of recreational or entertainment programs that could compensate them for staying away from their homes”\(^{14}\). This further emphasizes the need for quality inviting design in mental facilities, especially for adolescents.

1.5 Healing Architecture Concept

Healing is the process of reinstating harmony in the body which is altered by a disorder. Healing architecture involves life-enhancing designs in the mental care hospitals that advance the healing characteristics of a building via architecture and planning models. These areas aim to minimize fear and tension while leading to the ultimate recovery of the patient. The poorly designed facilities catalyze the mental conditions rather than help in recovery. An ideal psychiatric care physical design should minimize injury in addition to the refreshing healing process. Safe facilities reduce the cost for both the patient and facility through mitigation of injuries which tend to cause more expenditure. The reverse action of typical hospital buildings motivates this paper to study the practically tested designs that enhance healing, especially in terms of daylighting, green roof, and color selection.

\(^{13}\) Al-Nefaie, and Al- Al-Qathami “4 Patients Reveal the Reasons For Their Escape From The Shihar Hospital.”
1.5.1 Color

The color of the room is the first thing people perceive when they walk into a room. The color speaks louder than almost any object in a given space\textsuperscript{14}. Interestingly, according to research, the vibrational energies of colors have an effect on our moods, behavior, physical and mental wellbeing. "Color can affect our brainwaves, emotions, and biological systems"\textsuperscript{15}. Many studies have been conducted to prove that the color can affect people in different aspects, including health. There is a concept called “Chromo Therapy” or Color Therapy that means” the practice of using colored light and color in the environment to cure specific illness and in general to bring about beneficial health effect\textsuperscript{16}. The positive health effects according to color therapy are the ability to increase and decrease heart rate, blood pressure, respiratory rate, body temperature, and can be used to treat cancer, depression, and bacterial infections\textsuperscript{16}. Thus, it can be stated that color, when incorporated in architecture, can be used to initiate the healing process through a sequence of experiences and influence mood and enthusiasm. For example, lighter colors and warm blue colors have been found to give a warm and thrilling mood in the hospital \textsuperscript{16}. Additionally, green would be suitable for exercise rooms because it provides balance and harmony in the body and influences muscle health whereas purple should be favored in therapeutic rooms for its calming property (to the nervous system). However yellow should not be used in the bedroom because it negatively affects sleep\textsuperscript{17}.

\textsuperscript{14} Best, Janet, ed. \textit{Colour design: theories and applications}.
\textsuperscript{15} Reed. Ron. \textit{Color+ Design: Transforming Interior Space}.Page.22
\textsuperscript{16} Li, Xili. "How Architecture Can Promote a Sustainable and Therapeutic Experience for Patients in Psychiatric Hospitals in China."
\textsuperscript{17} Makki, Ayman. "Healing Architecture: Designing for The Mentally Ill".
The implementation of color in mental architecture may not be easy, due to individual differences in color preference. However, there are underlying universal color patterns that everyone responds to\(^\text{15}\). The following tables illustrates the general color’s impact on people.

<table>
<thead>
<tr>
<th>Colour/hue</th>
<th>Positive effects</th>
<th>Negative effects</th>
<th>Best usage</th>
<th>Consider avoiding</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Yellow</strong> (psychological primary, relates to the emotions) Popular names: cream, daffodil, sunflower, acid yellow, mustard, lemon</td>
<td>• Happiness, optimism, self-confidence, self-esteem</td>
<td>• Irrationality, anxiety, warning</td>
<td>• Hallways – which are usually dark, yellow creates a sense of light and welcoming</td>
<td>• Bedroom – over time, wake up irritable and annoyed</td>
</tr>
<tr>
<td></td>
<td>• Light blue is serene and mentally calming. Aids in reducing stress and relieving tension, helpful to insomnia sufferers</td>
<td>• Too much yellow can over-stimulate the nervous system</td>
<td>• Breakfast rooms – creating a sunny, happy way to start the day</td>
<td>• Babies are very sensitive to colour frequencies, so avoid using cream which also contains yellow</td>
</tr>
<tr>
<td></td>
<td>• Dark blue aids focus and concentration</td>
<td>• Depressed, withdrawn, cold, aloof</td>
<td>• Brightens a dark space.</td>
<td>• Spaces that already feel overheated or are south facing</td>
</tr>
<tr>
<td><strong>Blue</strong> (psychological primary, relates to the mind) Popular names: sky, duck egg, navy, turquoise, royal, ice blue, periwinkle, teal</td>
<td></td>
<td></td>
<td></td>
<td>• Kitchen and dining areas as blue can work as an appetite suppressant</td>
</tr>
<tr>
<td><strong>Red</strong> (psychological primary, relates to the physical) Popular names: fire engine, rust, maroon, pillar-box, burgundy, vermilion, watermelon</td>
<td>• Warth, energy, stimulation, excitement, strength, physical courage</td>
<td>• Aggressive, demanding, dominant, defiant, impatient</td>
<td>• Bedroom – masculine passion (lust)</td>
<td>• Spaces that already feel cold or are north facing</td>
</tr>
<tr>
<td></td>
<td>• Red makes objects appear nearer than it is, therefore attracts our attention first</td>
<td></td>
<td>• Dining room – stimulates lively conversation</td>
<td></td>
</tr>
</tbody>
</table>

*Table 1: The Table Shows Color and Its Influence (Table from Colour design: Theories and Applications Book).*
<table>
<thead>
<tr>
<th>Colour/hue</th>
<th>Positive effects</th>
<th>Negative effects</th>
<th>Best usage</th>
<th>Consider avoiding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown</td>
<td>• Warmth, nature, earthiness, safety, reliability, seriousness, support</td>
<td>• Lack of humour, heaviness, lack of sophistication</td>
<td>• Where stability or grounding is needed</td>
<td>• Nursery, infant rooms (use softer, paler end of the brown spectrum)</td>
</tr>
<tr>
<td>Popular names: tan, camel, chocolate, taupe, clay, umber</td>
<td>• Hygiene, sterility, clarity, purity, cleanliness, simplicity, sophistication, efficiency</td>
<td>• Isolation, sterility, coldness, barriers, unfriendliness, elitism</td>
<td>• Kitchen, bathroom – feeling of hygiene, cleanliness</td>
<td>• Avoid cold whites in spaces that already feel cold or are north facing</td>
</tr>
<tr>
<td>White</td>
<td>• Sophistication, glamour, respect, aspirational, security, emotional safety,</td>
<td>• Oppressive, cold, heavy, menacing, sinister, draining, intimidating</td>
<td>• Recommend only to be used by those where black is in their tonal colour family</td>
<td>• A room that already feels cold, small or with little light as it will make the space feel smaller and possibly claustrophobic</td>
</tr>
<tr>
<td>Popular names: ivory, oyster, cream, pure white</td>
<td>• Gravitas, efficiency, substance</td>
<td></td>
<td>• More supportive dark colours are dark brown, purple or blue</td>
<td>• Nurseries, infants and children’s rooms or bedrooms. Any areas where creativity is needed</td>
</tr>
<tr>
<td>Black</td>
<td>• Neither black nor white, it is psychologically neutral</td>
<td></td>
<td>• Works well in an accent</td>
<td></td>
</tr>
<tr>
<td>Grey</td>
<td>• Non-committal, lack of confidence, dampness, depression, hibernation, energy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>draining</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Fear of exposure, cloaking oneself, remaining hidden</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1.5.2 Daylight

Light and lighting have a significant role in the healing process. Various research has proven that natural light helps in recovery from particular diseases. As cited in Connellan et al. literature view of the effects of lighting on mental health recovery, there are three significant roles of light in the healing process. The first finding is that lighting helps in the accurate execution of visual assignments, reasonably without flaws. The second finding is that light enhances a good mood. In contrast, heat due to poor lighting negatively affects both mood and the performance of tasks. Finally, light was found to enhance peaceful sleep and rest. Moreover, the architectural design should be well lit to allow for penetration of bright light. According to patients exposed to higher sunlight intensity are likely to experience low-stress levels, pain, and reduced pain management costs. Mental health hospitals should adjust for light by incorporating light inlet inpatient wards with adjustable temperature. Moreover, the windows to the patient cubicles should be adjustable to allow morning sun rays and make a provision for artificial lighting that precipitate the performance of visual tasks. Since light has a wide application for the healing process, mental health centers should make it an integral part of their design.

In order to achieve the ideal daylighting needed in a room, it is important to understand the know the required lighting levels for the different room types. The following table illustrates the recommended illuminance (illuminance is the measure of the amount of light received on the surface) for each room.

---

19 Daylight Calculations and Measurements. Velux.com
<table>
<thead>
<tr>
<th>Room Function</th>
<th>Illuminance (Ix, lumen/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Areas with Dark Surroundings</td>
<td>20-50</td>
</tr>
<tr>
<td>Areas with Traffic and Corridors-Stairways, Escalator and Travelators-Lifts-Storage Spaces</td>
<td>100</td>
</tr>
<tr>
<td>Working Areas Where Visual Tasks Are Only Occasionally Performed</td>
<td>100-150</td>
</tr>
<tr>
<td>Coffee Break Room, Waiting Rooms</td>
<td>200</td>
</tr>
<tr>
<td>Easy Office Work</td>
<td>250</td>
</tr>
<tr>
<td>Classrooms</td>
<td>300</td>
</tr>
<tr>
<td>Normal Office Work, PC Work, Kitchen, Auditoriums</td>
<td>500</td>
</tr>
</tbody>
</table>

**Table 4:** The Table Shows the Recommended Illuminance Levels for Each Room Based on The Function of The Room (Table by The Engineering Toolbox website, edited by Author).

1.5.3 Green Roof

![Green Roof Detail](image)

**Figure 4:** The Sketch shows a Green Roof Detail (Sketch by Author).
An essential aspect of design that enhances healing is landscaping with a contemporary green roof. Green roofing is the partial or complete coverage of the roofs with vegetation or growing medium planted on a waterproof membrane. In the hospital set up, green roof technology may take the form of extensive green roofs that serve as habitat for plants and animals and roof gardens with inbuilt seats, and alleys. The seating near greenery such as the green roof enhances social activities. For example, patients will gather around the attractive beautiful views of nature which will aid on relieving their stress and help recover earlier than anticipated\(^{20}\).

Additionally, the garden should not be entirely exposed, it should offer refuge against strong wind and intense sunlight. Moreover, plant species should be varied to accommodate varied colors, shapes and smell that activate the five senses \(^{20}\). The garden incorporates specifications to activate self-recovery and also shifts patient attention to meaningful activities other than stressing over their mental conditions.

The imminent benefit of the extensive association with nature is reduced medical costs. Auxiliary benefit of the system includes decimated operational costs facilitated by the heat absorption property of the green roof. The environment also benefits from the design by providing a home for plants which through absorbing greenhouse gases reduce environmental pollution that reduce the effects of climate change.

The U.S. Environmental Protection Agency study of the environmental effects of green roofs and another study called *Air Pollution Removal and Control by Green Living Roof Systems*, agree that green roofing has a great deal in improving the air quality. Therefore, the two articles are in support of living architecture as a solution to the current air pollution challenges. Vegetation

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\(^{20}\) Wood, Lincoln C., et al. "Green hospital design: integrating quality function deployment and end-user demands."
can remove the air pollutants both directly and indirectly\textsuperscript{21}. The plants take in pollutants through their stomata and break down compounds such as polyaromatic hydrocarbons and therefore improving the air quality. According to The U.S. Environmental Protection Agency, through reducing the energy use and lowering of temperatures, the green roofs help in improving the quality of air through reducing the concentration of the pollutants in the air\textsuperscript{22}. The two articles agree on the process through which the green roofs Increase air quality, reduce pollution.

In this note, they agree that Greenhouse gases are the major cause of air quality degradation in different parts of the world. Explaining the CO\textsubscript{2} concentration in the air is a determinant of air quality, if the green coverage is less than 10\%, the concentration of the Carbon (IV) Oxide would be above 40\%, which is not good for the quality of air\textsuperscript{17}. Carbon is a component of the plants’ structure; it is sequestered by the plants through processes such as photosynthesis and therefore maintaining the oxygen balance\textsuperscript{17}. the Greenhouse gases such as hydrofluorocarbons (HFCs), nitrous oxide (N\textsubscript{2}O), carbon dioxide (CO\textsubscript{2}), sulfur hexafluoride (SF\textsubscript{6}), and methane (CH\textsubscript{4}) are the major contributors of air pollution\textsuperscript{18}. Through the natural process, the plants trap these gases and maintain the required concentration in the air\textsuperscript{18}. However, “…brining nature into, onto, and around building is not a luxury but is instead important for health, productivity, energy conservation, and crucially, aesthetics”\textsuperscript{23}. More specifically, designing hospitals so that patients have access to nature and other positive distractions will reduce their recovery time\textsuperscript{24}.

\textsuperscript{21} Dimitrijević, Dragana, Živković, Branković, Dobrnjac, and Stevanović. “Air Pollution Removal And Control By Green Living Roof Systems”.
\textsuperscript{22} U.S. Environmental Protection Agency. “Estimating the environmental effects of green roofs: A case study in Kansas City”.
\textsuperscript{23} Lechner, Norbert. Heating, cooling, lighting: Sustainable design methods for architects.
\textsuperscript{24} Adult: Hospital Recovery | Asla.Org
Finally, green roofs are being implemented not only due to their thermal insulation properties, the green roofs in the proposed project will maximize the natural green views in the hospitals. This firstly, will enhance the connection between patients and nature. Secondly, “it has been proved that horticulture have the ability to relieve stress and help the human brain to rest and recover from mental fatigue”17. These two benefits meet the aim of this specific project.

1.6 Problem Statement

The World Health Organization (WHO) recently estimated that one in four people about 25% of the world population suffers from mental illness both in the developed and developing worlds25. Specifically, it is claimed that about half of the Saudi population is suffering from mental illnesses 25. Mental health is an issue that affects everyday life. It affects people’s happiness, health, and attitudes. The negative attitude that prevents Saudi people from getting therapy is derived by main factors, such as Saudi traditions and beliefs, cultural norms, the way people raised which caused a stigma according to the lack of awareness. Another negative factor affected their position toward treat-seeking is the fear of the mental healthcare facilities as their conditions is inadequate. Based on these factors, this current paper is suggesting a psychiatric facility design specialized for adolescents since Saudi Arabia lacks this type of facility and because of the importance of teenager’s mental health well-being. The project design contains an enormous space for conferences and lectures on raising people’s awareness of mental health. This is a major step for improving the current situation. The design will also include an institute that contains outpatient clinics, a few inpatient care units, and spacious outdoor spaces that will help to quick the therapy. For achieving this goal, the overall concept of the design is utilizing healing architecture aspects

25 Almutairi, “Mental illness in Saudi Arabia: an overview.” P.47
that are activated through the careful choice of colors, lighting including both artificial and natural, and sustainable elements like, green roofs.

1.7 Reasons for Choosing Makkah City

The highest percentage of psychiatric patients would be the first reason for picking a city, especially, if this city does not include a psychiatric facility. Acquiring this type of data is considered private in Saudi Arabia according to a member working in the Saudi Ministry of Health. This means that the author is not authorized to perusal this information. Consequently, the factor for picking the location of the project is the number of population as well as the lack of psychiatry healthcare in the city. Based on the World Population Review in 2020, Makkah city is the third-highest percentage of population with 1,323,624 people, after the capital city Riyadh with over than 4 million populations, and Jeddah with 2,867,44626. In addition, according to the ministry of health in Saudi Arabia, Makkah does not include a specialized mental health hospital. Dr. Jameela Murshid, it contains only three locations of outpatient clinics for psychiatry inside general hospitals, Al Noor Specialist Hospital, Heraa General Hospital, and King Abdulaziz Hospital27. King Abdulaziz Hospital includes also a limited bed capacity for adults and elderly mentally ill patients21. However, Makkah has a special place to the Saudi people as it is the core center for Muslims and the holiest city of Islam28. Thus, Makkah is eligible to be the appropriate city for the proposed mental health institute for adolescents.

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26 World Population Review.
27 Phone Interview with Dr. Murshid. January 12, 2020.
28 Nderi, “What Is the Importance of Mecca.”
2. **Precedent Studies**

2.1 Nuuk psychiatric Clinic

![Figure 5. Pictures Nuuk psychiatric Clinic (Picture from White Arkitekter Website).](image)

2.1.1 General Information:

**Location:** Nuuk, Greenland²⁹.

**Statue:** Ongoing²⁵.

**Architects:** White Arkitekter²⁵.

**Size:** 3300.0089 Square meter³⁰.

2.1.2 Project Description:

In order to provide a space that impacts the mood and the well-being of mentally ill patients, the architects tend to create a healing design environment for its visitors. Nuuk psychiatric Clinic highlights seven pillars for healing architecture, which are: promote dignity, encourage normalcy, create a free and open atmosphere, promote social interaction and promote patients’

²⁹ White Arkitekter. “A New Type of Psychiatric Clinic in Nuuk.”

³⁰ ArchDaily. “White Arkitekter’s Design for Nuuk’s Psychiatric…”
independence, offer views to the outside and free access to the outdoor environment, and balance the demands for safe and healing health-care environment.\textsuperscript{25}

2.1.3 Project Site:

What distinguishes the site of the project is that it is beautifully situated facing the bay which offers spectacular views of the islands in the fiord.\textsuperscript{25} Because of the rich of nature location, the White Arkitekter design team chose to emphasize the beauty of Greenland’s natural landscape and create a tranquil atmosphere with a strong connection to the hospital’s surroundings.

To take full advantage of the extraordinary site and to enhance the healing aspect of the project, the building provides large windows that assert the beauty and clarity of the landscape.
Besides accentuating the breathtaking views of the landscape, the large windows also allow an abundance of natural light in most areas.

### 2.1.4 The Exterior:

![Figure 7. Picture Showing the Exterior of Nuuk psychiatric Clinic (Picture from ArchDaily Website).](image)

The exterior, which is the outer shell of the structure is mainly from wood. According to the architects, wood is a natural material that was proven to reduce stress by its effect on human psyche. The minimal usage of materials in the exterior strikes a perfect balance between calmness and trustworthy atmosphere. In addition, “the environmentally friendly wood construction references a Nordic materiality while providing a pleasant indoor climate and tactile qualities.” This benefit justify use of the wood as an exterior shell of the building.
2.1.5 The Interior Spaces and Floor Plans:

*Figure 8.* Picture Showing the Interior of Nuuk psychiatric Clinic (Picture from White Arkitekter Website).

*Figure 9.* Picture Showing the Feature of Including A Large Window that Maximize the visual Connection Between the Inside and the Outside (Picture from ArchDaily Website)
Figure 10. First Floor Plan (Picture from ArchDaily Website)

Figure 11. Second Floor Plan (Picture from ArchDaily Website)
The interior design of the facility is predominantly minimal. All spaces were designed with a bountiful array of natural light to enter the space, selection of simple and comfortable furniture, and views of extraordinary outdoor. These views outlooks enhance the intimacy feeling in patients.

As it can be seen from the floor plans, most of the spaces has a strong connection to nature. The building’s design interacts with the landscape and generates a topography of various terraces, platforms, gaps, and other outdoor/indoor spaces. To maximize the ability to link patients and nature, the entire ground floor is open to the landscape. The courtyard and landscape create a protected, flexible outdoor space that invites different activities, such as conversations between visitors.

3. **Background of Makkah**

3.1 **Geographical Location**

![Map of Makkah](image)

*Figure 12. The Geographical Location of Makkah (Picture by Ashraf Osman).*

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Makkah is a city in the Kingdom of Saudi Arabia, and it is the capital of the Makkah Region. Makkah is located at the intersection of the two degrees of latitude and longitude 21.422510, 39.826168. Makkah city is located in the west side of the country. The total area of Makkah is approximately 550 km², of which 88 km² are inhabited. The height of Mecca on the sea level is about 330 meters.

3.2 Geology and Topography of Makkah

The location of the city of Makkah is one of the most difficult geological formations, as most of its rocks are very hard granite. Makkah located within different terrain, with hills and
mountains scattered throughout the city. The height area of the city is between 250 meters and 350 meters above sea level from west to east.

The topography of Makkah can be divided into three sections that extend from north to south:

1 - **The Western Section**: its height ranges between 200 to 250 meters, and some mountain peaks rise to 400 meters above sea level.

2 - **The Middle Section**: It ranges above 300 meters and a number of historical mountains stand out, including Mount Khendama, which reaches a height of 420 meters, Mount Abi Qubais, which reaches a height of 372 meters, and Mount Thor, whose summit rises to 759 meters above the sea level, and Mount Qaiqan Whose height rises to 427 meters.

3 - **The Eastern Section**: It is characterized by its height that exceeds 400 meters above the sea level and has mountain peaks more than 800 meters high, such as Al-Tariqi Mountain located in the east of Mina Hair, which reaches a height of 900 meters, which is the highest peak in the mountains of Makkah and the holy sites.

3.3 **Climate**

In General, the summers are long and winters are short. The summer is sweltering, arid, and partly cloudy while winters are comfortable, dry, and mostly clear. Over the course of the year, the temperature typically varies from 16°C to 42°C and is rarely below 12°C or above 44°C.

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32 N.D, "Weather Spark.com"
3.3.1 Temperature

The hot season lasts for 4.7 months, from May 12 to October 2, with an average daily high temperature above 39°C. The hottest day of the year is June 18, with an average high of 42°C and low of 27°C.

The cool season lasts for 2.9 months, from December 1 to February 25, with an average daily high temperature below 31°C. The coldest day of the year is January 22, with an average low of 16°C and high of 29°C.

3.3.2 Clouds

The percentage of time spent in each cloud cover band, categorized by the percentage of the sky covered by clouds (picture from Weather Spark).
In Makkah, the average percentage of the sky covered by clouds experiences significant seasonal variation over the course of the year.

The clearer part of the year in Mecca begins around October 17 and lasts for 8.3 months, ending around June 27. On November 12, the clearest day of the year, the sky is clear, mostly clear, or partly cloudy 85% of the time and overcast or mostly cloudy 15% of the time.

The cloudier part of the year begins around June 27 and lasts for 3.7 months, ending around October 17. On September 27, the cloudiest day of the year, the sky is overcast or mostly cloudy 45% of the time and clear, mostly clear, or partly cloudy 55% of the time.

### 3.3.3 Rainfall

![Figure 17. The Average Rainfall (Solid Line) Accumulated Over The Course Of A Sliding 31-Day Period Centered On The Day In Question, With 25th To 75th And 10th To 90th Percentile Bands. The Thin Dotted Line Is The Corresponding Average Liquid-Equivalent Snowfall (Picture from Weather Spark).](image)

Generally, Makkah does not experience significant seasonal variation in the frequency of wet days (i.e., those with greater than 0.04 inches of liquid or liquid-equivalent precipitation). The frequency ranges from 0% to 3%, with an average value of 2%. The most common form of precipitation throughout the year is rain alone, with a peak probability of 3% on May 5.
The sliding 31-day quantity of rainfall in Mecca does not vary significantly over the course of the year, staying within 2 millimeters of 3 millimeters throughout.

3.3.4 Sun

![Graph showing the number of hours during which the sun is visible (Black Line). From Bottom (Most Yellow) To Top (Most Gray), The Color Bands Indicate: Full Daylight, Twilight (Civil, Nautical, And Astronomical), And Full Night. (Picture from Weather Spark).](image)

The length of the day in Makkah varies over the course of the year. In 2020, the shortest day is December 21, with 10 hours, 50 minutes of daylight; the longest day is June 21, with 13 hours, 26 minutes of daylight.

The earliest sunrise is at 5:37 AM on June 7, and the latest sunrise is 1 hour, 23 minutes later at 7:01 AM on January 17. The earliest sunset is at 5:37 PM on November 27, and the latest sunset is 1 hour, 30 minutes later at 7:07 PM on July 4.
3.3.5 Humidity

![Humidity Graph](Picture from Weather Spark)

**Figure 19. The Percentage Of Time Spent At Various Humidity Comfort Levels, Categorized By Dew Point**

The humidity comfort level is based on the dew point since the dew point determines whether perspiration will evaporate from the skin, thereby cooling the body. The higher dew points mean it is more humid while the lower dew points feel drier. Contrasting temperature, which typically varies significantly between night and day, dew point tends to change more slowly, so while the temperature may drop at night, a muggy day is typically followed by a muggy night. Makkah city experiences some seasonal variation in the perceived humidity.

The muggier period of the year lasts for 4.7 months, from July 15 to December 6, during which time the comfort level is muggy, oppressive, or miserable at least 9% of the time. The muggiest day of the year is August 29, with muggy conditions 29% of the time. The least muggy day of the year is February 18, with muggy conditions 2% of the time.
3.3.6 Wind

Figure 20. The average of mean hourly wind speeds (dark gray line), with 25th to 75th and 10th to 90th percentile bands (Picture from Weather Spark).

The wind analysis in this paper will be based on the wide-area hourly average wind vector (speed and direction) at 10 meters above the ground. The wind experienced at any given location is highly dependent on local topography and other factors, and instantaneous wind speed and direction vary more widely than hourly averages.

The average hourly wind speed in Makkah experiences mild seasonal variation over the course of the year. The windier part of the year lasts for 3.4 months, from May 17 to August 31, with average wind speeds of more than 3.8 meters per second. The windiest day of the year is July 11, with an average hourly wind speed of 4.3 meters per second. On the other hand, the calmer
time of year lasts for 8.6 months, from August 31 to May 17. The calmest day of the year is October 5, with an average hourly wind speed of 3.4 meters per second.

![Figure 21. The percentage of hours in which the mean wind direction is from each of the four cardinal wind directions, excluding hours in which the mean wind speed is less than 0.4 m/s. The lightly tinted areas at the boundaries are the percentage of hours spent in the implied intermediate directions (northeast, southeast, southwest, and northwest). (Picture from Weather Spark).](image)

The predominant average hourly wind direction in Makkah varies throughout the year. The wind is most often from the west for 4.3 months, from January 16 to May 24 and for 1.6 weeks, from September 13 to September 24, with a peak percentage of 36% on May 15. The wind is most often from the north for 3.6 months, from May 24 to September 13, with a peak percentage of 49% on July 11. The wind is most often from the east for 3.7 months, from September 24 to January 16, with a peak percentage of 29% on January 1.

4. Programming

Designing a mental health facility is critical for all locations, including Makkah city. “The design of mental health facilities affect how services are provided and the efficiency with which care is delivered”\(^3\). In order to be aware of what should be included in the facility or

\(^3\) Department of Veterans Affairs. "Mental health facilities design guide."
what should not, it is important to consider the strategies and principals for building recovery-oriented environments for mental health settings. The following are guidelines that help with framing and selecting elements that will be at the mental health hospital and the outpatient clinic design.

4.1 Design Foundations for Mental Health Buildings (Inpatient)34

Healthcare buildings, in general, must achieve the highest levels of comfort in meeting the needs of the users. In the case of mental health care buildings, the building's first priority is to enhance comfort, security, and safety. The following is a guideline of design foundations for mental health buildings according to an assistant professor at the Department of Architectural Design, at one of the Arabian universities. This important to address in the paper as it highlights the design aspect in the same culture where the proposed project is located.

Design Elements for Mental Health Hospitals and Its Requirements:

1- Entrance:

The entrance of the building shall:

i. Be obvious for all visitors.

ii. Meets accessibility requirements.

iii. Protect from weather conditions, such as rain, wind, heat…etc.

2- Reception Space:

The reception space shall:

i. Be obvious for people entering the building.

ii. Allow daylighting.

iii. Be designed in a simple and minimal way to prevent any negative impacts or feeling.

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iv. Include a space for a reception desk where people check-in or sign.

v. Include an Information desk.

vi. Include a room for Initial interview with inpatients.

vii. Include bathrooms.

3- Waiting Area:

The waiting area shall:

i. Be designed different from regular waiting spaces in hospitals.

ii. Be divided into several spaces with different styles and furniture which allow families to set in small groups.

iii. Include restrooms for both genders.

iv. Meets accessibility requirements.

4- Circulation:

Corridors shall:

i. Not be curved or too long.

ii. Not be branched in many ways.

iii. Be designed in appropriate width at least allowing two persons to walk in different directions.

iv. Avoid dead end.

5- Nursing Units:

The Nursing units shall:

i. Be distinguished from public spaces, such as living room and dining room.

ii. Include a maximum of 30 patients in total per one unit.
iii. Include a maximum of 20 patients in total per one unit in critical cases to facilitate immediate care in case of emergency.

iv. Include a separate entrance for each unit and that any connection to any other unit or any facility in the building should be located in the corridor of this entrance. This entrance has to be visible for hospital’s staff.

v. Include bathrooms for patients.

vi. Storage for some equipment or movable chairs or extra beds.

vii. Not feel enclosed. The unit has to connect with outdoor nature with allowing daylight.

viii. Provide privacy for each patient.

ix. Enhance safety and intimacy feelings.

The nursing units should be divided into three main categories:

i. **Patients needing greater care from the nursing staff**

   Most of the time, those patients stay in bed and require continuous care. For this category, patients need individual rooms.

ii. **Patients needing moderate care from the nursing staff**

   This group of patients are not allowed to wander outside the unit unless they are under the nurse observation. They are allowed to interact during day hours under observation. For this category, patients’ benefit from multiple occupant rooms. At the same time, they have to be provided with some privacy.

iii. **Patients needing less care from the nursing staff**

   Most of this category patients are allowed to wander freely in the hospital facilities. During day hours, they can exist outside the unit. This category relies on little nursing care.
Important design considerations for Nursing Units:

i. The design of these units should feel homey.

ii. For each unit, 10% of the space should be ADA.

iii. The individual rooms should provide safety and prevent the patient from escaping, hiding, or harm himself or others. The walls must be padded to avoid hitting his/her head against the wall.

iv. Privacy must be provided in all rooms, including both acoustical and visual privacy.

6- Living Room:

The living room shall:

i. Feel homey or domestic.

ii. Enhance intimacy feelings.

iii. Include book shelves.

iv. Include entertainments.

v. Include a television.

7- Dining Room:

The dining room shall:

i. Be enough for all patient staying at the hospital.

ii. Be flexible to include staff.

iii. Be flexible to include family members.

iv. Include a space for kitchenette for light meals prepared by patients.

The dining room would benefit from being connected to living space.

8- Quite Room:

The quite room shall be:
i. Isolated from noise and provide calmness for patients who needs it during the day.

ii. Be furnished with comfortable furniture.

iii. Include book and magazines shelves.

iv. Provide space for quiet activities.

9- Patients Meeting Rooms:

The main function of this room is to provide groups therapy sessions. It shall include 10-12 people to sit together in a circle. This room may be used at other times as a music room or a waiting room.

10- Meeting Rooms:

This room primarily for meetings between patients and their doctors individually. It shall be sound proof space.

11- Administrative Offices:

It is the administrative area of the nursing unit. This area is responsible for managing the nursing units and following up on the various tasks and activities that take place in it. It shall include a space for accomplishing some tasks, such as recording information, writing medical reports, etc.

12- Nursing Station:

This place is where the nurses sits and observe what’s happening in the nursing units. It shall be placed where it can see all the unit’s entrances.

13- Doctors’ Offices:

The doctors' offices shall:
i. Include appropriate space for different tasks, such as making treatment plans, determining therapeutic programs…etc.

ii. Provide privacy while allowing appropriate vision to observe patients.

iii. Include bathrooms.

iv. Meets accessibility requirements.

14- Storage for Clean Linens/Bedding + Laundry Space:

This space shall:

i. Include a covered shelf to keep all clean linen, bedding, or towels.

ii. Include a space for collecting dirty linens.

iii. Include a space for washing machine and dryer.

15- Laundry Room:

This room might be available for patients to do their own laundry.

16- Therapy/ Treatment Services:
i. Electric shock therapy

![Figure 2: Floor Plan of Electric shock therapy room (Picture by Jerry Lewis in his paper Staff management and physical layout for electroconvulsive therapy).]

ii. Radiology/X-rays room

The existence of the radiology room is not necessary. It is only preferred to have as some patients may experience fractures and trauma due to aggressive behaviors.

### 4.2 Design Guideline for Outpatient Mental Health Clinics\(^{35}\)

According to the lack of data on design guidelines for outpatient mental health clinics in Saudi Arabia, the design guideline in this thesis will be based on the USA standards based on The Veterans Health Administration (VHA) which is the component of the United States Department of Veterans Affairs (VA) led by the Under Secretary of Veterans Affairs for Health that operates one of the world’s most comprehensive mental health care delivery systems.

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\(^{35}\) Department of Veterans Affairs. "Mental Health Outpatient Services Design Guide."
The main spaces in the outpatient facility are:

1- Lobby/ Reception Space:

![Image: Sketch Showing the Appropriate Reception Desk/ Check-In Desk For An Outpatient Mental Health Clinic (Picture from Mental Health Outpatient Services Design Guide).]

**Figure 23:** A Sketch Showing the Appropriate Reception Desk/ Check-In Desk For An Outpatient Mental Health Clinic (Picture from Mental Health Outpatient Services Design Guide).

i. The reception area shall be located adjacent to the waiting area, for greeting and observation of patients, family members, and other visitors. Entrances to patient corridors in the treatment zone of the clinic shall be easily observable from the reception desk.

ii. Check-in/interview areas should provide both visual access and auditory privacy.

iii. Lobby areas shall not have fall opportunities such as open multi-story spaces.

2- Waiting Space:

Waiting spaces shall accommodate the full range of users and allow for different preferences in seating arrangement:

i. Users include patients as well as spouses and children.

ii. Effectively differentiating sub-spaces within the larger waiting area can help to make the space comfortable for different users.

iii. Seating options should accommodate private, small clusters and larger groups for patient choice.
3- Clinical Offices or Consultation Rooms:

Clinical Office or Consultation Room is the basic building block of outpatient mental health facilities. The design consideration for this space are:

i. Provider workstation situated in close proximity to the door so the provider can have first egress unimpeded by the patient.

ii. Seating space for the patient.

iii. Flexible furniture arrangement.

4- The Family Consultation/Therapy Room:

The Family Consultation or Therapy Room shall:

i. Be accommodate up to six occupants, including the counselor. This consultation room is a scheduled space for groups too large for a standard-size consultation room.

ii. Consider including a small area for children’s play.

5- Treatment Spaces Including Group Psychotherapy:

The Group Therapy Room shall:

i. Be sized to accommodate up to 12 patients and is used for patient activities and counseling.

ii. Allow freedom of movement during sessions is an integral part of the treatment.

iii. These rooms shall serve as education space for patients and staff and accommodate staff conferences, treatment team meetings, and large family therapy sessions.

The design considerations include:

i. Non-institutional, relaxed and comfortable environment.
ii. Flexible furniture arrangements may include an open circle of seating or seating around a conference table. Flexibility is supported by:

- Stackable chairs
- Foldable tables
- Access to storage room

iii. Spacing between chairs.

iv. Provider workstation closest to door of the room. The office furniture should be arranged so that the patient is not in a position to block access to the exit.

v. Co-location of group therapy rooms such that movable partitions, if provided between rooms, may be opened to create spaces for larger groups

6- A Space for Care Coordination with Other Levels of Mental Health Care (Residential, And Inpatient) as Needed.

7- Staff Space.

8- Bathrooms.

4.3 Cultural Design Aspects

For religious and cultural reasons, the males and females sections should be separated in the hospital. Considering this aspect, the facility shall specify special rooms or spaces in men or women areas that allow other gender to visit. To illustrate, in the women department, there should be a specific room that allow the female patient to meet her male family members such as her father, husband, brother…etc. and vice versa.
4.4 Selecting Elements of The Proposed Project

The previous design guidelines for both inpatient and outpatient departments as well as the healing aspects of the design asserts that the architectural design should also consider social and environmental factors. These areas should also be designed to reduce anxiety in patients. The elements encompass visual access to the outside environment or an image of nature—spacious washrooms, seats in the bedrooms, minimal noise and other features that enhance beauty. Caregiver spaces should be organized to prevent any brakes in the workflow. Additionally, nurses’ rooms should be close to the patient ward or have visual access to attend to any emergency. Staff station should also incorporate features that enhance stress reduction by having a quiet room for mediation. Additionally, the facility should mimic a home allowing the performance of chores such as washing, reduced people in unit rooms but at the same time, permit group activities such as recreational facilities or quiet activities such as chess. Moreover, the system allocates private rooms to permit intimacy and other family activities. When the facility factors the whole being rather than the recovery from the diseases, it helped the patients to be reintegrated into the society after recovery. Therefore, facilities should not only focus on the disorders but also consider life after the therapy stay of the patient in the model.

Finally, the design should incorporate the patient’s self-manageability. Facilities that encourage independence include operable windows and other sporting infrastructure to make the patient feel responsible for their life by performing tasks on their own volition. Additionally, the bathroom positioned in the view from the patient bedroom will encourage old-mentally challenged patients to use the bathroom. Additionally, the floor should be safe, for instance, safety-type sheet to reduce the cases of slip and the need to monitor the patient for safety throughout. Moreover, instead of using railings or grab bars for support, the facility should use tamper-resistant and
irremovable materials to reduce the possibility of removal and use as weapons amongst patients. When patients feel tree to manage their activities, they portray a sense of importance which is a very significant step towards recovery.

In sum, healing architecture is a multifaceted design that balances the conventional aesthetic value of a building but also incorporates patient-specific needs. Firstly, the facility should be serenely designed to minimize environmental stressors such as noise-limited privacy and bad odor. Secondly, the facility should be designed to link human patients to the surroundings and other natural elements such as an extensive green roof. These features create an ambiance of comfort and enhance inner peace. Thirdly, the design should also promote patient autonomy in the performance of functions. Although the patients are mentally ill, this does not negate the need to accord the requisite space to live the ideal life of a human being capable of making choices. Fourthly, the architecture should allow for patient support by providing adequate chairs in the patient’s rooms. Finally, the environment should provide constructive interference in the life of patients through amenities such as light that favors healthcare settings. Therefore, any mental health facility that aims to better the lives of its patients should incorporate both physical architectural needs subject to the patients needed for quick recovery.

The selected elements on proposed project are:

**Outpatient Building:**

**First Floor:**

1- Information Desks.
2- Waiting Areas.
3- Auditorium Garden.
4- Café.

5- Conference Room with 331 seats.

6- Bathrooms (Men + Women).

7- Janitor Closet.

8- Storages.

Second Floor:

1- Reception Desk (Check-In) for Men + Women.

2- Waiting Rooms (Men Women) + Pray Spaces.

3- 6 Individual Consultation’s clinics + 1 ADA + 2 family For Men.

4- 6 Individual Consultation’s clinics + 1 ADA + 2 family For Women.

5- 3 Different Group Therapy Rooms for Men.

6- 3 Different Group Therapy Rooms for Women.

7- Pharmacy.

8- Doctors Access to Inpatient Building.

9- Outpatient Clinic’s Manager Office (Men + Women).

10- Nursing Break Rooms (Men + Women).

11- Outdoor Break Space for Staff.

12- Vending Machine Area.

13- Bathrooms (Men + Women).

14- Janitor Closet.

15- Storages.

Third Floor:
1- Administrative Suite (Meeting Room + IT Department+ Finance Department+ HR Department+ Quality Department+ Maintenance Department).

2- Information Desk.

3- 4 Examination Clinics (For Moving Patient from Outpatient to Inpatient).

4- 12 Visit Rooms Is Different Sizes (For Families Visits to Patients).

5- 4 Classrooms For 24 Students (Training).

6- 2 Lab rooms for Training.

7- Patients and Doctors Access to Inpatient Building.

8- Bathrooms (Men+ Women).

9- Janitor Closet.

10- Storages.

**Inpatient Building:**

**First Floor:**

1- Multi-purpose room (living room Dining Room+ Kitchenette).

2- 5 Reading Rooms.

3- Sunroom.

4- 4 Group Therapy Rooms.

5- Storages.

6- Auditorium Garden.

7- Bathrooms.

**Second Floor:**

1- Nursing Station + Nursing Work rooms.

2- Residents for Patients who Need Great Care (55 Single Bedrooms+ Bathrooms).
3- 11 Patient & Doctor Meeting Room.

4- Storage.

5- Bathrooms.

6- Janitor’s Closet.

7- Laundry Room.

8- Clean Room.

Third Floor:

1- Nursing Station + Nursing Work rooms.

2- Residents for Patients who Need Moderate Care (36 Shared Bedrooms + Bathrooms).

3- Residents for Patients who Need Less Care (Shared Bedrooms + Bathrooms).

4- 11 Patient & Doctor Meeting Room.

5- Storage.

6- Bathrooms.

7- Janitor’s Closet.

8- Laundry Room.

9- Clean Room.
5. Proposed Project

5.1 Location

![Top View for the Location of the site illustrates how close it is from the Holly Mosque](Picture from Google Maps, Edited by Author)

The site of the proposed mental health institute is carefully chosen. The site was chosen because:

1- It is in the middle of the city in a good neighborhood unlike other mental health hospitals where they locate hidden in the suburbs.

2- It is located in the middle between to major hospitals in Makkah city, (Maternity and Children Hospital) and (King Abdullah Medical City Specialist Hospital). This important because:

i. It will assert the main focus of the project that mental health is part of the overall human well-being, and that mental health is as important as physical health.

ii. King Abdullah Medical City Specialist Hospital has seven departments which means it has many patients coming for checking appointments and follow-ups. Also having inpatient sections means there will be many visitors coming over. Those two points will increase the
number of people who will see the proposed mental health hospital which likely encourages them to be attracted to receive mental treatment.

iii. Based on the Statics Department at Maternity and Children Hospital\(^{36}\), the total number of patients (only) yearly is 29,2129 people. The number of giving births is 10,0070 per year, which means there are many families coming to the hospital to visit the new born babies. The point of these numbers is to prove that this specific site stands out for most of the city population as a location for positive heath care.

\[\text{Figure 25: Top View for the Site Location and its Surroundings (Picture from Google Maps, Edited by Author).}\]

\(^{36}\) Statics Department at Maternity and Children Hospital. 2019. “Statistical Indicators For The Health Services Activities …”
5.2 Site Analysis

5.2.1 Sun Path and Wind Direction

![Diagram showing wind directions and views in summer and winter]

**Figure 26:** A Sketch Showing the Analysis Of the Site Based On Sun Path, Views, And Wind direction (Sketch by Author).

It is important in this project to be aware of the wind direction as it helps in providing natural ventilation in the auditorium gardens. Since the wind in this city known for how hot and dry it is, the wind blowing on the water fountains located in the center of the garden will aid in cooling the area, so it becomes tolerable and pleasurable.
5.2.2 Site Boundary

*Figure 27:* Picture from A Closer View Showing Site Boundaries (Picture from Google Maps, Edited by Author)

5.2.3 Accessibility to Site

*Figure 28:* Top View of Property Showing Main Roads Lead to Site (Picture from Google Maps Edited by Author)
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4- Main Street View

Figure 31. Picture of The Main Street View - West Side of The Site (Picture taken by Bashaer Bin Seddeq).

5.2.5 Site Context and Travel Distance

The following context is important to the author to be aware of since it will create an idea of the existing surrounding. The list only includes buildings within the 0.80 km (half mile radius) as it is considered the most comfortable walking distance. The list mainly includes the two healthcare facilities, and the worship places as it is very important for the population, and the near hotels in case if the long-stay patients were not from Makkah city.

Healthcare Facilities:

Maternity and Children Hospital

(Hospital)

1 minute by car.

6 minutes by walk.

King Abdullah Medical City Specialist Hospital

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(Specialist Hospital)

1 minute by car.

12 minutes by walk.

Mosques (Worship place):

Maternity Hospital and Children Mosque

0 minute by car.

3 minutes by walk.

Aisha Al Rajhi Mosque

5 minutes by car.

12 minutes by walk.

Hotels and Furnished Apartments:

Four Points by Sheraton

(Hotel)

13 minutes by car.

6 minutes by walk.

Tilal Al Naseem Complex

(Hotel)

15 minutes by car.

6 minutes by walk.

Abyat Al Naseem Hotel

(Hotel)
6 minutes by car.

7 minutes by walk.

**Al Eairy Furnished Apartments Makkah 6**

(Furnished Apartments)

7 minutes by car.

12 minutes by walk.

**Al Eairy Apartments - Makkah 3**

(Furnished Apartments)

7 minutes by car.

12 minutes by walk.

**Al Eairy Furnished Apartments Makkah 8**

(Furnished Apartments)

7 minutes by car.

12 minutes by walk.

**Park Inn by Radisson, Makkah Al Naseem**

(Hotel)

6 minutes by car.

15 minutes by walk.

**Copthorne Makkah Al Naseem Hotel**
(Hotel)

7 minutes by car.

15 minutes by walk.

Al Eairy Furnished Apartments Makkah 6

(Furnished Apartments)

7 minutes by car.

15 minutes by walk.

Parks:

King Abdullah Garden

6 minutes by car.

10 minutes by walk.

Hussainiya Park

7 minutes by car.

17 minutes by walk.
5.3 Architectural Drawings

5.3.1 Sketches (Design Process)

These sketches of the design process show the developments in the forms of the building. These forms proved creating a welcoming structure that takes advantage of daylight and maximize views to respond to healing Architecture aspects.
5.3.2 Master Plan

As mentioned earlier in the paper, according to some cultural and religious aspects, the building needed to separate the men and women departments in the inpatient sections. The women inpatient department is located in the south side of the property in order to place it near the Maternity and Children Hospital. This way, many women can easily see it, and be encouraged to see a psychiatrist if needed.
5.3.3 Site Plan

Figure 34. The Site Plan of the Mental Health Institute for Adolescent (Designed by Author).

The main access from street to the building is through the entrance number 1. After that, the cars can either go to parking lots, or drop off people in the covered drop off area in number 3. The parking lots placed in the sides of the building to create an attracting façade of the institute. Another option for dropping off people by rushed drivers, is the drop off area in the main street which is...
labeled as number 2. Finally, the building entrance in the back, which is number 5, is mainly for staff as it is near to their workspaces, and also it is where the loading docks are located. This verity of accessing the building will make the street circulation organized, and easy.

5.3.4 Floor Plans

1- Overall Building First Floor Plan
2- Overall Building Second Floor Plan

Figure 36. Overall Building Second Floor Plan (Designed by Author).
3- Overall Building Third Floor Plan

Figure 37. Overall Building Third Floor Plan (Designed by Author).
Regarding to the form of the building, this specific structure is proven to be the best shape in a hot and dry climate. Also, because of the focus on providing calming and pleasant nature views and daylight, this shape is selected to provide better access to green views and allows making a plentiful use of natural light since it includes a large atrium garden. The atrium gardens will help maximize daylighting and inviting the sunlight to each floor.

This form of the building contains green roofs surrounding the side that does not overview the atrium to provide additional natural views that aids on the recovery and rehabilitation of patients, and the well-being of staff. An essential aspect of design that enhances healing and social sustainability is landscaping with a green roof. The green roofs will activate self-recovery and shifts patient mind to the beautiful views other than stressing over their mental conditions.

Finally, the form of the inpatient building is mirrored on the other side of the overall building because every space in the female wing is similarly provided in the male’s wing. This allows for equal access to services and yet provides for the cultural requirement of separation of men and women in hospital settings.
This first floor of the outpatient building includes all the main entrances to the institute. Through this floor people can enter and leave the building. From the front entrance, the visitors will come into the building to an entrance space. The entrance space is designed essentially to be welcoming and pleasing, to allay the unwelcoming entrances of other hospitals in the area. It has a bountiful sunlight which helps to keep people happy and optimistic. After the entrance, there will be the core public spaces of the entire institute, thus, providing with many different seating options surrounding the information desks.
Located in this floor as well, is a spacious conference room with a capacity of 331 seats. As stated before, lack of knowledge and awareness on the importance of mental health prevented people in the Kingdom of Saudi Arabia from seeing a psychiatrist. In this hall, there will be hosting several sessions that opens for public about raising the awareness on the importance of mental health. The room includes storages for seats and tables. The room has some glass walls to allow natural light entering through the auditorium gardens to enter the space. However, to enhance people’s attendance to these lectures, this floor includes a café for offering good break times. During breaks, people may also wait in the centered garden to catch some rays or enjoying the outdoor space.

The entire public space includes 4 staircases and emergency exits. In addition, it contains 4 elevators on the four sides of the building, and one in the center. On each sides of this story, there are the public bathrooms for both males and females as well as the janitor storages. Finally, for the hospital’s supplies, the first floor has 2 big storage areas.
The second floor of the outpatient facility is mainly for individual psychiatric visits. In this section the separation of gender is required, but not completely. Each gender is provided with their own waiting rooms, check-in, consultation rooms with their same gender doctors, and group therapy rooms. However, there are also waiting areas for families.

The waiting rooms is set in different layouts as required in the design guideline. There is the big waiting room with numbers of chairs and a room for prayer, while there are also some waiting rooms for families who preferred to seat together. Next to the waiting rooms, the manager’s offices are located so that patients can see them in case if they have a complaint or questions. The clinics staff break room is placed on the same side, and all of these rooms has glass walls where it is look into the entrance of the hospital in the floor below. In addition, another staff break space is located next to a balcony in the garden. This room will require a swipe access from staff because it is a dangerous place for some of the patients.
Continuing with the distribution of the second floor, this floor includes all the consultation clinics as individual clinics, ADA compliant clinics, and family consultation clinics. In the same area, there are the group therapy rooms for the patients, next to the pharmacy. Based on the fact that doctor’s spending most of their time inside their clinics, this floor includes the access by doctors to the inpatient department. This access has a room for a security staff to check on people entering the inpatient side.

The other access to the second building is only for green roof maintenance that located in the inpatient department. Only in case of emergency, patients can use these accesses to exist their department building.

### 6- Outpatient’s Clinic Building (Public Building) Third Floor Plan

![Figure 40. Outpatient’s Clinic Building (Public Building) Third Floor Plan (Designed by Author).](image)

The third floor is where private practices occurs in the hospital. For staff, this floor includes the administrative suite. In this suite there are offices of HR Department, Quality Department,
Finical Department, Maintenance Department, and staff meeting room. On the other side of the floor, there are several classrooms and lab rooms for training nurses and other workers.

For patients, in this story the examination clinics are located for making the decisions of transforming patient between outpatient and inpatient units. Also, the family visiting rooms are also located here as the access of the patient from/to the other building is placed in this floor. This provides all the patients and their families can acquire their needed privacy of moving freely in this floor without being seen from the other patients coming for the consultation clinics.

For families or trainers who have questions, they can directly go the reception desks provided in this area.

7- Inpatient’s Clinic Building (Private Building) First Floor Plan

Figure 41. Inpatient’s Clinic Building (Private Building) First Floor Plan (Designed by Author).

The first floor of the inpatient department is for public activities. These include a multipurpose room where residents can cook, eat, play, watch tv, and interact with each other. Second, the garden is their opportunity to enjoy the outdoor environment. They can socialize, practice exercises,
meditate, and relax. Third, the reading rooms for learning and enhancing their knowledge. Fourth, the quite room where they can stay away from all the activities and all the concerns in their minds. Finally, the group therapy rooms, where they can meet in groups with their doctors to share their thought, concerns, or issues.

The only vertical circulation in this building is through the staircases and elevators located in the south, while the other doors of the exists can be open only in case of emergency.

8- Inpatient’s Clinic Building (Private Building) Second Floor Plan

Figure 42. Inpatient’s Clinic Building (Private Building) Second Floor Plan (Designed by Author).

This floor is for patients who needs greater care from doctors and nurses. For that reason, all the bedroom in this story are not shared bedrooms. Each bedroom contains its own bathroom, seating space, and closet. All the rooms are monitored by the nursing stations. The nursing stations are composed of reception desks, offices, break rooms, and bathrooms. In addition, this floor has several meeting rooms for patients meeting with their psychiatrists. The access between the two
building used by doctors is in this floor not only because it’s close to their offices, but also because this floor is for people who need the most care, so in case of urgent events, doctors can get to their patients faster. The residents will find the laundry facilities in their floor, because it is can be closer to where they stay.

All the rooms include large windows with access to daylight, and green views.

9- Inpatient’s Clinic Building (Private Building) Third Floor Plan

Figure 43. Inpatient’s Clinic Building (Private Building) Third Floor Plan (Designed by Author).

Similar to the second floor this level is for bedrooms nursing stations, doctor’s meeting rooms, and laundry facilities, but the only difference here is that this floor is essentially for patients who need moderate and less care. For that reason, the residents can share bedrooms and bathrooms.
5.3.5 Sections

**Figure 44.** A-A Section cut through the entire institute (Designed by Author).

**Figure 45.** B-B Section cut through the inpatient care department (Designed by Author).
5.3.6 Elevations

*Figure 46. Front Elevation (Designed by Author).*

*Figure 47. Back Elevation (Designed by Author).*
The elevations show how architecturally the main entrance is stressed, also it shows the effective benefit of the shading device (which are the columns) and how it is calculated and design well to protect the building from the unwanted warm sun rays providing shading as well as preventing the excessive illuminations and glare.

5.3.7 Rendered Perspectives

1- Exterior Views

*Figure 49. Institute Sign Oriented To Street View To Attract People’s Eye (Designed by Author).*
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Figure 59. Outpatient Building’s Auditorium Garden (Designed by Author)

Figure 60. Another View of the Outpatient Building’s Auditorium Garden (Designed by Author).
2- Interior Views

I. Entrance:

*Figure61. Interior View of the Entrance (Designed by Author).*
Figure 62. Interior View of the Entrance from Different Perspective (Designed by Author).

The aim of this entrance interior is to create a welcoming and pleasing entry, to be different from the typical hospital’s entrances. This space is double height, and all glass which has a bountiful sunlight that helps on keeping people happy and optimistic.
ii. Seating Areas

*Figure 63. Interior View Of The A Seating Space - Morning Rendering (Designed by Author).*
The whole space has light colors to reflect sunlight that helps on preventing warming the space and also will help to light the area since light colors allows natural light to be brought far into the building. A seating space is provided with pendant light to add some intimacy.
iii. Check-in

Figure 65. Interior View of the Another Seating Space (Designed by Author).

Figure 66. View from the Outpatient Department, Females check in Desks (Designed by Author).
iv. Consultation Clinic

Figure 67. Interior View of the Consultation Clinic (Designed by Author).

This is an example of how the clinics looks like. The color of the room is the first thing people perceive when they walk into a room. It was proven that colors influence our moods, behavior, physical and mental wellbeing\(^\text{15}\). The rose-pink color is physically soothing, it is recommended in therapy rooms because it relaxes tension and help the person to cope with loneliness and grief. (See Color Section in the paper)
v. Group Therapy Room

Figure 68. Interior View of the Group Therapy Room (Designed by Author).

The glass wall helps to make a connection and communication between the inside and the outside. Also, it is a good method to borrow daylight. Regarding the color of the room, the little touches of the purple will encourage deep contemplation. In addition, it helps to meditate, think wisely. (See Color Section in the paper)
vi. Single Bedroom

Figure 69. Interior View of the Single Bedroom (Designed by Author).

Figure 70. Interior View of the Single Bedroom from another perspective (Designed by Author).
The walls are painted in different shades of blue because it is serene and mentally calming. Also, it aids on reducing stress and reliving tension, which is what people here wants especially before going to bed. Finally, the blue is known for its capability to prepare the body to relax and sleep. The furniture and bedding are yellow because the yellow color helps on creating a sunny and happy way to start the day. (See Color Section in the paper)

vii. Quite Room/ Sunroom

*Figure*71. Interior View of the Quite Room/Sunroom (Designed by Author).
The design guideline of designing mental health facilities suggested providing quite room. This proposed facility is recommending a sunroom design that functions as the quite room. This sunroom creates a connection between the outdoor and the indoor environments and it allows the residents to see the street and car movements, and to see people entering or leaving the building; thus, it will prevent the feeling of being trapped inside the hospital.

IIIv. Auditorium Garden

![Figure 72. View of the Inpatient Department's Auditorium Garden (Designed by Author).]({"image":null})
6. Measure to Success

1- Security and Safety Design Considerations

To assure safety of patients the building provided:

- Clear staff sightlines from nursing stations to all patient’s circulation areas.

- Secured access to all functional areas for all users.

- Avoidance of fall opportunities such as open multi-story spaces.

*Figure 73. Floor Plan Illustrating How Nursing Stations Observes All Patient’s Circulations (Designed by Author).*
2- Healing Architecture

In the study *Healing Architecture: Hospital Design and Patient Outcomes*, Lou Podbelski, the author, reports that architecture has a strong impact on a patient’s recovery time and overall effectiveness. He asserts that healing architecture indicates that the built environment impact patients’ health and psychological well-being. He stresses on the benefits of the aspects utilized in the current paper which are access to natural daylight, big windows, local plant life, and outdoor green views and how it improve the healing process by giving patients a psychological and physical lift. This study states that a thoughtful architecture and design focused on promoting healing have a measurable effect on patient recovery, including shorter hospital stays, fewer infections contracted in the hospital, and reduced pain\(^{38}\).

Another article called *Buildings That Heal* by the author Aditi Das, stresses that there is a direct connection between architecture and health outcomes and that medical buildings designs affect people’s health. In his paper, the writer mentions that healing can be achieved by the architecture. The architecture design can accomplish reducing anxiety, pain, and infection rates in patients. To help patients to heal quickly, the design shall contain skylights, fountains, lampposts, and orient all rooms to scenic views. This will have many benefits for both patients and staff. The author also mentions that nature or natural symbolism helps with healing. The author addresses a study that demonstrated patients whose rooms had a view of nature were likely to consume fewer analgesics and have shorter inpatient compared with others\(^{39}\).

\(^{38}\) Lukas, Lou, Carol Foltz, and Hannah Paxton. "Hospital outcomes for a home-based palliative medicine consulting service."

\(^{39}\) Das, Aditi. "Buildings that heal."
● **Daylighting**

According to table 4 in the paper, the following spaces are designed to allow daylight based on the Recommended Illuminance Levels for Each Room.

1. Entrance

2. Waiting Room
3. Classroom
4. Consultation Room
5. Sunroom

● **Healing Colors**

All the rooms in the proposed mental health institute are colored properly based on the function of the room. Each room is painted in a color that has a certain effect as it was proven that colors influence our moods, behavior, physical and mental wellbeing\(^\text{15}\). For example, the consultation clinic where patients come for their psychiatric visits is painted in rose-pink. The rose-pink color is physically soothing. According to Janet Best the author of *Colour design: theories and applications* book, the rose-pink color is recommended in therapy rooms because of its influence on relaxing tension and help the person to cope with loneliness and grief. The room's colors in the entire project are selected based on the same book\(^\text{14}\).

● **Connection to Nature**

The concept that plants being essential for mental health and help individuals recuperate after illness, and that it plays a role in the healing process is explained in the paper. The following figure shows how the project applied the connection between the building and nature through the green roofs and the other types of vegetation around the area.
Welcoming

To create a structure that reduces the fear of mental health hospitals, and to provide the population of Makkah with a new attractive mental health facility that will encourage them to come, this proposed project has put careful attention in the interior and exterior design. The main elements that enhanced the welcoming feeling are the large windows that allow daylight to enter the space, plants, and the use of light colors. By applying those elements, the hospital has shown a big difference between the existing mental health facilities in the city and the proposed facility.
7. Conclusion

Mental health is an issue that affects everyday life. The reason that prevents Saudi people from getting therapy is the stigma toward mental health. The current project aids on breaking down that stigma and attracts people by providing a supportive structure to the psychiatric profession the goal is to reduce the incidence of mental disorders in adulthood making a significant difference in the lives of the next generation.
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