HEALING ENVIRONMENTS IN RADIOTHERAPY

RECOMMENDATIONS REGARDING HEALING ENVIRONMENTS FOR CANCER PATIENTS

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Acknowledgements

Executive Summary

This report is the final product of the academic consultancy project *Healing Environments in Radiotherapy*. The consultancy project aimed to provide the commissioner at a radiotherapy department in the Netherlands with general recommendations regarding healing environments for cancer patients, as well as more specific recommendations for improving the current non-optimal healing environment at the radiotherapy department. This aim was approached through a four-tiered data collection strategy. First, a review of academic literature regarding healing environments was conducted to uncover insights into the physical, and social and psychological elements of healing environments. Since specific literature on healing environments *for cancer patients* is rare, data collection efforts were extended to interviews with experts in the field, as well as desk research on good practice examples of healing environments in radiotherapy. Furthermore, a comparative case study was conducted to gain insights on how cancer patients and staff evaluate the healing environment at their radiotherapy department. Patient perspectives were investigated through focus groups with patients at the commissioner's radiotherapy department, who had experienced a non-optimal healing environment, as well as patients at a second Dutch radiotherapy department where principles of healing environment have been implemented. Staff perspectives were studied through semi-structured interviews with radiotherapy employees at both radiotherapy departments.

The findings of the literature and good practice review were substantiated by interviews with four experts in the field of healing environments, including the most recognised academic in the field, prof. dr. Roger Ulrich. This revealed a range of elements that are important for healing environments. For instance, physical elements include lighting, fresh air, smell, access to outdoor nature, indoor nature, noise levels and music, the spatial layout, a homely atmosphere, art and positive distractions, and use of colour. Furthermore, social and psychological elements comprise feeling in control, privacy, access to information, being treated with respect, counselling and support groups, caring and compassionate treatment, and a functioning medical team. Importantly, it was found that social and psychological elements are equally important as physical elements of healing environments.

Through the comparative case study, it was possible to make these findings relevant to the specific situation at the two radiotherapy departments involved in this project, which led to a range of general recommendations for improving healing environments in radiotherapy, with a specific focus on the commissioner's department.

Of course, the study presented here had some limitations regarding sampling method and data collection, which will be outlined at the end of the report. In spite of these limitations however, the study was able to argue for the importance of implementing evidence-based design principles to create healing environments in radiotherapy. Furthermore, the study points to several areas for future research, especially in the direction of staff appreciation of radiotherapy environments and the links between staff satisfaction and cancer patients' recovery outcomes.

Executive Summary

Het voor u liggende product is het definitieve rapport van het 'Academic Consultancy Project' *Healing Environments in Radiotherapy*. Het doel van dit project is de opdrachtgever te voorzien van algemene en specifieke aanbevelingen omtrent de radiotherapie afdeling. Deze aanbevelingen betreffen het verbeteren van de huidige en niet optimale *healing environment* van de radiotherapie afdeling. Deze aanbevelingen zijn tot stand gekomen door op vier verschillende manieren gegevens te verzamelen. Als eerste is er een overzicht gemaakt van de bestaande literatuur omtrent *healing environments*, om op deze wijze inzicht te krijgen in de psychische, sociale en psychologische elementen ervan. Omdat specifieke literatuur betrekkende *healing environments* gericht op kanker patiënten zeldzaam is, is er voor gekozen om deskundigen uit het vakgebied te interviewen en te kijken naar bestaande voorbeelden van *healing environments* betreffende radiotherapie afdelingen. Ook is er, door middel van een vergelijkende *case study*, inzicht verkregen in de opvattingen en meningen van kanker patiënten en het personeel gericht op de radiotherapie afdelingen. Deze *case study* betreft focusgroepen met patiënten, waar een niet optimaal *healing environment* wordt ondervonden, en een radiotherapie afdeling waar een *healing environment* al is geïmplementeerd. Aan de hand van interviews zijn de meningen en opvattingen van het personeel van beide instanties verkregen.

De bevindingen uit de literatuur en de al bestaande praktijkvoorbeelden zijn ondersteund door interviews met vier deskundigen uit het vakgebied inclusief de meest erkende, prof. dr. Roger Ulrich. Dit uit zich in een aantal elementen welke belangrijk zijn voor *healing environments* bijvoorbeeld psychische elementen als licht, frisse lucht, geur, toegang tot natuur, muziek, een ruimtelijke indeling, een huiselijke sfeer, kunst en gebruik van kleur. Daarnaast bestaan er sociale en psychologische elementen, zoals, het gevoel van controle hebben in bepaalde situaties, de toegang tot informatie en eventuele hulpgroepen, privacy, behandeld worden met respect, goede zorg en behandeling en een goed functionerend medisch team. Niet onbelangrijk is de bevinding dat de sociale en psychologische elementen even belangrijk zijn als de psychische elementen in *healing environments*.

Door de vergelijkende *case study* is het mogelijk geworden de theoretische bevindingen toe te passen op de situatie in de twee radiotherapie afdelingen die betrokken zijn geweest bij dit project. Deze bevindingen leiden tot een aantal algemene aanbevelingen voor het verbeteren van *healing environments* in radiotherapie met een specifieke focus op de afdeling van de opdrachtgever.

Uiteraard heeft deze gepresenteerde studie een aantal beperkingen betreffende het verzamelen van de gegevens en de selectie methodes, welke worden beschreven aan het einde van dit rapport. Desondanks is deze studie in staat om het belang van het wetenschappelijk onderzoek aan te tonen voor de implementatie van *healing environments* in radiotherapie. Tevens geeft de studie mogelijkheid voor toekomstig onderzoek, met name oriënterend op de tevredenheid van het personeel van radiotherapie afdelingen en op de verbanden tussen de tevredenheid van het personeel en de herstelresultaten van de kankerpatiënten.

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1. Introduction

This report is the final product of the academic consultancy project 'Healing Environments in Radiotherapy', which was conducted from March to mid June 2009 by seven Master level students from Wageningen University. The project was commissioned by the director of a radiotherapy department at a hospital in a major city of the Netherlands (henceforth the target hospital), and enjoyed substantial support from the director of a second radiotherapy department at a Dutch hospital (henceforth the control hospital).

The project was concerned with evidence-based design of healing environments for cancer patients, and aimed to contribute to the vision of the target hospital to extend the efforts currently made to create a better healing environment in the radiotherapy department, and to base such efforts on relevant evidence. Before we outline the project goals and approach in more detail, the concepts of 'healing environment' and 'evidence-based design' will be explained, and advantages and disadvantages of creating healing environments in hospitals will be discussed.

1.1 Healing and healing environments

When trying to understand what a healing environment actually is, it is important to first gain a clear understanding of the word *healing*. According to the Oxford dictionary, healing means to "make or become sound or healthy again [or] put right (an undesirable situation)" (Oxford Dictionaries, 2009a). The word *cure* is sometimes used as a synonym, though it is not the same. According to the same dictionary, curing means to "relieve (someone) of the symptoms of a disease or condition [or] end (a disease, condition, or problem) by treatment or appropriate action" (Oxford Dictionaries, 2009b). In general, whereas curing aims at removing factors that cause a specific disease or condition (pathogenesis), healing takes a more holistic approach, aimed at strengthening factors that promote health and well-being (salutogenesis). Zborowsky and Kreitzer (2008) describe healing as "harmony of mind, body and spirit". A healing environment is therefore more than just a place to be cured. In fact, a healing environment can be effective even when cure is not possible. For example, a person who is suffering from an incurable disease may still experience benefits of a stay in a healing environments.

Although the term healing environment is being used more and more, consensus on a clear definition still seems to be lacking (Van den Berg, 2005). However, several attempts have been made to formulate a precise meaning of the term. Very generally speaking, and somewhat simplistically, "a healing environment is one which makes us feel better, and feeling better is the key to getting better" (Department of Health, 2009). Although this definition provides a sense of what healing environments are about, it is too broad to be of practical use. Weterings (2003) goes into a little more detail when describing a healing environment as an environment that makes a stay in the hospital more comforable and contributes to the well-being of all users, in particular the recovery of patients. According to Ulrich (1999), the reduction of stress and mental fatigue play a crucial role in the positive effects of healing environments.

But what exactly are the factors that make a stay in a healing environment more comfortable? Van den Berg (2005) emphasizes the importance of physical elements, such as nature and natural

elements like daylight, fresh air and quiet, which have traditionally played an important role in the design of healing environments. Dijkstra et al. (2006) also describe a healing environment as "the *physical* environment of the healthcare setting [which] can encourage the healing process and patients' feelings of well-being" (p. 166, italics added). This emphasis on the physical environment is not evident in all definitions of the concept. For example, in the holistic healing tradition, a healing environment is defined as "an environment that stimulates healing processes by strengthening an individual's inner powers" (Jonas et al., in Van den Berg, 2005, p. 9). This can include both the physical and the social environment. Indeed, much of the literature emerging from the field of complementary and alternative medicine seems to emphasise social and psychological factors in the environment, rather than its physical characteristics (see for example Block, Block & Gyllenhaal, 2004; Geffen, 2004; Silver, 2004).

For the purpose of this report, a healing environment will be defined as *a treatment setting that sustains the healing process by creating a supportive physical and social environment that promotes a subjective sense of well-being, reduces stress and fatigue, and encourages a sense of hope and positive attitude.*

1.2 History of healing environments

In *Health Impacts of Healing Environments*, Van den Berg (2005) describes the historical development of healing environments in the 'Western' world, arguing that the concept of a healing environment was acknowledged throughout ancient, medieval and early pre-modern times. However, this focus on the healing properties of nature was 'lost' around the time of the Enlightenment and through increasing urbanisation and industrialisation, and is now beginning to be acknowledged again (ibid). The very first hospitals emerged around 300 BC in Greece and were located in certain temples. As the Greek believed in the divine power of nature, these temples were generally located in forested locations near springs and contained dormitories with open entry to the south (figure 1). The presence of nature, water in particular, was considered essential.

Figure 1: Greek healing temple

In the middle Ages, healthcare was usually provided by religious institutions. The nuns and monks who treated patients believed in God's ultimate authority over people's health. Intending to help the sick make a connection with God, the monasteries usually had a central courtyard on which the patients had a view (figure 2). Peace and quiet were also highly valued. In the 18th century, the pavillion style hospital emerged (figure 3). This hospital design emphasised the benefits of nature, such as fresh air, sunlight, green surroundings and a peaceful environment.
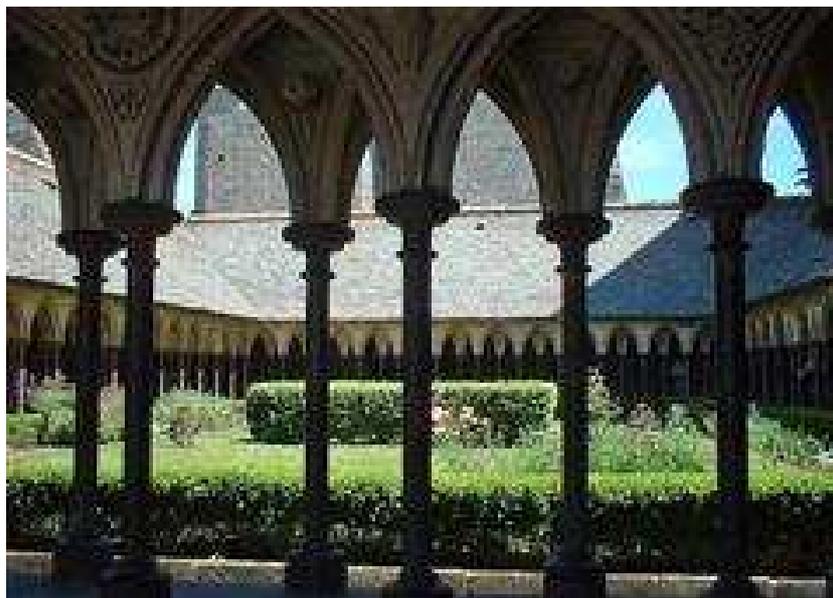
Figure 2: Monastery courtyard

In the beginning of the twentieth century, the tradition to locate hospitals in natu   environments broke off. Due to a revolution in medicine and technology combined with th   emergence of modernist design styles the environmental qualities of hospitals became neglected   in den Berg & Wagenaar, 2006). In the late 1970s, interest in the effects of the environment on h   ng and health outcomes was renewed. The US non-profit organization Planetree designed a mode   hich indicated healthcare design should provide possibilities to connect with nature. Healing ga   ns, fish tanks, waterfalls and gentle sounds were provided to connect patients, family and staff   h the relaxing and healing aspects of nature. (Van den Berg, 2005, p. 9-12). Currently, the co   ots of healing environment and evidence based design are increasingly implemented in hospitals a   ver the world. Healing environment concepts are being implemented frequently in the United Stat   are becoming common in Sweden and Denmark, as well as in Canada, and also increasingly in   an and other Asian countries like Singapore. The Netherlands is also among the countries that hav   ecently begun to implement principles of healing environment (Ulrich, 2009).

1.3 Evidence-based design

Until recently, efforts to design healing environments in healthcare were mostly based on common sense and philosophical notions of healthcare providers. When professional awareness of the role of the environment on the healing process increased, scientific evidence of the relationship between health and environment was called for. Ulrich (1984) was the first to produce scientific evidence for health impacts of healing environments. His research showed that surgery patients who were able to view nature from their rooms had shorter postoperative hospital stays, and suffered fewer occasions of being upset or 'down', and less post-surgery complications such as persistent headaches or nausea. Furthermore, patients who did not have natural views needed stronger pain relief drugs than patients with a view of nature. Such findings call for architecture and medicine to unite, to develop research agendas to explore the interaction of science and design in order to move into new directions in the design of health care facilities (UMC Groningen, 2009).

This scientific approach to designing healing environments is called evidence-based design, as an architectural parallel to evidence-based medicine (Van den Berg, 2005, p. 13). The Center for Health Design describes evidence-based design as "the process of basing decisions about the built environment on credible research to achieve the best possible outcomes" (2009). Hereby the goal "is to create hospitals that actually help patients recover and be safer, and help staff do their jobs better" (Ulrich et al., 2004, p. 26). Evidence-based design can therefore be seen as *scientifically grounded practical guidelines to creating a healing environment.*

1.4 Project goals

The radiotherapy department at the target hospital is currently situated in a basement with little access to daylight and fresh air. The commissioner wished to gain insights into elements of healing environments specifically for cancer patients, in order to be able to make informed decisions about

current and future efforts to design a healing environment at the target hospital's radiotherapy department. In order to support the commissioner in this aim, the consultancy team defined two project goals and according questions that need to be addressed (see Figure 3).

To provide general evidence-based recommendations for designing a better healing environment for cancer patients.

- What are the recommendations provided by academic literature on healing environments?
- What specific recommendations exist in the literature in terms of healing environments for *cancer patients*?
- Who are experts on healing environments and what do they consider important elements of healing environments for cancer patients?

To provide more specific recommendations for (re)designing a better healing environment at the radiotherapy department of MC Haaglanden.

- What do cancer patients and hospital staff consider important in the design of radiotherapy departments?
- How do cancer patients appreciate different kinds of radiotherapy environments?
- What are good practice examples of healing environments in radiotherapy, and which elements of healing environment do they emphasise?

Figure 3: Project Goals

1.5 Approach

To reach the project goals, the consultancy team designed a four-tiered approach to data collection in order to address a range of aspects of empirical reality in regards to healing environments in radiotherapy. This strategy, also referred to as triangulation (Jennings, 2001), was intended to enable the consultancy team to make well founded recommendations. Furthermore, data was collected and interpreted by several team members in order to ensure inter-rater reliability of the findings. All data was carefully analysed and the outcomes were used to formulate general and specific recommendations on healing environments in radiotherapy departments. The data sources that were surveyed in the four-tiered approach were (1) the academic literature on healing environments, (2) good practice examples of healing environments in radiotherapy, (3) interviews with experts in the field, and (4) patient and radiotherapy staff perspectives on the benefits of healing environments.

Figure 4: Four-tiered data collection

Figure 4 gives an indication of the range of data sources addressed by the consultancy team. The detailed strategy employed for the collection and interpretation of the four kinds of data is presented below.

Literature Review

The comprehensive literature review conducted for this project focused specifically on evidence-based design, in order to point to recommendations on healing environments, and to guide the design of the comparative case study described below. The location of relevant articles was guided by Agnes van den Berg, an expert in the field of healing environments, and was substantiated by a thorough examination of relevant databases of academic journals. While the priority was to locate literature that focuses on cancer patients, the amount of articles that fit these criteria was very limited. Therefore, findings were supplemented through desk research of good practice examples of healing environments in radiotherapy as well as interviews with experts in the field.

Good Practice Examples

The term 'good practice' is a less ambitious version of the term 'best-practice', which is often used in organisations and management to indicate an established way of business practice that has been proven to be successful in achieving a certain goal. For the purpose of this project, 'good practice' was defined as *cases or reports of hospital environments, and specifically cancer wards, in which elements of healing environments have been implemented in practice.*

The search for good practice examples intended to reveal information on ways to practically implement design modifications. This information was then used to supplement the theoretical findings of the literature review. Through an online search and through conversations with the commissioner and experts, several good practice hospitals could be identified. Where possible, these hospitals were visited or interviews with representatives arranged. Furthermore, the professional literature on healthcare design was scanned for relevant recommendations. In textbox below (Figure 6), the good practice examples drawn on for this project are briefly reviewed in terms of their dedication to implementing elements of healing environments.

GOOD PRACTICE EXAMPLES

RADIOTHERAPEUTISCH INSTITUUT STEDENDRIEHOEK EN OMSTREKEN   www.riso.ws
Deventer, The Netherlands.
The radiotherapy department RISO is linked to Deventer Ziekenhuis. The department's new building was designed to implement principles of healing environments, focusing on spaciousness, natural daylight, art, and plants and flowers. This was done in consultation with the staff and an interior architect.

MARTINI ZIEKENHUIS   www.martiniziekenhuis.nl
Groningen, The Netherlands
In 2008, Martini Ziekenhuis opened a new hospital building, which was built designed to incorporate elements of evidence based design to create a healing environment, focusing on natural daylight, colours and natural elements, as well as culture, sports, relaxation and meaning.

UMC GRONINGEN   www.umcg.nl
Groningen, The Netherlands
UMC Groningen is one of the largest hospitals in the Netherlands. Believing that medicine and architecture should unite, the hospital building aims to counteract an institutional image by designing the building to resemble a 'village' or communal space. The hospital also exhibits a lot of art in order to distract patients and give them positive emotions. Furthermore, it offers psychosocial support and counselling.

UMC ST. RADBOUD   www.umcn.nl
Nijmegen, The Netherlands
UMC St. Radboud is currently constructing a new hospital building, which implements elements of healing environment in its design. In the design of this new building, special attention was given to creating as many views on nature as possible and enhancing patient control of the environment.

GOOD PRACTICE EXAMPLES (CONT.)

ST. CHARLES MEDICAL CENTER   http://www.cascadehealthcare.org/Bend
Bend and Redmond, Oregon

St. Charles Medical Center acknowledges everything in the environment has an effect on healing, and implements an Integrative Cancer Care program, which connects patients with complementary therapies such as stress reduction, support programs, physical or occupational therapy, health education and spiritual care. The hospital also organises cancer charity and awareness raising events.

BARBARA ANN KARMANOS CANCER INSTITUTE   www.karmanos.org
Detroit, Michigan

The Barbara Ann Karmanos Cancer Institute is a Comprehensive Cancer Center that offers state-of-the-science cancer research and compassionate patient care. Focusing on bringing hope to cancer patients and families, the hospital offers support groups, seminars and complementary therapies.

PARRISH MEDICAL CENTER   www.parrishmed.com
Titusville, Florida

Parrish Medical Center brands itself as One Of America's Finest Healing Environments ®, having been one of the first hospitals to have designed and constructed (in 1996) an entire medical center using the principles of evidence-based design to create a healing environment. In doing so, the hospital was advised by the Center for Health Design. The hospital also aims for a positive organisational culture, and offers a range of services, including weekly concerts, humour therapy, and animal therapy.

MARIN GENERAL HOSPITAL   www.maringeneral.org
Greenbrae, California

Marin General Hospital is a non-profit community medical center, committed to serving communities by working together to identify and adopt best practices that benefit patients, the community and employees. The hospital has a Cancer Resource and Recovery Center with a medical library open to the public and emotional and spiritual support services for patients and their families and friends.

FROEDTERT MEMORIAL LUTHERAN HOSPITAL   www.froedtert.com
Milwaukee, Wisconsin

Froedtert is an non-profit Academic Medical Centers in partnership with the Medical College of Wisconsin. In the hospital's cancer ward, there is a Quality of Life Center offering several kinds of support services and complimentary treatment options.

BRONSON METHODIST HOSPITAL   www.bronsonhealth.com
Kalamazoo, Michigan

In 2000, the Bronson Methodist Hospital, a not-for-profit institute, was completely redeveloped, incorporating elements scientifically proven to improve healing, including space, light, colour and nature. Since then, the hospital has become a recognised best practice site for hospital design.

CENTER FOR HEALTH DESIGN   www.healthdesign.org
Concord, California

The Center for Health Design describes itself as "a leading research and advocacy organization of forward-thinking healthcare and design professionals who are leading the quest to improve the quality of healthcare through building architecture and design." The organisation's mission is to transform healthcare environments for a healthier, safer world through design research, education and advocacy. Publications by the Center for Health Design' Coalition for Health Environment Research were reviewed for the good practice study in this project.

Figure 5: Description of good practice examples

Expert Interviews

For the purpose of this project, an expert was defined as a person who is significantly involved in the design or implementation of healing environments, or in raising awareness for the importance of environmental factors in healing processes. Interviews with experts were used in order to get up-to-date, relevant information on healing environments in radiotherapy. The experts were located through personal recommendation and an Internet search, and all experts agreed to being referred to in this report. In total, four experts were interviewed through face-to-face interviews, and in one case a telephone interview. Please see Figure 6 below for a short account of the experts' kind of engagement with healing environments.

Expert interviewed	Short sketch of relevant biography
PROF. DR. ROGER ULRICH *Texas A&M University* www.tamu.edu	Dr. Roger Ulrich is a behavioural scientist and professor both in the Department of Architecture and the Department of Landscape Architecture and Urban Planning at Texas A&M University, and serves as Director of the Center for Health Systems and Design, an interdisciplinary centre housed jointly in the colleges of Architecture and Medicine. He teaches courses in the area of evidence-based design, and conducts research on the effects of healthcare facilities and nature on medical outcomes. Dr. Ulrich is probably the most frequently cited researcher internationally in the area of evidence-based healthcare design.
GERRIE VAN LAGEN *Casa Terra* www.casaterra.nl	Gerrie van Lagen studied psychology and interior architecture, is a photographer and has a long held interest in healing environments. She is currently running a consultancy bureau, Casa Terra, through which she advises health institutions, companies and individuals on how to use photographic images of nature to make the interior surroundings more pleasant.
DR. FIONA DE VOS *De Vos Omgevingspsychologie* www.fionadevos.com	Dr. Fiona de Vos is an environmental psychologist, specialized in healing environments. She has worked as an independent consultant for the past 13 years, focusing on programming and evaluating healthcare- and children's environments.
ARNOUD KWINT *Plants for People* www.plants-for-people.org	Arnoud Kwint is the founder of Plants for People, an international initiative, spreading knowledge of the benefits of plants in a working environment. Plants for People initiates and supports international research projects, collects and publicizes relevant study results and communicates these results at symposiums and workshops.

Figure 6: Experts interviewed for the project

Comparative Case Study

Because healing environments in radiotherapy are intended to provide a number of benefits to cancer patients, it was deemed important to gain the patients' perspective on the kind of elements of radiotherapy environments that are needed to create a healing environment. This kind of qualitative data is essential especially in under-researched areas, since it can provide important directives for the practical implementation of theoretical findings, as well as guide future research efforts.

Both cancer patients and radiotherapy staff can be expected to have valuable insights into which elements of healing environments 'work' for patients in terms of creating a sense of well-being, reducing stress, and supporting a positive and hopeful attitude. Therefore, the comparative case study addressed both the patient and the staff perspective on healing environments in radiotherapy. Here, it needs to be said that, although healing environments also have significant benefits for staff, the limited scope and timeframe of this project did not allow for a separate investigation of these benefits. Therefore, findings regarding the benefits of healing environments for staff were only included in the report if they provided indirect benefits for the patients.

The patient perspective was investigated through focus groups, a kind of semi-structured group interview, at the radiotherapy departments of the target and control hospitals. This enabled the consultancy team to compare insights from patient groups who had been exposed to different kinds of radiotherapy environment. The perspective of radiotherapy staff was investigated through semi-structured interviews with in total six employees at the target and control hospital's radiotherapy departments. The detailed methodology of the focus groups and staff interviews is outlined in section 3 on patient and staff perspectives.

1.6 Report structure

The literature review uncovered several elements that are important in healing environments. Through the good practice research and expert interviews, these findings could be substantiated and made applicable to the specific focus on cancer patients. In order to avoid repetition, this report presents the findings of the literature review, good practice research, and expert interviews together in one section. The third section of the report will then focus on the findings of the comparative case study, highlighting first the patient perspective on elements of healing environments, and then turning to the perspective of radiotherapy staff. The findings of the project are summarised in the penultimate section concerned with specific recommendations for healing environments in radiotherapy. Finally, the report discusses limitations of the approach taken in this project and directions for further research.

2. Elements of Healing Environments - Theory and Praxis

As pointed out in the introduction, healing environments are associated with certain physical elements - such as access to natural daylight, views of nature, and fresh air - as well as social and psychological elements - such as a sense of control, positive attitude and hope, and respectful medical staff. The following section discusses the academic literature on healing environments and evidence-based design, reviewing the most important physical and social elements of healing environments. Although the consultancy project focuses on evidence-based design in radiotherapy departments, the literature on healing environments for cancer patients is rather limited. Therefore more general literature on healing environments was also included in this review. Furthermore, the findings from the literature review are substantiated by quotations from the experts interviewed for this project. In addition, good practice examples of healing environments in healthcare settings are used to make the theoretical insights more relevant in terms of practical implementation.

2.1 Advantages and disadvantages of healing environments

When thinking of creating a healing environment in a healthcare setting, it is important to first be clear about both the advantages and disadvantages for patients, staff and visitors. Providing a very powerful argument, Ulrich refers to research in the field of business and economics, which shows that investing in the implementation of principles of healing environment actually leads to quite significant cost savings after 10 to 20 years, because patients will have shorter stays and staff turnover is reduced (2009). Going into a little more detail, Fouts and Gabay (2008) have recently provided a list of the following advantages of healing environments (p. 31):

- Reduction of stress and anxiety for patients and family members
- Reduction in pain and less need for pain management
- Reduction in occurrence of infection
- Improved sleep and restoration
- Improved patient satisfaction
- Reduction in staff stress and errors
- Improved job satisfaction
- Greater staff productivity
- Increased ability to retain quality caregivers
- Overall cost savings through increased operational efficiency and improved medical outcomes
- Differentiation from other providers in the market

Fouts & Gaby (2008) do not mention any possible disadvantages of healing environments. This uncritical view is quite typical for authors who are committed to organizations such as the American Centre for Health Design and other groups that aim to promote healing environments. However, several more independent authors(Findlay & Verhoef, 2004; Geffen, 2004; Boyce, Hunter & Howlett, 2003) have pointed out that healing environments do not only provide benefits, there may also be costs or limitations, such as:

- Patients, staff and decision makers may not (yet) be willing or able to engage in a process of transformation towards a more 'holistic' approach to healing
- A non-traditional approach can encounter problems with government and insurance regulations
- Costs may rise due to increased administration, health and malpractice insurance premiums and reduced reimbursements
- Fear of litigation can lead to increased costs and tension and may inhibit people to try a new approach
- Some implementations may have adverse effects on certain patients (e.g. daylight can have adverse effects on people who are sensitive to ultra-violet radiation)

All these factors need consideration before deciding on whether to make design implementations to create a healing environment. It is noteworthy however, that most known disadvantages are concerned with rather structural or bureaucratic issues. From a moral standpoint, this should not outweigh the significant advantages healing environments can offer in terms of health outcomes; after all, most forms of innovation are likely to initially encounter structural 'roadblocks' and negative attitudes. Hence, it is fair to say that, in general, healthcare settings should be encouraged to implement measures towards the creation of healing environments.

2.2 Physical factors

Architecture cannot heal, but it can provide an environment that supports people in coping with stress or other symptoms of illness (Hesta, 2008). There are several physical attributes of healthcare environments which have been shown to influence patients as well as visitors and staff. The most important factors are summarised below.

Lighting

In general, researchers agree that proper lighting is an important issue and that healthcare settings should not be too dim. For instance, it has been shown that hospital rooms with poor lighting can alter circadian rhythms, which causes negative effects like eye fatigue and headaches. In addition, staff will make fewer errors in brighter surroundings (Devlin & Arneill, 2003). However, one expert points out that light is the most important element of healing environments, and that harsh light should be avoided because it can be very annoying for patients to look into (A. Kwint, Plants for People).

A significant amount of literature on healing environments is concerned with a debate about the advantages and disadvantages of natural light versus artificial light. Some kinds of artificial lighting have been shown to be beneficial. For example, the use of ultraviolet light has been proven to decrease blood pressure, which in turn can help to increase protein metabolism, decrease fatigue, and increase the release of endorphins (Altimier, 2004). However, certain aspects of in-door lighting, such as luminance level, lamp colour, and flicker have been argued to affect mood and performance in a negative way. For instance, Knez (1995), studying the effect of luminance levels, compared the

effects of warm-white and cool-white fluorescent lamps on a set of cognitive tasks, mood scales, and ratings of the appearance of the lighting. The results showed that under luminous circumstances, participants preformed better at recognition and problem solving tasks. However, as Veitch (1997) asserted, Knez's experiments produced some evidence that certain lamp types and luminance combinations can have negative effects on performance.

The Coalition for Health Environment Research (2004) recommends warm, indirect lighting, as it makes the environment more natural and cheerful (Cassidy, 2003). At the control hospital, emphasis is placed on indirect lighting in areas where patients might pass through while lying on a bed, so that the light won't shine in their eyes (figure 8). Indirect lighting also gives the space a much warmer feeling, as figure 9 shows.

Figure 7: Indirect lighting in a corridor at the control hospital

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Figure 8: Indirect lighting creates a warm atmosphere

Furthermore, uniform lighting that eliminates shadows should be avoided, as shadows help define the three-dimensionality of items. Shadows make an environment 'feel' more natural, and therefore contribute to a sense of normality (Coalition for Health Environment Research, 2004). On the other hand, extreme shadows should be avoided because they might be disturbing to patients and limit effectiveness of healthcare delivery (Mahnke, 1996).

Lighting can also be used to enhance the natural, homely feel of the hospital. For example, St. Charles Medical Center uses indirect lightning, table lamps and shimmering lamps. This is the kind of lighting you can find at home, which differs a lot from lighting at offices and public buildings. The picture below shows a table lamp at UMC Groningen which combines elements of art and homely atmosphere (figure 10). In the mid 90s, fluorescent lamps that simulate natural daylight were advertised as a solution to indoor lighting issues, supposedly enabling people to "feel better, be more alert, see better, and perform better" (Veitch, 1997). However, studies have as yet been unable to demonstrate positive effects of this so called full-spectrum light on mood (van den Berg, 2005).

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Figure 9: Artful table lamp at UMC Groningen

Natural daylight, on the other hand, is often reported more beneficial than electric light for psychological comfort (Devlin & Arneill, 2003; Boyce et al., 2003). One study has shown that 73% of the respondents thought natural daylight was better for health than electric lighting (Heerwagen & Heerwagen, 1986; Van den Berg, 2005). Another study indicates that patients who are exposed to increased amounts of natural sunlight during the recovery period after surgery experience less stress and pain, use less analgesic medication, and produce less pain medication costs (Walch et al., 2005). Besides, daylight also affects levels of alertness during the day (Laurance, 2005). One expert, G.van Lagen from Casa Terra, points out that "there should be sufficient natural light from outside, so people do not feel locked up and can wander off with their eyes or thoughts", which indicates that the provision of natural daylight also has an added bonus of offering distraction for patients.

At UMC Groningen, glass roofs are used to create a light, open space. At one point, the roof can even be opened to let fresh air and direct sunlight into the building. At the control hospital, the radiotherapy building also has many large spaces full of light. In some areas, glass roofs are provided to let in natural daylight and give the place an open, bright atmosphere. In narrow corridors of the department, the walls have glass tiles in them to make the room seem more spacious and to make light from adjacent rooms shine through (figure 11).

Figure 10: A glass ceiling (left) and glass tiles in a wall (right) at the control hospital

Furthermore, the Barbara Ann Karmanos Cancer Institute is implementing a policy that every room should have a window (Cassidy, 2003). At Martini Ziekenhuis Groningen and UMC St. Radboud, the windows are placed lower so patients can see the outside world from a bed; in some rooms the windows even reach to the ground. Most of the corridors here also have windows.

Summary

Artificial lighting can have certain benefits, but certain characteristics have been argued to negatively affect mood and performance. The lighting should neither be too dim, nor too bright. Warm, indirect lighting is recommended. Lighting shouldn't create sharp shadows; neither should it eliminate shadows completely. Providing lamps can also increase a homely feel. In general though, natural daylight is much preferred as it corresponds with circadian rhythms and can reduce the experience of stress and pain. It also affects patient alertness. Furthermore, providing an natural daylight can have physical and psychological benefits for patients.

Fresh air

In-door air quality has a significant impact on health benefits (Schweitzer et al., 2004). A. Kwint from Plants for People points out that it is especially air temperature and humidity that can be a source of annoyance for patients.

One important means of providing fresh air is through ventilation or "the rate at which the indoor air is renewed per unit of time" (van den Berg, 2005). Ventilation improves in-door air quality by adjusting room temperature and humidity through provision of fresh air (van den Berg, 2005). Research has shown that in less naturally or mechanically ventilated buildings, people tend to have symptoms like dry throats, headaches and nasal congestion (Burge et al., 1987; Jaakkola et al., 1991). Furthermore, Jaakkola & Miettinen (1995) did research about ventilation rates in office buildings. These authors suggest that if fresh air ventilation rates drop below the optimal rate (15 to 25 litre per second per person), the occurrence of symptoms of Sick Building Syndrome (SBS) will increase. This term is used when people experience acute effects on health and comfort that appear to be linked to the time spent in a specific building, but no specific illness or cause can be identified (Indoor Air Quality, U.S. Environmental Protection Agency, 1991). Further research supports that air quality has an effect on health and comfort (Wargocki et al., 2000; Wargocki et al., 2004). For example, a certain level of humidity needs to be ensured indoors in order to remove and dilute indoor pollutants (van den Berg, 2005).

Fresh outdoor air seems to be most beneficial to patients. For instance, a well controlled experiment by Everett & Kipp (1991) was designed to test the impact of air-conditioning systems in operating rooms on infection rate. Results showed that "increasing the supply of outdoor air in summer led to a decrease in infection rate among 1998 patients" (van den Berg, 2005). At Martini Ziekenhuis Groningen, patients are able to adjust the settings of the air conditioning system to control the amount of fresh air in a room. Furthermore, care is taken that windows can be opened without a breeze coming in, which is achieved through a glass barrier on the outside of the windows. Some hospitals, however, claim that patients should not be allowed to open any windows in the interest of their own safety (Wartna, 2008).

G. van Lagen from Casa Terra points out that "there should be natural fresh air in the space, which does not associate with hospital smells." This leads to a next element that is discussed in the literature on healing environments; smell.

Summary

Fresh outdoor air is recommended, as this can influence temperature and humidity. Whereas poorly ventilated buildings can add to uncomfortable symptoms of sickness, good ventilation can improve health care quality.

Smell

Only little research has been conducted on the effects of smell in healthcare settings. Schweitzer et al. (2004) mention that fragrance perceived as pleasant can lower patient-rated anxiety, whereas negative odours can stimulate anxiety, fear, and stress. At St. Charles Medical Center, the in-house bakery not only bakes delicious food for the patients, but also provides a nice smell of fresh bread and coffee, which is unexpected in hospitals and can make patients feel more at ease. Importantly however, F. de Vos from De Vos Omgevingspsychologie points out that the smell of food can make people feel nauseated, so the kitchen should not be located next to the treatment area for cancer patients.

In terms of promoting positive health effects through smells, the practice of aromatherapy has received increasing attention over the last few years, coinciding with the proliferation of alternative and complementary approaches to medicine. Several studies have reported positive effects of aromatherapy and the introduction of fragrances in medical settings. For example, one Japanese study found that the smell of Japanese cedar wood (Miyazaki, Morikawa & Yamamoto, 1999) brought about changes in physiology indicative of relaxation. However, other studies have found that provision of aromatherapy during radiotherapy did not reduce anxiety (Graham et al., in Block, Block & Gyllenhaal, 2004). Hence, the influence of smells on health and well-being needs more research before any recommendations can be given.

Summary

Smells perceived as positive can reduce anxiety, whereas negative smells stimulate stress and fear. Although food smells can be perceived as positive, they can make cancer patients feel nauseated. Aromatherapy can increase a sense of relaxation, but doesn't decrease anxiety for cancer patients receiving radiotherapy.

Gardens and the outdoors

Nature and natural elements play a significant role in healing environments. For instance, Whitehouse et al. (2001) showed that adults who are stressed or depressed prefer natural landscape scenes to urban environments; going to natural settings in the outdoors can help people feel better. Here, natural elements such as trees, grass, water, visible sky, rocks, flowers and birds were mentioned as particularly helpful (ibid). Furthermore, research indicates that patients, families and staff experience less stress when they have access to nature through indoor or outdoor gardens (Schweitzer et al., 2004). The Care Hotel for Young Cancer Patients report by Hesta (2008) also states that a garden cannot cure cancer, but it

can facilitate stress reduction, since nature scenes foster positive feelings (Ulrich, cited in Hesta, 2008). Ideally, gardens in healing environments should be designed so that they provide a range of different experiences. For instance some shadier, secluded areas should be provided for patients wishing for some privacy. Having the opportunity to feel 'alone' with nature can promote a feeling of being protected for some patients. In contrast, larger open areas provide opportunities for people to gather and be social, and to enjoy the sun (Hesta, 2008). At the Martini Ziekenhuis Groningen, for example, the garden is intended to be a special place promoting calmness and social contact. It was designed in cooperation with the nature protection agency Natuurmonumenten, which advised the hospital to create a wheelchair friendly trail towards a nature park nearby (Wartna, 2008). Figure 12 shows a healing garden at a cancer centre in Massachusetts, which incorporates the positive benefits of being among trees, having sweeping views, and enjoying a water feature.
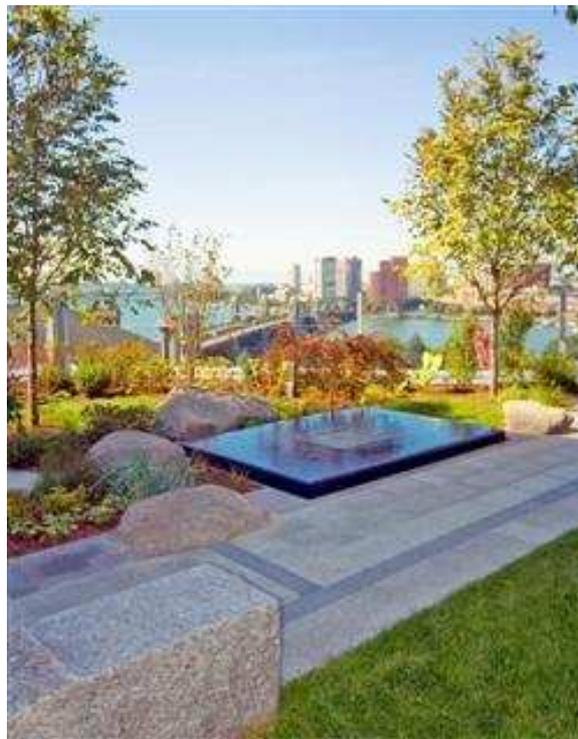
Figure 11: Healing garden at Massachusetts General Hospital

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The image below shows a small garden courtyard at the radiotherapy department of Marin General Hospital in California (figure 13). In the background, the floor-to-ceiling glass windows provide a view into the garden from the waiting area. Offices in the first floor also look out and down onto this space. According to the patients and visitors, this garden provides an area of relaxation and an opportunity to get away from the busy hospital environment, providing a "big mental and emotional lift" (Marin General Hospital, 2009). Froedtert Memorial Lutheran Hospital has created a similar central courtyard with window access from 14 of its 32 rooms, in response to a survey of visitors that indicated a need for a more visually pleasant and sunny environment (Cassidy, 2003).

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Figure 12: Courtyard at Marin General Hospital, California

An outdoor glass pavilion, for instance with tropical plants and a waterfall, as provided by the Parrish Medical Center, can act as a peaceful retreat for staff, patients and visitors. An atrium, which is a space indoors with high walls and a glass ceiling, is another way in which Parrish Medical Center introduces natural elements to the healthcare setting. In this atrium, tropical plants and water fountains reinforce the natural feel of the space and therefore contribute to the healing environment. The picture below shows a fountain in a central courtyard at UMC Groningen (figure 14).

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Figure 13: Fountain at UMC Groningen

Summary

People experience less stress when they have access to gardens. Elements such as trees, grass, water, visible sky, rocks, flowers and birds particularly contribute to this effect. Gardens in healthcare settings should ideally offer several different opportunities, so people can find privacy as well as places to meet others and enjoy the sun.

Nature from Indoors

At UMC St. Radboud, a new building will incorporate a number of healing patios with different kind of flowers, plants and other natural elements. Some patios will be accessible from wards, while others are only intended to provide a view. However, the literature suggests that there are more possibilities for implementing nature in healthcare settings. In the previously discussed study by Ulrich (1984), it was demonstrated that *views* of nature through windows can already have a significant beneficial impact on patients: participants had a more favourable post-operative recovery process if windows in their rooms overlooked a small stand of trees rather than a brick wall. Since the publication of this study, the benefits of having a natural view from the window have been replicated in several studies, both inside and outside health care settings (see Van den Berg & Van Winsum Wenstra, 2006, Chapter 3, for an overview). Hence, it is advisable for hospitals to "create an attractive, spacious environment, with big windows you can open and that offer a view on green" (Gerrie van Lagen, Casa Terra).

While access to and views of outdoor areas are important in healthcare settings, it is also vital to provide natural elements inside the building, especially in circumstances where logistics or the patient's health status make going outdoors more difficult. Elements like indoor plants or an aquarium are simple solutions to bring nature indoors.

Besides having a direct influence on the air quality, indoor plants may affect health through psychological mechanisms, such as mood improvement or reduction of stress and pain (van den Berg, 2005, p.31). For example, Lohr et al. (1996) randomly assigned computer tasks to participants who sat either in a room with plants or in one without. These authors found that participants in a room with plants responded quicker and experienced less stress than participants who preformed tasks in a computer room without plants. Larsen et al. (1998) showed that mood improves with a higher density of plants. In a recent review of the literature, Bringslimark and colleagues have pointed out that the benefits of indoor plants are contingent on features of the context in which the indoor plants are encountered and on characteristics of the people encountering them (Bringslimark, Hartig, Grindal, & Patil, 2009). According to these authors, a more robust set of findings is needed to better understand the conditions on which benefits of indoor plants depend. According to A. Kwint from Plants for People, this should not prevent hospital managers from investing in indoor plants

"to design a healing environment is a onetime investment if you speak about plants." Interestingly, A. Kwint also points out that "plants can actually grow in the dark, through an interaction between the root system and microorganisms in the potting soil".

At the control hospital, many plants are used throughout the radiotherapy department. On the ground floor, a dense display of real plants makes the place lively and green (figure 15). The plants serve also to divide large rooms to offer more privacy for the waiting patients. In addition, weekly changed bouquets are placed at the reception and throughout the department, which gives the department a welcoming atmosphere. Furthermore, at Bronson Methodist Hospital, plants and flowers fill the public areas. In the lush Garden Atrium located in the heart of the facility, over 2,500 plantings can be found (figure 16). Aquariums, pets, or fireplaces are other natural elements that can be applied in healthcare settings. For example, research has shown that blood pressure decreases when patients are looking at an aquarium (e.g., Edwards & Beck, 2002).

Figure 15: Dense array of indoor plants at the control hospital

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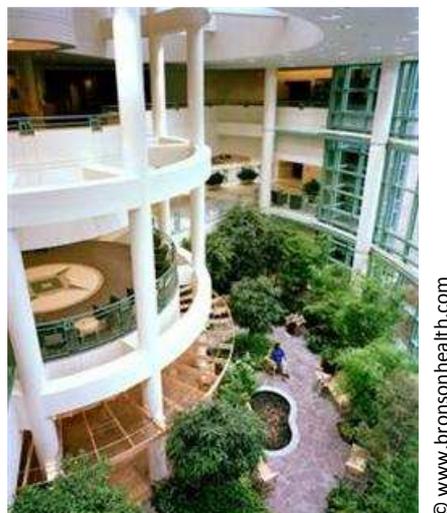
Figure 14: Garden Atrium at Bronson Methodist Hospital

"A healing environment needs nature. If real nature can't be there it should be simulated" (A. Kwint, Plants for People). G. van Lagen from Casa Terra agrees; "if there are no windows, offer people a view of a nature image or for example an aquarium with fish and plants. Preferably there should be a dog or cat walking around or birds in a aviary." The Care Hotel for Young Cancer Patients report also states that hospitals should feature some kind of water attraction, as the sound of water can be calming for patients (Hesta, 2008). Bronson Methodist Hospital, for example, provides bubbling fountains to create the calming sounds of water (Cassidy, 2003). Below is a picture of the aquarium in one of the waiting areas at the target hospital (figure 17).

Figure 16: Aquarium at the target hospital

However, placing living plants, pets, aquaria or fountains in hospital environments, especially in treatment areas, is sometimes impossible for hygienic reasons. However, A. Kwint from Plants for People refers to research that found that plants in hospitals do not lead to the feared increase in microorganisms in the air which is sometimes cited as a health concern in regards to indoor plants in hospitals. On the contrary, plants actually extract pollution from the air. Hence, he argues, it is safe to use plants in hospital settings, as long as care is taken to avoid plants that are a common allergen (A. Kwint, Plants for People). Nevertheless, hospital hygienists are often unwilling to risk infections or allergic reactions caused by plants. However, Van den Berg (2005) points out that there is substantial evidence to show that *images* of nature on screen or on pictures can also promote relief from stress and pain. For example, a study by Ulrich, Simons & Miles (2003) showed that blood donors had lower blood pressure and pulse on days when a wall mounted television displayed a videotape of natural settings (a park and a stream) in the waiting room, compared to days when the television displayed a videotape of urban settings (a commercial street and shopping mall). Parson et al. (1998), conducted an experiment in which 160 students viewed one of four different nature dominated video-tapes while stress levels were measured in terms of elevated blood pressure and electro-dermal activity. Result showed that participants who viewed nature dominated videos showed quicker recovery from stress. Another video study by Tse et al. (2002) investigated 46 healthy volunteers who were

randomly allocated to two groups. One group watched a soundless video with natural scenery, whereas the control group watched a static blank screen. This study showed that the participants reported less pain and displayed a higher pain tolerance when exposed to scenes of nature. Therefore, in spaces where living plants cannot be placed, images of nature can provide a solution. The picture below provides an example of an attractive image of nature in a hospital environment (figure 18).

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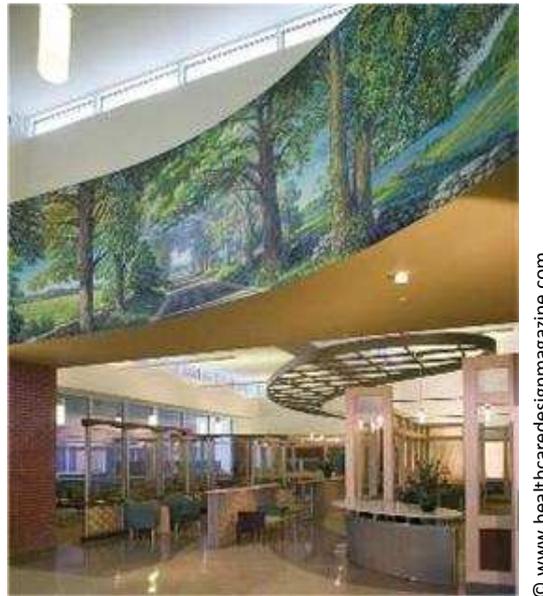
Figure 17: Large painting of natural scene over reception area

Summary

Views on nature as well as natural elements indoors can benefit patients. Examples are plants and flowers but also aquaria, pets and fireplaces. Plants can increase air quality and seeing them may reduce stress and pain. They are safe to use in hospitals, although plants that are common allergens should be avoided. Where real nature cannot be provided, images of nature on screens or pictures can also provide stress relief.

Noise, quiet and music

The reduction of noise is an important aspect of healing environments. Altimier (2004) investigated how noise influences patient mood and found that sound levels above 60dB have negative effects on rest and sleep. This can have adverse physiologic effects such as hypoxia and increased blood pressure. Much evidence shows that improving the acoustical environment in hospitals by carefully considering design factors can go a long way toward reducing

noise, improving speech intelligibility, and increasing patient confidentiality (Joseph & Ulrich, 2007). Therefore it is recommended to use the most quiet equipment and train staff to close doors when appropriate (Devlin & Arneill, 2003). Furthermore, interior design solutions for noise reduction are advisable, such as flooring made from sheet vinyl with sound-deadening properties, wall panels that are sound absorbent and chairs that are upholstered with sound-absorbent fabric (Parsons et al., 1998). It is noteworthy, however, that some hospitals dislike using sound proofing as a strategy because it increases the risk of nurses not being able to hear patients calling for help (Wartna, 2008). A report on sound control published by the Center for Health Design adds that indoor walls should fully extend to the support ceiling in order to provide acoustical as well as visual privacy (Joseph & Ulrich, 2007). At Barbara Ann Karmanos Cancer Institute, sound proofing efforts were creatively combined with creating a visually pleasing environment by covering acoustic panels in the hallways with artistic fabric (Cassidy, 2003). At Martini hospital in Groningen outdoor noise is prevented from entering the building through a glass wall that is placed 80 cm in front of the building. Even if the windows are opened, outdoor noise cannot reach inside (Wartna, 2008).

Noise reduction does not have to mean the total removal of sounds. Certain kinds of sound, in particular music, can actually have positive effects in a healing environment. For instance, playing music during minor surgery can reduce pain and anxiety levels (Rubin et al., 1998; Schweitzer et al., 2004). Furthermore, White (1992) shows that the general provision of music in healthcare settings, as well as providing a way to distract from other noise, can calm and soothe the patient's mood. The author concludes that music reduces anxiety, heart rate, and respiratory rate. His research showed that classical music is particularly beneficial in this case. Guzetta states that "music therapy effectively reduces anxiety, stress and the experience of pain" (1989, p. 610). A. Kwint from Plants for People points out, however, that "music […] can be very disturbing as well, because that's a matter of how you feel."

However, offering patients the opportunity to bring their own music, which gives them control over their environment, was shown to have positive benefits (Menegazzi et al., 1991). "If patients want, it should be possible to listen to their own music or pleasant relaxing music that is offered. […] In the background you should hear your favourite music playing" (G. van Lagen, Casa Terra).

In terms of type of music, Joseph & Ulrich (2007) recommend using music that has no accented beats, no excessive percussion, a relatively slow tempo, and a smooth melody. Implementation is relatively simple, for example by installing speakers in the ceiling, providing headphones for the patient, and installing speakers that are attached to the underside of the operating table (Parsons et al., 1998). Bronson Methodist Hospital, for example, plays classical music in public areas (Cassidy, 2003), and at Martini Ziekenhuis Groningen patients can use a Personal Service Unit to listen to the radio. At St. Charles Medical Center, the local music school uses a space in the hospital for giving piano lessons and practicing concerts. In this area, a lot of chairs and couches are situated for patients to sit, enjoy music and have a drink. Occasionally, a harpist plays in the reception area and patients seem to find it a beautiful instrument to see and hear.

Summary

Loud noises can have negative effects on patients' health. Reducing noise by using quiet equipment and closing doors is therefore important. Sound absorbing materials in the ceiling and on the walls contributes to this, although it might make it harder for staff to hear when patients are calling for help. Certain sounds, like music, can have a positive effect on patients' anxiety levels and mood. Slow, smooth music without accented beats is preferred. As music can be disturbing as well, it is recommended to give patients the freedom to choose.

Spatial layout

Patients need to be able to find their way around the hospital relatively easily, because feeling lost is likely to create feelings of anxiety (Wartna, 2008). Here, asymmetric building design, like the one implemented at Martini Ziekenhuis Groningen helps patients to orient themselves. However, walking distances should be kept short for the patients as well as visitors and staff (Wartna, 2008).

F. de Vos from De Vos Omgevingspsychologie recommends to make sure that the hospital in general, and its entrance, the parking, and the emergency room in particular can be easily found, and that there are signs inside and outside the building. At Martini Ziekenhuis Groningen for example, the entrance hall has only one information desk, not a separate admission desk, and when a visitor or patient enters the hospital, the rotating door steers the person directly toward this information desk. Similarly, at Parrish Medical Center a prominent circular entrance clearly visible from the road leads and invites people to the centre's front door. When entering, one comes into an atrium-like lobby, from where all departments and elevators are visible and arranged in a semi circle.

At the control hospital, patient flow is regulated so that follow-up patients have a waiting area which is separate from the one for patients who are currently in treatment; patients who come for the first time also have their own waiting room. This set up is very efficient and helps patients at different stages of treatment not to be confronted with each other. Furthermore, patients who come for a whole-day treatment have the possibility to use a separate room with comfortable facilities and special services, such as an Internet connection.

Garling (1984) and Weisman (1981) indicate that hospitals should provide good signs with large script that attract attention, and use different colour schemes for different departments. However, Park and Mason (1982) have demonstrated that most people do not find colour coding as effective as the provision of appropriate signs. Martini Ziekenhuis Groningen uses a signing system that was inspired by Schiphol Airport. Seven signposting routes are identified by letters and numbers, and signs become more detailed as the patient or visitor comes closer to their destination. Furthermore, every out-patient clinic has one specific colour theme so the different clinics are easily recognized. UMC

Groningen uses an even more creative signage system based on street names and 'house' numbers, because people understand this kind of way-finding. Furthermore, Parrish Medical Center tries to provide 'landmarks' to help patients orient themselves.

Summary

In the spatial layout of the hospital, it is important that people can find their way easily. This can be achieved by making the building asymmetrical and using clear signs. A recognizable kind of way-finding is recommended, such as street names. Different patients should have different waiting areas and walking distances should be kept as short as possible.

Homely atmosphere

Devlin and Arneill argue that it is important to design hospital environments in a homely fashion, because people are "attracted to healthcare environments that are reassuringly familiar" (2003). Indeed, several experts agree, stating that day treatment for cancer patients should provide a pleasant environment with a "living room feeling" to it (F. de Vos, De Vos Omgevingspsychologie), and that waiting areas should be made comfortable, for instance through providing reading tables, and dividing several areas through the use of plants; "The space should be arranged with natural materials and nicely designed furniture. There should be a rug on the floor [and] flowers in a vase" (G. van Lagen, Casa Terra). The picture in figure 19 expresses nicely what this 'homely' atmosphere means.
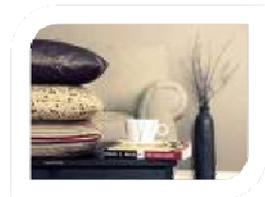
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Figure 18: A homely atmosphere

UMC Groningen makes a reference on the hospital's website that stress will be reduced when patients can feel like 'non-patients' as long as possible and at Martini Ziekenhuis Groningen, rooms are designed to resemble a living room as much as possible. At St Charles Medical Center, waiting rooms are all designed somewhat differently: some with a fireplace and all of them have inviting chairs and coffee and tea are available. At the control hospital, the waiting rooms offer the possibility for interaction, but also for privacy. For instance, some waiting rooms feature several sitting corners, which make it possible to sit with relatives and also looks cosy (figure 20). Furthermore, the reading tables are often used by people who would like to be alone (figure 21); reading a magazine at the table provides this possibility. The waiting rooms all have coffee machines and water dispensers, and 'real' cups and glasses are used instead of plastic to make the patients feel more at home (figure 22).

Figure 19: Sitting corners in a waiting room at the control hospital

Figure 20: Reading table in a waiting room at the control hospital

Figure 21: Water dispenser and Internet access in a waiting room at the control hospital

The consultation rooms at the control hospital are also designed in a way that it is very comfortable and efficient, and avoids giving the impression of a sterile environment. The rooms are split so that one side serves as a consultation room and the other as examination room (figure 23).This enables patients to talk to their doctor in an office like setting, and it also creates more privacy for physical examinations, since the second half of the room is not immediately visible when entering the room. Furthermore, behind the consultation rooms is a back office, where the doctor can take a phone call without passing the patients in the waiting rooms, which could make them impatient.

Figure 22: Consultation room (left) and examination room (right) at the control hospital

Tudor (2008) applies this concept of familiarity to the architecture of hospital buildings and recommends that design should focus on creating a community. The author refers to an architectural plan for a Care Hotel for Lung Cancer Patients, in which spatial design emphasises linking the private

with the public to create an open environment for social interaction. For instance, the Care Hotel plan links views from patient rooms to the garden, from the garden to the lounge area and some water pools, and from the patients entrance to the more public restaurant and lounge area (ibid). The sense of community is perhaps even better exemplified by UMC Groningen, where the hospital's entrance hall looks more like an entrance hall of a train station or a shopping mall. From the entrance hall you can walk into two streets without patient clinics on the side. Both of the two streets have a nature theme with plants, flowers and rocks. The two streets come together at a small shopping street. Right before the shopping street, there is a big fountain with a small café next to it. This is the place where for example performances, discussions and television recording take place.

However, Van den Berg (2008) points out that a hospital should not be too homily either. People expect a hospital to be an imposing building with a professional atmosphere. It should immediately give people the feeling that this is a place to be cured, which in itself makes a contribution to the healing process.

Hospitals, and especially radiotherapy units, are characterised by the presence of large machines and equipment that can seem strange and impersonal to patients and their family (Cutter, 1990), which makes it difficult to feel at home. Hence, it is advisable to conceal technical equipment from patients' eyes, which can be achieved for example through the use of screens or closed storage areas in treatment rooms. According to Cooper-Marcus & Barnes (1995), cluttering rooms with furniture should be avoided; the focus should be on quality, not quantity. In this context, it is also vital to avoid having many items and medical equipment lying around. At Barbara Ann Karmanos Cancer Institute, this problem was solved by building closets directly into the walls of patient rooms and treatment areas (Cassidy, 2003). The treatment rooms at the control hospital are designed with round screens around the radiation machines. Behind these screens, additional equipment such as treatment masks is located, so that patients do not have to see all the equipment. Furthermore, these rooms do not have doors, so that patients don't feel locked up during treatment. Instead, radiation is prevented to come into public areas of the department through curved corridors made of thick walls (figure 24).

Figure 23: Screens around treatment machine (left) and corridor toward treatment room (right) at the control hospital

In the context of spatial design, it is also interesting to note that children perceive the environment differently from adults. Children are mainly concerned about the functional aspects of the environment, such as whether a tree affords climbing. Adults consider, 'what does the environment look like?', whereas children ask, 'what can I do here?' (Whitehouse et al., 2001). This is important to consider in children's wards, but also in the waiting areas of all healthcare settings. The provision of some form of entertainment for children, such as small tables with drawing materials or a playing corner with toys can significantly reduce annoyance levels of everyone involved; the children, their parents, other patients, and staff. St. Charles Medical Center addresses this need for playfulness also for adults, by placing many large tables in public spaces of the hospital, on some of which lie uncompleted puzzles that invite patients and visitors to continue fitting pieces into the puzzle.

Summary

People are attracted to hospitals that are reassuringly familiar to them. Therefore, avoiding seemingly sterile environments and making it feel more like home is advisable. However, this shouldn't be overdone, as people expect a certain professional atmosphere in a hospital. Concealing technical equipment and clutter in cabinets and behind screens also contributes to a comfortable environment, as well as providing possibilities for children to play.

Art and positive distractions

Healthcare settings often provide art and decorations in order to improve the aesthetics of the environment and provide visual distractions. "In UMC Groningen, even the parking garage underneath is made attractive, [based on reasoning that] when people don't feel safe and well when they are entering an environment, it's not a good beginning." (A. Kwint, Plants for People). Martini Ziekenhuis Groningen implements a concept of reflection and inspiration as distraction for the patients. The four themes of this concept are spirituality, nature, art and sports, and the aim is to make the patient feel as comfortable as possible. Similarly, at Parrish Medical Center, a "Circle of Life" theme is repeated throughout the building, which is intended to imply hope and optimism. At the control hospital, several artworks and sculptures are placed throughout the department. An art renting company regularly replaces the artworks, so that new distractions are offered on a regular basis. In the largest waiting area, a big white elephant sculpture entitled 'Wish I Could Lift You Up' is hanging under a glass ceiling (figure 25). The symbolic meaning of this sculpture is explained on a wall panel as intending to make light what is heavy. With this, the elephant represents the ideology of the control hospital's radiotherapy department to make the heavy journey of the patients through radiotherapy as 'light' as possible. However, it should be kept in mind that this can also be interpreted differently. Some patients may see this as something heavy hanging over their heads.

Figure 24: Elephant sculpture at the control hospital

Research shows, however, that not all kinds of decorations offer the same kind of benefits. For instance, Devlin and Arneill (2003) recommend using images of happy faces to provide a more cheerful environment. Furthermore, these authors emphasise that pictures of animals are highly favoured by patients (ibid). In addition, pictures of natural environments featuring water, the ocean, mountains, and open views of landscapes tend to be appreciated by patients (Horsburgh, 1995). At St. Charles Medical Center, the hall features an enormous window in front of which there are a number of chairs and loose seats that invite waiting patients to enjoy the view.

Importantly, the use of abstract art is discouraged, as it can promote feelings of uncertainty and insecurity in patients (Schweitzer et al., 2004). G. van Lagen from Casa Terra explains "there should be art that 'feeds', that does not call for doubt, confusion or estrangement". In terms of wall coverings, Cutter (1990) recommends the use of 'friendly' materials, such as tapestry or patterned fabric. Again, G. van Lagen agrees, recommending to "use textile; textile always has a softening effect on a space." However, it can be considered wise to avoid patterns and designs that are somewhat eccentric or highly fashionable, since they may not be appreciated by everyone. Martini Ziekenhuis Groningen uses specific selection criteria for art displayed in the hospital. Artworks have to be warm, expressive, and inviting observation, but should not be confronting. At UMC St. Radboud, a thematic system will be implemented in their new hospital building, in which each clinic is assigned a certain 'atmosphere' that defines the colours and artworks used. Parrish Medical Center on the other hand, designed the interior environment to be consistent with the regional and organizational culture in terms of coastal colours and local artworks.

Artworks can be expensive, which can make it difficult for hospitals that have to operate on a budget to implement many efforts to create a pleasant environment through decorations. UMC Groningen has found an innovative solution by offering their staff the opportunity to display their own artwork in the hospital. Furthermore, the hospital works with local artists to design decorations, and collaborates with art schools in making the hospital environment more pleasing. For instance, the elevators were all designed by students of an art school in Groningen. This strategy allows the hospital to display a great variety of artworks, one of which is shown in figure 26.
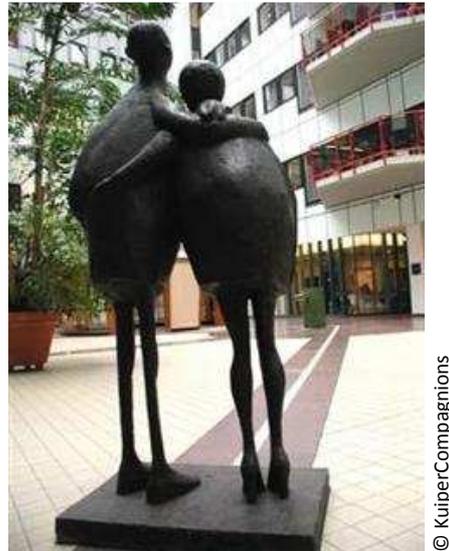
Figure 25: Sculpture at UMC Groningen

Importantly, artworks are not only provided because they look nice, but because they offer distraction, which can be very helpful for seriously ill people who are dealing with a lot of anxiety. To aid this distractive effect, artworks displayed at Parrish Medical Center are arranged like in a gallery, so that patients are invited to stroll around to look at the artworks.

In terms of offering other distractions, Martini Ziekenhuis Groningen also provides a large screen on which patients can watch sports events. Furthermore, every bed in the hospital has its own Personal Service Unit. This is a screen above the patients' bed which has several applications. The patient can use it to listen to the radio, watch TV, go on the internet, use the telephone, and search for hospital information. Such extra 'distractive' services also enable the patient to keep in touch with the outside world through TV, internet and being able to talk to others (F. de Vos, De Vos Omgevingspsychologie).

Providing distractions is also very important in radiotherapy treatment rooms, since patients have to lie still while being alone in a room with a big machine, which can feel threatening and produce anxiety. At the control hospital, this problem is addressed by decorating the ceilings of treatment rooms with a screen with many small holes, through which tiny shining lights simulate a starry sky (figure 28). Another method is to provide posters on the ceiling, or to provide other visual distractions, such as light diffuser panels or virtual skylights (figure 29) (see for example www.theskyfactory.com or http://www.stratusdesigns.net/).

Figure 26: Starry sky above the treatment machine at the control hospital

© www.theskyfactory.com

Figure 27: Light diffuser panel in treatment room

Summary

Works of art can improve the aesthetic appeal of a hospital and provide distraction. Preferable they should be warm and expressive and feature happy, cheerful images and natural elements. Abstract art is discouraged, as this can produce feelings of uncertainty and insecurity. When artworks get replaced regularly, patients and staff won't get bored by looking at the same pictures all the time. Other distractions, such as radio, television, internet and telephone, can also contribute to positive distraction.

Colour

In ancient Egypt and China, colour therapy was often used, with each organ being associated with a certain colour. In Western society, such practices are regarded as 'new-age medicine' which is not substantiated by scientific evidence. There is however some indication that colour influences people psychologically. For instance, Clark (1975) found that green environments seem to make time pass quicker. However, Mahnke (1996) notes that the colour green has been overused in hospital settings and now evokes unpleasant institutional associations, a phenomenon that is similar for the colour white. Malkin (1992) argues that using the colour white in hospital settings can be detrimental to healing, because it creates a bland monotonous environment and leads to sensory deprivation. Block, Block and Gyllenhaal (2004) agree, stating that dull and grey shades should be avoided, since they are associated with depression. Instead, they recommend using warm tones which are not too bright or dominant. G. van Lagen from Casa Terra agrees, recommending to "use pleasant, non intrusive colours, [such as] soft colours or earthen colours", and Bronson Methodist Hospital, focuses on using natural colours and textures (Cassidy, 2003).

However, Devlin and Arneill (2003) favour the use of bright colours to promote positive moods. Furthermore, Altimier (2004) states that the use of primary colours in particular can be calming and promote rest. F. de Vos from De Vos Omgevingspsychologie points out that some colours are associated with certain liquids, like blood and urine, and should therefore not be used.

A report by Tofle et al. (2008) finds several agreements in the literature in terms of colour in healthcare settings, namely that colour can make the environment seem less institutional, and that warm colours make objects look heavier than cool colours. Furthermore, cool colours tend to be relaxing while warm colours offer stimulation. At St. Charles Medical Center, the walls of the hospital have a warm tint, sometimes light green and light yellow. At UMC St. Radboud, patient rooms each have an *Ambilight* (manufactured by Phillips). This is a lamp with different colours, which can be adapted according to individual preference. The hospital expects that with this kind of lighting the mood and well-being of the patients can be influenced (Wartna, 2008).

To determine which colours are warm and which cool, it may be useful to consult the Colour Wheel, which is often used in interior design (figure 29).

Figure 28: The Colour Wheel

Schweitzer et al. (2004) point to the largely anecdotal nature of such claims about the effects of colours in indoor environments; no thorough research has been conducted on the influence of colours on (cancer) patients (Block, Block & Gyllenhaal, 2004). Moreover, Tofle et al. (2008) critique that "there are no direct linkages between particular colours and health outcomes of people". They argue that colours do not contain inherent emotional triggers; emotional responses to colours are caused by culturally learned associations and by the physiological and psychological makeup of people (ibid). It therefore seems difficult to give specific recommendations on colours to be used in healing environments.

Parrish Medical Center bases decisions on which colour to implement in which environment on so called 'healing properties' of colours, which are outlined in figure 30. While this information may not be based on scientific evidence, it may nevertheless be useful for designing pleasant environments.

PURPLE

Comforts, spiritualizes, creates mystery, and draws out intuition. For clarity of thought, worldly ambitions, healing.

GREEN

Balances, normalizes, refreshes, encourages emotional growth. For health, luck, nurturing, growth, prosperity.

BLUE

Relaxes, cools, produces tranquil feelings and peaceful moods.

TEAL

Tranquil feelings and balances.

YELLOW

Cheers your spirit, increases energy. For confidence, joy, intellect.

ORANGE

Encouragement, stimulation, adaptability, courage, stimulates appetite and conversation.

RED

Empowers, stimulates, dramatizes, and symbolizes passion. For strength, health, protection, energy.

PINK

Communication, relaxation, healing of spirit, success, compassion, honour.

Figure 29: Chart of 'Healing Colours' used at Parrish Medical Center

Summary

Little consensus exists on the use of colours in hospitals, although most agree that it can decrease the institutional atmosphere of hospitals. In general it is recommended to use warm, soft, natural colours. Grey and dull shades should be avoided, as they can produce anxiety. Similarly, intrusive and overly bright colours shouldn't be used.

2.3 Social and psychological factors

Besides physical factors of the healthcare settings, social and psychological factors also play an important role in healing environments. Below, a review of current literature is provided, identifying a range of relevant non-physical factors in healing environments. However, it has to be noted that many (though not all) accounts seem to be based on the personal experience of the authors rather than scientific research. Nevertheless, it is well established that social and psychological aspects significantly affect physical health and well-being, as evident in the increasing amount of scientific journals that specifically address this connection between sociology, psychology, and physiological health (for example *Health,* an interdisciplinary journal for the social study of health, illness and medicine; *Social Science and Medicine*; *Journal of Health Psychology).* Hence, the available research on social and psychological factors in healing environments deserves some attention in this discussion.

Feeling in control

People who are diagnosed with a serious disease can often feel out of control. Processes are happening in their body which they can do nothing about. "In a hospital environment, people are 100% dependent on the doctor or nurse; they even lose their identity and become a number on a file. This can be very threatening" (A. Kwint, Plants for People). In healing environments, it is therefore important to restore a certain sense of control. An important means of establishing this is to involve patients in decision making processes. This may concern decisions regarding the hospital where patients are being treated and the preferred treatment methods.

Another way of giving patients more control is to offer lifestyle recommendations that encourage active engagement and a sense of taking control of one's life, such as a change of diet or exercise (Block, Block & Gyllenhaal, 2004). The architectural plans for the Care Hotel for Lung Cancer Patients, for example, intend to provide a diversity of facilities that patients can choose to use, such as a restaurant, silence room, library, or spa (Tudor, 2008). Here, it is noteworthy that such facilities might attract additional expenditure, which can in turn be used to finance the implementation of a better healing environment.

Furthermore, a relatively simple way of providing opportunities to exercise freedom of choice is to enable patients to adjust their treatment and recovery environment (such as changing the lights or temperature), their companionship (flexible visiting hours) and the time at which other activities take place (Silver, 2004; Fouts & Gabay, 2008; Provinciaal Patiënten/Consumenten Platform Utrecht, 2001; Zborowsky & Kreitzer, 2008). At both Martini Ziekenhuis Groningen and UMC St. Radboud, patients in all rooms can operate the light switch on their own. Even simple measures, such as giving patients the opportunity to choose ambient music themselves (Joseph & Ulrich 2007) or enabling patients to take a folding chair and place it where they wish, can improve their feeling of control and self-esteem (Tudor, 1991, cited in Hansen, 2008). Furthermore, F. de Vos from De Vos Omgevingspsychologie recommends giving people the option to take their own drinks or snacks when they feel like it, and give people in the waiting room the option to sit together with others or to sit alone. At St. Charles Medical Center for instance, each waiting area has several different types of furniture, so that people can compose their own furniture arrangements. Hence, the hospital does not force patients to sit in rows in the waiting room, but invites freedom, comfort and individual character. The picture below is a good example of such a furniture arrangement (figure 31). The red bench in this case is more suitable for people looking for privacy, while the brown sitting arrangement in the foreground invites interaction.

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Figure 30: Seating arrangement for choice of privacy or interaction

Summary

An important way to restore a sense of control for patients is to include them in decision making processes. They should have influence over their environment, including light, temperature, companionship, and at what time activities take place. In the waiting area, patients should have the possibility to sit alone or together with others. Lifestyle changes that encourage taking control of one's life should also be promoted.

Privacy

Single rooms are much recommended for several reasons. For instance, private rooms reduce the risk of infection (Zborowsky & Kreitzer, 2008) and provide an optimal situation for the staff to consult with patients. Furthermore, they ensure privacy when the patient speaks with family and friends. At St. Charles Medical Center, all patients have single rooms with a folding bed for family members to stay. Family members can help for instance with washing, dressing, feeding and bringing the patients to bed. On the bedside table a menu card with the heading 'room service' is placed, which adds a sense of homeliness. This card also contains instructions for feeding patients, and the menu is varied and appealing. Data from Press Ganey (1999-2002), a healthcare consultancy firm in the United States, show that patients who enjoy private hospital rooms have much greater satisfaction levels than patients in shared hospital accommodation (Schweitzer et al., 2004). This points to a dilemma, since patients often like privacy, whereas staff may prefer to have a good overview (F. de Vos, De Vos Omgevingspsychologie). It should also be kept in mind that some patients with few social contacts might in fact prefer to be in room with others. However, an effort should be made to give patients the opportunity to "create [their] own sheltered space with curtains or a screen" (G. van Lagen, Casa Terra).

Summary

Private rooms are recommended because they reduce risk of infection, provide privacy and increase patient satisfaction. However, they may make it harder for nurses to keep a good overview, it might not always be financially possible to create private rooms only, and some people may prefer to have company. Attempts should be made to offer people the *possibility* to stay in a private room.

Access to information

Naturally, patients have a high need for understanding their situation. Especially after a diagnosis has been made, patients are being confronted with a great deal of new and often unsettling information. However, it is not always easy to understand, remember and process this new knowledge (KWF Kankerbestrijding, 2007). Furthermore, too much, confusing or untrustworthy information can cause psychological distress (Kaplan & Kaplan, 2003; Block, Block & Gyllenhaal, 2004). A recent study shows that cancer patients only remember about a quarter of the information they received in a conversation with their doctor or nurse (Jansen, 2009). Giving more information or ignoring the emotions of the patient makes them remember even less. Asking patients about what information they need is therefore very important (ibid). St. Charles Medical Centre provides a large library with books that are related to syndromes, healing processes, crisis processing, and life considerations. In this space a large reading table is situated which invites patients who are interested to learn more about their condition to sit and read the books or folders in their own time. According to A. Kwint from Plants for People, patients should have access to a choice of media when it comes to educating themselves about their illness. Hence, this could also involve the use of videos, books, and referral to support groups and internet sites. At Froedtert Memorial Lutheran Hospital for example, the Small Stones health resource service in the hospital's Clinical Cancer Center empowers patients to make informed decisions about health and wellness. It features a library, health cyber centre, and a retail store. The service is staffed by nurse educators and focuses on the needs of individuals living with cancer. Furthermore, the Barbara Ann Karmanos Cancer Institute brings out a monthly publication titled 'Karmanos Hope', which contains stories of individuals dealing with and surviving cancer, and intends to provide patients with a sense of hope.

Summary

Patients have a need for relevant information which they can understand and process. Too much or confusing information can invoke stress and should be avoided. It is therefore useful to provide possibilities to ask questions as well as media through which information can be found.

Being treated with respect

Just like anyone else, patients want to feel they are being recognized as a unique person with individual needs. Even though hospital staff is often under a lot of pressure for time, it is vital to ensure that patients are receiving personal attention and are being treated with respect, so that they feel taking seriously (Block, Block & Gyllenhaal, 2004; Geffen, 2004; Provinciaal Patiënten/Consumenten Platform Utrecht , 2001). Hence, as F. de Vos from De Vos Omgevingspsychologie states, it is important to explain things to people. She points out that healthcare is a process of giving and taking, of treating people with respect. Furthermore, she states that it is important to provide a view on the reception area from the waiting area, because patients want to feel seen and not forgotten about, even though staff may not want to work in the view of the patients all the time.

Summary

For patients it is important to feel taken seriously. They like to feel noticed, receive personal attention and be treated with respect.

Counselling and support groups

Providing patients with the opportunity to receive psychological therapy or counselling may be an important step towards enabling a more positive outlook on their situation (Block, Block & Gyllenhaal, 2004). Martini Ziekenhuis Groningen, for instance, provides rooms for spiritual reflection and worship for all confessions of faith. Furthermore, at Froedtert Memorial Lutheran Hospital, the Jeffrey C. Siegel Quality of Life Center offers services such as psych-oncology nursing, nutrition advice, and complementary medicine, as well as connection to state welfare resources, spiritual counselling for cancer patient, and cancer genetic counselling. The hospital also a Cancer Rehabilitation Gym, in which patients receive personalised fitness advice by physical therapists. Furthermore, in-house support groups are offered for patients with different kinds of cancers. St. Charles Medical Center has a similar service in the hospital's Integrative Cancer Care program. In addition to the above mentioned services, this program offers pet therapy and educational classes for cancer patients and their family.

Some patients might also wish to get involved with support groups outside of the hospital they are receiving treatment in. In the US, the organization Cancer Lifeline (www.cancerlifeline.org) organises individualised meetings for cancer patients and their family, friends, or any other group of people concerned about cancer. Acknowledging that communication among family members often suffers when cancer enters their lives, the Cancer Lifeline meetings are facilitated by a counsellor or nurse, who gives each person the opportunity to speak, uninterrupted, about what they are thinking and feeling.

In the Netherlands, several foundations for cancer patients, their families and ex-cancer patients exist. These non-profit organisations provide the opportunity to be heard and speak with people who are going through similar experiences. Often the foundations also offer relaxing and creative activities organised by volunteers. These volunteers are often ex-cancer patients or their relatives. Other volunteers are not personally afflicted by cancer but have a background in nursing or community work.

Examples of such foundations are the 'Inloophuisen' (for example www.inloophuishaaglanden.nl, or www.inloophuisdeboei.nl), the Toon Hermans Huis (www.thha.nl) and Foundation Kleef (www.stichtingkleef.nl). These foundations are sharing the same goal, namely to maintain the quality of life of cancer patients as good as possible by offering an informal place where every person feels welcome.

Summary

Psychological therapy or counseling is an important means for cancer patients to develop a more positive outlook on their situation and maintain quality of life. Hospitals should therefore provide a service to link patients to in-house or external support groups, confessional support services, and complementary treatment options.

Love, care and compassion

Geffen (2004) points out the importance of the human dimension in healthcare, stating that "what people ultimately want most from their healing environment is meticulous medical care delivered with genuine love, caring, and compassion. [...] These factors are far more important than the physical trappings of the centre" (p. S98). G. van Lagen from Casa Terra agrees; "there should be staff with a cordial, warm and social appearance." The vision of the control hospital's radiotherapy department is to take care of patients in the same way as if for a family member, which means that a caring and warm atmosphere should be created through the environment, but also through the attitude and behaviour of the radiotherapy staff.

This means that people who work in healthcare settings need to be encouraged to balance their own psychological tendency to disconnect from emotional aspects of their work with a willingness to show compassion and appreciation for the patient's feelings and needs. Naturally this also involves "giving people the opportunity to have contact with their family or friends who can sit with them" (G. van Langen, Casa Terra) while getting prepared for treatment or during consultations. At UMC St. Radboud, this need for maintaining social contact is addressed by offering family members the opportunity of using an extra folding bed in the patient's room.

Geffen goes further and points to the need for healthcare staff to genuinely engage with their patients on an interpersonal level that goes beyond the direct provision of care and expertise (2004). At Parrish Medical Center, several community celebrations and festivities are held each year, which are aimed at fostering familiarity and reducing the fear of many people to come to a hospital.

Summary

The staff should be genuinely engaged with patients when providing care by showing compassion and appreciation of the patients' feelings and needs. For staff it might be helpful to think about how they would like a family member to be treated and then to act in that way.

Integrated medical team

A sense of hope and positive outlook can be encouraged in patients if they see all members of medical, nursing and allied health staff working together to develop a coherent plan of action. Geffen (2004: p. S98) points out that "[t]he conscious and unconscious thoughts that staff members have regarding the meaning of health and illness … can profoundly influence, both positively and negatively, the healing process." Hospital staff should therefore critically reflect on their own attitude towards health and all embrace the same vision. This will help patients to know what they can expect, which restores a sense of security and control. All communication towards patients should be open, honest, supportive and life-affirming (Geffen, 2004; Block, Block & Gyllenhaal, 2004). Also, it is vital to encourage a sense of humour despite the patients' situation, as this is an important way to focus on the positive (Horsburgh, 1995).

Of course, hospitals often have to deal with lack of funding, so that staff can be under considerable time pressure. A. Kwint from Plants for People illustrates this with an example; "when you go to the hospital with a bunch of flowers you say to the nurse 'can you please put them in a vase?' So the nurse first needs to pick them up, then bring them somewhere else, get a vase, fill the vase… […] It just costs too much time." Such a stressful environment can make it difficult for staff to focus on humour and positive attitude. However, this should be even more reason to create a healing environment, as "it also has a positive impact on the staff, since the working environment is more pleasant" (G. van Lagen, Casa Terra).

One way of ensuring that staff is happy with their working environment is to involve them in decision making processes about its design. At UMC Groningen, for example, every out-patient clinic has got their own budget for decorations, and an interior designer is available to help with planning. In this way, the staff contribute to the creation of their own working environment and the clinic's identity, which makes them feel more 'at home' in the hospital (Wartna, 2008). This positive attitude of staff

towards their working environment has, according to (Pati, Harvey & Barach, 2008), great effects on their work satisfaction and efficiency, which directly translates to a more positive experience for patients.

Summary

Patients are treated best when all staff work together on the same goal and share the same vision. Their communication toward patients should be honest, supportive and life-affirming. It is therefore important for radiotherapy departments to have happy staff members. One way to reach this is to involve them in the decision making process of designing the hospital.

3. Healing Environments - Patient and Staff Perspectives

3.1 The need for a qualitative study

Patients who receive radiotherapy are different from other patients in a hospital in a number of ways. First, about 90% of radiotherapy patients are out-patients, and therefore do not occupy a room in the hospital. Instead, they come to the radiotherapy department on a regular basis, often several times per week (Struikmans, 2009; Immerzeel, 2009). Hence, in their case, the healing environment should be implemented in waiting areas as well as treatment rooms, since this is where cancer patients spend most of their time in the hospital. Secondly, radiotherapy patients have received a diagnosis that may be life-threatening and requires intensive treatment. Consequently, they can be expected to be dealing with high anxiety levels and stress, as well as depression (Immerzeel, 2009), which may affect their reaction to or appreciation of elements of healing environments.

To date, there are only two well-controlled empirical studies that specifically deal with healing environments for cancer patients. One intervention study showed that women with newly diagnosed breast cancer showed significantly greater improvement in performance on attention tasks after following a nature based activities program (Cimprich & Ronis, 2003). Another post-occupancy evaluation study of a healing garden surrounding a pediatric cancer centre indicated that emotional distress and pain were lower for all groups (patients, family, and staff) when in the gardens than when inside the hospital. As yet, there are no studies that have investigated cancer patients' appreciation and experience of radiotherapy environments. Therefore, it was deemed necessary to gain an impression of this patient group's specific interpretation of, and reaction to elements of healing environments in radiotherapy. Only with this specific knowledge can radiotherapy departments start to implement evidence-based design for healing environments.

Besides cancer patients, staff of radiotherapy departments, as well as family and friends of patients can be expected to possess valuable insights regarding healing environments for treatment of cancer. It was therefore decided to also investigate their perspective on the effects of the (healing) environment on patients. In this way, it was possible to gain a third party perspective on the beneficial effects of evidence-based design.

The goals of the comparative case study and the research methods used to achieve these goals are outlined in figure 32.
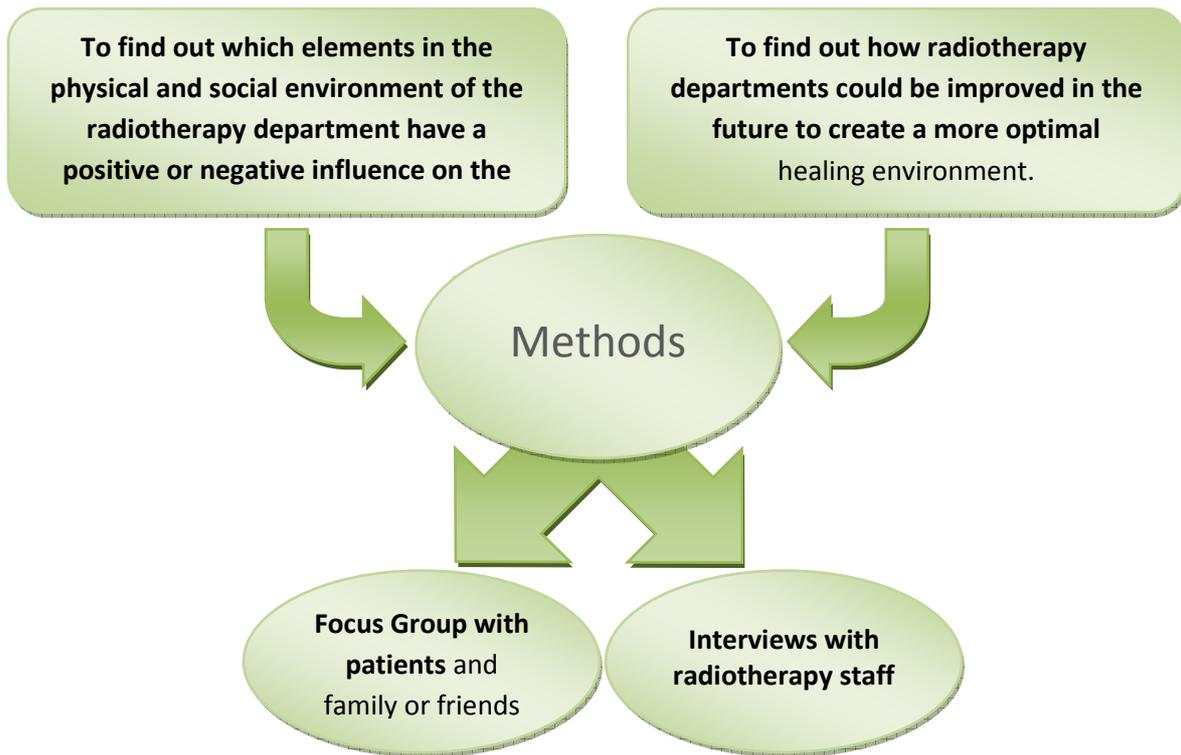
Figure 31: Goals and methods of the comparative case study

As illustrated in figure 32, the comparative case study employed two separate methods to gain the patient as compared to the staff perspective on healing environments in radiotherapy. This was done because mixing staff and patients in focus groups may influence the outcome of group discussions because of the higher level of expertise and medical status of radiotherapy staff (Krueger & Casey 2000). Incidentally, the timeframe of the project was too limited to conduct focus groups with the staff. As an alternative, it was decided to invite staff to participate in face-to-face interviews. Furthermore, this strategy of using a variety of research methods also contributed to data triangulation. The specific methodology and findings regarding patient and staff perspectives are outlined in the following sections.

3.2 The patient perspective

In order to investigate to what extent elements of healing environment in radiotherapy are actually perceived as positive (or negative) by patients, the academic consultancy team used a focus group method, comparing the perspectives of patients who are receiving radiotherapy in a non-optimal healing environment (at the target hospital), to those who are exposed to a radiotherapy department where special attention has been given to implementing elements of a healing environment (the control hospital). Therefore, the control hospital is regarded as a good-practice example.

Focus group methodology

Any attempt to understand the thoughts and experiences of people requires analysis to be based on the participants' own concepts, as opposed to pre-defined notions of the researcher (Jennings, 2001). Focus groups are a research technique that collects data through group interaction on a topic determined by the researcher (Morgan, 1997). The main purpose is to understand how people feel or think about an issue, and to uncover factors that underlie the participants' opinions. Focus groups are an ideal method when trying to understand differences in perspective between groups of people (Krueger & Casey, 2000). Hence, studying the differences between the patients' appreciation of the treatment environment at the two radiotherapy departments at the control hospital and at the target hospital can provide important information on what is relevant in healing environments for cancer patients.

The advantages of focus groups include the possibility to collect a large amount of information in a limited amount of time (Morgan, 1997), combined with a richness of data collection made possible by the opportunity to question, clarify and discus different positions of the group participants (Jennings, 2001). Furthermore, participants tend to disclose more about themselves to people who are similar to themselves (Krueger and Casey, 2000), i.e. cancer patients are expected to speak more openly compared to other methods such as personal interviews with the researcher. On the other hand, it needs to be acknowledged that group discussions can result in more outspoken participants taking a dominant role. Furthermore, there is a risk of adherence to social desirability, leading participants to give answers according to what they expect the researcher wants to hear (Morgan, 1997). Hence, focus group interviews need to be conducted by an experienced facilitator in order to guide the group to accomplish the set discussion goals (Krueger & Casey, 2000).The focus groups were therefore led by Saskia Leenders, a member of the consultancy team with previous experience in facilitation.

As explained above, family members often accompany patients to receive treatment and therefore can give valuable insight into the benefits of elements of healing environments. Furthermore, family members spend a significant amount of time in waiting areas of radiotherapy departments, so that the environment may also have an impact on them, which in turn may influence the patient they accompany. Family members were therefore invited to participate in the focus groups as well.

Logistics

Using a convenience sampling method, patients of both radiotherapy departments were approached by the receptionist and given a brochure invitation to the focus group, including a registration form that could be returned at the reception.

In order to reduce travelling time for the patients, both focus groups were conducted in a meeting room of the patients' respective hospital. Furthermore, as suggested by Krueger & Casey (2002), great care was taken to make the participants feel comfortable at the venue. For this reason, the focus groups were conducted in Dutch, and took place in the late morning, to ensure that patients were not too tired. Complimentary drinks and snacks were also offered to the participants.

The first focus group was conducted at the control hospital on the 26th of May with six current patients and two family members. The second set of focus groups at the target hospital took place on the 3rd of June. Here, current patients were separated from follow-up patients who had been successfully treated at the target hospital. This was done in order to avoid mixing of participants who have different anxiety levels due to their different stages of treatment, which might have influenced the focus group outcomes (Immerzeel, 2009). The first focus group at the target hospital had six current patients as participants, as well as two family members. Three follow-up patients attended the second focus group.

In the first focus group, activities included an introduction game, mind-mapping the participants' general feeling at the department, a discussion on elements of healing environments and what could be improved at the control hospital, and a final relaxation and imagination training game. After experiencing some problems in the first focus group with participants talking amongst each other a lot, which was difficult to record, we consulted with focus group expert dr. Astrid Hendriksen, who advised the consultancy team to use some additional techniques to keep participants focused on a task. Based on this advice, the second focus group was structured more rigidly. It began with a shorter introduction game, and was followed by a discussion of participants' general feelings of the environment. Then, participants were asked to mind-map their ideal future radiotherapy department in small groups. This activity was followed by a discussion of the group's recommendations, and the relaxation game. For a detailed description of the structure of the focus groups and the activities conducted with participants, please see Appendix A: Focus Group Layout.

Summary

Three focus groups were conducted with patients and their partners at the radiotherapy departments of both the target hospital and the control hospital. This method was chosen because it is ideal when trying to understand different perspectives, as participants are encouraged to speak openly and discuss different position. The focus groups were designed in consultation with an expert and facilitated by an experienced team member. Activities at the focus groups included group discussion, mind mapping, envisioning the future, and imagination games

3.3 Results - Focus groups

In the following sections, the outcomes of the focus groups will be presented. First, general evaluations of the focus groups will be discussed. These general evaluations refer to the general feelings and experiences of how the environment (physical and social) is currently perceived by the patients. Furthermore, participants were asked to describe which specific elements evoke this general feeling or experience. These outcomes are to be found in the next section, titled

Appreciation of Current Environment. In the focus groups, participants were asked to imagine they had been given a budget and decision making power to re-design the current environment, and think about which aspects they would change. This led to specific recommendations on how to improve the healing environment at the two radiotherapy departments, which will be presented in the last section of this report part, titled Visions for the Future.

General feelings and experiences

The results of the focus groups indicate that important similarities exist in both the general evaluations of the radiotherapy wards and the specific elements that contribute to this. The general evaluations primarily refer to the feelings that people have; the way they experience the hospital as pleasant or unpleasant, supportive or not supportive. The specific elements that patients describe contribute to these feelings encompass physical as well as social and psychological factors. Of course, there were also some differences between the participants in each focus group; they lie in the particular elements that participants focus on; because of their background, interest and personality, different participants see different things. For example, a garden architect (one of the focus group participants) focused on a 'dead' garden at the control hospital, while others didn't even notice the garden at all. Also some people indicated that they enjoy talking with others to share experiences when waiting whilst others do not want any contact at all.

The target hospital

In general, the participants at the target hospital are very satisfied with the social aspects of the radiotherapy environment. It was constantly stressed how friendly and efficient the staff is, which was considered to be the very important. Patients feel the staff know what they are talking about, which gives them a comfortable and confident feeling. Contrary to this, the participants were not very pleased with the physical environment of the radiotherapy department. On the whole, the department is perceived as being very dreary, and is associated with a 'bunker' feeling. In addition, participants found the environment confusing, messy, and boring. Participants felt that the environment lacks a sense of liveliness.

Key Words

General Feelings at the target hospital

- **Friendliness of doctors:** The employees are always in a good mood, alert, caring, efficient and very professional. The medical staff are very patient-minded.

- **Dreary environment:** The lack of natural daylight, long corridors, few colours, and the messy spaces and empty walls give the patients a 'bunker' feeling.

The control hospital

Generally the participants are very happy with the control hospital as it is now, indicating that it is truly a 'good practice' example. One of the first things the focus group participants mentioned when asked what they think about the environment at the control hospital was: 'Prima zo!' meaning: 'Well done! It is good the way it is now!' The factors that all patients in the focus group stressed as most important were the human contact and the friendliness of the staff. Participants feel that they are really respected; employees are not rushing them and know who individual patients are, and ask how they are doing. In addition, what was perceived as very pleasant is the flexibility at the control hospital; participants said that it is no problem to shift appointment times when needed. According to the patients, the physical environment of the department supports this positive feeling. The control hospital feels like a peaceful, comfortable, pleasant environment to them, which takes away a lot of stress. Of course patients don't enjoy having to be there in the first place, since dealing with cancer is not easy. However, the hospital itself is not perceived in negative terms by the patients. They say they never mind going to the control hospital; as soon as they step in, a peaceful feeling comes to them: they feel they are being treated to cure their disease, which provides a sense of hope and positive outlook.

Key-Words

General Feelings at RISO

Friendliness of staff: Employees always have time for the patients and treat them with respect.

Peacefulness: The place is quiet, and there is a relaxed atmosphere.

Light: The space is open and full of light and nice colors.

Comparing *the target and control hospitals*

From these results, it becomes clear that the biggest difference between the two radiotherapy departments lies in the physical environment. Patients at the target hospital, consider the environment to be dreary, dark and dull, giving the patients a 'bunker' feeling when in the department. Contrary to this, the patients at the control hospital regard the environment as peaceful, comfortable and pleasant, which takes away a lot of stress for them. In terms of the social environment, patients at the target and control hospitals have similar appreciation levels. At both locations the patients consider the medical staff to be very friendly, caring, efficient and professional.

Patient appreciation of current environment

This section will provide more specific information and quotations regarding the physical and social elements responsible for creating the general feelings of the patients outlined in the previous section.

The target hospital - The physical environment

Participants indicated that upon arrival one gets the feeling of entering a bunker. One participant states:

> *"This area [when you get out of the lift] is the most dramatic. There are dirty carpets, bags full of waste and the interior in general is very old. This is a pity because first impressions in general are very important."*

Furthermore, the atmosphere of the radiotherapy department is considered to be dreary, the long corridors seem endless, and the directions within the department are very unclear;

> *"This is caused by lack of daylight, the [choice of] colours and the long corridors. The combination of all these elements gives it a bunker feeling."*

The fact that there is no garden at the target hospital is understandable and accepted by the participants. However, there is a small garden behind a glass window near the waiting room, which participants felt was not pleasurable at all;

> *"This garden is dead and very ugly! It is full of rocks and has no colours; there is no sign of life whatsoever."*

The very few plants that are present at the radiotherapy department are replicas and not taken care of; *"they are full of dust".* In one of the waiting rooms there is an aquarium, which is perceived as a big improvement.

> *"At least there is something to look at, but besides the aquarium there is nothing else that gives a sign of life."*

Several times, participants mentioned that the waiting rooms were boring and very unpleasant. Most find the chairs uncomfortable and arranged in an unsocial setting. Another important point of criticism agreed upon by all participants is that there is no coffee machine or water dispenser available. (One of the patients who regularly asked for coffee because her diabetes makes her thirsty complained about getting a brisk response from one of the staff; *"Don't expect us to give you coffee*

all the time, this is not the way it works here".) Moreover, the fact that waiting rooms were perceived to be dull and boring was explained by the participants to be caused by the lack of variation in colour and the fact that only very few paintings are hanging on the walls;

> "There are some paintings - very few - but the ones available hang on the wall we are not looking at when waiting, so you are still looking at a bald and empty wall."

Furthermore, the participants indicated that the radiotherapy environment is very quiet, especially in the waiting areas.

> "Often the waiting areas are too quiet, giving me a very uncomfortable feeling. What we need here is more distraction - for example some more reading material, paintings to look at or even some nice background music - some soft candlelight

The target hospital - The social environment

In terms of the social environment the participants were very satisfied with the friendliness and professional attitude of staff, which made them feel more secure.

> "Friendly staff: always alert, efficient and in a good mood - human contact is the most important thing!"
>
> "The doctors are very caring and professional. They are very sure of themselves- giving you a comfortable and secure feeling."

One aspect participants critiqued, however, was the fact that there is no place where patients can present themselves once they arrive at the radiotherapy department. Currently, the patients have to stop regular staff to tell them they have arrived, and the participants indicated that they miss a place to communicate, to have a bit more personal contact upon arrival;

> "There is no real contact person for the patients. The ones working behind the desk at the entrance are also not very friendly."

What most participants also indicated is that they really like to interact and talk to others when they are in the waiting area, *"but the waiting area does not take these needs into account."* The participants said that the space could be much better designed for interaction.

The control hospital - The physical environment

Part of the experience of going to the radiotherapy department everyday is having to drive there and find parking before entering the hospital. Patients appreciate very much that there is always space in the parking lot and that they don't have to pay. This is seen as special support and contributing to the feeling of being taken care of.

The environment at the control hospital is perceived to be very light, which is appreciated by all participants for providing a very open and spacious atmosphere. Also the plants in the waiting rooms are highly appreciated; aside from being nice to look at, they also serve to divide the room into several smaller areas, allowing privacy for the waiting patients. While waiting, some patients like to share stories, while others don't want to talk to anyone. The division of space makes it possible for each patient to chose. Furthermore, the fact that flower bouquets are exchanged weekly is liked a lot by the participants.

> *"It [seeing fresh flowers] gives a sense of caring, while it is such an easy thing to do."*
>
> *"There is enough space [in the waiting area] and it is nice and high, without losing the private corners to sit and wait."*

According to the participants, the major factor in creating the peaceful atmosphere at the control hospital is that there are no annoying noises or stressful activities. All of them mentioned the feeling as if not being in a hospital. There is free access to coffee, tea and water, and the design of the waiting area is comfortable and relaxing. The colours of the furniture are nicely chosen and they are very comfortable according to everyone, although one of the participants said she found the design a bit too businesslike and efficient.

However, participants mentioned some aspects that could be improved in regard to elements of nature within the control hospital. There is a lack of a view on nature, even a lack of view on the outside in general; all the windows are facing inwards, with few views towards outdoor nature:

> *"Only a view on a horrible indoor garden, but this is a 'dead' garden."*

Most of the participants hadn't even noticed this garden before it was pointed out at the focus group, which led them to agree that they don't perceive the inner garden as such, because nothing is growing there. There is only stone and wood, which makes the sight even drearier, especially during bad weather.

Furthermore, some participants found it a pity that there is no access to a garden where patients can wait when the weather is nice. Although there is a garden, it is difficult for patients to re-enter the building after having been in it, since the doors are regulated by a swipe card that only staff members possess:

> *"I don't want to bother someone every time I want to go inside. The garden doesn't seem to have a real function, while I thought: that should be a beautiful garden, for all those unfortunate people, but no."*

However, not everyone seems to be bothered by this. Since many patients don't have to wait for a very long time, they don't feel the need for a garden - they rather sit in their own garden at home.

In terms of the treatment environment, some participants mention they had to get used to the tube-like corridor that serves as an entrance to the radiotherapy room, and by some it is experienced as uncomfortable and disorienting. For example, one participant always finds herself 'wanting' to walk into the closet, because of this disorientation. However, the staff explained the necessity of this shape very well to the patients, so that it was understandable to everyone.

Interestingly, only one participant noticed the pictures of plants that are hanging on the wall of the tube-like corridor, while others didn't notice them before. An element of the treatment rooms that is very much appreciated by patients is the 'starry sky' ceiling decoration. When lying in the radiotherapy machine *"it is a nice thing to look at"*. Some participants even indicate that this feature of the treatment room enables them to immerse themselves in the environment and makes the time pass much more quickly:

> *"It is as If I am going in a straight line to the star heaven and back home."*

The control hospital - The social environment

As mentioned before the social environment is perceived as the most important element in creating a healing environment by the patients. The physical environment can only support the social environment, but it can never replace it. Most participants indicated that a lot of stress was taken away from them by the short waiting times at the control hospital. Furthermore, for the participants it was very important that there is understanding when something needs to be changed for the radiotherapy;

> *"When there are any problems they are solved right away."*

According to the participants, the most important element of the social healing environment is the friendliness of staff, which the patients at the control hospital highly appreciated:

> "Although every time there is a different nurse or radiotherapist, all people treat me very nicely."
>
> "I feel like a guest when coming to the hospital. The staff is really there for you. The people are truly hospitable."

Besides, some participants feel that the waiting rooms can be very familiar and lead to interaction with other patients:

> "When going straight to the waiting room every day, some faces are familiar, and this makes it possible to have a little chit-chat, which is very nice under the circumstances we are in."

Also, it is appreciated that it is possible for the partner to come along to see what is happening. According to the patients, being able to take their partner to the treatment room to see what is going on makes receiving treatment less scary for both. Besides, there always seems to be time for explaining how things work; the staff is seen as very professional.

Comparing the target and control hospitals

In terms of the physical environment, the respondents from the target hospital have almost opposite appreciation levels of the radiotherapy environment compared to participants from the control hospital. At the target hospital, the environment is perceived as dreary and boring, with the endless corridors and waiting areas that generally lack distraction and don't facilitate interaction among patients. At the control hospital on the other hand, participants found the atmosphere to be spacious and open, with waiting areas providing ample opportunity to pass the time and have a chat if patients so wish. Furthermore, the participants at the target hospital say that the colours and furniture in the department are not especially appealing, while participants from the control hospital generally praised the stylish design and colours. However, in terms of the social environment, participants from both hospitals agree that the staff is very friendly and dedicated to making the patients' time in the hospital as comfortable as possible.

Visions for the future - The target hospital

As mentioned before the patients of the target hospital were not very pleased with the physical environment of the radiotherapy department, but had only few points of critique regarding the social atmosphere. When asked which elements of the environment they would change, the participants gave the following recommendations. According to the patients, improving the following aspects would make a big difference.

Views of nature and natural elements

> If possible introduce some real plants, since they can make the department livelier and less dull. Like the aquarium, plants are a symbol for life.
>
> Make the small rock garden behind the window near the waiting room lively by putting plants or small trees there, and bird food to attract birds.

Noise, quiet and music

> There should be the possibility to listen to music in the waiting areas, for example soft 'candle light' music. It would also be nice to provide earphones for patients who want to listen to a specific kind of music. Music will create a more stimulating environment by providing some distraction and maybe triggering patients into memories connected to the music.
>
> During the actual treatment, patients should also be able to listen to music. Patients think this is better than listening to the buzzing sound of the machine and would make receiving treatment more joyful.

Design of the space

The entrance near the elevators needs to be improved. This can be done by replacing the carpet, painting the walls and removing any trash.

Certain areas are very messy and need to be cleaned up. For example trash bags and old furniture is stored in the basement and empty boxes are lying around.

It is very difficult for patients to find their way around in the department. This could be improved for example by giving corridors different colours.

A central point or information counter is needed where patients can have a bit more personal contact to present themselves when arriving at the department and to gain more detailed information about their illness.

The corridors are too long and empty. They can be made to look shorter by placing plant trays in them to divide the space.

Waiting areas

Provide a range of different chairs and seating options in the waiting area; it would be nice to have a couch somewhere.

Re-arrange the waiting area in a more cosy way by creating small sitting groups, so that patients can interact if they wish.

Provide a coffee machine and water dispenser in the waiting areas.

Provide more reading material in the waiting areas.

Art and positive distractions

In 'Area 5' of the radiotherapy department there are no pictures or paintings on the wall at all. This should be improved, and another aquarium would also be a good idea to make the place more lively and attractive.

The pictures in the hall are very pretty, but they need to be changed once in a while. Rotate the pictures; otherwise patients are looking at the same pictures constantly.

Put flat screen TVs in the waiting areas that show a slideshow of nature pictures or landscapes. Once a week the images should be changed.

Apart from images of nature, patients also recommended using Escher pictures, since they are especially distracting

Use of colour

The corridors and waiting areas should be repainted to be more colourful, but in a harmonic way, using warm colours that are not too bright.

Being treated with respect

The staff working at the front desk could be a bit friendlier; patients complain that they hardly make eye contact when saying hello. These small things really make a difference, and reception staff needs to be reminded of this.

Visions for the future - The control hospital

When providing recommendations for improving the healing environment of the control hospital, the participants tended to contrast the department with one of the big hospitals they are familiar with. In this sense, the control hospital seemed like a small paradise to the participants. The aspects they absolutely dislike in a big hospital are: the long corridors where patients get lost, which creates stress; the large amount of people and the hectic environment full of chaos; long waiting times; having to use elevators; general darkness of the hospital and less availability of open space. In general then, the environment of the control hospital is perceived to already provide a good healing environment; it can be kept in this way. To make an even better healing environment would be like making a paradise, which leads some participants to ask whether the effort is worth investing in,

> *"while the environment is already a supportive healing environment and we are only here for a very short time and we want to go away as quick as possible."*

However, when asked what they would change, participants came up with several recommendations, which are outlined below.

Lighting

> Keep the lighting the way it is, but maybe turn down some lights when there is enough light coming in from the outside; this saves energy and money!

Fresh Air

> The air conditioning in the waiting areas is sometimes too cold, this should be regulated.

Views of nature and natural elements

> Provide access to the garden without having to call staff to be let in again. Improve the courtyard garden by placing live plants in it.

Art and positive distractions

> Having coffee and tea available is very nice, but there could be better information about catering. It was not known to all participants that it is also possible to get a cup of soup. The participants said it would be lovely to have fruit, cookies and juice available in the waiting areas.

Waiting areas

> Some participants mentioned that it might be nice to have some more colourful art on the walls. However, others think that this might disturb the peaceful atmosphere, so this shouldn't be overdone.

3.4 Staff perspective

Complementary to the patient focus groups, employees at both the target and control hospitals' radiotherapy departments were interviewed concerning their perspective on beneficial elements of healing environments for cancer patients.

Interview methodology

To gain participants for the interviews, a convenience sampling technique was employed, in which the project's contact person at the respective hospital would approach staff at a general meeting of the radiotherapy department, informing them about the opportunity to take part in an interview. Six respondents were interviewed by members of the consultancy team, who followed a semi-structured interview protocol (See Appendix B: Interview Protocols). The interviews were conducted on the same days as the respective focus groups and took an average of 30 minutes.

At both the target hospital and the control hospital, two lab assistants and one radiotherapist were interviewed. The following sections describe what the staff thinks about creating healing environments in radiotherapy. Furthermore, the staff's evaluation of the current situation and the future possibilities of implementing a healing environment at both the target and control hospital's radiotherapy department are discussed.

Findings

The purpose of healing environments

Most respondents were not familiar with the term *healing environment*, yet they could all understand its meaning. In general they describe it as an environment which influences the way people feel and which can make a contribution to the recovery from a disease. One lab assistant from the control hospital points out that the environment is a combination of factors, such as a beautiful building, friendly staff and good communication within the medical team. Especially because cancer patients go to the radiotherapy department very often for longer periods of time, the environment of this department can play an important role. The environment should make people feel pleasant and safe, so the patients won't be dreading to visit the hospital and the staff will enjoy their work more.

The radiotherapist at the control hospital says that although he doesn't feel an environment can help to cure a disease, people will feel more pleasant in a nicer environment which can make them feel more hopeful. This is in line with what the radiotherapist of the target hospital remarks. According to him, people may not live longer because of healing environment, but it can improve their quality of life.

Advantages and disadvantages

Many of the respondents see mostly advantages in implementing a healing environment. They mention that in general it can have a positive influence on patients and staff. It can give the department added value by distinguishing itself from other departments, which may attract more staff who would like to work there. When employees feel happy in their environment, they will also call in sick less, which saves costs. Two staff members of the control hospital mention that their department doesn't look like a hospital, which they and the patients appreciate. They also like that their department is new, fresh and clean. One of them mentions that if the hospital looks old and not taken care of, it might be difficult to prove to the patients that their treatment will be of high quality none the less.

Several disadvantages were also mentioned. Two respondents say it might be expensive to implement a healing environment. Also, the highest importance should be given to the functionality of the space, for instance regarding hygiene. One lab assistant mentions not all patients are happy with the current atmosphere at the control hospital, which has been called a living room atmosphere. She said some people expect and prefer a more business-like atmosphere. This would stand for better quality of care and would look more professional to them.

Staff appreciation of current environment

The overwhelming amount of comments was positive; however, this may partly be explained by the interviewers' main interest in finding out which elements of healing environment 'work' for cancer patients. Somewhat unsurprisingly, respondents from the control hospital had much fewer negative

remarks than respondents at the target hospital. This might be largely due to the fact that the control hospital's employees were actually involved in the design process of the radiotherapy building, and could give recommendations based on their experience. The following sections give an impression of what respondents indicated to be important positive aspects of the healing environment at their workplace, as well as the points of improvement they mentioned.

Layout of the department

At the control hospital, much attention is paid to the layout of the radiotherapy department. This seems to be very important to all respondents. The staff at the control hospital especially appreciates the spaciousness of their department. Furthermore, they mention that there are special spaces where stretchers and wheelchairs can be put, to accommodate people with special needs. Back offices are also provided so doctors can take a phone call in private without walking past the waiting patients. This kind of clever design was appreciated by the respondents from the control hospital.

The radiotherapist at the target hospital notes that the mortuary is close to the radiotherapy basement, which can evoke very unpleasant feelings for patients. Also, the entrance to the radiotherapy department near the elevators looks very messy, dreary and unpleasant. There is garbage stored in this area and the colours of the elevators and floor are dark. The waiting room for the follow up patients also has dark walls and floors, according to the radiotherapist at the target hospital. Furthermore, the reception desk at the entrance of the hospital is too high, which makes it very uncomfortable to talk to the receptionist, and the receptionist also does not have a good overview of the waiting room. This same problem is also present in the radiotherapy department, where the nurses' desk is too high.

Communication

All respondents from the target hospital indicate how important it is that patients have access to information. The patients want to know what to expect from their treatment. The staff therefore needs to be friendly and provide opportunities to ask questions.

The radiotherapist at the target hospital comments that people attach great importance to the way they are being treated. They want to feel welcome, to be sure that there is enough time for them and to be listened to. The radiotherapist at the control hospital also mentions it is important for patients to be heard and supported.

The radiotherapist at the target hospital points out that the K of *kelder* (basement) often reminds patients of the K of *kanker* (cancer).

Natural elements

Generally speaking, everybody likes daylight. At the control hospital, respondents say that the staff find it nicer to work in the treatment rooms which have windows than in the ones which are on the

inside of the building. The radiotherapist of the control hospital mentions that it is technically possible to do your work in a room without windows, but it's just not pleasant and can make you feel locked up. Also the waiting area has daylight coming through the ceiling, which is regarded as pleasant for the patients.

The respondents at the control hospital say they appreciate the plants and fresh flowers in their department; they create a pleasant atmosphere and make people feel at ease, because they don't have to wait in such a sterile environment. The lab assistants at the target hospital appreciate the aquarium they have in the waiting area. They consider it to be peaceful, to make the space livelier and to provide a positive distraction.

One of the lab assistants at the target hospital mentions that it can be cold in the radiotherapy department, which makes the environment more unpleasant for both staff and patients.

Little was mentioned about noise; only one remark was made by one of the lab assistants at the target hospital. She states that in the planning room there is a zooming sound which makes her feel very irritated.

Waiting areas

The waiting area also plays an important role. The respondents at the control hospital say that the patients appreciate the many possibilities their waiting area offers. Here, people can sit in different places, together with others or alone. One respondent mentions that the patients appreciate this and really use the possibilities. Apparently they like it so much even, that the special waiting area for people needing privacy is rarely used.

Treatment areas

At the control hospital, a lab assistant points out that if patients walk from the dressing room to the treatment room, they can look into the control room. Sometimes there are more people present there than necessary, which can make the patient feel uncomfortable. A different lay out of the space could solve such issues.

In general, the respondents say they want the space of the radiotherapy department to be functional and practical. However, the treatment rooms in the control hospital are circular. Hence, not all the equipment that is being used fits well in curved cabinets, which is why some things cannot be stored properly.

Art, use of colour and distractions

Although a lot is done with art and paintings in the building of the control hospital, none of the staff members here mention this element. At the target hospital the staff members do comment on the arts in their department. The lab assistants point out that they provide distraction and make the

corridors not so empty. One of them mentions that the pictures were made in India, and many of the patients are foreigners. This implies that people will appreciate looking at something which is familiar to them.

A lab assistant at the control hospital says that bright colours are happy and cheerful, although a respondent from the target hospital points out this might look less professional.

At the target hospital, one respondent pointed out that the floors used to be brown with bright yellow walls, which felt very unpleasant. In time, however, this has been changed to nicer, light colours.

Visions for the future - staff perspective

Similar to the patients, the staff from the control hospital in general had very little they would like to improve in their environment. However, during the interviews with the staff from the target hospital, several elements which could be improved came forward. They can be summarized as follows:

Daylight

> *There are hardly any spaces where natural daylight comes in. Bright and spacious rooms would be preferred.*

Views of nature and natural elements

> It would be nice to have a place to sit outside.
>
> A water fountain near the waiting area could be a good idea,
> as this can have a soothing effect.

Design of the space

The entrance to the department could be improved. It was criticized that people have to take the elevator to reach the basement.

A lower reception desk would be more accessible for patients.

The signs which indicate where to go should be clearer.

The corridors are long and narrow, which are sometimes referred to as a labyrinth; this could be improved.

Waiting areas

Different spaces for different patients would be appreciated. The people who come back for a check up don't like to be confronted with the spaces where they may have had negative experiences during their treatment. A distinction could help avoid this

The waiting areas could be improved a lot in terms of attractiveness and comfort, as they are currently just rows of chairs.

A more central waiting area could prevent staff members from having to walk too much.

Treatment areas

The treatment areas should look tidy, organized and neat. Now, the patients get to see messy rooms, for example where the masks for treatment are made. Although people don't complain about that, it still isn't necessary for them to see it. Closed cabinets or open cabinets facing another way could help to solve this.

Art and positive distractions

The enlarged picture above the radiation machine is seen as a positive element and should be extended to the whole ceiling, with for example pictures of birds or leaves.

3.5 Conclusions of the comparative case study

The aim of this comparative study was to find out which elements in the physical and social environment of both radiotherapy departments have a positive or negative influence on the patients, and how radiotherapy departments could be improved in the future to create a more optimal healing environment. The findings of the focus group study and staff interviews at the target and control hospitals suggest that physical and social/psychological elements of healing environments are indeed important factors that contribute to an improved attitude of patients (and their family) towards treatment. Different observations of patients and staff will be summarized per each radiotherapy department.

The target hospital

Both patients and staff agree that the entrance area needs to be improved. The entrance area, where the elevators are situated, is perceived by both patients and staff as very unattractive, giving a messy first impression of the department. Patients also indicate that they would like a contact person by the entrance of the department, and that better directions for way-finding are important.

Patients at the target hospital characterize the environment as dreary, explaining this by pointing out the lack of daylight, the choice of colors, and the long corridors. The staff members agree on this latter point, and support the patients in their wish to divide the corridors, for example by using plants, to create smaller spaces.

Furthermore, the patients mentioned that the waiting rooms are very unpleasant. Most find the chairs uncomfortable and arranged in an unsocial setting; there is also no possibility to have water or coffee. The desire of patients for other seating options is supported by the staff members, who wish to have different waiting areas for patients at different stages of treatment. More comfortable and cozy waiting areas with presence of real plants and the possibility to listen to music are emphasized by the patients. However, both patients and staff appreciate the aquarium, which makes the waiting area livelier and serves as a positive distraction.

Staff members tend to focus more on the treatment rooms, which they prefer to have tidy, organized and neat, because patients should not see all the equipment. Patients on the other hand focus more on the ceiling decoration, which they would like to see extended.

The patients were very positive about the staff, characterizing them as alert, caring, efficient and very professional. The medical personnel were viewed as confident, which gives patients a feeling of security. The radiotherapist at the target hospital agrees that people attach great importance to the way they are being treated. Patients want to feel welcome and be listened to without feeling in a rush.

The control hospital

The patients at the control hospital were generally very satisfied with the healing environment at this radiotherapy department. In the first place, the contact with staff, who always have time for the patients, is very appreciated. According to the participants, the control hospital has a peaceful atmosphere due to the absence of excessive noise and stressful activities. Both patients and staff are very positive about the waiting areas that offer a lot of possibilities. The plants and fresh flowers in the department are also very much appreciated by both patients and staff for creating a pleasant atmosphere and making people feel at ease. However, some patients would like to have more view on outdoor nature and easier access to the garden. Patients also indicated that they like the 'starry sky' ceiling decoration above the treatment machines a lot; it serves as distraction and makes the time pass more quickly.

Both patients and staff had very little they would like to improve about the healing environment. Patients mentioned that the air conditioning in the waiting areas is sometimes too cold. They also proposed to turn down the lights when there was enough daylight in order to save energy and money. Some patients would like to see the courtyard garden improved by making it livelier and placing real plants in it.

4. Recommendations

As healing environment expert Roger Ulrich states, the real costs in running a hospital are not in its architecture and interior design, but in the delivery of care. Studies show that implementing evidence based design will actually lead to reduced costs in the delivery of care, since patients have better healing outcomes and staff turnover is reduced (2009). This is a very powerful argument in favour of implementing concepts of healing environment in hospitals, and it is important that the people who do so base their efforts on relevant evidence.

This section of the report captures the insights gained through the four-tiered approach to data collection employed in this consultancy project in the form of recommendations. Arranged in sections concerning various themes, general recommendations in regards to creating a healing environment in radiotherapy departments will be presented, followed by specific recommendations for the improvement of the radiotherapy environment at the target hospital.

4.1 Defining a mission for healing environments

A healing environment has positive impacts on both patients and staff, and these effects multiply when patients and staff interact, since both are more relaxed, in a better mood, and have a positive attitude to giving and receiving treatment (G. van Lagen, Casa Terra). Furthermore, different people have different backgrounds and preferences, which lead them to appreciate different aspects of healing environments. Therefore, it is important to implement a range of different elements of healing environments in evidence-based design; i.e. a focus on lighting alone for example is not enough. In this section, some general recommendations for creating a better healing environment will be presented, drawing on the outcomes of this project; the theoretical insights, expert opinions, and good practice examples, as well as the statements of experts, patients and staff.

When planning to implement a healing environment, it is essential to formulate a mission. This mission statement should reflect the exact reasons why the environment should be changed, and the goals for the improved design (F. de Vos, Omgevingspsychologie De Vos). Furthermore, the staff of the hospital should participate in defining this mission and the goals regarding the healing environment. All consequent decisions should be measured against this mission and the specific goals. Hopefully the following recommendations can serve as a starting point for developing a mission to create a healing environment at the target hospital.

4.2 A pleasant and efficient radiotherapy department

One goal of healing environments is to reduce stress. Ideally, this should be addressed even before entering the hospital, to avoid patients entering in an anxious state. The hospital entrance and the parking facilities should easily be found, because the feeling of being lost can make patients feel anxious. Enough space and easy way finding from the parking lot to the building are also important, as well as easy directions in the building itself. This requires clear signage and ways to guide patients through the hospital. While many hospitals use colour themes to guide patients, the literature suggests that this is not always effective.

Access and way-finding

- ✓ Offer free and easily accessible parking spaces.
- ✓ Provide effective signage for patients to find the radiotherapy department from the main hospital entrance.
- ✓ Make it easier for patients to find their way around the department by using creative solutions that are immediately meaningful to patients, such as naming certain areas within the department after streets or places.

Flowers and plants

- ✓ Arrange an agreement with a local florist to provide fresh flower bouquets on a weekly basis.
- ✓ Place plants wherever possible. It is preferable to have few areas with high density of plants rather than a lot of 'lonely' plants dispersed throughout the department.
- ✓ Speak to a florist about which plants are easy to take care of. Consult with the hygienist which plants are to be avoided because of allergenic properties.
- ✓ In the long corridors, use trays of plants to divide spaces and break up the corridor visually.
- ✓ In narrow corridors, plants could be placed higher up on the wall or hanging from the ceiling, so that the path is not obstructed for stretchers or wheelchairs.

Attractiveness of the department

- ✓ Ensure that patients to not see any trash or mess in the radiotherapy department. Ensure that the space is cleaned up.
- ✓ Replace the carpet at the elevators and paint the area in warm, cheerful colours.
- ✓ Create a balanced colour scheme for the department, using a variation of colours that are neither too bright nor too dark, and that make for interesting variation while making sure that colours match and form a coherent theme.

Artworks and Colours

- ✓ Hang pictures of nature or landscapes in hallways, or use wallpaper with nature prints (see info box).
- ✓ Also hang pictures featuring happy faces or animals. Do not use abstract art.
- ✓ Invite local art schools to have exhibitions at the hospital or design a colour theme for the radiotherapy department. This could involve competitions for students.
- ✓ The colours used should bring a coherent whole, not too colourful, yet not to white. Gray colours will not bring a nice feeling.
- ✓ Hire a company that rents artworks to public venues and changes them regularly (see info box).
- ✓ Alternatively, arrange a rotating system in which staff of the department allows for artworks they have at home to be displayed in the department for a specified amount of time.

INFO BOX

❋ Large wallpapers with natural scenes are available for example from *Vandoorn*

www.vandoorn-bv.nl

❋ An art hire company that works in public venues is *Heden*

www.heden.nl/kunstuitleen-bedrijven

4.3 Friendly atmosphere

The human dimension of healthcare is extremely important. What most patients ultimately want from their healing environment is scrupulous medical care delivered with genuine love, care, and compassion. The staff should have a friendly, warm and social appearance and give the patients the feeling of being important and taken seriously. People working in healthcare settings need to be encouraged to balance their own psychological tendency to disconnect from emotional aspects of their work with a willingness to show compassion and appreciation for the patients' feelings and needs.

One important factor in ensuring that staff has a positive attitude towards their work is to involve them in the design of their working environment. Furthermore, such efforts at participatory planning also ensure that staff can contribute valuable insights in regards to which elements of healing environments are most beneficial to patients and themselves.

Happy staff

✓ Improve the space outside the staff room with some plants, a mosaic on the wall, and a water fountain.

✓ Give staff the opportunity to express concerns about their working environment and what they would like to see changed.

✓ Raise awareness among staff that their attitude and mood affects the patients' healing process.

4.4 Supportive environment

The findings from the literature review, expert and staff interviews, and focus groups with patients all showed that social and psychological support are extremely important factors in healing environments. Radiotherapy departments need to recognise the non-medical needs of patients and support them in meeting those needs. Essentially, patients need to be provided with accurate and relevant information about their illness, and should also be informed what support opportunities exist outside of the immediate hospital environment. Furthermore, patients need to be given as much control about their treatment environment as possible.

<div>

Information and social support

✓ Lower the nurses' counter and transform it into an information desk and small library where patients can borrow books about dealing with cancer, find information about relevant support groups, and leave suggestions how to further improve the healing environment at the target hospital.

✓ Arrange regular in-house support meetings for patients who want to share their experience with others who are in a similar situation. Some kind of trustworthy facilitator should be present at such meetings, for example a nurse, someone from a cancer support network, or a church representative.

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4.5 Natural versus artificial light

Natural daylight is preferable over artificial light. As the literature review showed, patients benefit physically and psychologically from exposure to natural daylight. Glass ceilings and windows are a good way of allowing natural light to enter the building. In addition, it should be possible to open the windows, as fresh air is beneficial to patients and can remove unpleasant 'hospital smells'.

When using artificial light, warm and indirect lighting is recommended, as it makes the environment more natural and cheerful. Lighting systems that imitate daylight have not been found to provide positive effects compared to other artificial lighting.

Indirect and natural light

✓ Use indirect lighting in corridors, especially in those that patients may pass while lying on stretchers.

✓ Grant patients more access to areas in the department where natural daylight is available, for example by creating waiting areas in those spaces.

4.6 Reducing noise, providing music

Noise reduction is an important aspect in creating a healing environment. Here, it is recommended to use quiet equipment, install sound-proofing systems and close doors when appropriate. On the other hand a certain kind of sound, like music (especially when chosen by the patient) is a positive element of healing environments. When playing music in public, the choice should be with music that has no accented beats or excessive percussion, but rather music with a relatively slow tempo and a smooth melody.

Noise and music

✓ Play soft, relaxing music at the entrance of the radiotherapy department and in the corridors.

✓ Prevent unnecessary noise by using sound reducing materials in walls and ceiling (see info box).

<div style="border:2px solid orange; border-radius:20px; padding:20px;">

INFO BOX

❋ *Ecophon* is specialized in sound reducing surfaces like ceilings and wall decorations. The company has a special section for the health care sector on their website:

http://www.ecophon.nl

❋ *Armstrong* is another specialist in sound absorbing ceilings:

http://www.armstrong.nl

</div>

4.7 Stimulating, comfortable waiting areas

Patients can be made to feel more comfortable if the hospital environment is designed in a homely way and evokes familiarity. To ensure this, the waiting areas must be comfortable and with a living room feeling. Using cheerful and natural colours can help to make the environment seem less institutional. Furthermore, cool colours tend to be relaxing, while warm colours offer stimulation. Providing reading tables and splitting the spaces will give patients the possibility to find some privacy if desired. The waiting areas should be arranged with nicely designed, comfortable furniture, artworks, and natural elements. Providing pants, flowers or an aquarium are ways of bringing natural elements indoors. If it is impossible to use natural plants, for example in treatment rooms, images of nature can provide a solution. These can be displayed for example through posters or on digital displays.

<div style="border:2px solid darkred; border-radius:20px; padding:20px;">

Division of space

✓ Use live plants to divide the space in the waiting areas, so that patients can choose more private or more public sitting arrangements.
✓ Water fountains or an aquarium can also be used to divide that space.

</div>

Positive distractions

✓ Provide large images of nature, landscapes, and animals, or engaging pictures, such as prints by Escher or Dali – but take care not to choose paintings with a 'dark' or anxiety producing content.

✓ Hang pictures in a way that patients can look at them while sitting.

✓ Provide a few handheld CD players with headphones, so that patients can chose to listen to music.

✓ Show nature documentaries without sound on a large flat screen TV. This is an excellent way to provide ever-changing views of nature.

✓ Provide a variation in reading materials that change regularly. A table with puzzles or card games is also a great way of offering distraction.

✓ Provide toys and a play area for children.

Homely atmosphere

✓ Provide a range of different furniture, including couches and chairs; avoid uniformity. All furniture should be comfortable and appealing to look at.

✓ Folding chairs are great to have in the waiting area because patients can place them where they like, for instance in front of the aquarium to watch the fish.

✓ Arrange tables and chairs into 'sitting corners' that facilitate interaction.

✓ Place coffee machines and water dispensers in the waiting areas and make the drinks freely available.

✓ Also provide fruit and cookies in the waiting areas. An easy way to charge patients for it is a small 'honesty box' placed next to the bowl of snacks. Another option is a fruit and vegetable vending machine (see info box).

✓ Provide indirect lights on the wall or standing lamps rather than bright light from the ceiling.

> *INFO BOX*
>
> Two companies provide fruit and vegetable vending machines:
>
> ✿ Fresh Tapas, see http://thegreenery.nl/?pag=409
> ✿ Fresh Day Vending, see http://www.freshdayvending.nl

4.8 Reduce stress in treatment areas

In the treatment areas, it is advisable to remove technical equipment from the patients' sight, for example by using screens or closed storage areas. Furthermore, it is vital to provide pleasant distractions in treatment rooms, such as music, and images, paintings or light games on the ceiling.

> **Tidy space**
>
> ✓ Place enough closets in the treatment rooms to hide any technical equipment from patients. Ensure that the rooms are not messy. Another option is to hide technical equipment behind a nice screen or curtain
>
> **Distractions**
>
> ✓ Offer patients the opportunity to listen to their own choice of music during treatment, either by providing a stereo system with a choice of CDs or a small music player with headphones.
>
> ✓ Provide a large distraction on the ceiling over the radiation machine, such as a 'starry sky' ceiling decoration like in RISO, or an image of a natural scene. Sky Ceiling light diffuser panels are also a very attractive option (see info box).

Privacy and family

✓ Provide as much privacy as possible and make sure patients have a comfortable place to get changed.

✓ Allow partners to accompany patients to the treatment areas as much as possible.

INFO BOX

❋ *The Sky Factory* produces and distributes light diffuser panels with natural motives and has a special section on ceiling panels in healthcare settings.

www.theskyfactory.com

4.9 Access to outdoor nature

If possible, patients should have access to, or at least a view of a garden or some kind of outdoor natural setting. If a garden can be provided, it should ideally offer the possibility to have a range of different experiences. For instance, patients who are looking for privacy would like to have some small secluded areas, while other patients might prefer more open areas in which it is possible to socialize and enjoy the weather.

Access to nature

✓ The small space behind the window of the waiting room could be changed into a garden with real plants in it and maybe a water fountain.

✓ In designing this garden, a local art school could be consulted.

5. Limitations and Further Research

To collect data for the comparative case study, several focus groups were conducted with cancer patients. We chose this method for its strengths, as elaborated in the section 'The need for a qualitative study'. Nevertheless, this method of data collection may have some limitations which need to be taken into account. Furthermore, some limitations in terms of sampling method need to be mentioned in regard to the staff interviews conducted for this project.

In the following sections, some limitations of the consultancy project are outlined. Furthermore, we provide an indication of directions for future research in the field of healing environments in radiotherapy.

5.1 Limitations to the sampling method

For the focus groups, a convenience sampling method was employed which involved approaching patients at the reception of both radiotherapy departments. In a similar fashion, employees of both radiotherapy departments were asked to participate at a general meeting of the hospital. In using this convenience sampling method, the consultancy team lost a degree of control over who was asked to participate in the focus groups or selected to give an interview. For example, the interview respondents might have been more aware of the concept of healing environment compared to other staff, and the patients might have been less sick compared to other patients, or with a more positive attitude towards alternative perspectives on healthcare. Furthermore, the sampling method was not randomised, which limits the representativeness of the data.

The timeframe of the project also limited the amount of focus groups (3) and staff interviews (6) that could be conducted. Both hospitals serve approximately 2000 patients per year. However, the focus groups only gathered the opinion of 14 patients (and 5 family members) regarding the radiotherapy environment. Furthermore, of the 14 patients who participated, 13 were women, and of these, 12 had breast cancer. Hence, the focus group participants may not be representative of the population of cancer patients who receive radiotherapy. However, given the exploratory nature of the study, the methodology can be deemed appropriate, especially since it involved a four-tiered strategy for data collection.

5.2 Limitations to data collection

Feelings and emotions are sometimes difficult to express through language. Both the individual interviews and the focus group method are limited to verbal behaviour and participants' conscious thoughts (Morgan, 1997). Also, for both individual interviews and the focus groups, there is a risk of adherence to social desirability, which can lead to participants giving answers according to what they expect the researcher wants to hear. Furthermore, because of time constraints patient behaviour was not observed in the natural setting.

Another limitation of focus groups is that they involve group discussions, which can result in more outspoken participants taking a dominant role. The facilitators tried to avoid this by making the

participants draw mind maps individually and discuss in small groups, separating the dominant from the more shy people. Furthermore, in focus groups, the researcher has less control and less time for each participant compared to individual interviews. This involves the risk of collecting less detailed information on opinions and experiences for each individual in the focus group (Morgan, 1997). Also, there could have been a tendency for polarization, meaning that participants might have expressed more extreme views in comparison to what they might say in a more private setting (Morgan, 1997).

We were aiming for a focus group size of eight to twelve participants, so that the group would be "*small enough for everyone to have an opportunity to share insights and yet large enough to provide diversity of perceptions*" (Krueger & Casey, 2000). However, one of the focus groups only had three participants, making the discussion less dynamic and the views expressed less diverse. Nevertheless, a varied and substantial data collection was ensured because eight people participated in each of the other two focus groups.

Finally, most interviews with staff and experts were conducted in Dutch and then translated to English, which might have led to inconsistencies.

5.3 Further research

Healing design is currently becoming a very influential field of study, and it is important to fill knowledge gaps to show the wide ranging effects of nature on health related topics (Ulrich, 2009). However, the available research base on healing environments or evidence-based design in respect to cancer patients is extremely limited. In following up on this consultancy project, further research could elaborate on the perspective of radiotherapy staff (or healthcare employees in cancer treatment in general). This is important because staff spend a great deal of time at work, and sub-optimal working environments can have a detrimental effect on the health, wellbeing, job satisfaction and work efficiency of staff. Hence, it is important to extend research into healing environments for cancer patients to include the needs of staff.

Furthermore, the links between job satisfaction of radiotherapy staff and patient appreciation of the (physical and social) radiotherapy environment should be further explored, since the respondents in this study placed such great emphasis on the importance of friendliness of staff and a relaxed relationship to the medical caregivers.

Further research into the positive effects of healing environments on cancer patients should also include a focus on pathogenesis to investigate the benefits of environmental factors on cancer patient recovery.

In terms of specific elements of healing environments, some areas deserve further academic attention as well. For instance, the effect of colour and smell on the health and wellbeing of (cancer) patients should be investigated further. Furthermore, the controversy over the appropriateness of abstract art in healing environments could be clarified through further research.

In sum, plenty of interesting research topics on healing environments in radiotherapy deserves the attention of researchers. Hopefully, the study presented here indicates the importance of further research in the field.

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Appendices

A: Focus Group Layout

Focus group at the control hospital

Introduction focus group (15 min): The facilitators introduce themselves and tell participants what they do and what the objective of the day is. End with an explanation of what will be done in the 1 ½ hours**.**

Introduction Game (15 min): Ask everyone to show their keys and tell something about each key (2 min max). This game is useful, because it is a playful way of introducing each other. People who are very open will say a lot, people who do not like to talk so much will make it short. This gives the facilitator an idea of the kind of people in the group. The activity also has a surprise effect and is a nice way to make people comfortable without talking about disease.

Mind Map Game (30 min): Give every participant a piece of A-4 paper and some pencils and markers. Explain what a mind map is and invite the participants to make one of the radiotherapy building/ department. Show some examples of mind maps, so people have an idea what to do and how to start. The following directions are given for drawing the mind map: "Please try to draw the way you experience the building, think of what you do, what you see, the routines you have when coming here. You could use words to explain what you draw. Also try to write down the general feeling you have when you are here on the backside of the mind map." After the drawing, we let people explain what they have created. This is a creative way of assessing how different people perceive the environment and the basis for the following discussion.

Discussion (15 min):

- What is the first thing that pops into your mind when hearing the term healing environment?
- Can you make a definition together for the term healing environment?
- What would be the ideal healing environment?
- What elements make this a healing environment?
- Scenario: imagine you as a team have been given a budget and the decision making power to re-design the current environment. What would you change (not change) and why.
- What would be the first thing that needs to be changed?

Imagination Training Game (15 min): Let the participants relax a bit. Then make participants choose a picture (nature/landscape pictures) and start the imagination game. The purpose of this game is to make the participants relax at the end of the workshop, to generate a positive feeling and to show them by imagination they can take themselves into another world/ dimension for a moment. This enables them to focus on nice things, memories, and dreams and take away some negative emotions, such as like stress.

Focus group - The target hospital

Introduction focus group (5 min): The focus group expert Astrid Hendriksen advised us that there is no need to give a theoretical introduction of the project, because participants have already received the brochure. The introduction session was therefore shortened to a brief overview of the project, who the facilitators are, and what will be done in the 1 ½ hours.

Introduction Game (10 min): Ask the participants to select one (post) card that attracts them, and then briefly introduce themselves, stating why they are at the focus group and why they picked that specific card.

Discussion Current Environment (15 min): Ask every participants to write down (in 5 minutes) on a piece of paper, how they perceive the current environment. For example; are there certain elements that create this specific environment? Afterwards, ask them to say what they have written and one of the facilitators will note this down on a flipchart. Shortly talk about each mentioned element followed by a small discussion.

Mind Map of Ideal (Future) Situation (20 min): After having noted down and discussed how the participants perceive the current environment, they are split up into sub-groups, putting the dominant participants together. The participants are then asked to work together and draw out the ideal future for the current radiotherapy department.

Recommendations (25 min): Each group presents their drawing and visions for the future of the radiotherapy department. The recommendations from each design are put together so that people can see the different opinions. Based on this information, the facilitators can write down the specific recommendations for the radiotherapy department.

Imagination Training Game (15 min): Let the participants relax a bit. Then make participants choose a picture (nature/landscape pictures) and start the imagination game. The purpose of this game is to make the participants relax at the end of the workshop, to generate a positive feeling and to show them by imagination they can take themselves into another world/ dimension for a moment. This enables them to focus on nice things, memories, and dreams and take away some negative emotions, such as like stress.

B: Interview Protocols

☙ Interview Instructions

Procedural:

- Take your student card with you when approaching potential interviewees, just in case people ask for confirmation you're a student from Wageningen University;
- Make notes of day, time, place (city), location (e.g. home of interviewee, campus, etc.) and length of the interview;
- Record the interview and keep the sound file.

Interviewer attitude:

- Always be gentle and polite;
- Always be interested, e.g. make occasional eye contact according to social rules;
- Make the interviewee feel comfortable;
- Don't speed up the interviewee;
- Don't judge upon anything the interviewee says;
- Don't steer the answers of the interviewee;
- Encourage the interviewee to continue talking by e.g. nodding or repeating phrases of the interviewee in a question format (probing techniques).

☙ Introduction to the Interview

Good morning/afternoon/evening. [Introduce yourself, introduce and explain the research/project we are conducting in detail]. *Thanks a lot for co-operating in our study, your contribution is very helpful for our study on healing environments. I estimate the interview will last approximately 30 minutes.*

I have a list of 8 (11 for staff) questions for you about the healing environments in general and about cancer patients in particular. It is no problem if you can't answer a question; please feel free to indicate that and we'll move on to the next question.

For concise analysis of the interviews, it would greatly help to record the interview. Can I have your permission to record the interview? [If yes, put recorder on.]

[If the interview is in English and if applicable, you might add the following:]

The interview will be in English, but if you feel difficulties in expressing your thoughts, you might express them in your native language as well. Do you have any questions at this point? Shall we start the interview?

IMPORTANT NOTE: [Ask the expert / staff member to introduce themselves-for example; their specific interest, type of research they do, for how long etc].

✂ **Interview Questions - Experts**

- What is the first thing that comes to mind, when you hear the term 'healing environment'?
- What is, according to you, a good definition of a 'healing environment'?
- Do you think 'healing environments' are important? If so, why?
- What are, in your opinion, the most important elements for a 'healing environment? (I.e. light, air, colours, music, etc.)
- What are incentives for hospitals to implement a 'healing environment' design?
- Where do you foresee problems in implementing 'healing environments' in hospitals? Are there any risks involved? (I.e. Financial, environmental, etc.)
- Can you provide us with some successful 'healing environment' cases?
- Thinking about cancer patients in particular, what do you think are special benefits for them in a radiotherapy department that offers 'a healing environment'?

✂ **Interview Questions – Staff**

[General questions about the healing environment]

- What is the first thing that comes to mind, when you hear the term 'healing environment'?
- What is, according to you, a good definition of a 'healing environment'?
- Do you think 'healing environments' are important? If so, why?

[Specific questions about the healing environment at the target hospital and the control hospital's radiotherapy departments]

- Thinking about cancer patients in particular, what do you think are special benefits for them in a radiotherapy department that offers 'a healing environment'?
- What elements in your current environment do you think are contributing to the healing? And what elements are not?
- What are, in your opinion, the most important elements for a 'healing environment' in your radio therapy department? (I.e. light, air, colours, music, etc.)
- On a daily bases you are involved with the patients. From your experience, could you tell something about how patients perceive the environment? Do you get feedback about the environment from the patients? What kind of feedback? [Question only applicable for staff members who are in contact with patients].
- What are incentives for the control hospital/the target hospital to implement a 'healing environment' design in the radiotherapy department?
- Where do you foresee problems in implementing 'healing environments' (if any)? Are there any risks involved? (I.e. Financial, environmental, etc.)
- In what way does the environment influence your working behaviour towards the patients?
- If you had the chance to change your environment, what would you change to make a better 'healing environment' and why?

ର Closure of the Interview

We've reached the end of the interview. We would like to incorporate the information you have provided us in our report. Can you give us the permission to do so? [If not allowed, indicate that the information will be treated confidentially and anonymously]

Thanks again for co-operating. I have all the information I aimed for. Is there anything you would like to add to our conversation? And do you have any concerns regarding this interview?

- [Put off the recorder]
- [Make note of the length of the interview.]

NB: Please ask interviewee if (s)he is interested in the final report. If yes please make a note of this and collect their e-mail address.

[When at home:]

- [Check if the interview is recorded properly.]
- [Make notes of your reflections on the interview; e.g. how did it go in general, are there questions that were not well understood by the respondent, was the respondent at ease, did the respondent seem open, did the respondent hesitate to answer, etc.]
- Make a transcription of the interview (for instructions see next page). Please do not erase sound file after you've completed the transcript.

ର Transcription of the Interview

General instructions

- Transcribe the interviews *ad verbatim* (literally) as much as possible (but you don't have to include the uh's and ah's);
- Try to translate expressions that are not in English into English literally;
- Use the order of the interview questions for your transcripts – analysis is much more convenient if everybody uses the same format;
- Do not erase the sound file after you've completed the transcript.

Standard-format

- State the name of the interviewer and interviewee (if allowed);
- State the date, place and length of the interview;
- State the answers on the questions as much as possible in the same order as the questions in the interview format (also, include the questions in your transcript);
- State your reflective notes about the interview.

Reference

Interview protocol guideline adapted from: Jacobs, M.H. (2009). *Measuring Emotional Experiences in Tourists: Interview protocol for semi-structured interviews*. Wageningen: Wageningen University.