

Designing for Hospital Environment

Salutogenic design and motivators

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ABSTRACT

The overall experience of a hospital visit is often stressful and confusing for the parties involved. Their experience of the environment has an impact on how they will evaluate the quality of their care. By researching the possibilities to make suggestive guidelines by comparing and combining theories, an approach towards patient centered design is developed. This is conducted by combining theories of needs and salutogenic design as to make the designer aware of the need to design environments with the patient as a whole person in mind, not separating body from mind.

KEYWORDS: Salutogenic design, Hospital design, environment design, design guidelines, Patient centered design

1. INTRODUCTION

The overall experience of a hospital visit is often stressful and confusing for the parties involved. The patients and their families are introduced to a new and unfamiliar clinical environment. These situations are often experienced as frustrating and frightening, as these surroundings can be experienced as unwelcoming.

The authors own experiences with being next of kin to several patients, are part of the motivation for this article. Experiencing the importance of the environment and atmosphere in the meeting of the healthcare system, especially in hospitals, were the drive for this research. This research is done to shed some light on the patients' needs and motivators in order to achieve a positive experience and impression of the hospital and the situation.

The focus of this article is on one of the main groups of stakeholders in a hospital setting, the patients. The primary users which are the health professionals, use the environment on a daily basis, and view it as a space of profession. The secondary user then becomes the patient. They experience the hospital as something temporary, but incredibly necessary (Angell, 2015). Their emotions, interactions and needs are the motivators which give them the ability to experience and act. Hospitals and other healthcare facilities are designed to able staff to efficiently provide high-quality care for their patients. In the design process, the impact the environment has on the patients is often overlooked (Dilani, 2009).

1.1 Goal

The goal of this research is to shed some light on the need for taking in to account the patients experience, needs and expectations as a whole in the design process. Exploring which measures that can be taken to improve the patients overall

experience, and develop suggestive guidelines from a combination of theories concerning health and human needs. This to enhance the importance of the overall experience of the environmental design in hospitals.

1.2 Method

This article is based on a literature review of articles connected to the theme of hospital design, salutogenic, Salutogenic design and Maslows theory of motivators, including articles found in medical journals.

The various journals were found using search words that concerns the theme about design for healthcare and research about the human perception of visual design. The information included in the article is gathered from the universities libraries and search engines, as well as different topical journals published by the various organisations connected to the theme.

1.3 Structure

The article begins with the precision of environmental design, and the benefits and importance it inflicts on the people using it. Continuing with a presentation of the hospitals state today, when it comes to environment and renovations. Then a presentation of human motivators and the hierarchy of needs, moving on to salutogenic and salutogenic design, its meaning and the sense of coherence. Then combining the theories, in order to create a Patient Centered Design approach, with recommendations on how to practice it in real life. The article concludes with final remarks with a summary of main points and recommendations for further work.

2. DESIGN OF HOSPITAL ENVIRONMENT

2.1 Background

In Norway the oldest hospital, Trondhjems Hospital, was built over 700 years ago (Braut & Iversen 2009). Today, Norways biggest hospital, Ullevål university hospital, is being upgraded. Built in 1887, many of the departments and buildings are outdated, and it is calculated that 52 percent of the hospital is in an unsatisfactory state. The cost of this upgrade is estimated to be around 1,8 billion in Norwegian currency (Storvik, 2015). As most healthcare facilities, this upgrade will surely be designed to meet the need for technology rather than the needs from patients (Ulrich et.al., 2008). This is something that needs to change, the designer and decision makers must focus on designing an environment that meets both parties requirements and needs.

Some people may think that design within hospitals is a superficial and costly waste of resources. But there are several examples that it has a measurable and desirable effect on both clinical and economical outcomes. Studies has shown that the use of aesthetics such as nature, interior design and art have shortened stays, helped manage pain and provided a pleasant escape from stressful situations (yamaguchi, 2005).

Most Norwegian hospitals were built in the timespan from 1900 to 1940. Upgrades has been done, but they are costly affairs. Even though Norway is estimated to be the leading country in Europe when it comes to financials used in the health sector, not much is set aside for aesthetic upgrades. The main focus is today to prepare the buildings which is currently not fit for modern hospital operations (Hansteen, 2015).

World health organization (2017) defines health as: "Health is a state of complete physical, psychological and social well-being; not only the absence of illness".

2.2 The environments impact

In this article the term Environment is used in the context of the physical and visual space of a hospital. Environmental design are the physical settings that provide comfort and support. Claudia Steinke (2015) defines physical settings as aspects of the physical, built environment that facilitates the delivery of a service. These settings are especially important considering the stress afflicted with illness, hospital stays, and the healing process (Dilani, 2009).

The sensory input provided by the environment affects us without our consciously knowledge. Pure sensory input creates an immediately emotional response, which later gets translated to mental understandable material and stored in our memory (Kolstad, 2007).

The aesthetic design contributes to the atmosphere at the hospital, and to the patients' mental state. Shapes, colours, art and decoration of a space, can help make the environment feel protected, clear and simple. Friendly, bright and tidy well-maintained spaces improve the sense of well-being. There is a clear connection between mood and assessment of a used space as research has shown that the atmosphere of a space effects the people using it (Schweitzer, Gilpin & Frampton, 2004).

People draw conclusions on how things look to other qualities. By using aesthetics and decorations actively in an environment, it has been shown to reduce anxiety and depression, and to lower blood pressure amongst other. Unsatisfying environments can have negative effects as stress and lost sleep quality (Ullrich, 2008).

2.3 Environment design

Environment design is the design of all that surrounds us in a setting, both physical, visual and emotional. It is the first thing that is experienced when walking in to a room. Through the sensory apparatus humans receive data for thought and

feelings. This data is then transported to the brain and through the nerve system to be deciphered. When the information is comprehensible to humans they get translated into an emotional understandable response (Kolstad, 2007). This emotional response is important to consider when designing environments.

The main goal of environment design is to reduce or even eliminate stressors, both physical and sensory. Environment design in hospitals aims to enhance the patient's impression of being in some degree of control in the situation. This by providing them options to alter their stay, especially the option to change scenery. Studies have shown that the design of the environment has an impact on the patients' health and physiological well-being (Yamaguchi, 2015). Evidence show that well thought out design including layout, colour scheme, furniture, floor and even curtains results in more positive environmental atmosphere, improved physiological state, change in mood, and greater reported satisfaction of the experience among patients. (Zimring et.al., 2004)

3. DESIGN WITH EMPHASIS ON MOTIVATORS

People have several expectations and needs when it comes to life. These needs are what motivates them and their actions, thus motivators. According to Abraham Maslow, human motives are set up in different levels, explained in his hierarchy of needs. Firstly, divided into two main groups, the deficit coverage and growth opportunities (Kaufmann & Kaufmann, 2015).

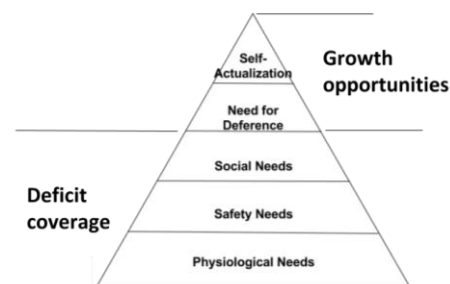


Figure 1. Hierarchy of needs

3.1 Motivators

At the bottom of the hierarchy of needs, see figure 1., are the fundamental and strongest needs, these needs must be fulfilled, but only to a minimum, before any of the above could be considered important. Here are the physiological needs, the biological drives that are fundamental to survival and adjustment. The next level is concerning safety. Translated to measures that guards the individual against harm. By achieving this it can release the energy needed to seek higher in the hierarchy. Social needs are the third and last in the first main groups, deficit levels. This level concerns connections that provide support and acceptance, like family, significant other and friends (Kaufmann & Kaufmann, 2015).

The first level in the growth opportunity group is the need for deference. This containing self-respect and recognition. The main concern is the individuals' opportunity for personal growth. The fifth and final level in the hierarchy is self-actualization. The individuals need to fulfil their abilities and their potential (Kaufmann & Kaufmann, 2015).

When designing environments this theory is a good indication, or checklist, of which factors the designed environment must contain and fulfil in the people using it.

3.2 Physiological needs

As mentioned above these needs are the basic motivator for human survival, such as food, air, water, sleep and rest (Kaufmann & Kaufmann, 2015).

Food and water are essential for humans to function. Access to proper nutrition is one of the most essential needs that needs to be fulfilled in order to survive. Sufficient air quality is key to thrive, and in an hospital setting it is especially important with non-contaminated air flow. This to secure the patients' health outcome and general wellbeing (R. Ulrich, et.al, 2008). Patients who are

hospitalized have an increased need for sleep, and calming and soothing environments (R. Ulrich, et.al, 2008).

3.3 Safety and social needs

These levels concern the patients need for safe environments that guards against both physical and physiological harm. Basic security measures and environments that prevents medical mistakes, physical harm, and stress.

The need for connection with other people, like staff, family, and other patients. Social environments that provides support and acceptance, that gives the patient the ability to go to the next level of personal growth.

3.4 Growth opportunities

When the needs above in the deficit coverage is fulfilled to an extent, the patient can now think of the personal growth needs. Just because the individual is hospitalized does not mean they have lost their need for personal growth. Often illness makes it even more important to prove yourself and your strength to others. Especially important for the people whom is there for longer periods.

This step is called Deference needs. This is the need for self-respect and recognition. Personal growth. Develop personal competence and abilities. The final and highest step is the need for self-actualization. The need to realize inherent abilities and potential.

3.5 The importance within design

These needs are important to consider, not only when designing for people, but also when designing for people as a whole, with both their physical and physiological abilities in mind. The hierarchy helps the designer see the individual as a whole person, not just a user of the product or service. The higher levels are dependent on the fulfilment of all the levels below, but they are also essential to the individual's wellbeing and general health.

4. SALUTOGENIC

Salutogenic is a theory about physiological and psychological health. The theory builds on promotion of health and provision of a sense of achievement and general wellness. The theory was developed as a counterweight to the pathology theory, which emphasises the cause of illness (Lønne, 2016).

The salutogenic understanding emphasises that health is connected to the individuals attitude towards life. The individuals ability to cope with stress and unexpected conditions (Lønne, 2016).

Salutogenic design is an adaption of the theory which is mostly used in architecture, but in this article, it is connected with environment design.

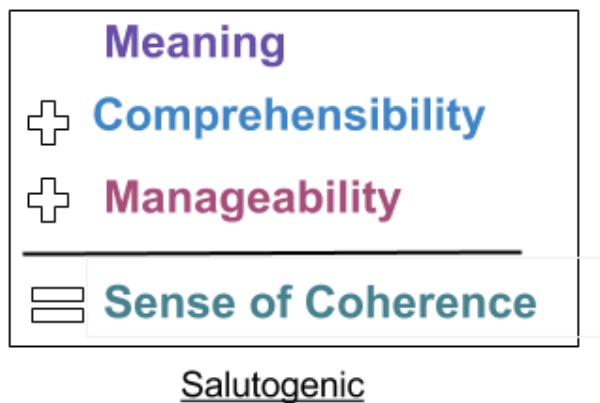


Figure 2. Salutogenic

4.1 Salutogenic design

Salutogenic design focuses on promoting the individuals sense of coherence. The theory is in this article interpreted as psychosocially supportive design of the environment. The aim is to stimulate the mental aspect to create pleasure, enjoyment and satisfaction (Dilani, 2017).

Golembiewski (2012) states that health outcomes improve when a sense of coherence is fostered. This depends on resources that supports meaning, comprehensibility, and manageability. These are the factor that help humans cope with situations, to make the best of the situations circumstances.

4.2 Elements of sense of coherence

Meaning is the most significant part of sense of coherence, and can be explained as the reason for seeing (Golembiewski, 2010). It is encouraged through environmental richness, considering aesthetic order and complexity. Meaning involves the process of choices, insight, creativity, sense of self and other complex cognitive processes. It enriches and gives quality to life. Meaningfulness are the sum of all the reasons people have to keep on living in stressful situations especially (Golembiewski, 2012).

Comprehensibility is a function of knowledge, the reading of the environment. To build a sense of comprehensibility humans need information about the life situations they find themselves in. The information an individual comprehends from an environment is often personal, and people react differently to it (Golembiewski, 2010).

Manageability concerns the physical resources needed to survive and keep going, the importance of being able to make a difference (Golembiewski, 2012). These are the factors that make the individual feel they are influencing a situation, and does not perceive themselves as victims of circumstance (Dilani, 2017).

The brain perceives, creates and manages meaning. The most basic level of this is manageability, basic instinct. The next step is Comprehensibility, it is more complicated, because it involves perception, which is a cognitive and interpretive step (Golembiewski, 2012). The final and most crucial step is to enrich meaning. Golembiewski states that meaning is found whenever humans engage in concerns beyond their own. This step is a hard to fulfil, because the things that make life worth living are personal, and often differ from person to person (Golembiewski, 2012).

5. TOWARDS NEED CENTERED DESIGN

Discussing here a proposal combination of the two theories of salutogenic design and the hierarchy of needs. This by comparing the two against each other, seeking out which similarities they have in order to combine them into one design approach. The reason for combining these two theories, is to make suggestions to how the designer should think, and what to take in to consideration when designing environments in hospitals with emphasis on patients.

Maslow's hierarchy of needs help the designer to assess the patients as whole persons. With their physical, intellectual, social, emotional and moral abilities. It can remind the designer that the patients physicality cannot be separated from its feeling and psychology. Meanwhile the Salutogenic approach sets guidelines and restrictions considering the physical design with emphasis on the psychological outcome of the experience.

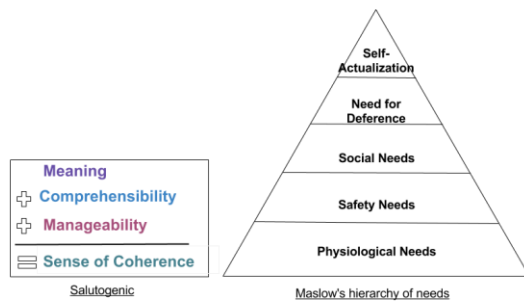


Figure 3. Salutogenic & Hierarchy of Needs

5.1 Comparison

Salutogenic design and Maslow's hierarchy theories can be combined in order to make design guidelines when it comes to hospital design.

The Salutogenic approach values the Sense of Coherence, divided into three main points; comprehensibility, manageability and meaning.

These levels have a correlation to Maslow's hierarchy.

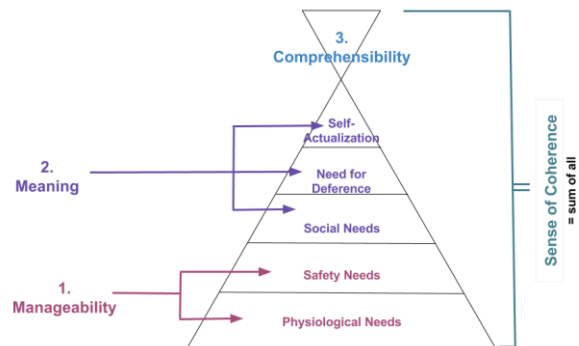


Figure 4. Comparison

Manageability contains the basic needs, the things that gives an individual ability to manage day to day realities. Manageability connects with only one of the groups; deficit coverage. To manage daily life the first level of the hierarchy, physiological needs, must be fulfilled first. These are the biological drives for survival and adjustment. Following these required fulfilments, comes the need for safety, general protection from physical and physiological harm.

Meaning is the foundation of the desire to live, it gives sense of identity, also called the reason for seeing. Everyone have different reasons to live and keep going in stressful situations. But the fundamental motivators can be found in both of Maslows two main groups; deficit coverage and growth opportunities. Here Meaning connects with social needs, need for deference, and self-actualization. Because of the nature of the hierarchy, social needs have to be fulfilled before the two others. Support and acceptance from the surroundings is key to fulfilment of self-respect and recognition. Once these are covered the need for self-actualization can be fulfilled through growth of inherent abilities and potential.

Comprehensibility is the desire to understand circumstances in order to make the most out of them. information about the life situation the

individual finds themselves in. This can only be done by fulfilling the other needs and requirements mentioned above. Once these basic underlying needs are fulfilled, it frees up the individual to examine their surroundings and to begin to understand them.

Together they compose an understanding of the physical and psychological needs of the patient.

5.2 Recommendations in use

Suggestable recommendations when designing for hospitals with the patient in focus using the compared theories.

According to the Model of Need Centered Design, see figure 4., the designers first task is to maintain level 3., which is comprehensibility. This can only be done when level 1. (manageability combined with physiological and safety needs) And level 2. (The need for self-actualization, deference and social needs combined with meaning) has been fulfilled.

5.3 First level

To fulfil the first level, it is firstly important to facilitate the measures needed for the patient to be able to manage day-to-day life at the hospital. Starting with the coverage of the basic biological drives.

Ensure availability to nourishment, especially a source of water. These should be available for the patient at any time and place the patient occupy. When it comes to nutrition, food should be consumed in such normal settings as possible. Food consumption areas should be designed to mimic cafes and restaurants, to able the patient a momentarily escape from the clinical situation.

Air quality is essential for human function, while it also is linked to wellbeing. The designer should let nature play a big role in the design. Indoor plants and access to nature enhances the experienced air quality.

Hospitalized patients have an increased need for rest and especially sleep. The designer should provide calm and soothing environments with the use of sound absorbing materials and well thought out space planning. This can be done by using sound absorbing partitions, optimally solid walls, and silent alarms. Other means to ensure the patients rest is giving the patient the ability to control the light at their will. To obtain normality for the patient it is important to maintain a natural circadian rhythm, this can be done by orienting and designing patient rooms, so they can receive and control their access to natural light through windows. By providing these measures the designer helps reduce or even remove some of the environmental factors that disturbs rest.

The final step is to make the patient feel safe, in this context from physiological and psychological harm. The aesthetics of the physical environment can and will affect how the patient view the level of care they receive, and this is an important role in how safe they feel. By designing the environment to give an ambiance of eliminated stressors, the designer is on a path to reduce this turmoil. Make sure the environment is not designed so the staff is alienated and separated from the patient. Create layouts that is experienced as open, yet calming and professional. Use products and designs that is experienced as clean, by using materials that are easy to maintain and disinfect. Furniture used

in the design should be movable, but solid enough for them to feel safe in use. There should be possibilities for the patient to retract from the open space and be able to lock doors, meanwhile it should be easy for staff to control and manage them.

5.4 Second level

In order to fulfil the second level, there must be taking considerations towards the patient's mental aspects, more than the previous physical needs. These are the aspects that gives meaning to life. Although these are mental needs they can possibly

be reduced or even solved with physical appearance means.

The first step is to facilitate designated social meeting points to enable the patient to fulfil their social need. Design areas that enables the patient to connect with other patients at will. Open common rooms with entertainment and spacing that enables social interactions. These common spaces should be placed on every department, but also allow for a bigger room where patients from other departments can socialise. These rooms can be used for family visits as well, but the patient may also have the need to talk to their family and friends in more secluded and private places. This can the designer solve by providing sufficient seating arrangements within the patient's room. To ensure confidentiality the patient should be housed in a single-bed room, when this is not the case the designer should provide partitions that shields the patient from by passers and other patients housed in the same room. Safe interactions with staff is an important aspect of the social needs within an hospital setting. The patient need to feel a connection to the staff, and this can be lost if the staff and the patient is separated physically. The designer can solve this by creating layout where the staff is placed closer to the patients, in open spaces for easier access for the patient. The privacy concern is apparent in this relation also, which can be solved by providing as mentioned solid partitions and separate private rooms for consultations.

The need for deference and self-actualization is a bit trickier to fulfil using environmental design. Yet the need for personal growth with the aspects of self-respect and recognition can be fulfilled using inspirational environments. By providing art, access to nature, and entertainment, the designer gives the patient positive distractions. These distractions give the patient the ability to focus on them self, and their abilities. This focus can facilitate personal growth I terms of development of competence and abilities, in the sense that it frees the mind of some worries connected to the situation. Another aspect to enrich meaning and give the patient a sense of

identity, is to let the patient customize their environment. This by enabling the possibilities to bring and display personal items.

5.5 Third level

When the other levels are fulfilled the patient can reach a sense of comprehensibility. They have their basic biological and mental needs met, and they can now start to read their environment. They are now receptive to the information about their situation and general state. The designer should take into account the information needed for the patient to truly fulfil their sense of comprehensibility. The patients need to understand the situations that occur. This can be done by providing sufficient signage together with clear affordances and signifiers to the elements of the environment they interact with. Simply put descriptions of where things are, and how they work, can be sufficient.

5.6 The sense of coherence

Once all the levels above are taken into proper account, the patient can experience a sense of coherence with the situation and environment. The sense of coherence is only truly met when, the patient has a pervasive and enduring thought dynamic, and a feeling of confidence that the stimuli derived from the environment in the course of living are structured, predictable and explicable. It also contains the experienced feeling that the resources available are there to meet the patients demands, and that these demands are worthy of engagement (Pretty, G. H).

By taking into account the patient as a whole, without separating body from mind, the designer using patient and need centered design, becomes a step closer to fulfil the patients need of a sense of coherence. This through the process of breaking down the patients need in order to understand and fulfil them.

5.7 Summary

Short summary of measures to consider and avoid when designing with need and patient centered design.

Measures to consider:

Make sure that the patient has access to sufficient nutrition in as normal surroundings as possible. Make these spaces suitable for social cohesion, but consider making environments suitable for both formal and informal settings. Make sure the patients have access to staff interactions, by ensuring the availability.

To make the situation more controlled by the patients, ensure that they have personal control of the environment. This by giving them options to regulate lightning, sounds, temperature, and other environmental factors. Access to private rooms also falls under this category.

To ensure the patients restoration and relaxation, design environments containing quiet rooms, soft lightning, access to nature and a good view. These measures can provide positive and inspirational distractions, which help the patient momentarily forget about the stress of the situation, and frees up for the development of the mind.

Measures to avoid:

When designing for hospital environments make sure to avoid disorienting design, especially long and bland corridors. This will only add to the stress of the situation. Another stressor is the machines used. The designer should avoid placing noisy machines, without explanations or that are self-explanatory, near patients when it is not essential.

Avoid designing environments without windows. This because the human contact with nature and daylight is essential to their wellbeing. The last and maybe most important factor to avoid is placing multiple patients in rooms together. Wards should

be avoided if possible, although this is not always the case.

6. FINAL REMARKS

This is by no means the only, nor a perfect solution regarding designing with the patient as a whole person in mind. This is merely a starting point towards the development of a new approach to be used on patient and need centered design in hospitals.

6.1 Main points

A lot of hospitals are now renovating their facilities. The comparison of the two theories are developed in order to influence the renovation processes. This to encourage the designers to take a new approach towards designing for hospital environments, with the patient as a whole person in mind. With emphasis on their needs, requirements, and experiences.

6.2 Further work

This theory has yet to be tested in real life, and must be researched further to be able to become a valid design approach.

References

- Angell, S. K., Keitsch, M., & Sigurjónsson, J. (2016). The significance of the secondary user experience when designing for medical diagnostics. *DS 85-1: Proceedings of NordDesign 2016, Volume 1, Trondheim, Norway, 10th-12th August 2016*.
- Braut G. S. & Iversen O. H. (2009). Sykehus. *Store norske leksikon*. Collected from: <https://snl.no/sykehus>
- Dilani A. (2017) Psychosocially supportive design. *World health design*. Collected from: <http://www.worldhealthdesign.com/psychosocially-supportive-design.aspx>
- Dilani, A. (2008). Psychosocially supportive design: A salutogenic approach to the design of the physical environment. *Design and Health Scientific Review*, 1(2), 47-55.

- Golembiewski, J. A. (2012). Salutogenic design: The neurological basis of health-promoting environments. *World Health Design: Architecture, Culture, Technology*, 5(3), 62-69.
- Golembiewski, J. A. (2010). Start making sense: Applying a salutogenic model to architectural design for psychiatric care. *Facilities*, 28(3/4), 100-117.
- Hansteen L. K. S (2015). Norges tilstand 2015. *Rådgivende ingeniørers forening*. Collected from: http://www.rif.no/media/5486/rif_stateofthenation_2015_lavopploeselig.pdf
- Kaufmann G. & Kaufmann A. (2015). *Psykologi i organisasjon og ledelse*. 5. Utgave, Fagbokforlaget, Bergen
- Kolstad A. (2007) Helbredende kunst – finnes det? Betydningen av utsmykking og estetikk i helsesituasjoner. *Tidsskrift for Norsk psykologiforening*, 44 (8). s 991-994. Collected from: http://www.psykologtidsskriftet.no/index.php?s_eks_id=28739&a=2
- Lønne A. (2016). Salutogenese. *Store medisinske leksikon*. Collected from: <https://sml.snl.no/salutogenese>
- Pretty, G. H., Chipuer, H. M., & Bramston, P. Sense of Coherence. *identity*, 23, 273-287.
- Schweitzer, M., Gilpin, L., & Frampton, S. (2004). Healing spaces: elements of environmental design that make an impact on health. *Journal of Alternative & Complementary Medicine*, 10(Supplement 1), S-71.
- Steinke C. (2015) HERD: Health environments research & design journal. *Sage journals*, 8 (2). S 31-42.
- DOI: <https://doi.org/10.1177/1937586714565611>
- Storvik. A. G (2015). 1,2 milliarder til oppussing av Oslo universitetssykehus. *Dagens Medisin*. Collected from: <https://www.dagensmedisin.no/artikler/2015/09/11/12-milliarder-til-oppussing-av-oslo-universitetssykehus/>
- Tenhue N. (2016). User experience: primary and secondary users in healthcare. Collected from: <https://medium.theuxblog.com/user-experience-primary-and-secondary-users-in-healthcare-8dd4c5c61490>
- Ulrich, R. S., Zimring, C., Zhu, X., DuBose, J., Seo, H. B., Choi, Y. S., ... & Joseph, A. (2008). A review of the research literature on evidence-based healthcare design. *HERD: Health Environments Research & Design Journal*, 1(3), 61-125.
- World Health organization (2017). Frequently asked questions. *World health organization*. Collected from: <http://www.who.int/suggestions/faq/en/>
- Yamaguchi Y. (2015). Better healing from better hospital design. *Harvard business review*. Collected from: <https://hbr.org/2015/10/better-healing-from-better-hospital-design>
- Zimring, C., Joseph, A., & Choudhary, R. (2004). The role of the physical environment in the hospital of the 21st century: A once-in-a-lifetime opportunity. *Concord, CA: The Center for Health Design*.