

A FUTURE GREEN AND HEALTHY HOSPITAL : A REVIEW ARTICLE

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ABSTRACT

The current environmental problems are triggered by various things, one of which includes the construction industry. From the building construction process to the waste disposal of the construction and residents, it has a significant impact on the environment. Public sector buildings, especially those in the health sector, which contain many people every day need to pay attention to the structure, management, and welfare of the people in the building. A hospital that has an improper environment and management will deteriorate the physical and mental condition of both the patient and the staff in it. Therefore constructing the hospital with a green and healthy concept is an option to reduce the negative impact on the environment and enhance health rate, wellbeing and the convenience of its resident. Green building develops a concept that integrates building and nature to reduce climate change and its negative impact on the environment which planned from the architecture, management, policies, to interior design. The concept of energy saving that is carried by green building is to use energy and power efficiently to carry out activities in the building without reducing the regular treatment. Therefore, the purpose of this studies is to provide information and explanation about the implementation of green building in terms of health aspects.

Permasalahan lingkungan saat ini dipicu oleh berbagai macam, hal salah satunya termasuk industry konstruksi. mulai dari proses pembangunan gedung hingga limbah habis pakai dari konstruksi maupun residents, berdampak signifikan pada lingkungan. Gedung-gedung sektor public terutama di sektor kesehatan yang berisikan banyak orang setiap hari perlu diperhatikan lagi struktur, manajemen, dan kesejahteraan orang-orang di dalamnya. Rumah sakit yang mempunyai lingkungan dan pengelolaan yang tidak layak akan semakin memperburuk keadaan fisik dan mental baik pasien maupun staff di dalamnya. maka dari itu membangun gedung berkonsep hijau dan sehat menjadi salah satu pilihan untuk mengurangi dampak buruk terhadap lingkungan. Green building mengembangkan konsep yang mengintegrasikan bangunan dan alam untuk mengurangi climate change dan dampak negative terhadap lingkungan mulai dari arsitektur, pengelolaan, kebijakan, hingga design interior. Konsep hemat energy yang diusung green building adalah dengan memanfaatkan energy dan daya seefisien mungkin untuk menjalankan aktifitas-aktifitas di dalam gedung tanpa mengurangi pelayanan yang rutin dilakukan. Maka dari itu tujuan dari penulisan artikel ini adalah untuk menyediakan informasi dan penjelasan tentang implementasi terkait green building yang ditinjau dari aspek kesehatan.

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INTRODUCTION

The developmental process of building industry produces the largest carbon emission in global warming which contain of more than 60% exhaust emission composed by CO₂, SO₂, and Methane gas. According to data from United Nation, building deplete 30% to 40% of energy. Thus, the choice made for construction and energy conservation will give a large effect to decrease the climate change and alleviate the morbidity and mortality of air pollution (Anastasia, et al. 2018). In providing the health care, hospital spend a huge amount of energy. It consumed more than 73 billion kwh of energy and based on United States Environmental Agency (EPA) it obtains more than US\$ 600 million per year for health cost. With the said amount of fund used for health sector, the maintaining of various health sector (large and small institution), modern energy-intensive technology usage, and waste production become a case of the public health. Then, the concept of green building, is planned in resolving the problem of climate and global energy. (Dhillon and Kaur 2015; Triwidiastuti 2017).

With the standard of green building for more than 3.5 billion square feet until now, green building architecture has been highly adopted (Allen et al, 2015). Moreover, the change of property improvement in Indonesia shows the trend adopting green idea and recently, the implementation of green hospital become the new method in hospital management (Anastasia, 2013; Permenkes, 2018). Green building focuses to reduce environmental pollution in ways decreasing the energy and water usage, also mitigating the environmental effect from construction sites. Besides that, green hospital defines as the planned, built, and maintained hospital that considering health principles and sustainable environment. Hospital structure should be built to provide the optimum usage of electricity, water, and material. Decrease the structural effect on human and environmental health through advancing the planning, development, repairing, and disposal (Allen et al., 2015; Dhillon & Kaur, 2015).

Health care sector is the most crucial sectors in the hospital with its mission to save people's life and improving their health. People come to the hospital to care of their health and looking for medical treatment. Hence, the hospital should provide a convenient and healthy environment since the curing process also depend on sophisticated hospital building. So that, the focus of the design should be on the green strategy to improve positive impact on patients and the staff of the hospital (IGBC, 2020). Objective of health and well-being result, also the established standard is related to green areas. A health advantage as a base of potential mechanism shows that sustainable areas encourage the process of reducing stress, depression, and anxiety, then the vigorous exercise, also improving interpersonal relationship and mitigating environmental pollution (Dadvand et al, 2016).

90% people spend time indoor with convenient atmosphere and obtain their majority exposure and pollutant indoor more than the outdoor situation. So that, people's wellbeing depends on the indoor atmosphere. In this case, green house focusses on decreasing the environmental effect generated by construction site, encouraging people's well-being, and promoting the program of water and energy conservation. Green building affects public health crucially on human levels and demographic level. On human level, it improves the quality of indoor, while on demographic level, it reduces power usage and emission which increase global warming, cause heart disease, premature mortality, and asthma. (Allen et al. 2015).

LITERATURE REVIEW

Green Hospital

a. History of Green Hospital

Green building movement was started to embrace since the late of nineteenth century. David Gissen, curator of architecture and design, and the National Building Museum in Washington DC address that some building such as the Vittorio Emanuele II Gallery in Milan and Crystal Palace in London adopted the method to reduce the effect of structure toward the environment. Those building used roof ventilation system to control indoor air temperature and cooling system for underground. Deep set windows also used by Flatiron Building and New York Times Building. Besides, detachable roof used by Chicago department store of Carson Pirie Scott. These types of design have been attested to effectively control indoor air temperature. (Cassidy, 2003).

The said cooling system massively changed the style of several modern architecture regarding to inner city building from 1930s to 1960s. The applying of steal beams and transparent glass that popularize the frame structure of glass and steal used a huge Air conditioning, heating, and ventilation system. Hence, it disrupts the areas and depletes the enormous energy of fossil fuels (Cassidy, 2003). 'Green houses' idea was included in the United Nations Sustainability ideology which always be raised first before all human growth areas for a few decades. This idea firstly discussed at the United Nations Climate and Human Environment Conference in Stockholm in 1972. The forum consent that the crucial matters for citizen's well-being and the growth of economy worldwide are the urgent need of world citizen, improving and protecting the human environment, and the responsibility of the governments (Dhillon & Kaur 2015).

The concept of sustainable green building revealed when John B Elkington adopted and publicized TBL (Triple Bottom Line) to assure the continuity in its practices. TBL aimed to measure market success on social, environment and economic sectors which present that because a high operational cost and low customer loyalty, the companies lose their social integrity and will be long-term financially unstained in a long-term period (Dhillon, 2015). Due to the concern about the practice of green building practice, in 2009, green building council (GBC) of Indonesia was established by the construction professional and designer. The main office of GBC Indonesia is in Toronto, Canada. It purposed to improve and disseminate the principle of sustainable green regarding to the construction industry in Indonesia. GBC cooperated with building-related stakeholders including government and private sectors as one of the strategies. Moreover, main initiative of GBC Indonesia is training and education, the transformation of business, certification of green building, and the initiative of community involvement (GBCI, 2021).

The effort to adapt and mitigate the climate change is still promoted by Indonesia government. Meanwhile, not all citizen being well-informed regarding to this topic, so it stimulates the Sick Building Syndrome (SBS). SBS condition is frequently happen in Indonesia including in the big cities of Indonesia. WHO (World Health Organization) calculated that around 30% buildings worldwide troubled with indoor air quality? Hence, the concept of green architecture is the solution for this problem (Triwidiastuti, 2017)

b. Definition of Green Hospital

The Federal Commitment to Green Buildings defined sustainable architecture as a building that efficiently use electricity, water and materials to decrease the building effect toward humans and environment through enhancement of the architecture, construction,

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operation, position, maintenance, and disposal (Howard, 2003). Buildings in US specifically the occupied building which people spend 90% of their time gives significant effects to the climate change, energy calculation, resources usage, waste, water, and air quality. The construction process such as operation and reconstruction in the site offer a bad impact on human's well-being. Hence, green building is the solution to reduce the negative impact on human and environment health. However, green building is constructed with similar cost as the conventional building. (Howard, 2003). Green building or also mentioned as sustainable building is defined by United States Environmental Protection Agency as planning and utilizing process of sustainable building which is equipped by efficient resources. This process enhances physical, utility, sustainability, and comfort aspects more than the design of conventional building (Bandhauer et al, 2013).

The lack of energy in 1970 become the start of the discussion about green building concept including solar panel system (active and passive) and the stronger building envelopes. The concept that energy contribute much on the sustainability is frequently discussed in green building topic comprehensively. The effect of a particular part of building toward environment also examined here. For instance, a bad building envelope will lead to the bad indoor air quality (Howard, 2003). Moreover, green design is a type of constructional design that can reduce the bad impact of construction toward humans and environment and interior design also in the scope of this design. Green design can be implemented in the small case in ways construct the building using 60:40 comparison between building and green space or the building is equipped with garden roof and green wall (Triwidiastuti, 2017)

c. Green Hospital Goals

Green building is a smart design of building to manage energy consumption and enhancing the quality for the residents. There are several different concepts for each public sector such as government, health, and education (Triwidiastuti, 2017). Moreover, green building focus on the ventilation system and optimum natural lighting, maintains open spot to organize the rain water and indoor air quality (Tzu, 2012). Based on Global Ecological and Sustainable Hospital Agenda, green building stably decreases the bad effect of building on human, environment, and the burden of disease. The correlation between human's health and environment proves through the policies and actions of the green hospital. The hospital regularly participated in protecting the environment, health, and improving green areas (Karliner et al, 2011). The founding factor of green hospital include green building design, management of waste, reduction of transportation cost, water conservation, energy conservation, alternative method to generate the energy and serve a healthy food (Dhillon, 2015)

1. Leadership (*Prioritize Environmental Health as a Strategic Imperative*)

To provide green and sustainable hospitals, top leadership is needed at all levels. Environmental quality, protection, and security must be considered essential corporate objectives. By informing ourselves, setting targets, being kept accountable, and integrating the objectives into both social affairs and interactions, this can be done. It amounts to a big shift in the way things are handled in the organization, whether it's a care center, health department, or ministry of health. There are four areas of key leadership, such as establish a task force for hospital, support future research, engage the community, and advocate for public health policy (Karliner & Guenther, 2011).

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2. Chemicals (Substitute Harmful Chemicals with Safer Alternative)

Contaminants well-known to influence health and the environment are widely used in the health care industry. Generally speaking, it can be mentioned that industries that aim to safeguard human health are also contributing to increased disease burden. When products used in health care are produced, used, and disposed of, chemicals in these products influence human health over the life cycle of these products. Employees, hospital staff who work in the areas where they become exposed, factory employees who manufacture products, waste collection plant workers, and those who live near sites where manufacturing or waste disposal take place are at heightened risk. (Strategic Approach to International Chemicals Management, 2012).

3. Waste (Reduce, Treat and Safety Dispose of Healthcare Waste)

India does not have a reliable and sustainable waste management in public sectors such hospital and nursing home. So that, the waste is disposed alongside the road or to the river (Muduli and Barve, 2012). Whereas, 10% to 15% of waste from healthcare facilities contains toxic and can harm the workers and surrounding environment (Hassan et al, 2008). If said particular waste site is inappropriately managed, it can raise diseases and spread toxic odors which caused cholera, hepatitis B and C, HIV, and tuberculosis through human blood or contaminated injury (Chartier *et al*, 2014).

Within recycling, composting and using recyclable things instead of plastics and reducing waste mobilization can be done to decrease the harm (Karliner, 2011). To avoid the emission and another harmful materials, infected plastic must be burned or disposed after disinfected. Embassy Medical Center Colombo, Sri Langka produce a new sustainable energy of carbon neutral using the filter system of lifted anaerobic thermophilic. The materials to create it is from the waste of Colombo Hospital and remotes area (Pierce and Guenther).

4. Energy (Implement Energy Efficiency and Clean Renewable Energy Generation)

The hospitals operate throughout the years because it is mainly necessary for people. Activities in the hospitals have a high intensity, waste huge amount of power and clinical procedure. Nevertheless, the nergy can be saved without reducing the regular treatment (Karliner, 2011). The gadgets that consumed most of Hospital electricity are HVAC system (AC, Ventilation, and Heating). The distribution are 30 to 65% by the EHC, 30%- 40% for lighting system, and 10 to 12% for water pumping. The massive use of HVAC is to assure the air in the building is convenient and can prevent the infection (Kapoor, 2011). Another sources that consume huge amount of electricity are lighting and water pumping. Lighting is the major sources which distribute into various needs based on the works, time and occupancy level. Additionally, water pumping consumed 5-15% of the use of electricity for various needs, but it has chance to reduce energy usage (Kapoor, 2011).

There are three basic method to reduce energy consumption. First is switching off all not-in-operating gadget which can carried out by hospital staff or automatically turned off. Then a routine energy maintenance and repairmen should be done to save the energy in the hospital (Kapoor, 2011)..Other more detail ways to reduce energy consumption which have a positive effect can be done by using LED light or fluorescent lamp, suit the thermostat control based on the season (low in the winter and only a bit high in the summer), stop using 'stand-by' energy gadget (Dhillon and Kaur 2015).

The use of electricity in the larger hospital and costs a lot of money is the one that takes energy from outside. The examples are air conditioning, machinery used, laundry that takes energy from gas and other fuels. Another example is from the hospital in India which utilize a

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machine which regularly waste the fuel and spread the smoke due to the lack of electricity power (Kapoor, 2011). To enhance the access into an essential health care service in the energy-shortage area, the use non-energy and low-cost medical technology can resolve the problem (Fletcher, 2012). Alternative resources such as sun, wind and water can replace the energy, such Tripolia Social Welfare Hospital in Patna did with their solar panel. They use it to sanitize medical equipment, hospital laundry, lighting system and the office (Boyle, 2010).

5. *Water (Reduce Hospital Water Consumption and Supply Potable Water)*

Water consumption is the main necessity in the health sector so it can consume enormous amount of water. However, due to the scarcity of water caused by climate change and drought, the saving measures that can be taken by health facilities are to collect rainwater and then filter and sterilize it for non-drinking purposes. (Karliner, 2011).

6. *Transportation (Improve Transportation Strategies for Patients and Staff)*

Transportation used by the health sector in each of its activities consumes a large amount of fuel, so it has a significant impact on climate change because the non-stop usage. Hence, it is very important to reduce greenhouse emissions through transportation. For example, Delhi contributes producing 70% emission from their transportation (Karliner, 2011). The way for hospitals to reduce gas emissions is by using environmentally friendly vehicles, encouraging staff and patients to use public transportation, carpools or those that save fuel. Also, telemedicine is useful for reducing traffic congestion (Hosking and Jennings 2011).

7. *Food (Purchase and Serve Sustainability Grown, Healthy Food)*

Incorrect diet strategy that recently known can cause various diseases which can increase the risk of being treated in the long term. This can be an opportunity for the health sector to provide healthy fresh and tasty for patients and staff and also supports the process of making food that is environmentally friendly and has a good impact on health (Health Care without Hazard, 2005).

8. *Pharmaceuticals (Prescribe Appropriately, Safely Manage and Properly Dispose of Pharmaceuticals)*

Health services, where medicines are in demand, play an important role in reducing pharmaceutical waste by restricting the volume of prescriptions administered, and by solving the waste issue in their own facilities and policy level. Healthcare facilities should be in charge of stock management (for example, using a first use by deadline or an expiration date, so as to reduce over-procurement and production of drug waste). Pharmacies and hospitals should also return expired pharmaceuticals to consumers, thus saving time, fuel, and future contamination. Medicinal waste should be more effectively and expeditiously handled at the state or national level. Through sweeping up garbage, storage and disposal is even more environmentally friendly. (Karliner & Guenther, 2011)

9. *Buildings (Support Green and Healthy Hospital Design and Construction)*

The enormous development of healthcare facilities gives pressure to the availability of material resources and local techniques (Karliner, 2011). The efficient method to save the resources can be done by building the hospital alongside the public road and integrated natural sustainable resources such as sun and wind to create natural ventilation and make a green and health hospital (Pancheon, 2009). Several research have shown that green hospital construction has the same cost as an ordinary hospital, but the improving health of green

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hospital greater by 13.5 to 87% (Dhillon and Kaur 2015). One example of a well green hospital is one that is built from environmentally friendly and sustainable materials but still has a beautiful architectural design. (Guenther and Vittori, 2013)

10. Purchasing (Buy Safer and More Sustainable Products and Materials)

A vast variety of products are purchased by hospitals and health services, including chemicals, electronics, plastics, electricity, pharmaceuticals, and food. The health system invests large amounts of money on purchasing stuff. The purchasing of healthcare results in a large environmental effect and human rights impact. With its large purchasing power in many nations, the health sector has the potential to control the supply chain, encouraging producers to deliver more affordable, sustainable goods, manufactured under fair and secure working practices and adhering to international standards. This would contribute to better health and sustainability. So, Green and ethical purchasing policies will play a major role in overcoming it. (Karliner & Guenther, 2011)

d. Green Hospital Benchmark

The development of green building was reached over 3.6 billion feet square certified construction until today. Regarding to the healthcare facilities, enhancing indoor air quality can be executed by build the LEED which was started in 1998 and finished 69000 construction in over 150 countries. Nevertheless, the standar of LEED built should follow ASHRAE 62.1 (the standard for proper indoor air quality) (ASHRAE, 2013) additionally, the reduction of smoke in healthcare will reduce the contamination (U.S Green Building Council, 2021). Occupancy comfort can be improved through improved IAQ such as increasing ventilation quality, using low emission paint, and controlling air conditioning. One example is the provision of a small volume high pressure ventilation system. This system can help residents overcome fatigue and is useful for reducing emissions in the surrounding environment (International WELL Building Institute, 2015).

Besides LEED, New benchmark was created namely WELL. The things covered in the WELL discussion are about how to integrate natural aspects in nature and humans with development, improve the quality of occupant comfort, and improve building aspects such as ventilation, air conditioning, the quality of water to be more efficient. In addition there is also the LBC (Living Building Challenge) which promotes a healthy way of life (International Living Future Institute 2020). Additionally, to promote healthy living, LBC 3.0 also discusses sustainable resources and convenience of facilities. One form of improving building quality is the existence of a list of chemicals that are prohibited for building use (Allen et al. 2015)

The Health Aspect of Green Buildings

a. Definition

WHO stated that human health is not only measured by disease-free condition, but also psychological and social well-being. In addition, this is also supported by social and community which is free from all prejudice. This prosperity is very important for human stability and security and can only be realized by humans themselves (WHO, 2006). The statement about health means free from all illness has been embraced since a few past decades ago. This perception also agreed by medical professional and the focus of medicine at that time is only to the disease and health (Boruchovitch & Mednick, 2002). However, instead of adopting the statement, human's health should be defined as the condition where human mentally and physically stable. It is not only focus on the pain in the particular human body,

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but also look at the whole side of the body. Healthy means have less illness than other who complicatedly have diseases (Boruchovitch and Mednick 2002).

The definition above encourage people to look at and combine the physical and mental health to define the wellness of humans and it also depends on their relationship with environment. Public health focus not only on the individual health, but also on the community and environmental health (Svalastog et al. 2017). Integrated condition where people, physically, emotionally and psychologically well is the real definition of wellness. Besides, when people has a full ability to run their activities, it also means health (Donev, 2000)

b. Healthy Hospital

Hospital as the healthcare provider that massive people related to it needs to pay attention on how their effect to environment and surrounding population. So that, the strategy to maintenance a healthy environment should be executed such as encouraging people to eat a healthy food and promote the physical exercise (CDC, 2020). The data from WHO shows that 23% mortality rate worldwide caused by environmental case. The disease can be transmitted from the public residents to the workplace setting or vice versa. This conditions happen due to the social problem such as the massive growth of population, lack of water, lack of healthy food and a huge amount of emission (MARS 2019).

Health sector as the provider to give treatments have a direct contact on the health problems of the citizens. Disease transmission around Patients and staff and also the hospital waste contribute the significant effect on the environment (MARS, 2019). A safe hospital should consciously reduce its effect on the environment and effectively remove its contribution to the burden of disease The connection between health and community based on healthy hospital represent on their policy, management, procedure, and fund allocation to keep a healthy environment. (Karliner, 2011)

c. The Health Aspect of Green Buildings

In three aspects of health, i.e. mental, physical, and social, the concept of health as the capacity to adapt and self-manage is identified and explained. (2011 Huber et al.)

1) Healthcare-Associated Infections (HAI)

Almost 3.2% patient identified with HAI which consist of UTIs, S.I and C. diff that makes them stay longer in the hospital, need more medical equipment, and get more medicine (Busl, 2019). Patients in ICU have more possibilities to have more control infection incident because the huge amount of drugs and organism that resistant to multi-drugs and mechanical ventilation (Bonten 2012). Patients in ICU get most frequent infection associated with the ICU and the most common is patients with UTI, which is about 23% of patients. Then at the NICU, the exposure obtained by patients would increase by 36% if they were there for more than 48 hours and there were 22% t of patients suffered from VRI contract ventriculostomy. However, this there are various infection which confusing in measuring the negative result.(Busl, 2019).

Around 15% of patients who are in hospital will become infected with HAI (Hospital Acquired Infection). The CDC stated that 1.7 million people were infected in hospital and 99 000 died from it. Pneumonia due to ventilators, infections from operating rooms, and urinary tract infections due to catheters are the main causes of death in the US and it costs \$ 9.8 billion. Therefore, evidence-based techniques can be used as a solution for this HAI infection.(Septimus & Moody, 2016). According to the HAI data related to the equipment, CLABSI and CLAUTI can be avoided for about 65% 0 70%. One of the ways to reduce it is providing the insetive for hospital that will used to repair the system and equipment. Thus, it will affect the hospital to enhance their performance. (Septimus & Moody, 2016).

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2) Indoor Air Quality

The topic of indoor air quality (IAQ) has been widely studied in various fields. From time to time, researchers have carried out to see the wellbeing, comfort and fitness of the building occupants. Because of this, currently IAQ regulations have been made for non-industrial buildings because most people spend 90% of their time in private places such as homes and public places such as schools, workplaces and transportation (Cincinelli & Martellini, 2017).

Indoor pollution is a serious problem because it affects health and the environment. People who spend 50% of their time indoors are exposed to 100 times more time than outdoors. data shows that employee productivity decreases in the workplace and results in losses of up to 200 billion per year (Sun et al. 2019). Poorly ventilated rooms lead to various ailments such as headaches, skin inflammation, kidney failure and sick building. Not only for individuals but also dangerous for the public. Data from WHO shows 700,000 people died due to lack of ability to breathe (Sun et al. 2019). If a room has a low air quality, it will deteriorate the quality of health, comfort and productivity. Health will be compromised by bad indoor air, and in some groups such as infants, the elderly, and people with chronic respiratory diseases will be worse off. Therefore, the IAQ contributes a lot to the influence on public health (Cincinelli and Martellini 2017).

3) Sick Building Syndrome

SBS is defined with symptoms discomfort, chest tightness, fatigue and pain in the eyes, nose and throat. This syndrome is arised instinctively and is triggered by various things in the building, so it is also associated with old-building syndrome. The human-made ecosystem often triggers various diseases or related symptoms and has an effect on human welfare (Malik, Qayyum, and Fatima 2021). SBS often occurs due to poor IAQ systems in occupied buildings. Symptoms such as fatigue, lack of concentration and skin irritation are caused by things related to the room such as air conditioning ventilation (Gawande et al. 2020).

To reduce indoor air problem, sustainable architecture is the solution. The construction of green buildings and aspects such as LED lighting, rain harvesting, toilets composting and other strategies will improve the quality of human life and protect the climate. This design uses large sustainable resources but does not have a bad effect on the environment. (Gawande et al. 2020).

4) Physical Health

Physical health is defined as a condition in which a person is in optimum condition both physically and mentally to interact with people and carry out their activities. Additionally, it also means the body is in good condition. Another definition also says that physical health is a representation of the balance of the body outside and inside (Lebedinsky et al. 2018). A stable body will be able to carry out allostasis, when the body is able to respond to reduce pain and maintain balance (Huber et al. 2011).

d. Psychological and Social Aspects of The Environment In Healthcare Facilities

1) Mental Health

Mental health is defined as a condition in which a person can function their mind properly, be aware of oneself and be able to withstand the burdens of life. However, mental health is often neglected and considered less important than the physical health. Mental health includes awareness of yourself and others, maturity, self-autonomy, awareness of intellectual and emotional abilities, and can contribute to society (Jong Wook, 2003).

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In mental health, there is sense of coherence, which means a human ability to be able to fight extreme stress, severe psychological conditions, and be fully mentally stable. Sense of coherence is obtained from good managing of severe mental conditions. Good adaptation between body and mind can have a positive effect on well-being (Huber et al. 2011).

2) Social Health

Welfare is built through human social relations. Their ability to interact, work socially and fulfill their responsibilities, as well as independence in health are some examples of social welfare. Therefore, welfare can be influenced by external factors in human social life (Huber et al. 2011). If humans can overcome their disease and feel safe in a social environment even though they have limitations, cognition degradation will not impact their quality of life and this is called the disability paradox (Von Faber et al. 2001).

e. Sustainable Healthcare and Patient wellness

Good living is typically a distinct state. Health and illnesses are not mutually exclusive, as long as they use their abilities to adapt to their environment and maximize their physical, social, and psychological well-being, even those who are chronically ill or injured can be considered to be in 'optimum health.' "Optimal wellbeing" is a useful word to describe "well-aging," Since the aging mechanism is connected to the deterioration of a number of body processes and organs, it is not a disease in itself. A patient-focused, personalized plan is required to say what is "ideal" for a patient. (Timóteo et al., 2014).

Healthcare services supposed to provide health building using sustainable structure. Sustainable structure is a structure that integrates 3 things, natural, social, economic. Through this, the hospital could provide a defense against uncertain and challenging conditions (Buffoli et al. 2013). Sustainable healthcare is not regarding to lifestyle, but it is about how to enhance healthcare service performance. The responsibility to maintain a secured life is for all people and patients is divided based on their level of health (Timóteo, Matuszak, and Indilait 2014).

CONCLUSION

The concern thought about environmental and human health raised the concept about green building or green architecture. This movement has been embraced since the late of nineteenth century. One of the examples is represented in the Vittorio Emanuele II Gallery in Milan where this building adopt the system control of ventilation to enhance indoor air quality. After that, this movement has spread into various field including science, health, and politics. Nowadays, as the main aspect in health sector, the hospital become the focus to implement green architecture in form of green and healthy hospital. Green building is defined as the concept of building which can maintain the wellness of environment, using as efficiently as possible energy such as electricity, water and fuel, and also enhancing people's health (physical, mental, and social health).

The goals of green building or green architecture includes several aspect, they are leadership, chemical, waste, energy, water, transportation, food, pharmaceutical, building, and purchasing. For each aspect it is highly crucial to plan and manage the most proper decision in order to achieve the best condition to implement green architecture for hospital. Green hospital should be implement because it also related to health of people. Inappropriate building will affect and stimulates building-related symptoms or illness and even able to disturb the surrounding health environment, besides, mental and social health will also be significantly affected by this situation. Therefore, green buildings in form of hospitals can help to maintain sustainable environment and enhance patient's wellbeing.

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