

Introduction

Background

From 1996 to 2008 the number of facilities in Japan where women could give birth were affected by a dwindling number of obstetricians. They decreased from 3,991 in 1996 to 2,567 in 2008, respectively (Ministry of Health, Labour and Welfare, 2009). Following this reduction of 1,424 facilities (35.7%), Japan's Ministry of Health, Labour and Welfare (2008) announced a vision whereby obstetricians and midwives would work collaboratively. Their report said that midwives should attempt to develop in-hospital midwifery-led care units to manage normal births working in collaboration with obstetricians and also to share their expertise with the obstetricians. Therefore, characteristics of midwifery expertise must be elaborated.

Women seek antenatal care because of their need for: information and explanation about their health status, their fetus, treatments, support for labour, child-rearing and care involving their family (Kennedy, 1995; Hildingsson et al., 2007). Moreover, their relationship with the midwife, should provide them with a sense of security, support for being responsible for themselves, feelings of being respected both themselves and their family (Bondas, 2002; Luyben et al., 2005; Hildingsson et al., 2007). To meet their needs and support the on-going process, caregivers need to work in partnership with women. This points to a crucial underlying concept called women-centred care (WCC) (Department of Health, 1993; Pope et al., 2001).

The four elements of WCC are respect, safety, holism, and partnership and its goal is the general well-being of the woman (Pope et al., 2001; Horiuchi et al., 2006). Four basic attitudes have been shown to be important in providing WCC: 1) treating women with respect, 2) providing care in a non-threatening manner, 3) working in collaboration as equal partners, and 4) giving priority to the woman's preferences over that of the health care provider (Horiuchi et al., 2009). In addition, WCC is said to have the three C's: choice, continuity, and control (Page, 1995/1996; Jackson, 1998).

The guideline, 'Antenatal care: Routine care for the healthy pregnant woman (2008)', published by the National Institute for Clinical Excellence (NICE) has a basic

philosophy of WCC. They emphasize the importance of informed decision-making through respectful communication and providing adequate information. In addition, they recommend that antenatal care should be provided by a small group of caregivers with whom the woman feels comfortable. There should be continuity of care throughout the antenatal period.

In Japan, midwife-led care is mainly provided at birth centres (Horiuchi et al, 1997) and represents approximately 1% of women giving birth. Care at these settings is said to provide positive communication and support the women's own way (Gepshtein et al., 2007). Takehara et al. (2009) reported that at birth centres there exists an overriding large goal: have women mentally and physically prepared so as to bear and raise the child. In receiving this care, women would be able to eventually maintain their own physical condition and improve their life style (Misago, 2008; Misago et al., 2009).

Initial studies of women's experiences at birth centres reported that women's satisfaction with care was higher than those who received care at hospitals and clinics (Iida, 2009a; Iida et al., 2011). The author, using self-completed questionnaires, surveyed 482 women who gave birth at birth centres, clinics, and hospitals. Results indicated that women giving birth at birth centres had the most positive perceptions of WCC compared to those who gave birth at clinics and hospitals. Two variables were considered to be highly correlated with this positive perception: respectful communication during antenatal care with adequate time and the continuity of care by midwives.

Some hospitals in Japan are establishing midwife-led care units as part of the regular hospital services. In order to popularize midwifery care within the entire system of perinatal care, there is a need to show evidence that continuity of midwife-led care for women will bring about positive outcomes.

Therefore, the objective of this study was to evaluate whether continuity of midwife-led care for women from the antenatal to postpartum period is related with effective obstetric and psychological outcomes right after birth and at one-month postpartum.

Objectives

The objectives of this study were to compare the health outcomes of women and infants who received midwife-led care with obstetrician-led care. In specific, this study asked: 1) is there a difference in women's perception of care, 2) are there differences in obstetric outcomes; physical outcomes, breast-feeding status, and mental health.

Significance of the Study

In Japan, continuity of midwife-led care is mainly provided at birth centres. Although, about 1% (9,533) of women give birth at birth centres each year (Japan's government statistics, 2011) yet it is a sizable number of women. This study compared continuity of midwife-led care and obstetrician-led care to compare women's outcomes. The evidence derived from this study may suggest a new system of care for hospitals and clinics in which most of the births occur. In addition, it may support the way in-hospital midwife-led care units provide care. This could lead to providing better care for women in the perinatal period.

Study Framework

Holzmer's (1994) outcomes model was used to provide information to answer the question: does continuity of midwife-led care lead to better outcomes for women and the infants in the perinatal period. Observed variables were applied to this model. The horizontal axis was the time course and 'pregnant women' was applied to the inputs, 'system of care' was applied to the processes, and 'evaluation of care', 'health outcomes during hospitalization', and 'health outcomes at one-month postpartum' were applied as outcomes. Although the vertical axes were the client, provider and the setting, the outcome evaluation was only focused on the client (**Table 1**).

Definition of the Terms

Midwife-led care. Care provided by a specific midwife throughout the antenatal, intrapartum, and postpartum period. Occasionally, a team of midwives would provide care.

Obstetrician-led care. The lead caregiver will be an obstetrician and he/she will be the one who has the final approval for the care provided. Midwives and nurses will work together as team members.

Women-centred care (WCC). Care that consists of the following factors: ‘feelings of encouragement’, ‘being respected’, ‘trusting the caregiver’, ‘effective interaction’, ‘help in decision-making’, and ‘non-threatening manner’ (Iida, 2009a; Iida, 2010) that focuses on the well-being of women **<Preliminary study 1>**.

Literature Review

Women-Centred Care (WCC)

To respond to women's needs and to support their needs during the maternity period, caregivers need to work in partnership with the woman. The underlying concept is women-centred care (WCC) (Department of Health, 1993; Pope et al., 2001).

From Horiuchi et al.'s (2006) concept analysis, four elements of WCC were identified: respect, safety, holism, and partnership and its goal is the general well-being of the woman (Pope et al., 2001; Horiuchi et al., 2006). Four basic attitudes have been shown to be important in providing WCC: 1) treating women with respect, 2) providing care in a non-threatening manner, 3) working in collaboration as equal partners, and 4) giving priority to the woman's preferences over that of the health care provider (Horiuchi et al., 2009). In terms of 'treating the women with respect', researchers have noted its importance (Bottorff et al., 2001; Hills et al., 2002, Hills et al., 2005; Hindley et al., 2006; Meadows et al., 2006). They reported that respecting the women means to acknowledge and respect their diversity, respect their experience and values, respect their needs and values, and respect their decision-making (Bottorff et al., 2001; Hills et al., 2002, Hills et al., 2005; Hindley et al., 2006; Meadows et al., 2006).

Page (1995/1996) and Jackson (1998) demonstrated that WCC should have the 'three C's', which are choice, continuity, and control. 'Choice' means that women can choose whose care to receive and where to give birth. The key of providing effective WCC is informed-choice and women should be involved when planning the care (Giarratano, 2003; Hills et al., 2005; Meddings et al., 2007). 'Control' means that the woman has control of herself and her choice is respected and she is involved in the decision-making. Lastly, many researchers (Morgan et al., 1998; McCourt et al., 2000; Pope et al., 2001; Osbourne, 2005) discuss the importance of 'continuity' and Pope et al. (2001) indicated that in order to provide WCC, health care systems should provide continuity of care and continuity of caregivers.

The outcomes of women who received WCC were improvement in their health

condition (Brown et al., 2000; Hills et al., 2002), high satisfaction (Bottorff et al., 2001), gained self-confidence (Hills et al., 2005; Horiuchi et al., 2006), and thus empowered (Giarratano, 2003; Horiuchi et al., 2006). In addition, women learned how to improve their own health, and were encouraged to think about holistic health (Horiuchi et al., 2006). This led to positive outcomes the maternity period and for the newborns (Hills et al., 2005; Henley-Einion, 2008).

Figure 1 demonstrates the concept of WCC extracted from 35 published articles using the keyword “woma(e)n-cent(e)red care” (Iida, 2009b). According to this model, WCC could be described as caregivers carefully considering the status of women and trying to change the social circumstances, which includes the interaction between women and caregivers and which eventually leads to caregivers trying to provide better outcomes for women.

Continuity of Care

The meaning of continuity of care. According to Hodnett (2000), ‘continuity of care’ is an ambiguous term. It can mean: 1) a stated commitment to a shared philosophy of care, 2) a strict adherence to a common protocol for care during pregnancy and/or childbirth, 3) a system whereby those who are discharged from hospital are routinely referred to community services, or 4) the actual provision of care by the same caregiver or small group of caregivers throughout pregnancy, during labour and birth, and in the postnatal period. Mostly, it means that care provided by the same caregiver(s) throughout the antenatal to postpartum period. In the guidelines, ‘Intrapartum care: Care of the healthy women and their babies during childbirth (NICE, 2007) it is said that continuity of care is defined in terms of continuity of caregiver and describes care provided by a midwife or a small group of midwives, from early pregnancy to the postnatal period.

Takehara et al. (2008) reviewed 13 studies to demonstrate how continuity of care was viewed. They concluded that the definition of continuity of care was based on the perspective of the caregiver (e.g. the number of caregivers, the system of care provided, and the period of time). From this, they emphasized that not only is the system of care

important, but also placing the women in the centre. In addition the way they provided care and the term continuity of care should include: 1) the meaning of the strong relationship between the woman and the caregiver, 2) the woman can trust the caregiver, and 3) have the feeling of being cared for consistently. They reported that eventually, this would provide women with a better sense of continuously feeling of warmly cared for.

Women's experience in receiving continuity of care. Lyberg et al. (2010) who interviewed 13 women receiving team-midwifery care reported that the care delivery model and the care managed system are important, the individual qualities of midwives are the most vital aspect for ensuring satisfaction with the care provided. Likewise, Davey et al. (2005) who conducted a postal survey to 1,616 women to analyse the aspects of continuity of caregiver in the antenatal period reported a similar result. They indicated that women who saw the same caregiver throughout pregnancy and the feeling that the caregiver got to know the woman and remembered her from one visit to the next was associated with the rating of care. Although, not only seeing the same caregiver itself improved their experience, but also the time spent personalizing each encounter was well received.

Midwife-led Care

Meaning of midwife-led care. **Table 2** describes the systematic review (11 trials, $n= 12,276$) conducted by Hatem et al. (2008) who compared midwife-led models of care with other models of care for childbearing women and their infants.

Table 2. Results of the systematic review of Hatem et al. (2008)

Advantages of midwife-led models	Less antenatal hospitalization, less fetal loss or neonatal death less than 24 weeks, less regional analgesia/anaesthesia, less forceps/vacuum birth, less episiotomy; More attendance at birth by a known midwife, more spontaneous vaginal birth, more breast-feeding initiation, higher perceptions of control during labour, higher satisfaction with care
No significant differences in variables for midwife-led models and other models	Antenatal haemorrhage, number of antenatal visits, overall fetal loss and neonatal death, fetal loss or neonatal death more than or equal to 24 weeks, amniotomy, augmentation during labour, length of labour, induction of labour, the use of opiate analgesia, caesarean section, perineal laceration require suturing, intact perineum, postpartum haemorrhage, duration of postnatal hospital stay, low birth weight infant, preterm birth, five-minute Apgar score less than or equal to seven, admission of infant to special care or neonatal intensive care units, neonatal convulsions, postpartum depression

Hatem et al. (2008) concluded that midwife-led care benefits the woman and the new-born and had no increased adverse outcomes. Furthermore, women who received midwife-led model of care increased the chance of being cared for in labour by a midwife she already knew, and the chance of feeling in control during labour. Hodnett's (2000) systematic review compared continuity of care during pregnancy, childbirth, and the postpartum period to usual care by multiple caregivers. It was concluded that, although continuity of care was beneficial to women, it was not clear whether the results were due to greater continuity of care or to midwifery care.

Continuity of midwife-led care. Continuity of midwife-led care in Japan is mainly provided at birth centres. Horiuchi et al. (1997) performed a survey of 1,065 women to elucidate their evaluation of maternity care. They found that 99.2% of women who gave birth at birth centres received continuity of care compared to only 19.7% of women who gave birth at general hospitals.

The author conducted a study (Iida et al., 2011) that aimed to demonstrate the perceptions and comparison of WCC at Japanese birth centres, clinics, and hospitals by using a self-completed retrospective questionnaire to 482 women. Key conclusions were that women giving birth at birth centres had the most positive perceptions of WCC. This was related to the respectful communication during antenatal care and the continuity of care by midwives, which were the core elements of WCC < see **Preliminary study 2**>.

Care to Prepare Women's Physical Condition

Gepshtein et al. (2007) collected qualitative data through active participation and interview in order to explore the knowledge and beliefs about midwifery practice of independent Japanese midwives. They demonstrated that the concepts guiding their midwifery process were: positive communication, supporting the woman's own way, respect for the natural process. They reported that the outcomes of women who received this care would be: feelings of happiness and joy, positive change, mother-child bonding, and lifelong health.

Takehara et al. (2009) conducted semi-structured interviews with 15 women to clarify the care provided for pregnant women and the relationship between women and midwives at birth centres. They discovered that the care provided at birth centres could be described as 'preparing women's body and mind for pregnancy, delivery and child-care'. The specific contents were: inherited wisdom, raising women's awareness, improvement of life style, concrete instructions about the process, accepting women's feelings, personalized care and advice, and respect for women.

The life style change of women who received antenatal care at birth centres were surveyed by Misago (2008) and Misago et al. (2009). They reported that women who received care at birth centres made the following life style changes: reduced their intake of fat and caffeine, took more vegetables, regulated their daily life, took a daily two-hour walk and increased awareness about keeping their body warm. In addition, they reported that they attempted to live in a relaxed mood and they changed to live in an emotionally comfortable life style. From the findings, they indicated that care

provided at birth centres were aimed to help women prepare the mind and body to gain the strength so that they can overcome their labour.

Psychological Support from Midwives to Prevent Postpartum Depression

Kitamura et al. (2005) conducted research with 140 women to investigate if psychological intervention performed by midwives during the antenatal period would reduce postpartum depression, attachment disorder, and child abuse. Accordingly, the results revealed that attachment disorder at one month and the severity of postpartum depression after three months of birth was significantly lower in the intervention group than in the control group.

Sato et al. (2010) examined whether continuous psychological support provided by midwives contributed to preventing women's anxiety and depression. They compared 30 women who received continuous psychological support and 28 women who received standard care. The findings revealed that at five-days postpartum, the number of women who were at risk of maternity blues did not differ between the two groups. However, the Edinburgh Postnatal Depression Scale score at three-months postpartum revealed that women's scores in the intervention group were significantly lower than those in the comparison group. Although the sample size was small, they considered that the psychological support provided by midwives provided a feeling of security to the women.

Maternity Blues and Postpartum Depression

Maternity blues. Maternity blues is a transient emotional disorder that occurs three to four days postpartum and lasts for a few hours to a few days (Okano, 1993). Examples of symptoms are crying, depression, restlessness, irritability, anorexia, and poor concentration. In Japan, it is reported that the morbidity is 30% (Nakano, 1994; Yamashita, 1994). Because maternity blues is a transient emotional disorder, the symptoms usually disappear within two weeks. However, maternity blues is a predictor of postpartum depression (Beck, 2001; Yamashita et al., 2002). Therefore health care professions need to pay attention to it (Okano et al., 1989; Okano et al.,

1991).

Postpartum depression. Postpartum depression is an emotional psychiatric disorder, which occurs within three-months postpartum. Nakano's (1994) survey, using the Edinburgh Postnatal Depression Scale, established the prevalence rate in Japan as 15%. Postpartum depression affects not only the woman, but also her family's health and is said to be a risk factor of child abuse (Kitamura, 2005). Therefore, it is important to carefully look for high-risk women and support them from the beginning of the antenatal period.

Summary

To effectively respond to women's needs, midwives are required to continuously support women from the antenatal period to the postpartum period. According to studies abroad, continuous support from midwives, yields positive outcomes for women. However in Japan, while there are studies that evaluate the continuous psychological support provided by midwives and care provided at birth centres, there are no studies that measure both the physical and mental outcomes regarding the continuity of midwife-led care. Therefore, there is a need to show evidence from the perspective of women who receive continuity of care.

Methods

Study Design

This was an observational study using non-random purposive sampling with a survey questionnaire comparing continuity of midwife-led care with obstetrician-led care. Selected settings were those that met the study's continuity of midwife-led care conditions in the natural provided care.

Participants

The inclusion criteria of the participants were: 1) women who received antenatal care delivering a term-singleton-infant at the participating settings during the research period, February to October in 2011; 2) women who could read and write Japanese and 3) women who consented to participate in the study. Women who had a caesarean section or who were in seriously poor physical condition, for example, severe postpartum haemorrhage or psychological complications, were excluded from the study.

Sample Size

The main outcome of this research was women's perception of women-centred care (WCC). According to previous studies, although continuity of midwife-led care was beneficial, when comparing obstetrical outcomes, few studies showed a difference with the standard care. Therefore, this study aimed to detect the difference of women's perception of WCC, which is said to broadly lead to women's well-being.

Previous studies (Iida, 2009; Iida et al., 2011) indicated that the score of the Women's Centred Care pregnancy (WCC-preg) questionnaire at birth centres was 233.3 points and at hospitals 199.8 points ($p = .000$). The *SD* was 31.6. Therefore, based on these scores, it was assumed that the birth centres provided continuity of midwife-led care and the hospitals provided obstetrician-led care. The alpha was .01 and power was .9. The sample size ended up to be 58 women in total. Although 58 women would be enough to measure the main outcome, the 50-item WCC-preg

questionnaire is still in its early use. Therefore, it is important to conduct a factor analysis, with at least five times the number of participants needed ($5 \times 50 = 250$) (Iishii, 2007). Considering the dropout rate to be 20% from the preliminary studies, the samples size needed was 156 women in each group ($250 \div 0.8 = 312.5$ in total, $312.5 \div 2 = 156.3$ in each group) and this was enough to measure the main outcome, women's perception of WCC.

Settings

From reviewing studies conducted in other countries, continuity of midwife-led care seemed to be provided in a team of six to eight midwives. Care was provided in collaboration with an obstetrician and continuity of care was provided throughout the maternity period to the postpartum period (Biro et al., 2000; Waldenstrom et al., 2000; Waldenstrom et al., 2001; Homer et al., 2002; Biro et al., 2003; Hicks et al., 2003) (Iida, 2011) <Preliminary study 3>.

According to the above findings, the author used a purposive sample of two settings each for the midwife-led care group and for the obstetrician-led care group.

Midwife-led care group. This was the group in which women received continuity of midwife-led care. A small team of midwives provided continuity of antenatal, intrapartum, and postpartum care.

Other characteristics of care was that midwives would make special efforts to support women so that they could prepare physically during pregnancy, take sufficient time for their antenatal care so that they can listen to women's special needs and fears about labour. If complications occurred, women were referred to an obstetrician. Where midwives are the main caregivers, there are some legal limitations to her practice; medical interventions during the maternity period are restricted. The two settings chosen were places that met these conditions.

Obstetrician-led care group. In this purposive sample women received care mainly from obstetricians with attendance by midwives and nurses. This group's care was provided with different caregivers across the antenatal, intrapartum, and postpartum period. According to the midwife's shift, women may have a chance to see

the same midwife. However, if the lead caregiver was not a midwife, this was considered to be the obstetrician-led care. **Table 3** describes the care provided in each type of group.

Table 3. Characteristics of midwife and obstetrician led groups

	Midwife-led	Obstetrician-led
Target women	-low-risk women	-low-risk women
Lead caregiver	-midwife (Mw)	-obstetrician (Ob)
Other staff	-Ob (provides care at least three times during the antenatal period)	-Mw and nurse (Ns)
System of care	-same Mw or a team Mw provides care -refer to Ob when needed	-Ob mainly provides antenatal care -Mw or Ns provide health advice when needed
Continuity of care from midwife	-intend to provide continuity of care throughout the maternity period	-depends on shifts -intrapartum and postpartum care will be provided by Ob, Mw, and Ns
Medical intervention	-at the minimum or refer to Ob (e.g. coded prescription) -transfer to obstetricians when needed	-conduct when needed
Other characteristics of care	-sufficient time for each antenatal visit -provide specific advice to support women's good physical condition	-standard care provided at the setting -early detection, rapid cure of risk condition

Procedure for Conducting the Study

The Research Ethics Committee at St. Luke's College of Nursing, Tokyo, Japan (No. 10-065) approved this study. Following approval, the researcher (author) sent a letter explaining the study's purpose, to settings that provided continuity of midwife-led care and obstetrician-led care asking for their cooperation with the study **<Appendix 1>** to **<Appendix 7>**. Upon receiving consent, the researcher went to the settings and explained the study to the entire staff or to the nurse manager.

When inviting hospitalized women to participate in the study, the researcher explained the research and the protection of their rights as a research participant and gave women the survey request, questionnaire, opaque envelope, and a token gift. In addition, the researcher explained to the women that there was a questionnaire to answer during hospitalization and at their one-month check-up. If the woman consented to participate, she completed the questionnaire after three-days postpartum and put the questionnaire in the envelope and then into the collection box **<Appendix 3><Appendix 4>**.

Completing and returning the questionnaire was regarded as consent to participate in the study. The researcher regularly collected the questionnaires from the collection box. After the researcher collected the questionnaire, she collected data from the medical record. The researcher did not provide supplementary or additional care.

To distribute the questionnaire at the one-month check-up, the researcher went to the women's one-month check-up and gave women the survey request, questionnaire, opaque envelope, and a token gift and asked for their cooperation again **<Appendix 5><Appendix 6>**. If the researcher was not able to meet the woman, she asked the medical processor beforehand to distribute the questionnaire.

The researcher regularly collected the questionnaires from the collection box. For collecting the one-month questionnaire, a stamped and addressed envelope was used so that women could choose whether to put the questionnaire in the collection box or post it.

Numbers were written on the questionnaires to match the first questionnaire (after three-days postpartum) and the second questionnaire (at one-month

postpartum). The explanation of distributed papers and the data collection process is described in **Table 4**.

Table 4. Data collection process

	During hospitalization (after three-days postpartum)	At one-month check-up
Inviting	-Appendix 3. Survey request	-Appendix 5. Survey request
Distributing	-Appendix 4. Questionnaire -opaque envelope -token gift	-Appendix 6. Questionnaire -opaque envelope (stamped and addressed) -token gift
Data collecting	Into the collection box *medical data were collected by the researcher	Into the collection box or by mail

Research Period

Questionnaires were distributed and collected from February to October in 2011.

Outcome Measurements

Since the objective of this study was to evaluate whether continuity of midwife-led care for women during the maternity period affects the women and infant's health immediately after birth and at one-month postpartum, data collection was conducted at those two points in time.

The researcher systematically examined the methodological features of published studies focusing on midwife-led care for pregnant women (Iida, 2011) **<Preliminary study 3>**. The outcome of studies comparing continuity of midwife-led care and obstetrician-led care, were broadly divided into women's experiences and clinical outcomes (Turnbull et al., 1996; Shields et al., 1998; Biro et al., 2000; Waldenstrom et al., 2000; Waldenstrom et al., 2001; Homer et al., 2002; Biro et al., 2003; Hicks et al., 2003). The outcome of the review informed the current study.

The process of substruction was used to show the relationships between the measured concepts and the measurements (**Figure 2**). Below are the explanations of this research's inputs, processes, and outcomes.

Inputs

Women's characteristics. There were 19 items asking women about: age, parity, features that may affect their attitude about choosing where to give birth, preparation of physical condition, and psychosocial factors that may affect their mental health.

Items about attitudes that may affect women's choice of where to give birth were extracted from research regarding women's experience in giving birth at birth centres (Higuma et al., 2000; Sasaki et al., 2000; Suzuki et al., 2003; Hasegawa et al., 2005). Items were: 1) value the relationship between the caregivers, 2) have particular hopes for birth, 3) anxious about receiving antenatal care only from midwives, 4) self-care is important for normal maternity period, and 5) have bad memories at hospitals in the past. These were asked in a 4-point Likert type scale.

Women were asked how they prepared physically for childbirth, paid attention to their own body and lifestyle and how they maintained their health. Five items asked about their physical preparation. Midwives provide care so that women can prepare physically and mentally for giving birth (Takehara et al, 2009). Therefore, items addressing physical preparation were extracted from studies (Gepshtein et al., 2007; Misago, 2008, Misago et al., 2009; Takehara et al., 2009) that described this activity were developed into a questionnaire. Items were rated using a 5-point Likert-type scale: 1) *I could not do it at all*, to 5) *I could do it very much*. Scores ranged from 5 to 25 points. The higher the points the better women prepared their physical condition. Five midwives who had birth experiences tested the face validity of the items. The Cronbach's alpha was calculated to assess reliability. The coefficient alpha for the five items was 0.57 and indicated moderate internal consistency.

Items querying factors that may affect women's mental health were extracted from the following studies: Beck (2001), Nakano (2001) and Yamashita et al. (2002). Items asked were: 1) history of psychiatric disorders, 2) planned pregnancy, 3) marital

relationship (feel afraid of partner), 4) partner supportive in housework and child-rearing, 5) someone to consult other than partner, 6) can seek help for self, and 7) economic situation. The item regarding marital relationship was taken from the Violence Against Women Screen (Kataoka, 2005). The way to answer differed among items.

Processes

Nature of care. Women were asked to answer 11 items about the actual care they received, which were extracted from the following studies: Davey et al., 2005; Misago, 2008; Iida, 2009a; Misago et al., 2009; Iida, 2011; and Iida et al., 2011. Items asked were: 1) waiting time for antenatal care, 2) actual time spent for antenatal care, 3) who talked more at antenatal care, 4) specific advice given (five items), 5) same caregiver at the antenatal period, 6) same caregiver at the intrapartum period, and 7) same caregiver at the postnatal period. This originally developed scale was rated using a nominal scale for options provided or individual's response.

Outcomes time 1: During Hospitalization

Evaluation of care. Evaluation of care was measured by using the WCC-preg questionnaire (50 items) and asking about their satisfaction with care (three items). There were 53 items in total.

The WCC-preg questionnaire is a questionnaire to measure women's perception of the received WCC (Iida, 2010) **<Preliminary study 1>**. The 50-item questionnaire asked women if they agreed or disagreed using a 5-point Likert-type scale: 1) *I strongly disagree*, to 5) *I strongly agree*. Scores ranged from 50 to 250 points. From the original factor analysis using promax rotation, six factors emerged; 1) feelings of encouragement, 2) being respected, 3) trusting the caregiver, 4) effective interaction, 5) help in decision-making, and 6) non-threatening manner. The Cronbach's coefficient alpha for all 50 items was .98 indicating high internal consistency, although this may be due to the large number of items. The correlation coefficient of the test-retest was .55 using 55 data.

Factor analysis was conducted to check the instrument's validity for this present study. However, the factor structure differed from the preliminary study (Iida, 2010). Therefore, to enable comparing the data, factors were specified to six factors as explained above.

Cronbach's alpha was calculated to assess reliability. The coefficient alpha for the total items was .98 for this study and indicated high internal consistency. The coefficient alpha for each of the factors was all fairly high ranging from .71 to .95.

Two items asked women to rate their satisfaction with care during antenatal care and care during the intrapartum period using a 10-point Likert-type scale: 1) *I was very unsatisfied*, to 10) *I was very satisfied*. The second item asked women if they felt warmly cared for using a 5-point interval scale: 1) *not at all*, to 5) *yes, very warm*. This was asked because previous studies indicated that women who received continuity of care from midwives felt warmly cared for (Higuma et al., 2000; Hasegawa et al., 2005; Gepshtein et al., 2007; Takehara et al., 2009).

Health outcomes during hospitalization. There were 25 items regarding: obstetric outcomes and mental health.

Obstetric outcomes consisted of documenting 12 items: mode of delivery, premature rupture of membranes, weak labour pains, prolonged labour, anaesthesia, induced labour, augmentation, amniotomy, episiotomy, umbilical arterial blood gas, and Apgar scores. These data were gathered from the medical record by the researcher. Another item asked women about their breast-feeding status: 1) *mostly formula*, 2) *more formula than breast milk*, 3) *more breast milk than formula*, 4) *exclusive breast-feeding*.

Mental health was measured using the Stein's maternity blues (Stein's MB) scale, which was developed by Stein (1980) and translated into Japanese by Okano et al. (1991). Validity and reliability of this scale was confirmed (Okano et al., 1991). This scale consists of 13 items and the rating differs according to the item. Scores ranged from 0 to 26 points. Women are considered to have maternity blues if they rated higher than 8 points (Okano et al., 1991). For this study, the coefficient alpha for the 13 items was .74 indicating high internal consistency.

Outcomes time 2: at One-Month Check-up

Evaluation of care. Evaluation of care was measured using three items: wanting to give birth again at the same setting, recommending the setting to other women, and satisfaction with care received during the postpartum period. Satisfaction was measured using a 10-point Likert-type scale: required to answer the same way as asked during hospitalization, and the other two were asked in a 4-level interval scale: 1) *no, certainly*, to 4) *yes, certainly*.

Health outcomes at one-month check-up. There were 14 items, regarding: postnatal physical preparation, breast-feeding, and mental health.

How women prepared postnatally was measured with three items, (items concerning keeping regular schedule and exercise were excluded from the questionnaire used during hospitalization because it was irrelevant). The coefficient alpha for the three items was .56 and indicated moderate internal consistency. Another item asked about their breast-feeding status: designed to respond the same way as asked during hospitalization.

Mental health was measured using the Edinburgh Postnatal Depression Scale (EPDS) developed by Cox et al. (1987) and translated into Japanese by Okano et al. (1996). Validity and reliability of this scale was previously confirmed (Okano et al., 1996). This scale consists from 10 items and the rating differs according to the item. Scores range from 0 to 30 points. In Japan, women are considered to be in high risk of having postpartum depression if they rated higher than 9 points (Okano et al., 1996). The coefficient alpha for the 10 items was .81 for this study and indicated high internal consistency.

As above, while women were hospitalized they were asked to answer 97 items and the researcher gathered the 11 items regarding labour and delivery from the medical records. At their one-month check-up, they were asked to answer 17 items. **Table 5** describes aspects of the questionnaires used in this study.

Analysis

Missing data from questionnaires were replaced with mode values. Data were analysed using SPSS version 19.0 J. as follows: 1) Descriptive statistics were used to summarize the participant's background. 2) Chi-square test was used to compare categorical data and *t*-test test was used to compare continuous data if participant's background differed among the continuity of midwife-led care group and the obstetrician-led care group. When using *t*-test, the variables were examined for the same variance using the Levene's test. 3) Pearson's correlation coefficient was used to check the relationships between variables. 4) Chi-square test and *t*-test test was used to compare the outcomes of the midwife-led care group and the obstetrician-led care group. 5) Stratified analysis considering women's backgrounds was conducted to compare outcomes (Ishii, 2007). 6) Unadjusted odds ratio (OR) was calculated for the comparable obstetric outcomes. 7) Structural Equation Modelling (SEM) was used to examine whether continuity of midwife-led care affected women's health during hospitalization and health at one-month postpartum. To assess the fitness of the model to the data, the following fitness measures were used: the Comparative Fit Index (CFI), and the Root Mean Square Error of Approximation (RMSEA). Recommended cut-off values were CFI> .95 or RMSEA< .05 (Yaun et al., 2007). Qualitative data were transformed to dummy variables. These data were calculated through AMOS version 19.0 J. A statistician supervised the analysis process.

Ethical Consideration

The Institutional Review Board at St. Luke's College of Nursing, Tokyo, Japan approved this study (No. 10-065). Women were informed verbally and given a written description of the following: 1) Participating in the study is voluntary. Therefore, even if they refused, there will be no disadvantage to them. 2) Collected data will be only used for the study purpose and the data will be masked. Data will be kept in a safe place and after a reasonable period of time it will be put through a shredder and be properly discarded. 3) This research is conducted as a doctoral dissertation. Therefore, the findings will be presented at conferences and published in academic journals. Since

the questionnaire asked about mental health, the survey request contained a written description of the information centre with mental health resources in the community so that women could ask for assistance when needed.

Findings

A total of 281 women responded during hospitalization (response rate 90.1%). Of these, 280 women were included in the analysis: 149 in the continuity of midwife-led care group, and 131 in the obstetrician-led care group.

Questionnaires were distributed to 277 women at their one-month check-up (it was not possible to distribute to three women because they cancelled their one-month check-up or they visited another office). Responses of all 238 women were included in the analysis for one month: 133 in the midwife-led care group, and 105 in the obstetrician-led care group.

Characteristics of Participants

Women in the midwife-led group were significantly older ($M= 33.2$, $SD= 4.3$) than women in the obstetrician-led group ($M= 31.7$, $SD= 4.3$) ($t(278)= 2.8$, $p= .005$). However, when divided by years under 34 and over 35, there was no difference. The midwife-led group has slightly more multipara (59.7%) compared to primiparas (40.3%) while the ratio of primiparas and multipara were about the same in the obstetrician-led group (**Table 6**).

Attitude about choosing where to give birth. Women's attitude influencing where to give birth differed between groups: all five items were significantly different. The largest difference was 'have particular hopes for birth' ($\chi^2(3, N= 279)= 74.7$, $p< .001$). Next was 'anxious about receiving antenatal care only from midwives' ($\chi^2(3, N= 279)= 53.9$, $p< .001$) followed by 'value the relationship between caregivers when choosing where to give birth' ($\chi^2(3, N= 278)= 37.5$, $p< .001$), 'have bad memories at hospitals in the past', and 'self-care is important for normal maternity period' ($\chi^2(3, N= 277)= 14.3$, $p= .003$; $\chi^2(3, N= 280)= 9.5$, $p= .023$, respectively) (**Figure 3**).

Psychosocial characteristics. Women in both groups showed similar psychosocial characteristics; the seven items were not statistically different.

Nature of Care Provided and Specific Advice

Nature of care provided. Nature of care provided differed significantly between the groups (**Table 7**).

More than 80% of women in midwife-led group waited less than 30 minutes while 70% of women in obstetrician-led group waited over 30 minutes ($\chi^2(2, N= 276)= 85.0, p< .001$). Over half of the women in the midwife-led group had more than 30 minutes for their antenatal care, while more than half of the women in the obstetrician-led group had less than 10 minutes ($\chi^2(2, N= 279)= 124.0, p< .001$). For the amount of conversation at antenatal care, more than 70% of the women in the midwife-led group answered that they talked the same amount as the caregiver, while 55% of the women in the obstetrician-led group answered that the caregiver talked more than they did ($\chi^2(2, N= 279)= 75.5, p< .001$). About 60% of the women in the midwife-led group received care from the same midwife more than five times, while about 90% of the women in the obstetrician-led group received care mostly from a different midwife ($\chi^2(3, N= 273)= 107.4, p< .001$). Over 90% of the women in the midwife-led group received care from a known midwife at labour, while only 21% of the women in the obstetrician-led group received care from a known midwife ($\chi^2(2, N= 274)= 159.4, p< .001$). Almost all the women received care from a known midwife while hospitalization in the midwife-led group. However, more than 70% of the women in the obstetrician-led group received care from an unknown midwife ($\chi^2(1, N= 276)= 159.6, p< .001$).

Specific advice given. Specific advice given to women at antenatal care differed between groups; all showed a significant difference (**Figure 4**).

Over 80% of the women in the midwife-led group received advice about keeping warm, dietary intake, and exercise (98.0%, 93.3%, and 83.9% respectively), while it was 61.8%, 65.6%, and 51.9% respectively in the obstetrician-led group. Although statistically more women in the midwife-led group received advice about resting and taking a sleep, both of the groups did not reach more than 50%.

Preparing Physically for Childbirth

During pregnancy. Three out of five items regarding women's physical preparation during pregnancy differed between groups. The item which showed the most difference was 'careful to keep warm': 79.9% women in the midwife-led group were 'very careful' ($\chi^2(4, N= 280)= 25.9, p< .001$) while it was 53.4% of those in the obstetrician-led group. Others were 'eat a well-balanced diet' ($\chi^2(4, N= 280)= 20.3, p< .001$), and 'exercise regularly' ($\chi^2(4, N= 280)= 14.6, p= .006$). 'Keep a regular schedule' and 'careful not to get too tired' were similar between the groups.

At one month. Two items showed a statistical difference asking women about their physical preparation at one month: 'eat a well-balanced diet' ($\chi^2(3, N= 237)=19.2, p< .001$) and 'careful not to get too tired' ($\chi^2(3, N= 237)=10.7, p= .030$), while 'careful to keep warm' did not differ.

The total scores showed a statistical difference both during pregnancy and at one month ($t(278)= 4.8, p< .001$ and $t(235)= 3.3, p= .001$ respectively) **(Table 8)**.

Perception of Care

Women-centred care. Women's scores of WCC-preg questionnaire were fairly high; although, women in the midwife-led group showed significantly higher scores with the WCC-preg questionnaire than women in the obstetrician-led group ($t(179)= 10.9, p< .001$) **(Table 9)**. When comparing WCC-preg questionnaire's factor's total scores, the midwife-led group showed a significantly higher score than the obstetrician-led group for all six factors.

Satisfaction with care. Women in both of the groups rated their satisfaction with care in a similar pattern: they rated care during labour and birth the highest, next was the care after birth, and third was the antenatal care. In comparing scores, the midwife-led group rated all three periods significantly higher ($p< .001$) than the obstetrician-led group.

Over 90% of women in the midwife-led group felt they were 'certainly warmly cared for', while it was slightly less than half (48.8%) in the obstetrician-led group, which was significantly different ($\chi^2(4, N= 277)= 71.7, p< .001$).

Quality of Service (indirect measure). In both of the groups, over 90% of the women answered that they would ‘want to give birth at the same setting’ and would ‘recommend the setting to other women’ in either ‘yes, certainly’ or ‘yes, probably’. Although, it was significantly different between the groups ($\chi^2(2, N= 238)= 39.3, p< .001$ and $\chi^2(3, N= 238)= 47.7, p< .001$ respectively).

Obstetric Outcomes: Physical Outcomes

Because of the characteristics of the settings, which provide midwife-led of care, all women had natural birth with no induced labour or augmentation. In addition, one midwife-led group setting did not perform episiotomies; therefore, these variables were not comparable which is portrayed in **Table 10**. About 90% of the women in the obstetrician-led group had natural delivery. However, there were some interventions: 10.7% induced labour, 20.6% augmentation, and 38.9% episiotomy. None of the women had anaesthesia during labour or birth in either group.

Table 11 describes the comparable obstetric outcomes. There were about 15% who had premature rupture of the membranes. More than 90% of the women in the midwife-led group had no weak labour pains, no prolonged labour, and no amniotomy. Premature rupture of the membranes ($\chi^2(1, N= 279)= 4.7, p= .030$), weak labour pains ($\chi^2(1, N= 280)= 15.9, p< .001$), and amniotomy ($\chi^2(1, N= 280)= 20.1, p< .001$) revealed a significant difference between the groups, while prolonged labour had no significant difference.

Apgar scores were classified as 8 points or greater and 7 points or less. Almost all infants scored over 8 points at one minute. There were no infants scoring under 7 points at five minutes in either group. In addition, umbilical arterial blood gas did not show any difference between groups.

Stratified analysis considering women’s age, parity, and physical preparation was conducted to compare weak labour pains (**Table 12**). Women were divided into groups: ages 34 or less and 35 or more, primiparas and multiparas and their behaviour of careful to keep warm or not. Weak labour pains were significantly less in the groups of

women who were age 34 or less ($\chi^2(1, N= 183)=12.1, p= .001$), primiparas ($\chi^2(1, N= 128)=9.7, p= .002$), and who were careful to keep warm ($\chi^2(1, N= 254)=14.6, p< .001$).

Obstetric Outcomes: Breast-Feeding Status

More than 90% of the women in the midwife-led group breast-fed exclusively and when adding women who were giving more breast milk than formula the ratio was 95.9% during hospitalization. In contrast, the obstetrician-led group, women exclusively breast-feeding was about half and when adding women who were giving more breast milk than formula it was 75.5%, which was significantly different ($\chi^2(3, N= 279)= 57.2, p< .001$). The difference was observed at one-month postpartum as well. More than 80% women in the midwife-led group were breast-feeding exclusively, while it was 67.6% in the obstetrician-led group ($\chi^2(3, N= 237)= 20.1, p< .001$) (**Table 11**).

Obstetric Outcomes: Mental Health

Maternity blues. The mean score of Stein's MB scale differed significantly between groups; women in the midwife-led group showed a lower score than those in the obstetrician-led group (2.67 ± 2.4 and 4.06 ± 3.2 respectively, $t(230)= 4.0, p< .001$). However, most of the women scored less than 7, which meant most were not considered to have maternity blues. Although there were fewer women in the midwife-led group who were at risk of maternity blues compared with the obstetrician-led group, there was no statistical difference between the groups.

Postpartum depression. Women in the midwife-led group showed a lower score in EPDS than those in the obstetrician-led group, although it was not significantly different (4.01 ± 3.3 and 4.93 ± 4.4 respectively, $p= .076$). Additionally, although women who scored under 8 points, which meant they were a low risk for postnatal depression, were fewer in the midwife-led group compared to those in the obstetrician-led group, it did not show a statistical difference (**Table 13**).

Comparison between Midwife- and Obstetrician-led Groups: Physical and Mental Health Odds Ratio

Women who received midwife-led care were significantly less likely to have premature rupture of membranes (OR .52 [95% CI .28 to .95]), weak labour pains (OR .21 [95% CI .01 to .48]), and to receive amniotomy (OR .19 [95% CI .09 to .42]) than those who received obstetrician-led care. Although women in the midwife-led group were more likely to have prolonged labour, no significant difference was found between the groups. No significant difference was found in Apgar scores, maternity blues, or postpartum depression. Unadjusted OR for the comparable outcomes is described in **Table 14**.

Relationship between Factors

WCC and satisfaction with care. There was a significantly high correlation between the perception of WCC and satisfaction with care during antenatal care ($r = .71, p < .001$). Perception of WCC and satisfaction with care during labour and birth and after birth showed a moderate correlation ($r = .53, p < .001$ and $r = .41, p < .001$ respectively).

Advice given and women's preparation of physical condition. Advice given during antenatal care and women's physical preparation during pregnancy and at one month showed a low correlation ($r = .28, p < .001$ and $r = .22, p < .001$ respectively). Women's physical preparation during pregnancy and at one month was moderately correlated ($r = .46, p < .001$).

Maternity blues and postnatal depression. Stein's MB and EPDS showed a moderate correlation ($r = .45, p < .001$).

Effect of Continuity of Midwife-led Care

Structural Equation Modelling was used to examine whether continuity of midwife-led care affected women's health during hospitalization and at one-month postpartum.

Figure 5 shows the path coefficients, which indicate the relationships among the

variables. All path coefficients demonstrated are statistically significant and the fitness measures for this model was CFI= .904 and RMSEA= .064, indicating acceptable fitness to the data.

The factor “particular hope for where and how to give birth” consisted of: ‘value relationship between caregivers’, ‘have particular hopes for birth’, and ‘not worried to receive antenatal care from midwives’ which had a positive effect on “continuity of care from midwives”. “Continuity of care from midwives” included: ‘short waiting time’, ‘plenty of time for antenatal care’, ‘I talked more or we talked the same amount’, and received antenatal ‘care from same midwife’ which all had a positive effect on “perception of care antenatal care”, “perception of intrapartum care”, “obstetric outcomes”, and “perception of care at one month”. The highest standardized solution was the “perception of antenatal care” which consisted of: ‘satisfaction with antenatal care’ and ‘perception of WCC’. This means that more “continuity of care from midwives” will lead to higher perceptions of care throughout the maternity period. “Obstetric outcomes” consisted of: ‘no weak labour pains’, ‘more breast-feeding during hospitalization’, and ‘more breast-feeding at one-month postpartum’ and had a positive effect on “continuity of care from midwives” as well.

Discussion

The findings of this study suggested that continuity of midwife-led care was perceived by women to be beneficial. The perception of care was significantly higher in the midwife-led care group than those in the obstetrician-led care. As for the obstetric outcomes, women in the midwife-led group had significantly less premature rupture of membranes, were significantly more exclusive breast-feeding during hospitalization and at one-month postpartum. In addition, the ratio of women who were at risk of maternity blues and postpartum depression in the midwife-led group was about half of those in the obstetrician-led care group, although there was not a significant difference.

Amount of Continuity of Midwife-led Care

Continuity of midwife-led care was mostly provided as intended with the majority of women in the midwife-led group received antenatal care from the same midwife more than five times and from a known midwife during labour and while hospitalization. These results were similar with previous studies (Waldenstrom et al., 2001; Homer et al., 2002; Biro et al., 2003; Hicks et al., 2003; Hatem et al., 2008). Studies comparing midwife-led care and standard care (different caregivers, such as midwives, obstetricians, and general practitioners would provide care through the maternity period) reported that significantly more women who received midwife-led care had a known midwife present at labour and birth than women receiving standard care. The midwife care scheme's intention is to provide women care from a known midwife especially during labour and birth. This is thought to be because the labour and birth period is the most stressful and anxious time for the woman.

Effect of Midwife-led Care: Effect on Perception of Care

Women's perception of WCC was significantly higher in the midwife-led group than in the obstetrician-led group. In addition, satisfaction with care throughout the maternity period, and feelings of being warmly cared for were significantly higher in

the midwife-led group than in the obstetrician-led group as well. Moreover, most of the women who received midwife-led care answered that they wanted to give birth at the same setting and would want to recommend the setting to other women.

What made these differences may be explained by the time spent at antenatal care. About half of the women in the midwife-led group had more than half-hour with the midwife during antenatal care visits, while it was only small proportion in the obstetrician-led group who had that much time. Indeed, Japan's nationwide survey (Japanese Nursing Association, 2009) found that average time spent for antenatal care mainly from midwives was 31.8 minutes, while mainly obstetricians was 13.3 minutes. Time spent at each antenatal care seem to differ greatly according to the model of care.

It can be assumed that having longer time spent for antenatal care will enable women to communicate their needs and expectation through 'effective interaction', which is one of WCC's factors, to the caregiver and enable them to express their concerns and fears as well. Regarding the caregiver's side, having enough time to spend with the woman will allow them to provide sufficient information concerning specific advice to prepare women's physical condition. Accordingly, this could have enhanced women's perception of WCC and satisfaction with care. Biro et al. (2003) considered that women in the midwife-led care group experienced longer antenatal visits which contributed to more individualized care than the standard group. This was reported similarly in the research of Waldenstrom et al. (2000) who found that longer appointment time might have suggested safety and competence in the care-provided.

The Department of Health (1993) reported that the woman must be the focus of care and she should be able to discuss her needs fully with her healthcare professionals. It also emphasis the importance of the woman having a trusted and familiar face for health care, that is to have 'her midwife' or 'her doctor' and that continuity of caregiver is one of the fundamental principles that underpins WCC. Since the same group of midwives were caring for the women in this study this could have enhanced women's feelings of being cared for. Moreover, through 'effective interaction', which is one of the factors of WCC, may lead to strong relationship and trust between the woman and the caregiver. This will enable women to communicate their needs and discuss their

expectations with the caregiver. Thus their perception of WCC was higher compared to those who received obstetrician-led care, which did not provide continuity of care.

Effect of Midwife-led Care: Effect on Obstetric Outcomes

Although comparable obstetric outcomes were limited due to the midwife-led group's characteristics of settings, they had better or similar outcomes compared with the obstetrician-led group. They had significantly less premature rupture of membranes, less weak labour pains, and less amniotomies and they were also exclusively breast-feeding during hospitalization and at one-month postpartum. In addition, the ratio of women's maternity blues and postpartum depression were about half in the midwife-led group of those in the obstetrician-led group.

Effect on Obstetric Complications and Interventions

No studies were found comparing differences in maternity care and occurrence of premature rupture of membranes. However, premature rupture of membranes is said to occur in 10 to 25% of all births (Ayabe, 2011) and is an important outcome of labour because if it occurred, it would increase the risk of infection and if the onset of labour were delayed it would affect the infant's outcome and increase the caesarean section rate.

This present study found that there were significantly less occurrences of premature rupture of membranes in the midwife-led group than those in the obstetrician-led group. One reason that could be considered is that almost all women (98.0%) received specific advice of keeping warm at antenatal care in the midwife-led group and 79.9% were in fact, actually very careful to keep warm. The relationship of sensitivity to cold and premature rupture of membranes is reported in Nakamura's (2011) study where she surveyed 2,810 Japanese women. She reported that women who were sensitive to cold were 1.7 times more at risk of having premature rupture of membranes and 3.4 times more at risk of having preterm birth than those who were not sensitive to cold. Additionally, surveys conducted by Misago (2008) and Misago et al. (2009) reported that women who received care from midwives who work

independently at birth centres self-managed their life style to keep their bodies warm.

Another probable reason of the higher rate of premature rupture of membranes in the obstetrician-led group than those in the midwife-led group could be the difference in the frequency of vaginal examinations. Lenihan (1984) reported that women who were examined vaginally weekly starting at 37 weeks were three times more to be seen with premature rupture of membranes than those who were not examined vaginally until term or past term (18% and 6%, respectively, $p = .001$). This present study did not gather data regarding the number of vaginal examinations. However, at hospitals where obstetrician-led care is mainly provided vaginal examinations occurred more frequently than at birth centres where midwife-led care is provided (Hiruta et al., 2002). The difference of the actual care provided from midwives, who emphasized the normality of the maternal period, restricted the use of medical interventions, and minimized medical interventions could have resulted in the difference in the prevalence of premature rupture of membranes.

The systematic review conducted by Hatem et al. (2008) reported that amniotomy did not show a difference between groups, although the present study showed a difference. Conducting an amniotomy could result in complications such as umbilical cord prolapse and fetal heart rate deceleration. If these complications occurred in midwife-led care settings, they would be required to transfer the women, while obstetrician-led care settings can conduct emergency caesarean sections. These differences in scope of medical procedures could have affected the use of amniotomy.

Studies comparing the outcomes of weak labour pains in midwife and obstetric led care could not be found. However, considering that women in the midwife-led care group had less weak labour pains than those in the obstetrician-led care group could again be thought to reflect the differences in scope of medical procedures in those settings. Since midwife-led care settings cannot use medication for augmentation, some midwives conduct acupressure and acupuncture instead. When midwives find symptoms of weak labour pains, they might conduct those alternative procedures. Although, this study did not gather details of the use of alternative and complementary treatments in midwifery practice, so this needs to be under

consideration.

Findings showing that the length of labour did not differ between the two groups were similar with Hatem et al. (2008). The infant's outcomes were consistent with researchers Turnbull et al. (1996), Waldenstrom et al. (2001), and Biro et al. (2002), who reported that infant's Apgar scores were similar between groups. This was the same in the systematic review conducted by Hatem et al. (2008).

Effect on Breast-Feeding Status

Significantly more women in the midwife-led group exclusively breast-fed during hospitalization and at one-month postpartum compared to the obstetrician-led group. These results were similar with Hatem et al.'s (2008) systematic review.

According to a survey on the nutrition of infants and preschool children (Japan Ministry of Health, Labour and Welfare, 2006; Mothers' & Children's Health Organization, 2011), 96% of pregnant women indicated they wanted to breast-feed their infant. However, women who were actually breast-feeding right after delivery were 48.6% and 42.4% at one month. It is obvious that the ratio of those who were exclusively breast-feeding was large in the midwife-led group compared to the general survey of women.

What made the large proportion of exclusive breast-feeding among women in the midwife-led group could be explained from how women and infants stay together at midwife-led care settings. The included midwife-led care settings were where the mother and infant co-slept and were mostly together around-the-clock. This enables the women to breast-feed her infant whenever needed. In fact, this is one of the steps to successful breast-feeding announced in the UNICEF/WHO Baby-Friendly Hospital Initiative (1989) where it states 'practice rooming in - that is, allow mothers and infants to remain together 24 hours a day'. On the contrary, settings where obstetrician-led care are provided have new-born nursery rooms where women can leave their child in the care of midwives or nurses which could have made the differences in outcomes.

Another reason for the high rate of breast-feeding may be how midwives support

women. A study conducted by Nakada (2008) which included 404 mothers reported that one of the hospital practices that related to breast-feeding continuance was the 'midwife's assurance for the mother that her milk will flow', and one of the factors associated with breast-feeding continuance after hospital discharge was 'midwives had helped her with breast-feeding'. Additionally, it was reported that giving assurance that her breast milk will flow adequately resulted in promotion of their breast-feeding continuation.

Breast-feeding is not easy to start and continue for some women. Although it could be a joyful and pleasant experience, it could also be painful and tiresome. It could be considered that adequate advice at the appropriate time enhanced women's breast-feeding status. In the midwife-led group, women's perception of WCC was higher than the obstetrician-led group. Factors explaining WCC are 'feelings of encouragement', 'being respected', 'effective interaction', and 'help in decision-making'. They may have had more time to talk about their thoughts about breast-feeding and given information during the antenatal period. If women were able to meet the same midwife, they would have had more chance to discuss the issue. In addition, if they had the same midwife care for them in the postpartum period, the breast-feeding may proceed smoothly because they already know the women's preference for breast-feeding. However, the actual information and the content of care women received were not questioned so this should be considered in the future.

Effect on Mental Health

The results revealing that the ratio of maternity blues and postpartum depression did not differ significantly between the midwife-led group and the obstetrician-led group were similar to Hatem et al.'s (2008) systematic review.

There are studies conducted in Japan by Kitamura et al. (2005) and Sato et al. (2010) where they examined whether continuous psychological support through the maternity period provided by midwives contributes to preventing women's anxiety and depression also reported similar results. There was no difference in postpartum depression at one month in those who were continuously supported by midwives and

those who were not, which was similar to this study. However, when the participants were followed to three-months postpartum, there was a difference (Kitamura et al., 2005; Sato et al., 2010). Since postpartum depression is an emotional psychiatric disorder, which occurs within three-months postpartum, and this present study followed women for only one-month postpartum, the time frame may not have been enough to detect the differences in outcomes. Nevertheless, the prevalence of postpartum depression decreases over time (Evans et al., 2001; Escriba-Aguir et al., 2011) and has many predictors (Beck, 2001), so the follow-up duration needs to be considered.

Women in the midwife-led group showed significantly lower scores in Stein's maternity blues scale than those in the obstetrician-led group. Additionally, the Edinburgh Postnatal Depression Scale score was also lower in the midwife-led group, although this was not significantly different. When comparing the ratio of maternity blues and postpartum depression, both of the ratios were about half in the midwife-led group compared to the obstetrician-led group, although these were not significantly different. Receiving antenatal care from the same midwives might enable the woman to share her personal problems and troubles in a relaxed attitude. In addition, since the midwife would know the woman more intimately, they would be able to assess woman's psychological risk factors through effective interaction and notice problem signs of the problems throughout the maternity and postpartum period.

Providing Maternity Care

The findings report that midwife-led care had no adverse outcomes to the woman and her infant. Although, this does not simply mean that care should be provided from midwives. What is meaningful is the content of care midwives provide and how they interact with women. Women in the midwife-led group received more specific advice about physical preparation from midwives in a longer period of time and were actually more careful than those in the obstetrician-led group. This could have likely been related to the differences in obstetric outcomes.

Another issue is that midwives and obstetricians have a different viewpoint when

observing women's health. Obstetricians target high-risk women as well as low-risk women. As long as women have no abnormal signs, there will be no need to intervene. Physicians are preventing disease. However, midwives only target low-risk women. Therefore, they will actively intervene to help women promote their self-care and prepare physically and help them stay low-risk. Midwives are promoting health.

Reported studies comparing midwife-led care and obstetrician-led care are mainly conducted in the United Kingdom or Australia. This present study is one of the first studies that compared midwife-led care and obstetrician-led care in Japan. Moreover, the results demonstrated that women's perception was high and obstetric outcomes were equal to or better than those who received obstetrician-led care. Therefore, midwife-led care in low-risk pregnancy could be applicable and recommended.

Limitations and Future Plans

Firstly, an obvious limitation of this study was due to the observational design. Settings that provided midwife-led care are not allowed to implement medical treatment and if complications occurred, women would be transferred. Therefore, it was not possible to include women who were transferred to other settings. Future research should take into account how to cover all women including those who were transferred.

Secondly, more unmeasured confounding variables should have been collected. As for the woman, more background information would be needed to assess the outcomes. As for the care provided, information such as who were the other caregivers and how many times did they interact with the woman, how did obstetricians interact and were they the same at each antenatal care should be considered. Additionally, more data about the actual information provided and content of care should be gathered as well. Gaining more information about the settings and antenatal care may lead to stronger evidence.

Lastly, this study did not refer to the issue of cost-effectiveness and well-being of caregivers. For successful implementation of continuity of care this should be assessed.

Conclusion

The objective of this study was to evaluate whether continuity of midwife-led care for women from the antenatal to postpartum period is effective for obstetric and psychological outcomes right after birth and at one-month postpartum. A total of 280 women who responded during hospitalization, and 238 women who responded at one-month postpartum were included in the analysis.

Women's age, parity, and psychosocial characteristics were similar between the midwife-led care group and the obstetrician-led group. However, women's attitudes about choosing where to give birth differed.

The findings of this study suggested that continuity of midwife-led care was perceived by women to be beneficial and had no adverse outcomes:

- 1) The perception of care was significantly higher in the midwife-led group: perception of WCC was high, their satisfaction with care was high throughout the maternity period, and they felt significantly more warmly cared for than women in the obstetrician-led group.
- 2) Women in the midwife-led group had significantly less premature rupture of membranes. The Apgar scores of the infants were similar, which almost all were healthy infants.
- 3) Women in the midwife-led group were significantly more exclusively breast-feeding during hospitalization and at one-month postpartum.
- 4) Women in the midwife-led group showed significantly lower scores in Stein's maternity blues scale than those in the obstetrician-led group. Additionally, the Edinburgh Postnatal Depression Scale score was also lower in the midwife-led group, although this was not significantly different.