# An exploration in the form of a persona of young pregnant women in the Netherlands: What are their needs and how may they be met?

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**ABSTRACT**
In a world where most research is focused on preventing pregnancy at a young age, the needs of young women who choose to become a mother are neglected and often not taken seriously. Within this research, a pilot study and three semi-constructed interviews with young mothers were held. They were asked to describe their needs and experiences per trimester of their pregnancy. In order to do so the participants were asked to use images, value words and prEmo emotion cards which were included within the digital prototype in Miro. Clear themes regarding distrust in health care professionals could be seen during all stages of the pregnancy, this feeling was often motivated by personal experiences. The supportive role of family and friends also was found to be extremely important during every trimester

**Author Keywords**
Pregnancy; health inequity; design guidelines; teen pregnancy; social inclusion; qualitative research; field study.

**INTRODUCTION**
In the Netherlands, teen pregnancy rates are among the lowest in the world; in 2016 around 3 in a 1000 young women under the age of 20 became pregnant (Fiom, n.d.), which contrasts significantly with the US with 18.8 births per 1000 women in 2017 (Centers for Disease Control and Prevention, 2019). A lot of research has been done on the prevention of adolescent pregnancy. This is mostly because teenage pregnancy can negatively influence the socioeconomic status and health of the mother and child (McDermott & Graham, 2005). Next to that, Fergusson, Boden & Horwood (2007) show that there is a significant difference in education level between women who became pregnant under the age of 21, but did not go for an abortion, and those who did or did not become pregnant at all. Dillon and Cherry (2014) have found that a lack or bad form of prenatal care could highly impact the physical and mental wellbeing of mother and child; both for developed and less developed countries. Still, only 65.4% of women below the age of 18 receive prenatal care in the US (Tilghman & Lovette, 2008); while this is 78% of all pregnant women in the Netherlands (Manniën et al., 2012). This lower rate of prenatal care in the US is mainly because pregnant teenagers are not aware of these possibilities (Dillon and Cherry, 2014). Therefore, it is important to do more research around the needs of young mothers or young pregnant women, to prevent and repair (further) social inequalities (McDermott & Graham, 2005).

**Health Inequity**
Improvement of the entire population's health, regardless of ethnicity, gender, socioeconomic status as well as eliminating differences in healthcare systems has been an important spearpoint for modern developed societies for years (Arcaya, Arcaya, Subramanian, 2015). Within healthcare systems, there is a systemic issue that stands in the way of better health outcomes. Technology is contributing to the shortcomings of healthcare in the case of marginalized groups such as elderly, immigrants or disabled people (Chang et al, 2004). This phenomenon is being generically referred to as the digital health gap which leads to health inequity. Health inequity is a common concept in health research. It should not be confused with health inequality. Where 'health inequality' points out the differences in health across relevant social groupings (Kawachi et al., 2002), 'health inequity' are systematic differences in the health of marginalized groups that could be avoided (Marmot et al, 2012).

### *Young Pregnant Women*

This research will focus on health inequity regarding young, pregnant women between 18 and 24 years old. Their needs regarding healthcare and the technologies or techniques to aid these women will be researched to diminish health inequity for this group. Help centers and information sites are currently available to young pregnant women, however scientific literature on the added value of these has not been found. Most research is aimed at teenage pregnancy prevention (Cabrera & Igartua, 2016; Coleman & Cater, 2006) rather than aiding young women who are pregnant with or without predetermined intention.

### Design Guidelines

Therefore, this research aims to provide information and design guidelines regarding the needs of young pregnant women in the Netherlands. This research will create a dialogue with young women about their experiences during their pregnancy. Insights from this study can be used by designers to create more empathy and understanding when engaging in a possible future design for this group. With this paper we want to contribute to the field of design research. The following research question will be answered: What is the experience of adolescent pregnant women in the Dutch healthcare system? How has health inequity among this target group affected their experiences with healthcare during pregnancy and how this can be summarized in personas/design guidelines?

This research will result in a set of needs and opportunities that will help designers during design and research projects, to better understand the needs of this target audience. At the same time, it will give healthcare providers a better understanding of the problems their patients face.

## THEORETICAL BACKGROUND & RELATED WORK

### Theoretical Background

According to Essink-Bot (2012), ethn**o**-differences, should be addressed with a different logic than currently happening in technology. Labelling ethno-differences in healthcare consumption as potentially inequitable, necessary changes are required for medical need for healthcare, patient preferences and treatment adherence. Therefore, for marginalized groups to be able to better understand and use their health information and take control of it, their needs should be explored and kept in mind during the design phase of a new healthcare tool or service. This could be done by taking health subsystem's dominant clinical logos, logic; ethos, also known as values and beliefs; and pathos, also known as empathy, into account (Waring, 2010). As explained in the introduction, this paper will look into the needs of a possible marginalized group to give healthcare providers a better understanding of the problems their patients face.

### Related Knowledge

Several papers already give design guidelines for designing for health inequality or inequity. Naaldenberg et al. (2014) for example did a research among people with intellectual disabilities, and frames the outcome as several wishes, visions and propositions that can be used for developing ideas. Emerson et al. (2011) also suggests several actions as appropriate responses to health inequalities, for example by increasing health workers' skills for working with people with intellectual disabilities. Additionally, Vedam et al. (2019) investigated mistreatment by health care providers, experienced by several groups of pregnant women. Their study has demonstrated that e.g. pregnant women of below 24 years old experience more mistreatment (1 out of 4) and physical abuse of health care providers compared with women above the age of 30 (1 out of 7). Furthermore, the odds of mistreatment will be doubled for first-time mothers.

#### *Social Exclusion*

As mentioned in the introduction, teenage mothers show higher rates of not finishing their education and experiencing negative socioeconomic consequences. Next to that, they also experience an increase in postnatal depressions (Goossens, Kadji, & Delvenne, 2015). Therefore, Goossens et al. (2015) state that more support is needed from a professional environment, e.g. psychologists or gynaecologists. Barn and Mantovani (2006) argue that the failure of support could lead to social exclusion, which is also stated by Mollborn and Jacobs (2011). Both studies aim for collecting insight into the needs and personal background of the pregnant young women or mothers, to stimulate social inclusion.

#### *Stereotype*

Cense and Ruard Ganzevoort (2018) found in a study with Dutch participants that young pregnant women and mothers should not be captured in a stereotype; since they have a personal story behind this typical view. This typical view caused by morals of society should refer to irresponsible behavior, because of having an unplanned pregnancy, which could place the person in question in a shameful position (Cense & Ruard Ganzevoort, 2018). By thematic analyses, both Boath et al. (2013) and Neill-Weston and Morgan (2017) demonstrated that these biases negatively impact the feeling of support for young mothers by the society. Moreover, Boath et al. (2013) gave insight that a good connection with the health caretaker of the young pregnant woman increased her confidence, although this good connection was often not present. Furthermore, Boath et al. (2013) found that the needs for teenage mothers should not be generalized with adult mothers; which require strong professional support as well as strong family support to increase the confidence of the young mother / pregnant woman.

#### *Personas*

Wenger et al. (2014) designed for behavioral patterns during pregnancy with a qualitative analysis. Additionally, themes of this analysis were selected, which could then be used to create personas . These personas, combined with interviews and surveys were used to represent struggles that the women faced during their pregnancy. This method is demonstrated as well by Gao et al. (2014) who used an affinity wall in combination

with the creation of personas in their design for pregnancy. Instead of using personas for a clearer problem definition, Gao et al. (2014) used the personas for a better understanding of the behavior of the pregnant users.

### *Design for Needs*

As seen in the previously mentioned work, it is necessary to distinguish the (personal) needs of young pregnant women from those of older pregnant women (Barn & Mantovani, 2006; Boath et al., 2013). This could contribute towards stimulation of social inclusion of pregnant women and young mothers (Goossens et al., 2015; Barn & Mantovani, 2006; Mollborn & Jacobs, 2011; McDermott & Graham, 2005). Furthermore, this marginalized group faces more mistreatment of health care providers; which expresses the impact of health inequity within this target group. To accomplish a qualitative study, previous studies have shown that a thematic analysis was valuable for this target group (Neill-Weston & Morgan, 2017; Boath et al., 2013). A current design for needs is the Jong & Zwanger app (Jong & Zwanger, 2018). This app focusses on emotions, roadmaps, tasks, goals and agenda and has a chat function to chat with their support caregiver. This app also allows bringing different healthcare professionals and family and/or partner together to get in contact with the young pregnant woman and be assigned tasks in the care for the woman. This app has however not been tested academically yet regarding satisfying needs and is only a regional effort rather than national.

## STUDY SETUP & METHODS

This paper answers the aforementioned research question through a field study. As a method for this study context mapping (Sleeswijk Visser, 2009) is used to create an understanding of the needs of young pregnant women in combination with a semi-structured interview. The method of context mapping fits into the field approach as it investigates what the context is of our target group and

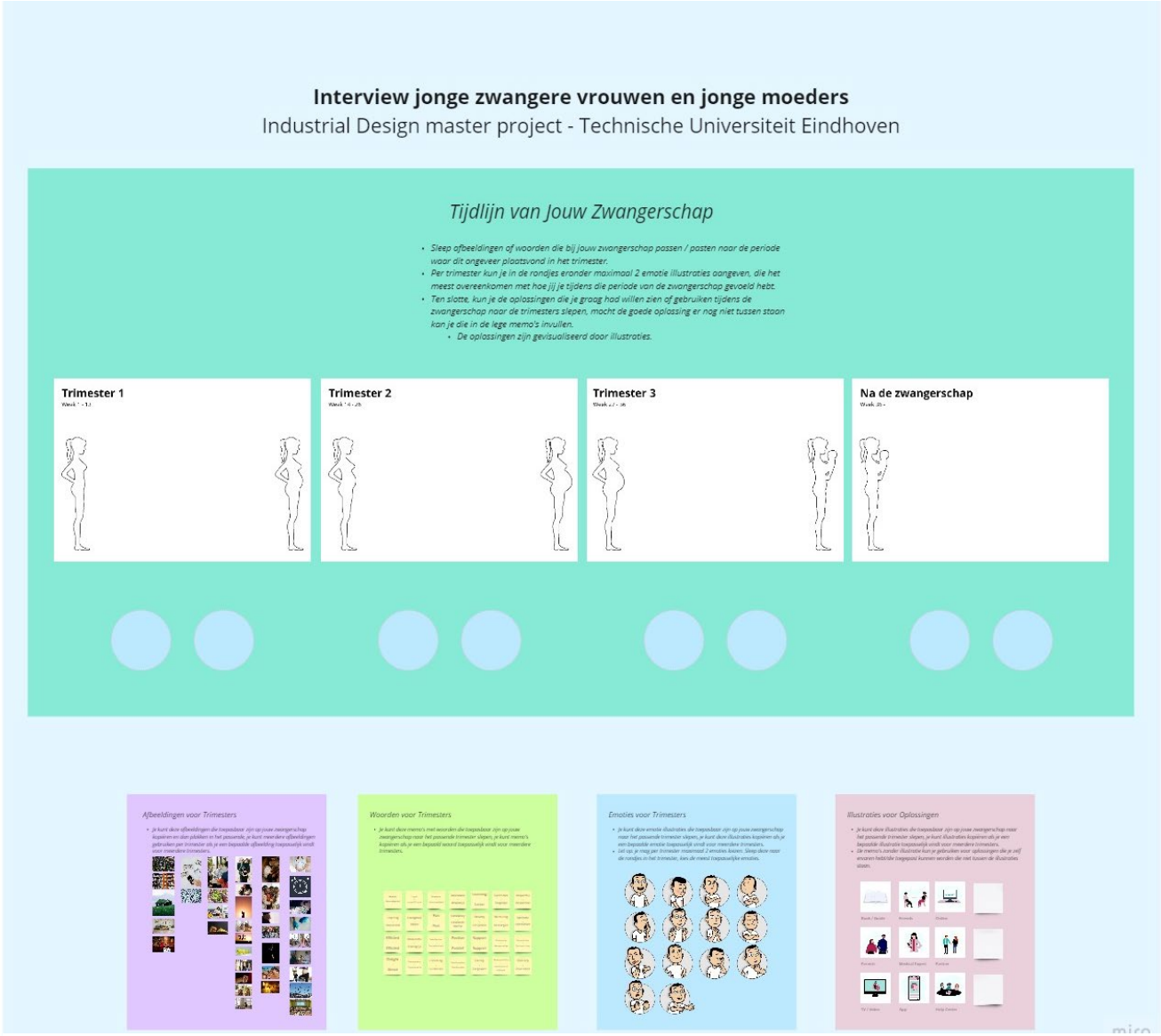


**Figure 1 The digital prototype environment in Miro**

*'You get on a train that is already running, which you have not planned in advance, and you do not know where it will end or what the journey will look like. I found that very scary. I never looked into pregnancies, never into baby things or whatever.'*

*- Participant 2 about Doubt in T1*

*'In fact, I liked to drink a redbull every now and then, and then I could not do that anymore.'*

*- Participant 2 about Physical health in T1*

*'Those reactions were that I was too young. And that I was wasting my life and that I had to enjoy and that sort of thing.'*

*- Participant 1 about Misunderstanding social environment in T1*

*'I felt alone, I did not see my friends anymore because I did not have time for them, and I slept a lot.'*

*- Participant 1 about mental effects in T1*

allows users to make and explain their own experiences with a tool. In this case, our tool (fig 1.) is a process visual per trimester on the online platform Miro guided by the semi-structured interview (Miro, 2020). Our tool was created after interviewing two experts in aiding young pregnant women and an experience expert. The two aid experts consisted of an organization that created the Jong & Zwanger app (Jong & Zwanger, 2018; see Appendix D) and an organization that supports and aids young pregnant women, JEM (see Appendix E). These three interviews helped us in selecting the content used in the Miro visual.

According to Kallio et al. (2016), the semi-structured interview can be used to dig deeper into what participants tell or show using the context mapping while the participants can still show their opinion through verbal expression. Furthermore, using semi-structured interview reciprocity between participant and researcher is possible. The test has been conducted with three female participants aged 18-24, who recently had a child (n = 3).

Using this platform, participants were asked to choose from images (Pexels, n.d.; Pixabay, n.d.; Unsplash, n.d.), sorting cards (Contentsparks, n.d.; Ideo.org, n.d.) and prEmo emotion cards (Desmet, 2018) to describe their experience during their pregnancy per trimester. The images and sorting cards were selected after having spoken to an expert who had been pregnant herself at a young age. Her experiences and various topics she brought up are summarized in Appendix F. If no image fit what a participant wanted to express, blank images were provided where text could be written on by the participant. The visuals like images and the prEmo emotion cards can help to share latent needs because they more playfully invite people rather than just asking questions (Visser et al., 2005). The cards may also provide more cues regarding the ability to express what was experienced during the participant's process and moves beyond what the participants say and think as in interviews to what they know, feel and dream. Besides, participants were asked to choose from several images that could represent a solution to a possible problem that was identified during the context mapping. This part provides insight into the pains and gains of our target group as well as the why and when of the problems. After identifying the problems, the solution images allow for co-designing solutions to the pains. As explained in the third paragraph of the introduction, not much is known about young pregnant women's needs. This method may provide good first insights and possible solution directions that can later be explored more widely at a later stage.

**Study Setup**

The study consisted of three steps: 1) introduction of the experiment, 2) using the Miro visual to explore the experiences 3) finding solutions to possible problems that arose in the second step. During the introduction, two researchers had a casual conversation to get acquainted with the participants and make them feel comfortable. The researchers provided a brief explanation of the research and Miro visual (Figure 1.) to the participants. Next, in the second step participants told their experience per trimester based on the semi-structured interview (see Appendix G), while also placing the cards with pictures and sorting cards related to their story on the Miro visual. To conclude a trimester, participants were asked to choose two PrEmo emotion cards (Desmet, 2018) that fit that trimester best. In the third step visuals were used, where participants chose cards based on problems or difficulties they encountered (i.e. loneliness) and choose illustrations or cards that represent possible solutions or improvements to that (I.e. talking, friends, information). Details of the Miro board can be seen in Appendix H. The filled in boards per participant as results from this research can be found in Appendix I.

Before the study, the participants were extensively briefed about the study setup. Informed consent was granted by the experts and participants of this study, who were also reminded that they could exit the study

*'In fact, it is all medical information you get. Other things you have to find out for yourself.'*

*- Participant 1 about Insufficient information in T2*

*'When I said I was scared, I was not taken seriously.'*

*- Participant 2 about Distrust in healthcare providers in T1/T2*

*'The first half of the 2nd trimester was very negative for me, because I was still sick.'*

*- Participant 2 physical pregnancy effects in T2*

*'I was a little afraid of their reaction, so we told them very late.'*

*- Participant 3 about Misunderstanding social environment in T2*

whenever desired with no explanation needed. The consent form templates for experts and participants can be found in Appendix A and B, and the ERB form in Appendix C.

The experiment was recorded on audio to capture all explanations. The audio was transcribed verbatim. All data were combined and analyzed by thematic analysis per trimester using an inductive approach (Braun & Clarke, 2006).

### Analysis of Semi-Structured Interview

The questions are related to the experiences of the first, second and third semester (see Appendix G). The semi-structured interview has been conducted, recorded and transcribed. An approach to thematic analysis of Braun and Clarke (2006) is used to analyze the data. The goal of this method is to 'systematically identify, organize, and offer insight into patterns of meaning (themes) across a data set' (Braun and Clarke, 2012).

The first phase of this thematic analysis is to familiarize yourself with the data. This is done by listening to the audio and writing down the transcription. The second phase is to generate initial codes per participant (see Appendix K). The third phase of the thematic analysis process is about searching for general themes. The initial codes are analyzed, compared between participants and used to create potential themes. In the fourth phase, the chosen themes are reviewed, compared with the original data from the interview and if needed narrowed down. In the fifth phase, the themes are defined and explained related to the research. The final step is to report the outcome of the thematic analysis in this paper.

## RESULTS

The interviews are analyzed following the method of Braun and Clarke (2006, 2012). This part describes the analysis of the interview per phase.

### Initial Codes

The analyses of the interviews started by listening to the audio recording, transcribing the text, rereading the transcribed text and generating initial codes. These are the first and second phase of the analyze method. The parts of spoken sentences we found revealing are collected in an excel document (for an example of this analysis, see Appendix J). Based on these chosen parts the initial codes were formed per trimester as shown in Table 1, 2 and 3. Separate initial codes were created for each participant to minimize influencing and biases.

In the third phase of the analyze method, a second look was given to the initial codes. All initial codes were placed next to each other to identify patterns among them and to come up with themes. The idea is that these themes are more generally applicable than the initial codes, however since we already had brief codes to work with, we mainly looked at identifying patterns among the participants. Some initial codes that were very similar were combined to create coherent themes. These themes were divided in occurrence per trimester of the pregnancy as shown in Table 4.

Table. 1

*Trimester 1: Forming initial codes per interview.*

| | **Participant 1** | **Participant 2** | **Participant 3** |
|---|---|---|---|
| **Initial codes** | Environment<br>- Incomprehension<br>- Feeling alone<br>Insufficient information<br>- Emotional effects<br>Pregnancy effects<br>- Physical<br>- Mental<br>Pride<br>- Child<br>Dependence<br>- Physical<br>-Social | Problems with medical aid/experts<br>Social contacts<br>Physical health mother/baby<br>Mental health<br>Insecurities<br>Lifestyle<br>Finance<br>Positive feelings | *No data** |

*Note.* *Participant 3 did not know she was pregnant during trimester 1.

*'We really had a wonderful system of people around us and only then do you notice how important family is around you.'*

*- Participant 3 about support from social circle in T3*

*A stranded whale [...] that's how I really felt in the end'.*

*- Participant 1 about physical dependency in T3*

*'I was just growing a tiny human inside me. I loved that so much.'*

*- Participant 3 about Happiness & pride child in T3*

Table. 2
*Trimester 2: Forming initial codes per interview.*

| | Participant 1 | Participant 2 | Participant 3 |
|---|---|---|---|
| **Initial codes** | Environment<br>- Incomprehension<br>-Support<br>- Feeling alone<br>Insufficient information<br>- Practicalities<br>- Social circle<br>Regulatory burden<br>Pregnancy effects<br>- Physical<br>- Mental<br>Pride<br>- Child | Problems with medical aid/experts<br>Social contacts<br>Physical health mother & baby<br>Insecurities<br>Lifestyle<br>Finance<br>Information<br>Positive feelings | Support<br>Judged<br>Insecurity/fear<br>Dependency<br>Preparations<br>Intimacy<br>Isolation/lonelinessResponsibility/caring<br>Mood swings |

Table. 3
*Trimester 3: Forming initial codes per interview.*

| | Participant 1 | Participant 2 | Participant 3 |
|---|---|---|---|
| **Initial codes** | Environment<br>-Support<br>- Feeling alone<br>Pregnancy effects<br>- Physical<br>Pride<br>- Child | Problems with medical aid/experts<br>Physical health mother & baby<br>Mental health<br>Insecurities<br>Lifestyle<br>Positive feelings | Support<br>Judged<br>Insecurity/fear<br>Dependency<br>Preparations<br>Pride<br>Mood Swings |

**Final Themes**

In the fourth phase of the analyze method, the themes were adjusted to make them more accurate. In the fifth phase the themes were reconsidered and defined precisely. The meaning of the themes is further elaborated in Table 4.

For the first trimester, the results were divided in five main themes. The theme social incomprehension is about the reaction and interaction with others when they find out the participant was pregnant. The theme, mental effects, is about how learning that they were pregnant influenced their state of mind and physical health is about the physical inconveniences. The theme Doubt perfectly is shown by Participant 2, she told us that she *'never looked into pregnancies, never into baby things or whatever*'. Finally, the last theme of the first trimester, distrust in healthcare providers, is related to the feeling of not be taken seriously by healthcare professionals.

In the second trimester, three themes are still relevant namely, misunderstanding social environment, mental effect and distrust in healthcare providers. The themes insufficient information; not getting enough information from care professionals on both medical and emotional effects, and physical pregnancy effects; including physical health as well as the reaction of people around you notice the pregnancy, are relevant for the first time in this trimester. A quote that illustrates the theme insufficient information on the involvement of partners, is as follows: '*That in a pregnancy more involvement is needed from the man, more is explained to a man, rather than focusing everything on the woman and the baby*'.

In the last trimester of the pregnancy, six main themes were found: distrust in healthcare providers, support from social circle, physical dependency, insecure of baby health and care, happiness & pride child and judged as incapable. Especially the theme judged as incapable has to do with how other view and react to the young mothers to be.

Finally, the opportunities for improvement according to the participants were analyzed. Combining these opportunities with the themes that were just described, a persona was created, summarizing insights from all

participant into one persona. This persona can be found in Appendix L (used sources: Birth Verloskundigen, n.d.; Unsplash, n.d.).

Table. 4
*Forming themes.*

| Trimester | Theme | Explanation |
|---|---|---|
| **1** | Misunderstanding social environment | Family and friends do not understand what young pregnant women are going through and may make insensitive comments and suggestions. |
| | Mental effects | The pregnancy affects them in mental health and state of mind. |
| | Physical health | The effects of the pregnancy around physical changes as well as dietary to be physically healthy. |
| | Doubt | Insecurity about what to do. Feeling that you are not timely informed about next steps. |
| | Distrust in healthcare providers | Not feeling like healthcare professionals take them seriously and therefore lacking trust in the healthcare system and providers. |
| **2** | Misunderstanding social environment | Not getting enough support from partner and friends. Next to this the feeling of being alone due to the social environment not always understanding what they are going through relating to the fear of not being understood. |
| | Insufficient information | Not getting enough information from care professionals on both medical and emotional effects. Therefore, reliance was on the social circle and the internet. Partners also should get more information from professionals to be able to understand and support the pregnant women. |
| | Physical pregnancy effects | The effects of the pregnancy around physical changes as well as people around you notice the pregnancy. |
| | Mental effects | The pregnancy affects them in mental health and state of mind. |
| | Distrust in healthcare providers | Not feeling like healthcare professionals take them seriously and therefore lacking trust in the healthcare system and providers. |
| **3** | Distrust in healthcare providers | Not feeling like healthcare professionals take them seriously and therefore lacking trust in the healthcare system and providers. |
| | Support from social circle | Support from partner and family regarding self-care and emotional support |
| | Physical dependency | The effects of the pregnancy regarding the inability to resume daily tasks due to changes of the body and energy levels. This resulted in being dependent on others. |
| | Insecure of baby health and care | Feelings of being insecure regarding the right care for the baby and wellbeing of baby and lacking information regarding this. |
| | Happiness & pride child | Feeling of being happy and pride regarding the visible belly and bringing a child to the world. |
| | Judged as incapable | Feeling of being judged as incapable by the environment and therefore having tasks taken over by family. |

## DISCUSSION

### Interpretation

The found themes in combination with the personas could help medicals and help-centers to adapt their method to more specific needs of different types of young pregnant women. This way, health equity could be realized in the field of pregnancy of young women. Furthermore, as demonstrated in the Related Work section it is important to consider personal stories instead of a moral stereotype. Hence, within this study one persona was created, to obtain insights of most important needs that correspond to the situation of a young pregnant woman. This could simplify the process of meeting the needs for this specific woman, still this is rather a tool of assistance than a main focus. Additionally, the proposed opportunities (needs) could be combined with personal aspects outside of the more general persona; to match the actual user needs and stimulate both social inclusion and health equity.

The literature review shows the importance of support from a specific angle for improving the confidence of the young pregnant woman and to stimulate social inclusion. Still, the results of this study could demonstrate that instead of support of the professional environment only, there is a need for support of multiple angles as well social as professional, which was not proposed by all related work. Furthermore, the found literature focused mainly on the negative impact of the stereotype that represents careless behavior. This negative impact of a stereotype did not seem to be the main struggle in this study, but participants did acknowledge that they felt judged by (health) caretakers and by the social environment when they were in public. This struggle was an initial point for a bigger problem. Moreover, Participant 2 mentioned the feeling of being misunderstood and not taken seriously by health care takers. This was in general a more present problem with not only health care takers, but also the social environment; as mentioned by Participant 1 (Misunderstanding in the Social Environment). This

misunderstanding was mainly caused, as derived from the interviews, due to loneliness and isolation as a young pregnant woman and later on mother. Therefore, there could be thought of a solution that captures both the need for social inclusion of the young pregnant woman, but also to stimulate understanding of this situation by close friends and family.

With regard to a solution, the participants did use different kinds of apps; but these apps did not demonstrate to solve the biggest challenges as e.g. decision-making, feeling supported. Probably, these needs cannot be met in a technological manner only. Another perspective on this thought of technology not being the solution, is the previously mentioned app called Jong & Zwanger. This app may play into the themes of insufficient information, insecurity and doubt regarding care for the baby and own health. It provides step by step roadmaps of what to do as well as tasks to complete so the pregnant women may feel more like they are doing the right thing. Secondly the app has a function to bring people, who are closely connected to the young pregnant woman, together e.g. various healthcare professionals, family, partner. This might help regarding the themes insufficient information and distrust in healthcare professionals as the caretakers are available to chat with. This may also help regarding the misunderstanding social environment as the family and partner may be more included in the process and might be assigned tasks in the app as well. This app is still regional, and therefore not a national effort yet; which could declare why the participants of this study did not use this app (another region). Secondly, it is not clear whether healthcare professionals outside of the app organization actually use this app to get into contact with the young pregnant women. Hence it is recommended to see whether the needs are actually met with this app, how more needs may be met, and how this could become a national effort where all healthcare professionals for the young pregnant women are brought together.

Additionally, results suggest that there is a need for connecting young pregnant women with others in the same situation. This could tap into the theme of feeling misunderstood by their social environment, since they would then have an opportunity to experience a more similar lifestyle. Furthermore, there could be room for discussing their approaches on challenges that they face; to feel better informed and thus address needs within the themes doubt and insufficient information. This more empathic connection could also be used to decrease loneliness and isolation; thus feeling socially-excluded; and therefore create more support or solidarity around the needs of all themes. The needs within different themes could then be discussed, and since these themes are sorted per trimester; the focus of the needs will probably change per trimester (approximately). This could also be valuable for the stimulation of social inclusion during motherhood. While this study focuses on the design for needs during the pregnancy, there were insightful opportunities for the young motherhood as well. Participant 3 mentioned the loneliness in the motherhood, because she was not acquainted with other mothers who had kids in the same age. When a design solution is created for the needs for young pregnant woman, it would be valuable to involve stimulation of health equity and social inclusion for the young mother as well.

### Design for Young Pregnant Women

The method is based on a demonstrated design approach as discussed in the method, which uses picture cards and value words. Still, it is applied in an online environment in this study, because of current measures of limited physical contact. Moreover, it is not applied in the proposed physical context which could have impact on the results. Additionally, thematic analysis is applied, which has been combined with the use and creation of personas in a previous health-related study. Although it was found that thematic analysis and the creation of personas were separately used to conduct research about (teenage) pregnancy, it was not found that these were previously combined in studies within this topic.

In a later stage beyond this research, it may be good to use a cultural probe as this method allows being conducted without a researcher present, so the participants may respond in a more unbiased way. This is important as our target group may experience some sensitive issues and they need to feel comfortable sharing their experiences. Furthermore, our study has a small sample size; meaning that our results should be interpreted carefully. This is also caused because the age category of young pregnant women within this study is rarely used in literature reviews. Most studies define adult pregnancies of an age of 19 or 20 years old, while as shown before it was found that young pregnant women till an age of 24 years old experienced a higher rate of mistreatment than older pregnant women. Furthermore, JeM is an organization for young pregnant women or mothers up and till the age of 24 years old; which made it valuable to do research on this age group; to define needs for realizing health equity and social inclusion. Hence, future work is required with a larger sample size to obtain a better evaluation of user needs. This could both contribute towards design of health (in-)equity and the medical field.

## CONCLUSION

In this paper, the needs of young pregnant women were researched. This research should point out how the healthcare for young pregnant women could be improved. The research question was: What is the experience of adolescent pregnant women in the Dutch healthcare system? How has health inequity among this target group affected their experiences with healthcare during pregnancy and how this can be summarized in personas/design guidelines?

To answer this research question, semi-structured interviews were conducted using a design probe, those were analyzed through thematic analysis. The themes that were found were then used to create a persona.

In the three trimesters of pregnancy, several important themes for young pregnant women in those periods were

distinguished. The one theme that was visible throughout the entire pregnancy was the distrust in health care professionals which is a result of the women feeling like they were not taken seriously. Secondly, social support, from partners, family and friends, was another prominent theme seen in the results.

Next to the needs of pregnant women, several opportunities were found where care for these young pregnant women can be improved. An example is how the information supply to these women can be improved. It is important for healthcare providers to provide accurate and relevant information to these women. As previously mentioned, there is a theme of distrust in healthcare professionals. Maybe by improving the information supply, these young women can have more trust in healthcare professionals.

Even while keeping in mind the discussion points of this research, it still provides some important results that can stimulate further research and design opportunities for young pregnant women.

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## REFERENCES


Arcaya, C. Arcaja, L. Subramanian, S. (2015). Inequalities in health: definitions, concepts, and theories. 8: 10.3402/gha.v8.27106. Doi: 10.3402/gha.v8.27106. PMCID: PMC4481045

Barn, R., & Mantovani, N. (2006). Young Mothers and the Care System: Contextualizing Risk and Vulnerability. British Journal of Social Work, 37(2), 225–243. https://doi.org/10.1093/bjsw/bcl002

Birth Verloskundigen. (n.d.). Pregnancy trimesters [Illustration]. https://birth-verloskundigen.nl/verloskundige-stadshagen-zwangerschapsfasen/

Braun, V. & Clarke, V. (2006). Using thematic analysis in psychology. Qual. Res. Psychol. 3, 2 (January 2006), 77–101. DOI:https://doi.org/10.1191/1478088706qp063oa

Braun, V., & Clarke, V. (2012). Thematic analysis. In APA handbook of research methods in psychology, Vol 2: Research designs: Quantitative, qualitative, neuropsychological, and biological. (Vol. 2, pp. 57–71). American Psychological Association. https://doi.org/10.1037/13620-004

Boath, E. H., Henshaw, C., & Bradley, E. (2013). Meeting the challenges of teenage mothers with postpartum depression: overcoming stigma through support. Journal of Reproductive and Infant Psychology, 31(4), 352–369. https://doi.org/10.1080/02646838.2013.800635

Centers for Disease Control and Prevention. (2019, March 1). About Teen Pregnancy | CDC. https://www.cdc.gov/teenpregnancy/about/index.htm

Cense, M., & Ruard Ganzevoort, R. (2018). The storyscapes of teenage pregnancy. On morality, embodiment, and narrative agency. Journal of Youth Studies, 22(4), 568–583. https://doi.org/10.1080/13676261.2018.1526373

Chang, B. L., Bakken, S., Brown, S. S., Houston, T. K., Kreps, G. L., Kukafka, R., Safran, C., & Stavri, P. Z. (2004). Bridging the Digital Divide: Reaching Vulnerable Populations. Journal of the American Medical Informatics Association, 11(6), 448–457. https://doi.org/10.1197/jamia.m1535

Coleman, Lester & Cater, Suzanne. (2006). 'Planned' Teenage Pregnancy: Perspectives of Young Women from Disadvantaged Backgrounds in England. Journal of Youth Studies. 9. 593-614. 10.1080/13676260600805721.

Contentsparks. (n.d.). BIG LIST OF CORE VALUE WORDS. Retrieved 23 oktober 2020, from https://contentsparks.com/16896/free-download-big-list-of-core-value-words/

Desmet, P.M.A. (2018). Measuring emotion: Development and application of an instrument to measure emotional responses to products. In: M.A. Blythe & A.F. Monk (Eds.), Funology 2: from usability to enjoyment (pp. 391-404). Springer Publishing.

Dillon, M. E., & Cherry, A. L. (2014). An International Perspective on Adolescent Pregnancy. International Handbook of Adolescent Pregnancy, 1–38. https://doi.org/10.1007/978-1-4899-8026-7_1

Emerson E., Baines S., Allerton L. & Welch V. (2011) Health Inequalities and People With Learning

Essink-Bot, M.-L., Lamkaddem, M., Jellema, P., Nielsen, S. S., & Stronks, K. (2012). Interpreting ethnic inequalities in healthcare consumption: a conceptual framework for research. The European Journal of Public Health, 23(6), 922–926. https://doi.org/10.1093/eurpub/cks170

Disabilities in the UK. I. H. a. L. L. D. D. Observatory, Public Health England, London

ideo.org. (n.d.). Design Kit. Design Kit. Retrieved 23 oktober 2020, from https://www.designkit.org/methods/card-sort

Fergusson, D. M., Boden, J. M., & Horwood, L. J. (2007). Abortion Among Young Women and Subsequent Life Outcomes. Perspectives on Sexual and Reproductive Health, 39(1), 6–12. https://doi.org/10.1363/3900607

Fiom. (n.d.). Cijfers en feiten | Fiom. https://fiom.nl/kenniscollectie/jong-ouderschap/cijfers-feiten

Gao, Y., Li, X., Lin, Y.-H., Liu, X., & Pang, L. (2014). Nuwa. Proceedings of the extended abstracts of the 32nd annual ACM conference on Human factors in computing systems - CHI EA '14, 257–262. [Student Competition] https://doi.org/10.1145/2559206.2580928

González-Cabrera, Catalina & Igartua, Juan José. (2016). The narrative and media literacy as influential factors in the efficacy of programs for the prevention of teenage pregnancy. 1189-1196. 10.1145/3012430.3012668.

Goossens, G., Kadji, C., & Delvenne, V. (2015). Teenage pregnancy: a psychopathological risk for mothers and babies?. Psychiatria Danubina, 27 Suppl 1, S499–S503.

Jong & Zwanger (2.3.0). (2018). [Guidance for young moms]. Lucine. https://play.google.com/store/apps/details?id=com.jongenzwanger&hl=nl

Kallio, H., Pietilä, A. M., Johnson, M., & Kangasniemi, M. (2016). Systematicmethodological review: developing a framework for a qualitative semi-structured interview guide. Journal of Advanced Nursing, 72(12), 2954–2965. https://doi.org/10.1111/jan.13031

Kawachi I, Subramanian SV, Almeida-Filho N ,A glossary for health inequalities, Journal of Epidemiology & Community Health 2002;56:647-652.

Manniën, J., Klomp, T., Wiegers, T., Pereboom, M., Brug, J., de Jonge, A., van der Meijde, M., Hutton, E., Schellevis, F., & Spelten, E. (2012). Evaluation of primary care midwifery in the Netherlands: Design and rationale of a dynamic cohort study (DELIVER). BMC Health Services Research, 12(1). https://doi.org/10.1186/1472-6963-12-69

Marmot M, Allen J, Bell R, Bloomer E, Goldblatt P; Consortium for the European Review of Social Determinants of Health and the Health Divide. WHO European review of social determinants of health and the health divide. Lancet. 2012 Sep 15;380(9846):1011-29. doi: 10.1016/S0140-6736(12)61228-8. Epub 2012 Sep 8. PMID: 22964159.

McDermott, E., & Graham, H. (2005). Resilient Young Mothering: Social Inequalities, Late Modernity and the 'Problem' of 'Teenage' Motherhood. Journal of Youth Studies, 8(1), 59–79. https://doi.org/10.1080/13676260500063702

Miro. (2020). [Online whiteboard platform]. Miro. https://miro.com/

Mollborn, S., & Jacobs, J. (2011). "We'll Figure a Way": Teenage Mothers' Experiences in Shifting Social and Economic Contexts. Qualitative Sociology, 35(1), 23–46. https://doi.org/10.1007/s11133-011-9213-1

Naaldenberg, J., Banks, R., Lennox, N., Ouellette-Kunz, H., Meijer, M., & Lantman-de Valk, H. . v. a. n. . S. (2014). Health Inequity in People with Intellectual Disabilities: From Evidence to Action Applying an Appreciative Inquiry Approach. Journal of Applied Research in Intellectual Disabilities, 28(1), 3–11. https://doi.org/10.1111/jar.12130

Neill-Weston, F., & Morgan, M. (2017). Teenage childbearing: young sole mothers challenge the stereotypes. Kōtuitui: New Zealand Journal of Social Sciences Online, 12(2), 179–191. https://doi.org/10.1080/1177083x.2017.1358185

Pexels. (n.d.). *Royalty Free Images* [Photograph/illustration]. https://www.pexels.com/

Pixabay. (n.d.). *Royalty Free Images* [Photograph/illustration]. https://pixabay.com/

Sleeswijk Visser, F. (2009). Bringing the everyday life of people into design. TU Delft, Delft University of Technology

Tilghman, J., & Lovette, A. (2008). Prenatal Care: The Adolescent's Perspective. Journal of Perinatal Education, 17(2), 50–53. https://doi.org/10.1624/105812408x298390

Unsplash. (n.d.). *Royalty Free Images* [Photograph/illustration]. https://unsplash.com/

Visser, F. S., Stappers, P. J., van der Lugt, R., & Sanders, E. B.-N. (2005). Contextmapping: experiences from practice. Contexmapping: Experiences from practice E.B.N, 1(2), 119–149. https://doi.org/10.1080/15710880500135987

Waring, J. J., & Bishop, S. (2010). Lean healthcare: rhetoric, ritual and resistance. *Social science & medicine*, *71*(7), 1332-1340.

Wenger, M. S., Bell, J., McEvoy, P., Yamaguchi, C., & Shokrpour, A. (2014). Bloom. Proceedings of the extended abstracts of the 32nd annual ACM conference on Human factors in computing systems - CHI EA '14, 245–250. [Student Competition] https://doi.org/10.1145/2559206.2580935