RESEARCH PLAN

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AR3AD110 DWELLING GRADUATION STUDIO:
DESIGNING FOR HEALTH AND CARE

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Figure 1. "Illustration of a new mother"
- Author's own illustration

01. introduction

Over the past decades, we have taken tremendous steps toward becoming an efficiency-driven society with an endless amount of possibilities. Everything is within hand's reach and the sky seems to be the limit. Unfortunately, this mentality of wanting to be efficient more often seems to be taking its toll. People all around us struggle with burnout, mental health issues such as depression, and all other health issues that this high-pressure society is bringing us. This graduation studio, designing for health and care, allows me to explore the influence of architecture on health(care) and how we as future designers can help people with health issues or prevent health issues through our designs.

Looking back at the past years, I have often found myself designing for people in need or health-related topics. As my final design project, I want to use this opportunity to yet again design for a health-related topic and hopefully contribute to a healthier living environment. This time, I have chosen to research the (mental) health of women, specifically women who are pregnant and/or have given birth. As I have seen in my close circles, healthy childbirth can be a very amazing experience as well as a very overwhelming experience. Feelings of extreme joy and stress go hand-in-hand. Within this society, it is not surprising that new moms can feel very overwhelmed with the birth of their new baby or even develop postpartum depression. As designers of the built environment, we know the influence architecture can have on people and their health. I therefore hope to learn and discover more about the positive contribution architecture can have on the (mental) health of women who are pregnant and/or have given birth.

02.
problem statement

the (lack of positive) influence of architecture on women during labor

Childbirth is considered to be one of the most significant experiences of a woman's life with a powerful psychological importance (McKelvin, Thomson, & Downe, 2021). Unfortunately, under the influence of negative experiences, childbirth can be harmful and have negative effects on women's (mental) health. As authors Esfeh, Kazemi, and Shamsaie write in their paper about a soothing labor environment, stress and anxiety that arise from these negative experiences are associated with negative effects such as an increased need for sedatives during labor, prolonged labor, and impaired mother-child attachment (Esfeh, Kazemi, & Shamsaie, 2020, pp. 1). A negative birth experience does not only physically influence these women, Nielsen and Overgaard write in their paper about women's birth experiences that a negative birth experience may also have a lifelong psychological impact in the form of post-partum depression, PTSD symptoms, and increased fear of childbirth (Nielsen & Overgaard, 2020, pp. 11). The Timbos Instituut, a Dutch scientific research institution, states that based on the number of births in the Netherlands and the prevalence of postpartum depression, it is estimated that 23,000 women who are pregnant and/or have given birth in the Netherlands develop postpartum depression every year. These numbers therefore make postpartum depression the most common condition among new mothers (Trimbos Instituut, n.d.).

"23,000 women who are pregnant and/or have given birth in the Netherlands develop postpartum depression every year"

- Trimbos Instituut

The factors affecting the experience of childbirth involve a number of interrelated psychological and physiological processes, that are influenced by social and organizational context. Another context that profoundly affects women's birth experience, and health and well-being during childbirth, is the physical environment (Esfeh, Kazemi, & Shamsaie, 2020, pp.1) (Nielsen & Overgaard, 2020, pp. 2). Sarah Joyce's research paper, named '*Wait and transfer, curate and prosume: Women's social experiences of birth spaces architecture'*, mentions the same statement: "The birth environment can help or hinder physiological birth and influence a woman's level of satisfaction with birth" (Joyce, 2021, pp. 540). With the statements of these research papers, it is clear that the physical environment and architecture take part in women's experiences and effects during childbirth.
Within the stage of LDRP; an acronym for labor, delivery, recovery, and postpartum, formulated by Esfeh, Kazemi, and Shamsaie (Esfeh, Kazemi, & Shamsaie, 2020, pp. 1), women come in contact with various types of physical environments. The environments can vary from their own homes to birth centers to the hospital. A study done in 2021 by Eenvandaag and Ouders van Nu, shows that 42% of the women give birth in first-line care, whereas 21% of the women give birth at home and 21% of the women give birth in a birth center or at the hospital. The other 58% of the women give birth in the hospital and cover the second-line care (Lubbe, 2021). This concludes that in The Netherlands, 79% of the women experience childbirth in other physical environments than their own homes.

Unfortunately, a problem seems to occur with these physical (birth) environments. Joyce describes that contemporary maternal care facilities and hospital settings are designed from a highly regulated and standardized maternity care perspective, based on building regulations, and evidence-based- and medical design, instead of a woman-centered design approach. Moreover, she concludes that 'regulatory design guidance for maternity facilities still deliver similar birth spaces to those first created post-war when childbirth moved wholeheartedly into hospitals' (Joyce, 2021, pp. 552).

"The birth environment can help or hinder physiological birth and influence a woman's level of satisfaction with birth"

- Sarah Joyce

In addition to this, personal experience and conversations that have been done up till now give similar kinds of results. A simple question that I asked my sister, who just gave birth herself, was about the physical environment of birth centers. The birth centers describe themselves as home-like maternity facilities, but contrary to what they advertise, my sister was very clear in not choosing to give birth there because of their highly regulated and standardized maternity care atmosphere. She said: "They try to make it feel home-like by just hanging up a painting and putting a colorful chair in the corner of the room". Furthermore, a personal visit to birth centers and hospitals gave the same kind of results. Simply looking at the corridors of these facilities showed either corridors that were dark and lacking natural daylight, or corridors that were sterile, white, and crisp, just as for the rooms; it was all lacking from a home-like atmosphere (fig. 2, fig. 3).
Authors Nielsen and Overgaard researched similar problems and solutions regarding the highly regulated and standardized physical environments of women during the stage of LDRP. They researched adapted patient-centered birth environments in hospitals which gave women associations to a recognizable home-like environment, which seemed to make the women adapt more easily to the room and to the transition from home to hospital. Providing solutions to counter these highly regulated and standardized physical environments and tackling the lack of home-like environments is a great addition, emphasizing the previously mentioned fact that 79% of the women come in contact with these physical environments. Unfortunately, this is one of the few cases wherein solutions for women-centered care are provided, and although developments seem to have been made over the past years within maternal care facilities, such as newly built Mother and Child centers in hospitals, does it seem that the problem that Joyce described is still accurate and the developments are scarce. All earlier mentioned research papers stating the influence of the physical environment on women during childbirth, a similar problem or solutions concerning the birth environment, have been published within the past three years. Moreover are the research papers interior-oriented, and minimally include nature-inspired design methods such as biophilic design, which has proven to have the ability to reduce stress, improve our well-being and expedite healing (Browning, Ryan, & Clancy, 2014).
This concludes that whether it is a maternal care facility in the form of a birth center or a hospital, the same problems seem to be coming back. The results show that the possibilities for women during the stage of LDRP are small and the gap between their homes and a maternal care facility, where 79% of the pregnant women are essentially assigned to, is substantial. The highly regulated and standardized maternity care settings hereby take the overhand, provide interior-related improvements at most and lack health-improving nature-inspired design approaches. It is therefore important to research the possibilities physical environments and architecture could provide for maternal healthcare facilities to women during the stage of LDRP.

Figure 2 and 3. "Photographs of corridors at a maternity ward"
- Author's own photographs

03.
theoretical framework

The theoretical framework of this research plan forms the foundation of what this research is built upon and contains two main sources. The first part of the framework is based on the research paper written by Jane Hyldgaard Nielsen and Charlotte Overgaard, earlier mentioned in the problem statement, named '*Healing architecture and Snoezelen in delivery room design: a qualitative study of women's birth experiences and patient-centeredness of care*'. Nielsen and Overgaard's paper forms the base of the theoretical framework and covers important principles like hospital design, birth environment and -experience, and patient-centered care. They hereby research women's birth experiences in an alternative delivery room and compare its design differences to a standard delivery room. Multiple principles that arose from this research, which 'added evidence on the positive influence of hospital environment design on patients' psychological and physical well-being and thereby the psychosocial outcomes of care' (Nielsen & Overgaard, 2020), will be used. The principles include the design differences between a standard- and an alternative delivery room and its corresponding improvements that cover the topics of guiding focus of the physical birth environment, visual stimuli, interior and furniture, privacy, and light.
Due to the previously mentioned interior-oriented literature and its minimal inclusion of nature-inspired design methods such as biophilic design, will the theoretical framework be zoomed out from maternity care- and interior-oriented setting to a wider- and nature-related perspective. To create a foundation on the influence of architecture in healthcare architecture and healing design, the book named *'14 patterns of biophilic design; Improving health & well-being in the built environment'*, by Browning, W.D., Ryan, C.O., and Clancy, J.O., will be used. This book covers important biophilic design principles that can reduce stress, improve cognitive function and creativity,improve our well-being and expedite healing (Browning, Ryan, & Clancy, 2014). Out of the 14 design principles that are appointed in this book, 5 principles have been chosen that offer stress reduction and positively influence emotion, mood, and preference, which, based on the literature used in the problem statement, seem to be important factors for women during the stage of LDRP. The principles are about visual connection with nature, non-visual connection with nature, presence of water, dynamic and diffuse light, and biomorphic forms and patterns.

04.
hypothesis

This research hypothesizes that a women-centered design, based on the current experiences of women during the stage of LDRP in a maternal healthcare facility, together with a healing-design approach, form design principles and/or a design that battles negative experiences and effects on birthing women. In other words, the design principles and/or the design contribute to a positive experience and an improvement in health & well-being in a maternal healthcare facility. It tackles the problem of highly regulated and standardized maternity care settings and stimulates a more home-like birthing environment whilst being in a healthcare facility.

05.
research question

What kind of architectural environment could contribute to a positive experience, improving health & well-being, for women during the stage of LDRP* in a maternal healthcare facility?
**labor, delivery, recovery, and postpartum*

To support the main research question, four sub-questions are formulated. Additional information about the sub-questions can be found in the appendix.

1. What are the environmental needs of women during the stage of LDRP in a maternal healthcare facility?
2. How do women during the stage of LDRP perceive their (architectural) environment in contemporary maternal healthcare facilities?
3. How are the (architectural) environmental needs of women during the stage of LDRP currently visible in the maternal healthcare facilities?
4. What kind of nature-inspired design principles could improve women's health & well-being in a maternal healthcare facility?

06.
definitions/framework

Definitions
- LDRP: An acronym for labor, delivery, recovery, and postpartum
- Maternal healthcare facilities: Facilities in where childbirth can be professionally assisted, such as birth centers and hospitals
- Environmental needs: Spatial, architectural, perception of space

Framework (in- and excluding)
- Literature study will be based of research in western- and first world countries
- Fieldwork and interviews will be based in The Netherlands
- The research is women- and patient-centered, partners, staff, or other parties will only be included in the research if mentioned by the women themselves
- First-line care and low-risk births

Figure 4. "Illustration of a woman in labor"
- Author's own illustration

07.
methodology

In order to answer the main- and sub-questions, various types of research methods will be carried out in this research. The research methods that will be used include literature study, interviews, fieldwork whereby research methods such as observing, sketching, and mapping will be done, and case study research. The interviews and fieldwork will require prior preparations and planning such as preparing interviews and accessory mediums, scheduling appointments, and discussing possibilities with the hospital staff.

Literature study
The first type of research method that will be done is a literature study. The literature study will provide the necessary background to my research and will involve researching, reading, analyzing, and evaluating different types of scholarly literature such as books and articles. Research papers, like the papers earlier mentioned in the problem statement, will hereby be used, concerning the topic of birth-environment, women-centered care, and spatial design for birth. In addition to that will literature study be done concerning topics of perception and biophilic design. If needed, the literature study will be strengthened with additional facts and figures provided by official records and resources. Exact information about the literature can be found in the 'theoretical framework' section and in the bibliography. The literature study will provide answers to the first-, second and fourth- sub-questions.

Interviews
To further support my research, various semi-structured interviews will be conducted. For this research method, approximately 5 women will be interviewed who have given birth in a maternal care facility within the past year or the coming month wherein the fieldwork takes place. The participating women must have self-selected to take part in the interviews, must have had a low-risk birth, and those under the age of 18, those known to be vulnerable, or women requiring an interpreter for the interview will be excluded. The maternal care facility wherein the women have given birth could be a birth center or a hospital.
Due to the unknown moment of time that childbirth takes place, will a part of the interviews be done during the fieldwork in two hospitals with women who will be assigned and willing to be interviewed at that moment of time. Interviews that will be conducted apart from the fieldwork that will be done, will take place with women who are recruited through other channels (midwifery practices, social media, and personal sources) at a time and location of their preference.
The interviews include a various amount of pre-setup questions whereby topics such as women's (spatial) needs, environmental experiences, perception, and memory will be researched. Inspired by Joyce's research method, the interviews will partially be done with the help of drawing methods which facilitate difficult to verbalize experiences and help women to think spatially (Joyce, 2021, pp. 542). The interview will start off with the request to draw memories of the space wherein the participants' baby was born. With the help of a sketchbook and markers, I will encourage the participants to draw and talk about all the spaces in the maternal care facility that were important to them or even write down spaces that were missing. I will help them to explore and translate the spatial experiences they have had during the stage of LDRP, their memories, perceptions, and needs.

Lastly, with the results of the literature study on the topic of biophilic design, images of biophilic designs (preferably in healthcare environments) will be presented to the women to research potential helpful environmental and architectural possibilities within maternal care facilities. This helps to explore design options that are currently not applied in maternal care facilities. The interviews will provide answers to the first- and second sub-questions.

Fieldwork

In addition, fieldwork will be done in two hospitals at the maternity ward and in the birth center. Research methods such as observing, sketching, and mapping will be done during this fieldwork. Observation will be the main research method, whereby people and their behavior, routings, and expressions or noticeable comments will be observed. The main focus will hereby be on women during the stage of LDRP, to ensure it is a women/patient-centered research. Approximately 3 spaces per hospital will be chosen to observe from and will be observed every 2 to 3 hours during the day to notice patterns or come across irregularities. Women's behavior, expressions, or maybe important comments will be sketched and written down, and women's routings in the facilities will be mapped. The fieldwork will provide answers to the first- and second sub-questions.

Case studies

To find out what design strategies have proven to be efficient, or based on the literature study, interviews, and fieldwork have proven to be inefficient, case studies of maternal care facilities or other healthcare facilities that relate or add value to the research will be researched. The case studies will be researched through analysis of floor plans, pictures, and articles. The following case studies will be researched:

1. Ikazia Hospital (Mother and Child center); a hospital in Rotterdam, The Netherlands, with a recently renovated Mother and Child center. The focus will be on maternity wards and other maternity-related spaces
2. Erasmus MC (Sophia Children's hospital); a hospital in Rotterdam, The Netherlands. The focus will hereby also be on maternity wards and other maternity-related spaces
3. EKH Children Hospital, a children's hospital in Samut Sakhon, Thailand, designed by Intergrated Field
4. SK Yee Healthy Life Centre, a healthcare center in Hong Kong, China, designed by Ronald Lu & Partners
5. *Optional: Gødstrup Regional Hospital, a hospital in Herning, Denmark, designed by Arkitema*

The case studies will provide answers to the third sub-question.

08.
research diagram

PROBLEM STATEMENT

Under the influence of negative experiences, childbirth can be harmful and have negative effects on the women's mental health, such as postpartum depression which is the most common condition among new mothers. One of the factors affecting women's experience of childbirth is the physical environment. A problem that seems to occur is that contemporary maternal healthcare facilities are designed from a highly-regulated and standardized maternity care perspective, instead of a woman-centered design approach. Research has shown that 79% of the women in The Netherlands come in contact with these highly-regulated and standardized maternity care facilities, which provide little interior-related improvements at most and lack of health-improving and nature-inspired design approaches.

RESEARCH QUESTION

What kind of **architectural environment** could contribute to a **positive experience, improving health & well-being, for women during the stage of LDRP*** in a **maternal healthcare facility?**
*labor, delivery, recovery, and postpartum

SUB-QUESTIONS

What are the environmental needs of women during the stage of LDRP in a maternal healthcare facility?

How do women during the stage of LDRP perceive their (architectural) environment in contemporary maternal healthcare facilities?

How are the (architectural) environmental needs of women during the stage of LDRP currently visible in the maternal healthcare facilities?

What kind of nature-inspired design principles could improve women's health & well-being in a maternal healthcare facility?

METHODS

Literature study will involve researching, reading, analyzing and evaluating different types of scholarly literature such as journals an articles.

Semi-structered interviews will be done with women who gave birth in a maternal care facility. The interviews will partially be done with the help of drawing methods.

Fieldwork will be done whereby research methods such as observing, sketching, and mapping will be used.

Case studies will be researched of maternal care facilities or other health care facilities that relate or add value to the research.

OUTCOME

Design strategies / Preliminary design

09.
bibliography/literature list

This bibliography partially includes sources that have not been used in this research plan yet. These sources will be used for the literature study and are therefore included in this bibliography.

9.1 Bibliography

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9.2 List of figures

10.
appendix

10.1 Additional information sub-questions

In addition to chapter '05. research question', the following information gives more clarity to the content and goals of the sub-questions.

1. What are the environmental needs of women during the stage of LDRP in a maternal healthcare facility?
   - What are the types of maternal healthcare facilities?
   - What is the current usage of the maternal healthcare facilities in The Netherlands and why is it like this?
   - What are factors influencing a woman's experience in a maternal healthcare facility?
   - What are the environmental needs for these women?

2. How do women during the stage of LDRP perceive their (architectural) environment in contemporary maternal healthcare facilities?
   - What is perception?
   - How can the (architectural) environment in maternal healthcare facilities be perceived?
   - How do women perceive their (architectural) environment at the moment of staying in a maternal healthcare facility?
   - How do women perceive their (architectural) environment after their stay in a maternal healthcare facility?

3. How are the (architectural) environmental needs of women during the stage of LDRP currently visible in the maternal healthcare facilities?
   - n/a

4. What kind of nature-inspired design principles could improve women's health & well-being in a maternal healthcare facility?
   - Which health-issues could be reduced or prevented by what design principles?
   - What design principles would be applicable within a maternal healthcare facility?

10.2 Interview questions

This list of interview questions advocates as a base of interview questions that will be used for the research. The list of questions will be supplemented over the weeks by doing literature study and conversations with hospital staff, where the fieldwork will take place. This will form interview guidelines.

- Can you draw what you remember of the space where your baby was born?
- What spaces in the facility are most important to you? Why is this?
- What makes you feel comfortable in a space?
- Which spaces in the facility do you use least?
- What elements of the facility remind you of a home-like environment?
- Are there rooms or spaces that you are missing and feel like they should be present?
- Does this space give you a safe and secure feeling?