



Development of Maternity Room Design with the Concept of Healing Environment to Increase Psychological Comfort and Satisfaction of Maternal Mothers

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ABSTRACT

Labor pain and anxiety are common experiences for maternity mothers, which significantly impact their satisfaction and psychological comfort. One of the continuous efforts to overcome this issue is the creation of a supportive physical environment through the concept of a healing environment. This study aims to develop a delivery room design based on the healing environment concept to improve psychological comfort and maternal satisfaction. This study uses a Research and Development (R&D) method with a User-Centered Design approach. The evaluation of spatial needs was carried out through Focus Group Discussions (FGD) involving 24 pregnant women and 10 midwives representing space users, where all participants provided informed consent. The results of this study are a blueprint for a delivery room layout that integrates optimal natural elements, lighting, materials (transparent lattices, vinyl floors), and air circulation to divert stress and anxiety. The outputs of this R&D development have been officially registered as Intellectual Property Rights (HKI) at the Ministry of Law and Human Rights of the Republic of Indonesia, consisting of the Delivery Room Design document (Registration No. EC002026041912) and the Delivery Room Design Educational Brochure (Registration No. EC002026041907). This design is expected to be applied in healthcare facilities as an adaptive spatial standard that supports a positive birthing experience.

ARTICLE INFO

Article History:

Submitted/Received 14 Feb 2026

First Revised 5 April 2026

Accepted 27 May 2026

First Available online 1 June 2026

Publication Date 1 June 2026

Keywords:

Delivery Room Design;

Healing Environment;

Psychological Comfort;

R&D Method;

Intellectual Property Rights

1. INTRODUCTION

Morbidity and maternal mortality are still global health problems today. The WHO reports that about 810 women die from complications related to pregnancy and childbirth every day.¹ The risk of maternal mortality and morbidity is higher due to limited access to quality health services, inadequate facilities and various socio-economic factors, especially in developing countries such as Indonesia. One of the risks of complications experienced by a birth mother can come from the inability to adapt to pain and anxiety in the delivery process which has a significant impact on the mother's physical and psychological state during childbirth.¹⁻³

Labor pain is an experience that almost all mothers feel universally. It is a natural state with varying levels of pain from mild to very severe. Adaptation to pain can have an impact on the sustainability of the childbirth process where physically and psychologically this will affect the quality of the childbirth process undergone. Inadequate pain management during labor can increase the risk of complications, slow down the labor process and negatively impact the mother's well-being.⁴

Whitburn et al.'s (2017) research explains that the experience of labor pain is not only influenced by physiological factors, but also influenced by psychological, social and environmental conditions of childbirth. An uncomfortable environment can increase the perception of pain and worsen the mother's childbirth experience.⁴⁻⁶

In addition to pain, anxiety is another factor that can also be experienced by a mother who gives birth, especially for those who give birth for the first time. Anxiety affects the perception of pain, increases the risk of complications and can prolong the duration of labor itself. Anxiety negatively impacts the overall childbirth experience as well as the quality of life of postpartum mothers.^{5,7}

Anxiety during childbirth can increase stress hormones such as cortisol and catecholamines which have an impact on uterine contractions and the length of labor. An emotionally supportive childbirth environment can help reduce stress and improve the mother's psychological comfort.^{6,8,9}

Effective management of pain and anxiety in childbirth contributes to increased satisfaction and reduces the risk of maternal morbidity and mortality. Maternal satisfaction is an important indicator of the quality of health services in childbirth. This is influenced by various factors including pain management, emotional support, interaction with health workers, and the delivery environment.^{4,5,7,8}

Effective management of pain and anxiety during childbirth will contribute positively to increased maternal satisfaction. This can be realized, one of which is by creating a supportive environment in addition to the competence and professionalism of a qualified medical team in childbirth management, pain and anxiety management so as to create a more positive and safe childbirth experience.^{7,8,10}

Efforts that can be made by integrating three important elements that are interrelated and support each other in creating a positive childbirth experience, namely by combining pain management, optimizing maternal satisfaction and applying maternity room design with the concept of a healing environment.¹⁰

The design of the maternity room with the concept of a healing environment is part of an effort to reduce pain and increase maternal satisfaction effectively. The design of the maternity room that applies the concept of a healing environment aims to create an environment that supports the physical and psychological recovery of the maternal mother. Healing environment is a user-centered design-based design approach that integrates natural elements, lighting, color, sound and sensory comfort to support the patient's physical and

psychological healing process.¹¹⁻¹³ This concept combines natural, sensory and psychological elements to create a calm, comfortable atmosphere and speed up the recovery process.^{10,14}

Sakallaris et al (2015) stated that the healing environment is a system that plays a role in supporting the capacity of the patient's healing process holistically, both internally, interpersonally, behaviorally and externally.¹¹ The healing environment is considered one of the important factors that support the healing of patients in health services by building a good space atmosphere supported by excellent service so as to trigger patient recovery.^{12,15}

Millenia et al in 2022 reported that the application of healing environment techniques in the delivery room can help reduce stress and pain felt by mothers.¹⁰ Hasya (2017) explained that a comfortable and supportive maternity environment can increase maternal satisfaction by providing a sense of security, control and support needed by maternity mothers during the delivery process. The results of the study show that the application of healing environment can increase maternal satisfaction by creating a more positive and supportive environment.^{14,16}

Some previous studies have mostly discussed the healing environment in hospitals in general, but there are still limited research that specifically develops the design of maternity rooms based on user needs (*user-centered design*) in Indonesian midwifery services.¹² This research aims to produce a maternity room design that is integrated with the concept of healing environment in order to provide psychological support for maternity mothers, it is necessary to develop a maternity room design with a healing environment concept that integrates the principles of the healing environment optimally.

2. METHODS

This research method *is research and development (R&D)* used to develop certain products and test the effectiveness of products, design of maternity rooms with the concept of healing environment, validity testing of contents to experts, FGD to 24 pregnant women and 10 midwives in the practice of independent midwives. Sampling is carried out by Technique *purposive sampling* With the inclusion criteria set are pregnant women, independent practice midwives and the inclusion criteria are mothers who are not willing to participate in the research.¹⁷ This study involved participants as users of the space for design evaluation. All participants have given their consent (*informed consent*) before the FGD activities were carried out, and the confidentiality of the participants' identities was fully maintained. The stages of the research can be seen as follows:

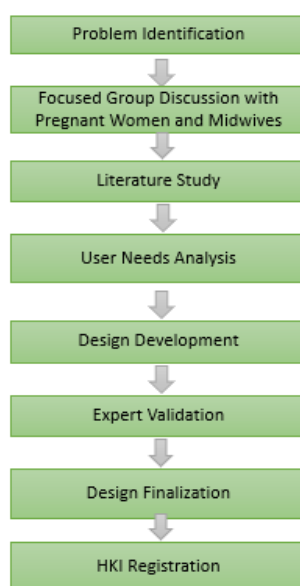


Figure 1. Research Internships

The research stage is carried out systematically using a Research and Development (R&D) approach with a user-centered design orientation to produce a maternity room design that meets the needs of users.¹⁷

The stages carried out include the *first stage*, namely identifying ideas related to the phenomenon of pain and stress/anxiety in childbirth, especially in maternity mothers who give birth for the first time while the current facilities have not fully supported optimal psychological services. The result of this identification becomes an issue or design problem that will be solved. *The second stage is* to conduct a data review through a literature study on maternity room standards, psychological services, and healing environment approaches. The data obtained is compiled to produce a criterion as a strategy used in the design analysis process. In addition, an FGD was held involving 24 pregnant women and 10 midwives about the design to be made. *The third stage is* data analysis based on a literature review and design criteria obtained at the previous stage. The analysis produced includes financial analysis, site analysis, zoning analysis, mass analysis and building appearance, structural and utility analysis of buildings and rooms. *The fourth stage is* the preparation of a design concept which is the result of an analysis process that will be a solution to the design problem formulated at the initial stage. Design concepts or recommendations include the concept of room, the concept of the site, the concept of mass and appearance, the concept of the utility structure of the building that applies the concept of a healing environment that combines elements of nature, senses and psychology to reduce labor pain and increase maternal satisfaction.

This research and development follows the R&D stage to produce a final product that has been patented through Intellectual Property Rights (IPR). In collecting data through FGD, the researcher has ensured ethical aspects by providing research explanations to participants and obtaining *informed consent* and ensuring data anonymity.

3. RESULTS

Based on the results of data collection through FGD on 24 pregnant women and 10 independent practice midwives, a total of 34 respondents were in accordance with the set inclusion criteria. A total of 10 people (41.7%) of the respondents were pregnant with their first child and 14 people (58.3%) had experience of childbirth ≥ 1 time and 10 midwives had work experience and carried out 100% independent practice of midwives for more than 5 years and had their own practice place.

Based on the results of the analysis of user needs, a maternity room design was developed (Figure 1. The design of an integrated and connected maternity room area) that has been registered in IPR No. EC002026041912. The results of the FGD from the respondents conveyed their perceptions regarding the design of the maternity room with the concept of healing environment as follows:

A. Opinions about current pregnancy and previous childbirth experiences.

Of the 24 pregnant women respondents, most stated that childbirth was a worrying experience and felt anxiety even though the mother had previous childbirth experience, especially for mothers who were pregnant for the first time. 10 midwives stated that "the average mother who has been helped with childbirth shows pain and anxiety in childbirth to a different level in each mother

B. Experience and perception of maternity ward facilities

Most pregnant women, especially those who have childbirth experience, tend to think that the atmosphere of the delivery room is scary, the tools in the room are scary and can increase anxiety.

The midwives said that the facilities in the maternity room must meet the standards and the arrangement must be improved so as not to cause concern for patients.

C. Expectations for maternity room facilities and infrastructure

All pregnant women tend to expect room facilities that can provide comfort, complete and more like an atmosphere at home. Pregnant women expect professional service, comfort aspects are a priority, adequate waiting rooms for families, comfortable seats and clean toilets. Most pregnant women also want access to a wide space so that they can walk around when there is a contraction. The bed and mattress used should not be too hard.

According to the midwives, the existing infrastructure facilities must still meet the standards that apply in the maternity room but can be adjusted to the concept of a comfortable room and pay attention to the ease of mobility and affordability in the use of tools in carrying out services.

D. Preferred atmosphere and sensory elements in the maternity room

Most pregnant women expect a sound that has a soothing effect such as the sound of water gurgling or other sounds. In addition, pregnant women also expect fragrances as therapeutic aromas with fresh and calm floral scents such as lavender, jasmine, and so on. Most pregnant women do not like the smell that is too strong.

The midwives expressed their opinion that sensory elements can be applied in accordance with the concept of hypnobirthing, for example by presenting soothing music to cause a relaxation effect, and still paying attention to the cleanliness and hygiene aspects of the room. Midwives do not recommend ponds with mini lagoons in the delivery room for fear that it will be an infectious source of mosquito seeds and other diseases to breed in the place.

E. Preferred colors in the maternity ward

Almost all pregnant women prefer soft color tones with preferences and color gradations that are not too much, namely plain colors or a combination of 2 colors that are aesthetic and matched. Some pregnant women prefer white as the main wana.

The midwives explained that the effect of color can affect the performance of the service so that light but soft colors are preferred and recommended.

F. Size of the delivery room

According to all pregnant women, the maternity room is preferable if there are not many people or patients in one room. Pregnant women recommend that there is only 1 bed in 1 room, a maximum of 2 separate beds and a good partition to maintain privacy and a sense of security during childbirth.

Midwives recommend a rather spacious room with 1-2 beds in the delivery room and closed to each other to provide comfort in the action and also to provide a guarantee of comfort and safety for the patient.

G. Preferred ornaments and decorations in the maternity room

All pregnant women explained that the ornaments they liked had natural elements, with wall decorations with nuances of a soothing natural scenery but not too crowded with images. The tendency of the chosen image is mountains, oceans or gardens so that it gives a refreshing and soothing impression. Respondents also want a maternity room equipped with plant and flower elements to create a garden-like atmosphere. Some pregnant women recommend simple decorations such as displaying photos of babies who have been born in childbirth or other cute baby photos to stimulate and provide support to mothers who are about to give birth. Most midwives recommend rooms with a natural concept that is hommy but does not contain harmful and excessive elements so that comfort is not only for the patient but also for the midwife in carrying out services.

Most midwives love the elements of nature that can provide a relaxing and comforting effect.

H. The expected room is in the delivery room

All pregnant women expect easy and affordable access from one room to another during childbirth. The delivery room is close to the family waiting room and toilet and other treatment rooms.

Midwives are of the opinion that the delivery room must follow the set standards, but the integration of the room and the continuity of the room with each other is an important aspect that needs to be considered in order to optimize all services provided to patients

I. Expected lighting in the maternity room

Respondents gave varied responses, most wanted a bright room, but some liked an ambience with dim lighting. There are also a small number of respondents who do not have special preferences.

Midwives recommend a bright room to make it easier to carry out services so that mistakes do not occur, especially when taking actions.

J. Other supporting element fund facilities in the maternity ward

Most respondents think that ventilation is important with wide opening windows, equipped with air conditioning to support good air circulation and room comfort. All pregnant women and couples recommend a family-friendly and comfortable waiting room to occupy with adequate storage facilities and access to a close and clean toilet. In the waiting room, it is hoped that it can also be used for patients to walk around when there is heartburn so that they can continue to interact with other families.



Figure 1. Integrated and connected maternity room area design

Source: Results of the development of the researcher's design based on FGD and user needs analysis (2025)

The opinion of the midwives is that the current waiting room is inadequate and is considered less comfortable to the family due to the limited space.

Based on the results of the interview through the FGD activity, then a design/design of the maternity room with the concept of a healing environment was made following the rules of the standardized maternity room. The resulting designs are as follows:



Figure 2. Footprint to Build Maternity Room Design with the Concept of Healing Environment
Source: Documentation of the results of the development of the design of the maternity room by the researcher (2025)

The designed room consists of 1) observation room, 2) maternity room, 3) bathroom, 4) tool and sterilization room, 4) waiting room and 5) post-saline treatment room.



Figure 3. Maternity Room Area
Source: Documentation of the results of the development of the design of the maternity room by the researcher (2025)

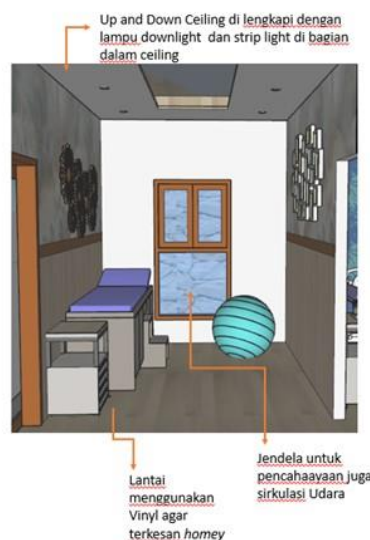


Figure 4. Maternity Indoor Design Details (floor, bed, window and ceiling) Type 1 alternative
Source: Documentation of the results of the development of the design of the maternity room by the researcher (2025)



Figure 5. Detailed ornaments of the maternity room with the concept of healing environment
 Source: Documentation of the results of the development of the design of the maternity room by the researcher (2025)



Figure 6. Maternity Indoor Design Details (floor, bed, window and ceiling) Type 2 alternatives
 Source: Documentation of the results of the development of the design of the maternity room by the researcher (2025)



Figure 7. Maternity Room Toilet Design
 Source: Documentation of the results of the development of the design of the maternity room by the researcher (2025)

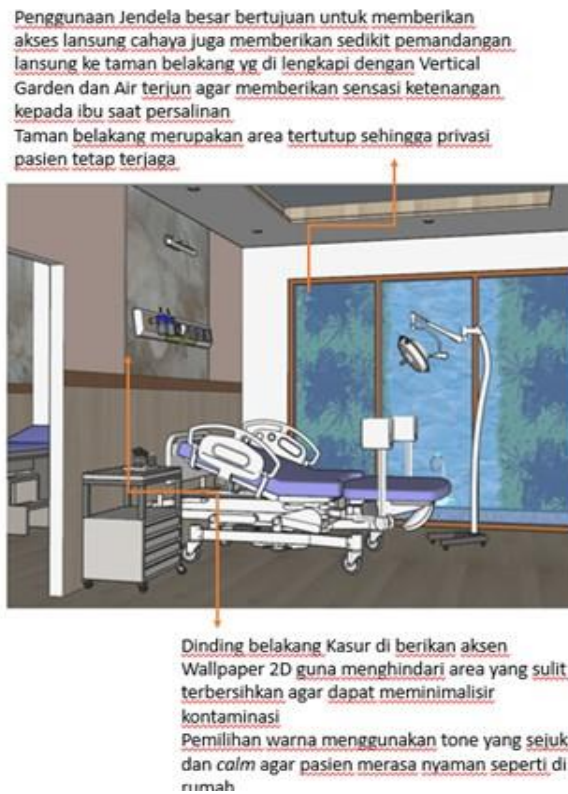


Figure 8. Maternity Indoor Design Details and Explanation

Source: Documentation of the results of the development of the design of the maternity room by the researcher (2025)



Figure 9. Design of Connecting and Access of the maternity room with other rooms

Source: Documentation of the results of the development of the design of the maternity room by the researcher (2025)



Figure 10. Family Waiting Room

Source: Documentation of the results of the development of the design of the maternity room by the researcher (2025)



Kelengkapan Kamar Mandi:

1. Akses langsung dari ruang bersalin
2. Akses langsung menuju kamar mandi
3. Akses langsung dengan ruang menunggu
4. Jendela untuk pencahayaan juga menuju taman depan
5. Tempat tidur bayi
6. Single sofa

Figure 11. Postpartum Room (postpartum care)

Source: Documentation of the results of the development of the design of the maternity room by the researcher (2025)



Figure 13. Postpartum Room (postpartum care)

Source: Documentation of the results of the development of the design of the maternity room by the researcher (2025)

4. DISCUSSION

Jones et al in the book *Health and Human Behaviour* explained that environmental factors play a major role in the human healing process by 40% compared to medical (10%), genetic (20%) and other factors (30%). Related to this, environmental factors should get a large portion in the design of health service facilities, especially midwifery services in the maternity room. One of the design concepts that optimally applies environmental factors is the *Healing Environment*.¹⁸

The design of the room with the concept of a healing environment emphasizes the *user-centred-design* or a design that focuses on the needs of the user, in this case the patient in a health care facility. The results of the research found that where the health service facility is located affects the quality of the healing process carried out in it. The principle of user-centered-design is applied to the artificial environment such as interiors, the application of colors, textures, materials and other architectural elements that are able to create a calm, relaxed and comfortable atmosphere. This situation can certainly reduce the stress experienced by patients who are under treatment. The results of the research also prove that the natural environment and the artificial environment have an influence in creating a conducive unity in a healing process that focuses not only on the physical aspect but also on the psychological aspect. Optimal psychological condition is supported by excellent and stable physical condition directly and indirectly provides a positive stimulus to accelerate the healing process in the treatment of a patient.¹⁹

The application of the concept of healing environment in the maternity ward is to build an atmosphere through the adjustment of all design elements to provide positive stimulation for the patient's five senses. The principle of application of the concept refers to Subekti (2007), which includes that the design must support the recovery process both physically and psychologically of the patient, access to nature, having access that is directly related to nature, the design created is directed at creating the quality of the room so that it feels comfortable, safe and does not cause stress for both patients and service providers.¹⁹

Spatial planning elements in the design of the healing environment concept include ^{13,19–21}

a) Lighting

Lighting in space design with the concept of healing environment is not only obtained from direct sunlight but also from lighting obtained through window openings, as well as ceilings (skylight). The benefit of exposure to one's psychic state is that it reduces psychic anxiety (*psychological fatigue*) as well as encouraging positive emotions of patients. Lighting that comes from lamps is more recommended to use incandescent lamps because they can give a warm and comfortable impression. Avoid using white fluorescent lights because it can make you tired and allergic to stress. Recent research shows that natural lighting can help lower anxiety and improve patient comfort in the maternity care room.²²

b) Color

Color gives different effects in the design of a healing environment. The color used is soft and close to the elements of nature. The selection of colors that calm and evoke optimism such as soft blue or soft green. The application of color is not only on the walls but also on the floor, ceiling, furniture, decorations and accessories used. Soft colors such as light blue, pastel green, and earth tone are known to provide a relaxing and emotional stabilization effect for patients.²³

c) View

The aesthetics of the room have an influence on the patient's psyche which is created by the application of natural scenery into the room. Access to nature is necessary to

stimulate health and reduce stress. Windows with large openings towards the outdoors and garden should be considered.

d) Sound

The anatomical function of the human body is influenced by one of the sounds or rhythms of music heard by the ears. The source of bungi can come from nature (natural sound) which gives a calming impression and creates a feeling of peace, such as the sound of wind or water pounding. Another sound comes from music that is able to stimulate hormonal functions in the human body, which in psychiatric practice music not only plays a role as a means of healing but can improve the quality of personality.

e) Texture

Texture plays a role in addition to touch therapy as well as to improve the quality of the surface as well as the light that falls on the surface of the shape. Texture is influenced by materials that have a psychological effect on a room design. Selection of wood materials for a warm effect, medium-effective natural stone and light-effective glass. The use of wood material in the headbed area (Fig.6) is a response to the input of midwives and pregnant women during the FGD who want a non-rigid/medical atmosphere.

f) Art

Art in the design of healing environments is emphasized on the aspect of visualization. Ulrich (2007) explained that art that displays natural elements has a positive effect on the health of patients.

g) Aroma

The smell that is perceived through the sense of smell serves to stimulate the part of the brain that works on emotions. The aromatic elements present in the design of the healing environment concept room are obtained, one of which is through fresh flowers placed in the room or from aromatherapi's signature fragrances.

The natural approach has an influence on human psychology because it is considered to be able to provide a sense of comfort so as to reduce stress and stabilize or reduce a person's tension. In addition, this is also believed to affect the mood of the individual so that it can be a mood booster that increases the body's immunity in the individual.^{12,13}

The application of natural aspects in the design of the maternity room with the concept of a healing environment can be done by making *Healing Garden* or indoor plant use. This can also be done by adjusting the type of plant, water and light to the patient's needs to help the healing process.^{12,24}

The concept of a healing garden used in the design of a space with the use of nature can help the process of calming the mind, awakening the senses and reducing stress. A relaxed atmosphere created by the existence of a healing garden or scenery and the selection of suitable plants can reduce anxiety and depression which will affect the psychological aspects of the patient and have a positive impact on health.¹²

The application of the healing environment in the maternity room is carried out by combining elements of form, color and nature. The selection of shapes is related to the level, functionality and customization of the theme of the design object. The use of color needs to be adjusted to the properties of color, characteristics and function of the space itself. The most important thing is the characteristics of the patients being served. The selection of shapes and colors is applied to the room furniture while still paying attention to the functional aspects and standards that must be met in the maternity room. The application of indoor natural aspects can be seen from the arrangement of the room layout and the selection of materials. The selected material is preferred that has transparent properties, with a grid model that provides a gap for the patient to be able to see the natural atmosphere from the inside of the room.

The design of the maternity room with the concept of a healing environment functions to help accelerate the patient's healing, reduce sadness, create and increase comfort and reduce stress. The design concept offered must meet the aspects of comfort, cleanliness, good ventilation and lighting, equipped with elements of natural scenery, aromatherapy, a soothing atmosphere, comfortable beds, clean and bright floors, privacy is maintained but allows companions who are always involved during treatment. The main factors that affect the comfort and success of childbirth include the management of patient anxiety. Hommy maternity room design elements, natural/natural elements, and the presence of supporting facilities can increase a positive childbirth experience for both patients and midwives. The presence of natural elements in health facilities has been proven to improve mood, reduce stress, and speed up the patient's recovery process.²⁴

5. CONCLUSION

This research has succeeded in developing a maternity room design with the concept *of a healing environment* that integrates physical and psychological elements. The final product of this research is in the form of Design Documents and Education Brochures that have been officially registered as Intellectual Property Rights (IPR). The implementation of this design is expected to become a new standard in providing maternity room facilities that are more humane and support the psychological comfort of mothers. The findings of the study show that the main needs of maternity room users include psychological comfort, privacy, a hommy atmosphere, natural lighting, good ventilation, and the connection of the space with the family. The healing environment approach is considered to be able to improve a more positive and humane childbirth experience. The next study is recommended to carry out the direct implementation of maternity room design in health facilities to measure the effectiveness of the level of anxiety and satisfaction of maternal mothers quantitatively.

THANK YOU

Gratitude was conveyed to the Director of the Bandung Ministry of Health Polytechnic who has provided policies and funding support so that this research can be carried out. Thank you to the Head of PPM Poltekkes of the Ministry of Health Bandung and the team, the Head of the Department of Midwifery, the research team and room design experts (Teh Tofi), Felzha, Farsya, Rangga and Deras (students of the Department of Midwifery and the Department of Health Promotion) who have completed the research activities and realized the design of the maternity room with the concept of a healing environment as planned.

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