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## **Birth Centre Care in the Netherlands: added value?!**

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### **Citation**

Klapwijk-Hermus, M. A. A. (2018, September 26). *Birth Centre Care in the Netherlands: added value?!*. Retrieved from <https://hdl.handle.net/1887/66033>

Version: Not Applicable (or Unknown)

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**Note:** To cite this publication please use the final published version (if applicable).

Cover Page



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**Title:** Birth Centre Care in the Netherlands: added value?!

**Issue Date:** 2018-09-26

Chapter

10

Summary and General discussion



## Background

This thesis contributes to a broad evaluation of birth centre care in the Netherlands. It is one of three theses based on data from the Dutch Birth Centre Study. The aim of this national study was to provide evidence based recommendations for birth centre care in the Netherlands. To make these recommendations all sub-studies of the Dutch Birth Centre Study must be considered.

This thesis focuses on the effect of a birth planned in a birth centre on perinatal outcomes, cost-effectiveness, transfer and referral and experiences. Studying an effect is not possible without a clear definition of the study subject or without a reliable outcome tool that is suitable for the Dutch maternity care system. Part I describes the study protocol, the formulation of a definition for 'birth centre' in the Netherlands and the description and validation of the outcome measurement tool. Part II focuses on the effect of a planned birth in a birth centre and Part III addresses job satisfaction amongst maternity care-providers with reference to working in a birth centre.

This final chapter represents an overview of the main findings of the thesis and a reflection on its findings. It also describes implications for practice and research.

## Main findings

### Part I

#### Chapter 2: Study protocol of the Dutch Birth Centre Study

This chapter describes the study protocol for the Dutch Birth Centre Study. The aims of this national study were 1) identification of birth centres and measuring integration of their organization and care; 2) measuring the quality of birth centre care; 3) effects of birth centre care on the quality and provision of birth care; 4) cost-effectiveness analysis; and 5) an in depth longitudinal analysis of the organization and processes in birth centres. The inclusion criteria, different methods, instruments and expected outcomes were described per sub-study. Results will enable users of maternity care, professionals, policy makers and health care financiers to make an informed choice about the kind of birth location that is appropriate for their needs and wishes.

#### Chapter 3: The identification of Dutch birth centres

In the Netherlands a standard **definition** for a birth centre was lacking. Without a clear definition it was not possible to identify birth centres in a consistent way. With a mixed-methods research design a Dutch definition for birth centres was formulated: birth

centres are defined as midwifery-managed locations that offer care to women with low-risk pregnancies during labour and birth. They have a home-like environment and provide facilities to support physiological birth. Independent community midwives take primary professional responsibility for care. In case of referral the secondary care-provider (obstetrician or paediatrician) takes over the professional responsibility of care. Three types of birth centre were identified based on their location to the nearest obstetric unit in a hospital: freestanding, alongside and on-site birth centres. Forty-six locations were considered as presumed birth centres and in September 2013, **twenty-three birth centres were identified** in the Netherlands: three freestanding, fourteen alongside and six on-site. The reason for their establishment, their characteristics and their view on the importance of different philosophies were described.

The definition and classification described above was used to study the effects of birth centre care on many different aspects such as perinatal outcomes, costs and client and healthcare provider satisfaction.

#### **Chapter 4: Development of a new Dutch Optimality Index (OI-NL2015)**

Adverse outcomes are a rare condition for women at low risk of perinatal complications and with full-term pregnancies. To evaluate the outcome of maternity care for these women it is therefore preferable not to focus on perinatal complications only. The optimality index (OI) is a composite outcome tool based on the concept of optimality that focuses on the presence of optimal outcomes. Although an individual OI is calculated for each woman, it is designed to compare groups of women. The OI can highlight differences in the combined processes and outcomes by comparing sum scores after adjustment for baseline characteristics of the women. The previous Dutch version of the OI dates from two decades ago. **A new version of the Optimality Index based exclusively on items of Perined was developed:** the OI-NL2015. It consists of 31 items in 3 different components: 22 intrapartum, 7 neonatal and 2 postpartum items. All but 2 items have an evidence based criterion for optimality. For the remaining 2 items the criterion was based on consensus. Every item that scores optimal adds 1 point to the score with a total sum-score of 31. The sum-score of a group needs to be adjusted for baseline characteristics of the women (age, ethnicity, social economic status and level of urbanisation).

Next, the reliability of the registration of these 31 items within Perined was examined. This was done by calculating the inter-rater agreement on optimality between scores from two different data-sets: data collected as part of the Dutch Birth Centre study were compared with data from Perined. All but one met the 90% criterion of reliability.

## Part II

### Chapter 5: Effect of planned birth in a birth centre on perinatal outcomes

The new Dutch version of the Optimality Index (the OI-NL2015) was used to evaluate the effect of planned place of birth in a birth centre. The sum scores of the OI-NL2015 of women who planned to give birth in a birth centre were compared to women who planned to give birth in a hospital (under the care of a community midwife) and to women who planned to give birth at home. In total 3455 women with low-risk, full-term pregnancies (1686 nulliparous and 1769 multiparous) participated in this study. There were **no differences in OI-NL2015 for women who planned to give birth in a birth centre compared to women who planned to give birth in a hospital**: the sum scores of both groups were equal. In contrast, **women who planned to give birth at home had a higher OI-NL2015 (scored more optimal items) than women who planned to give birth in a birth centre**. These differences were larger for multiparous women than for nulliparous women.

### Chapter 6: Effect of planned birth in a birth centre on cost-effectiveness

The **economic evaluation** took the form of a cost-effectiveness analysis in which we estimated the costs and effects attributable to planned birth in a birth centre, in a hospital or at home. The time-frame of this evaluation was from the start of labour until seven days after birth. Volumes of health care resource use were collected prospectively and unit costs were calculated as obtained by different sources. Sensitivity analyses were undertaken when unit costs showed great variation. **The total adjusted mean costs and effects (OI-NL2015) per woman planning birth in a birth centre and in a hospital were similar. Planned birth at home led to significantly lower adjusted mean costs and significantly better effects compared to planned birth in a birth centre.** Looking at the parity sub-groups, nulliparous women had higher adjusted total mean costs and less optimal outcomes than multiparous women. Sensitivity analyses led to the same results as the original generalized linear model on costs.

### Chapter 7: Transfer to the birth centre

In our study **69% of the nulliparous women who planned birth in a birth centre arrived during labour in a birth centre**, 22% of these women were referred directly from home to the obstetric unit and 9% chose another place to give birth (ie. remained at home, or went to a hospital (without referral)).

In total 74% of the nulliparous women who arrived at the birth centre during

labour had a vaginal examination at home before they transferred to the birth centre. Outcomes of these women were compared with those nulliparous women who arrived during labour at the birth centre but did not have a vaginal examination at home prior to their transfer to the birth centre. **The group who had a vaginal examination at home had more progress in dilatation** at arrival in the birth centre and had a lower chance of referral to secondary care. These last differences were not significant.

### **Chapter 8: The effect of planned birth in a birth centre on women's experiences**

Experiences of maternity care were compared between women who planned birth in a birth centre and women who planned birth in a hospital, at home (all under care of a community midwife) or in a hospital under care of an obstetrician. The Repro-Q questionnaire was used to measure the responsiveness of birth care in a group of 1181 women. **Women who planned birth in a birth centre had similar experiences as women who planned birth in a hospital under care of a community midwife. Women who planned birth at home had significantly more favourable experiences on the domains of dignity and autonomy during birth and on the domains of social considerations, choice and continuity postpartum**, compared to women who planned birth in a birth centre. More than 80% of the women who received care in a birth centre rated the facilities, the moment of arrival/departure and the continuity of care in the birth centre as good.

## **Part III**

### **Chapter 9: Job satisfaction among maternity care providers**

Job satisfaction among maternity care-providers working in or with a birth centre was compared to job satisfaction of maternity care-providers working only in other settings. The questionnaire used was based on "the Leiden Quality of Work Questionnaire". Data from 3849 health care providers were analysed by profession (maternity care assistants, community midwives and clinical care providers) and by work setting: working with or in a birth centre and working in other settings. **Job satisfaction among maternity care providers is generally high. All three groups of care providers are positive about working in or with a birth centre.**



## Reflections on findings

The number of birth centres in the Netherlands has increased rapidly over the last decade. The most important reason for this increase was the wish for a more home-like environment for the growing number of women who did not want to give birth at home [1]. Identification of these birth centres was challenging as a definition was lacking and the term itself was used loosely: not all locations that call themselves birth centre in the Netherlands are places where women can actually give birth. The term birth centre was also used for locations that house, for example, community midwifery practices, maternity care assistance organisations and ultrasound facilities [2–4].

To study the effect of birth centre care in the Netherlands in a structured way, the formulation of a definition was required [1]. This definition was developed as part of the Dutch Birth Centre Study [5]. It is important to use uniform terms for birth locations in order for women to make a well-informed choice for their birth location. Furthermore, research on outcomes of birth locations is only possible when these are well defined. The gap in agreement on the items planned and final place of birth between the Dutch Birth Centre Study and Perined data showed the need for more clarity on these items [6,7]. **Therefore the consistent use of the term birth centre should be pursued** and the differences between a birth centre and the obstetric unit of a conventional hospital should be made more well-known and more widely publicised.

Because of the enthusiastic participation by all professionals we were able to gain even more data than at first, during the power calculations, shown needed. However, most findings presented in this thesis are based on data collected in 2013. At that time more than 50% of all birth centres in this study had been open for less than two years and working in a birth centre was, for most midwives, a new experience. **The situation regarding birth centres has changed over the years:** new birth centres have opened and existing birth centres have **adapted their care** gradually [8–10]. These developments will influence the outcomes of future birth centre care in the Netherlands.

## Implications for practice and research

**Every pregnant woman has the right to an environment that promotes the optimal conditions for a safe and satisfying birth, regardless of her risk status during labour and birth, be it under the care of a midwife (low risk) or under the care of an obstetrician (increased or high risk).** Different aspects of care affect these chances of an optimal outcome even before labour starts: to optimize the chances, women

should be well informed about the physiological process of birth, about what to expect from her care provider and of what to expect from her planned place of birth[7,8]. In the past few years, the number of women who plan to give birth outside of home is increasing rapidly [11]. Our research showed no differences in effects on the Optimality IndexNL-2015, nor in costs or birth-experience for women with low-risk pregnancies who planned birth in a birth centre compared with women with low-risk pregnancies who planned birth in a conventional hospital setting. The birth environment, number of interventions and care provided differed per planned place of birth. **A planned home birth gave better results on all outcomes** mentioned. But as the planned birth location showed to be of importance on outcomes for women with low-risk pregnancies, we should ask: **which aspects of a home-birth situation could be implemented in an alternative, out-of-home birth location, such as a birth centre or an obstetric unit, to support physiological birth for all women regardless of their risk status?** Effective practices for childbearing women regarding the birth location will be discussed to answer that question.

### ***Birth environment***

Oxytocin is the most important hormone that affects the process of childbirth: understanding the oxytocin system is a key to optimizing the process of physiological birth. One important factor that affects the release of oxytocin is **the woman's perception of the physical environment**: a place perceived as calm, warm, friendly and supportive facilitates oxytocin release whereas a place experienced as stressful, threatening or demanding triggers release of catecholamines which prepare the body for fight or flight [12–14]. For most people, home is a peaceful and restful place, where they feel more in control of environment and events. A home-like environment can contribute to reduced stress and encourage a comfortable feeling, which can help to support the physiological process of birth [15]: low levels of stress hormones during labour and birth promote uterine blood-flow and support neonatal well-being, whereas greater levels of stress hormones can lengthen labour and impede neonatal transition [16]. Earlier research linking architecture and neuroscience has revealed that many conventional hospital rooms may actually impair rather than improve health outcomes by increasing patient and staff stress [17–19]. A home-like birth environment is associated with lower rates of analgesia, augmentation and operative birth, as well as greater satisfaction with care and a positive effect on care-providers [20–22]. It is characterized by comfortable non-institutional furniture, ambient lighting, the use of warm colours, no medical equipment in direct sight (including emergency protocols, breath masks, etc), opportunities to benefit from warm water, quietness, and a bed that does not look institutional and is not centrally located in the room [12,16,17,23–25]. **All**

**Dutch birth centres facilitate a home-like environment** and more and more hospitals try to create this [1]. When refurbishing a birthing room with the purpose of optimising the ambient environment for giving birth, one should think of the reason behind the adjustment of this environment, instead of only introducing some of the individual items. For example, the benefit of a home-like wallpaper in a room where medical equipment and emergency protocols are still in sight will most likely not have the optimal intended effect. It is the coherence of various elements that helps to create a place that feels safe and a little bit like home.

### ***Effect of a home-like birth environment on birth attendants***

Several studies have examined the impact of different birth environments on the communication behaviour of birth attendants, including midwives. These studies revealed that different environments (e.g. home, birth centre or hospital) exert a powerful and unintended pressure on midwives **to conform to unwritten rules of conduct and styles of communication** depending on the location in which they find themselves, even if it is with the same woman. The less home-like the birth environment was, the greater this effect was experienced [26,27].

Also known is the impact of the **experience of alienation by the midwife** on stress: stress can be experienced when a midwife attends a birth with for example other equipment than her own trusted equipment (in contrast to the safe feeling that she experiences when she knows exactly where to find supplies and how to use them). Awareness of this potential form of stress can help in the creation of solutions for this type of problem, for example that a midwife brings her own equipment, or finds a way to become more familiar with the supplied equipment. Birth attendants should be aware of the impact a birth environment can have on their communication behaviour and experienced stress: it influences the way midwives and other care-givers practise [12,15,17,21,25,28–32]. **The impact of a supporting birth environment should be explored more thoroughly and outcomes should be implemented in all Dutch birth locations.**

### ***Birthing facilities/Equipment***

Home is for most women the place where they feel most in control: they feel free to move and deal with the contractions in a way that is at that moment the most comfortable and effective. Different facilities can affect the progress and experience of labour and childbirth. Some of these are facilitated by the maternity-care provider and can be used at any setting (such as one-to-one and continuous support) and some of them can only be used when the birth location provides this facility. Walking and upright positions in the first stage of labour reduces the duration of labour, the risk of

caesarean birth and the need for epidural administration. Also, these positions do not seem to be associated with increased interventions or negative effects on mothers' and babies' wellbeing [33]. **The availability of equipment such as birthing-pools, showers and birthing-balls** can encourage women to get out of the bed and to deal better with the first stage of labour. On the obstetric unit the availability of a **wireless (mobile or telemetry) continuous foetal monitoring** unit can be helpful to facilitate moving and upright positions for women who need continuous foetal monitoring [34]. An upright posture can also stimulate the physiological process of birth during the second stage: it reduces the number of assisted births and increases comfort. However, there is also an increased risk to blood loss greater than 500 mL [24,35,36]. A birthing chair or cushion can be useful to facilitate an upright position, although squatting is also effective [37]. In any birth setting, midwifery care providers can encourage the use of these facilities and equipment that support physiological birth, if these are available. Most community midwives have access to a birthing chair or cushion for use at any location. In addition, most obstetric beds on an obstetric unit can be transformed to a birthing chair position as well. All Dutch birth centres except one offer pools and the number of obstetric units with a pool is increasing [1,38]. Unfortunately, the evidence based effect of these facilities on health outcomes and learning how to use them is currently not included in the general educational program of any of the maternity care providers in the Netherlands. Initiatives for multidisciplinary courses on the subject of physiology have started recently [39]. Also, midwifery colleges offer courses on birthing positions and the Royal Dutch Organisation of Midwives (KNOV) wrote a practical guidance and developed a leaflet for pregnant women on the subject [40–42]. The development of more integrated maternity care in the Netherlands may enhance more respect of vision and expertise among maternity care providers of all echelons. It can break boundaries and promote a willingness to share skills and knowledge during work but also during inter professional education [43]. Apart from making these facilities available, maternity care-providers' lack of knowledge and willingness to use such facilities needs to be tackled in order that they feel confident in using them, encourage their use and thus support the process of physiological birth.

### ***Culture and management***

Another important factor that differs between home and other birth locations is the local culture; the birth location is not just a physical structure. **The philosophies on physiological birth of the individual care provider and its management influences the birth-culture of the location.** Education is an important factor affecting views on physiological birth: Midwives are trained to observe, identify and encourage the physiological process of pregnancy and childbirth, and to be attentive to any

abnormalities. **Low risk women who receive midwife-led continuity models of care are less likely to experience intervention and more likely to be satisfied with their care** with at least comparable adverse outcomes for women or their infants than women who received other models of care [44,45]. Obstetricians are trained to manage medium and high-risk pregnancies and abnormalities during childbirth and tend to focus on the pathologic potential of pregnancy and birth. It is important that midwifery care-providers examine their personal philosophy, because the care they provide to women during labour depends on their own beliefs about birth. Some may view birth as a high-risk event likely to need intervention; others believe birth is a normal physiological process in need only of support to progress naturally [24,46]. Even amongst a group of people within the same profession there is a variance in this philosophical concept [21]. In every location where maternity care-providers work they are influenced by the culture of that birth location. This culture differs significantly from location to location, as would be confirmed by any professional or mother (-to-be) [47]. A midwife managed ward (like a birth centre) will have a philosophical culture far more greatly influenced by a midwifery mindset than any obstetric managed one, with its focus on a more pathogenetic side of birth. There should be an awareness of this important cultural aspect of a birth location: it affects outcomes.

### **Possibilities for birth centres**

Awareness and implementation of the subjects mentioned can contribute to a more home-like approach in out-of-home birth locations and **to support the physiological process of childbirth for all women, regardless of their risk status or planned place of birth**. In the Netherlands, women who are under the care of a community midwife, and who are full-term and at low risk when labour starts can choose where they want to give birth: at home, in a birth centre or in a conventional birthing room at the obstetric unit of a hospital. **Birth centres facilitate all aspects that are important for a birth location to stimulate the process of physiological birth**. In addition, suggestions can be made to birth-centres that can further enhance an even more natural process of birth, fewer referrals in the case of a prolonged first stage or the wish for pharmacological pain relief and the need of fewer interventions finally culminating in better perinatal outcomes.

### ***Home visit prior to transfer***

Our research showed that more than 25% of all nulliparous women who arrived at the birth centre did not have a vaginal examination prior to the transfer to the birth centre [chapter 8]. These women arrived at the birth centre on average earlier during dilatation and this possibly increased their chances for referral to an obstetrician. A home visit prior to this voluntary transfer makes it possible to make **an individual approach on**

**the woman's wishes and need for support during labour**, according to what is optimal for each individual woman. **Especially for nulliparous women; with no experiences of childbearing, a home visit should be standard procedure in order to decide on the optimal time of transfer to the birth centre.**

### ***Admission to the birthing room***

Dutch Birth centres varied in September 2013 with regards to admittance policy with 'as indicated by the woman' (52% of birth centres) versus 'as indicated by the midwife' (48% of birth centres)[chapter 3] [1]. For nulliparous women who wanted to give birth in a conventional labour room on an obstetric unit it was an unwritten rule that they transferred to the hospital together with their midwife when active labour started and dilatation progressed over 6 centimetres [48]. International research shows that labour assessment programmes to delay admission to the labour ward until labour is in active phase may benefit women with full-term pregnancies [49]. **The moment of admission to the birthing room should be critically appraised for every individual woman in order that her personal preferences will be considered with respect to the aim for the best possible outcomes. A home visit prior to this transfer is needed to make this possible.** Continuous support can be beneficial to support women during the first hours of contractions. In more and more regions in the Netherlands early continuous support is an option to receive at home, even when the woman plans to give birth elsewhere. Further Dutch research on the subject of intrapartum home assessments and the moment of admission to the birthing room is needed to gain further insight into the effect on perinatal outcomes, such as referrals and women's experiences.

### ***Possibility to use inhaled analgesia***

Preparation for how to deal with labour and effective support during the latent phase is needed in order to help women deal with this period. When the active phase continues and non-pharmacological methods for pain relief are not sufficient enough, an **inhaled analgesia should be an option** to use in primary care [50]. Since September 2014 Dutch midwives are legally allowed to prescribe and offer Relivopan® in a primary care setting. Strict rules for regulation and specialist education is needed to maintain safety for mother, child, partner and attending care-providers [51–53]. The effect of Relivopan® on the number of referrals has not yet been studied in the Netherlands, but it can contribute to lower the relatively high number of intrapartum non-urgent referrals and thus lower the total intervention-rate. At the time of our research Relivopan® was only an option for pain relief in only three out of 23 birth centres. **Birth centres are the only places to provide this approach to pain relief in a midwife managed birth location that can fulfill the legal conditions for use.**

### **Quality assessment**

With the identification of birth centres in the Netherlands it was made possible to study the effect on outcomes of birth centre care in the Netherlands. For example, a discussion on birth centre outcomes was held during a structured peer review meeting (intercollegiale toetsing) with collaborating midwives. Motivation for this discussion was local feedback on the results of the Dutch Birth Centre study. These results showed a significant lower sum score of the OI-NL2015, for women who planned birth in their local birth centre compared to the national outcomes on OI-NL2015 for planned birth centre birth. This led to a critical appraisal of the individual items of the OI-NL2015. Their relatively high number of prolonged first stages and women with a need for pain relief led to an enthusiastic discussion of possible causes for this finding [54]. Arrival in the birth centre at the first signs of labour was replaced with a more individual approach per woman, after providing information on the effect of transfer in an early stage of labour on experiences and outcomes prenatally. Finally this critical appraisal and personal reflection led to an adaptation of the previously formulated vision about the preferred timing of admission to the birth centre [54,55].

A tool such as **the Optimality Index NL-2015 can help care providers to be more aware of the effect of every intervention and outcome** [6,56,57]. Implementing the Optimality Index in Perined Insight (a web based tool that makes it possible to make analysis with perinatal data) can make it easier to reflect on local differences between planned birth locations compared to other regions or to national data [7]. Before implementing the Optimality Index one should be aware of the importance of the correct values of Perined items 'planned' and 'final place of birth' as our research showed that it was not reliable to use current Perined data on those items. Clear information on the different types of birth locations can be helpful in raising the level of agreement.

### **Concluding remarks**

The key factors in providing effective, safe and satisfying birth care is not the birth location in itself. Personal attention, continuous support, a well-defined birth plan and service provision to optimize the physiological process of birth are, in coherence with each other, all important [17,58–60]. However, the birth location affects a lot of aspects that can be supportive to facilitate and encourage the physiological process of birth. Women should be well informed prenatally on the differences between birth locations to make their own decisions based on evidence based information on all available possibilities. Several suggestions can contribute to support the physiological process of birth, such as the birth environment, availability of facilities and the philosophical culture of the

birth location. For women with low-risk pregnancies who do not wish to give birth at home, the home-like midwifery managed birth centre is the most logical place where these aspects can be realised. Possibilities to improve outcomes in birth centres, such as a standard home visit prior to the voluntary transfer and a transfer in active instead of latent phase of birth, should be studied and implemented. The conclusions drawn from the Dutch Birth Centre study demonstrates that outcomes on effect, costs and experiences are identical for women with low-risk pregnancies who plan birth in a birth centre as compared with a hospital. Opportunities to easily optimize the outcomes for women who do not want to give birth at home, have been identified. Birth centres have the best potential to easily implement these opportunities. After this implementation, and with the fact that more and more obstetric units in the Netherlands are dealing with capacity problems, birth centres are an added value as birth location for women who don't plan to give birth at home [61].



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