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**Title page**

# WOMEN'S SATISFACTION WITH MIDWIFE-LED CONTINUITY OF CARE – A CASE-CONTROL STUDY IN PALESTINE

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## ABSTRACT

*Objectives:* A midwife-led continuity model of care had been implemented in the Palestinian governmental health system to improve maternal services in several rural areas. This study investigated if the model influenced women`s satisfaction with care, during antenatal-, intrapartum- and postnatal period.

*Design:* An observational case-control design was used to compare the midwife-led continuity model of care with regular maternity care.

*Participants and setting:* Women with singleton pregnancies, who had registered for antenatal care at a rural governmental clinic in the West Bank, were between one to six months after birth invited to answer a questionnaire rating satisfaction with care in 7-point Likert scales.

*Primary outcome* was the mean sum-score of satisfaction with care through the continuum of antenatal, intrapartum and postnatal period, where mean sum-scores range from 1 (lowest) to 7 (highest). Secondary outcome was exclusive breastfeeding.

*Results:* Two hundred women answered the questionnaire, one hundred who received the midwife-led model and one hundred who received regular care. The median timepoint of interview were 16 weeks postpartum in both groups. The midwife-led model was associated with a statistically significant higher satisfaction with care during antenatal, intrapartum and postnatal period, with a mean sum-score of 5.2, versus 4.8 in the group receiving regular care. The adjusted mean difference between the groups' sum-score of satisfaction with care was 0.6 (95% CI 0.35 to 0.85) $p<0.0001$. A statistically significant higher proportion of women who received the midwife-led continuity model of care were still exclusively breastfeeding at the timepoint of interview, 67% versus 46% in the group receiving regular care, an adjusted odds ratio of 2.56 (1.35 – 4.89)$p=0.004$.

*Conclusions:* There is an association between receiving midwife-led continuity of care and increased satisfaction with care through the continuum of pregnancy, intrapartum and postpartum period, and an increased duration of exclusive breastfeeding.

**Trial registration number** NCT03863600


**Key words:** Case-load Midwifery, Satisfaction with care, Experience, Continuity of care, Maternal care, Developing country

## STRENGTHS AND LIMITATIONS OF THE STUDY

- The study adds new information from a low-middle income country to existing evidence on midwife-led continuity of care
- The study's complete data obtained from face to face interviews brings information on satisfaction with care from a marginalized group of women
- The study investigated to what extent a pragmatic implementation could improve continuity with care in a low resource setting
- The main limitation of this study is the observational, retrospective design comparing groups with potential unmeasured confounders.
- Not knowing the woman's village of origin and in which governmental hospital the women gave birth, could represent potential bias. However, the women in both groups represented a quite similar rural population from villages in different regions in the West Bank.

## BACKGROUND

Yearly, more than 300 000 women die from preventable causes related to pregnancy and childbirth, and 99% of them are from low-and middle-income countries[1] It is estimated that in the shadow of each maternal death, between 50 and 100 women suffer severe maternal morbidity.[1,2] A new-born child's prospects of survival, good health, and wellbeing is closely linked to their mother's survival, health and wellbeing.[2] Several studies investigating disrespectful and abusive treatment of women in maternity care, suggest this may explain why many women choose not to use available services.[3,4] In a literature review from developing countries in 2015, Srivastava *et al*. investigated what determines women's satisfaction with maternal health care.[5] They found that being treated respectfully, in terms of courtesy and non-abuse, irrespective of socio-cultural or economic context, is especially important to women.[5] Interpersonal behaviour was the most prominent reported determinant of maternal satisfaction, more than structural factors as cleanliness and physical environment.[5] Around the world women seek dignity, empathy and respect while obtaining maternal care and women's experience with disrespectful care and abuse in health care has been investigated in both low- and high-income settings.[4,6] Based on the research evidence, the World Health Organization

(WHO) has recommended interventions that scales up midwifery and facilitate continuity with care to enhance respectful relations in maternal care.[1,7-11]

Midwife-led continuity of care described in the literature, can be organized as *case-load*- or *team-midwifery* models.[12] In the case-load model one designated midwife cares for a group of up to 45 women, while in team-midwifery four to six midwives share the care of a group of up to 360 women. In both models, women are followed up through the continuum of pregnancy, intrapartum- and postnatal period. The case-load model facilitates an individual relationship between the woman and her midwife. Ideally, in both models, women will be cared for during labour by a midwife they know from antenatal care.[7,12] A Cochrane review on continuity of midwifery care models, conducted by Sandal *et al*. in 2016, reported improved health outcomes for women and babies. Several studies in the review also confirm satisfaction with midwife-led continuity models of care, but the studies lacked consistency in how satisfaction with continuity of care was measured.[8] Perriman and Davis identified in a systematic integrative review from 2015, four suitable instruments to measure satisfaction with continuity of care through the continuum of pregnancy, birth and the early postpartum period.[13]

**Palestinian context**

Palestinian midwives work in an overcrowded, understaffed and fragmented governmental maternity care system.[14,15] In such environment it is challenging to establish good relations and to meet each woman's individual needs. In a study from 2006, Giacaman *et al*. identified that Palestinian women were not satisfied with the place they gave birth, and that their choice were constrained by availability, affordability and limited access due to Israeli military closures and sieges.[16] To address the challenge faced by Palestinian women living under Israeli occupation in rural areas in the West Bank, the Palestinian Ministry of Health implemented a modified midwife-led case-load model of care, in cooperation with a Norwegian humanitarian organization, The Norwegian Aid Committee (NORWAC). The model was implemented between 2013 to 2016 in six governmental hospitals from where midwives provided outreaching antenatal and postnatal care in 37 rural villages. The implementation increased number of antenatal visits, number of detected pregnancy complications referred to higher level of care, and number of postnatal home-visits.[17] When the midwife-led model was tested in the region of Ramallah between 2007 and 2011, the midwives described in a qualitative study, how the model enabled them to provide

personalized care related to the individual woman's needs and how the broad scope of practice gave them new and important experience and knowledge.[18]

The aim of this study was to investigate if and how a modified case load midwife-led continuity model of care, in the governmental system in Palestine, influenced rural women's satisfaction with care, through the continuum of antenatal, intrapartum and postnatal period. A secondary aim was to explore the association between the model and duration of exclusive breastfeeding.

## METHODS

### Study design

An observational case-control design was used to compare satisfaction with care, between rural women receiving the midwife-led continuity model and rural women receiving regular maternity care, through the continuum of antenatal, intrapartum and postnatal period.

### Power and sample size

The power calculations were based on the results from a recent study in Australia, as we found no available studies on satisfaction with midwife-led continuity models of care in low – middle income countries.[19] A sample of 164 to 186 (82 to 93 in each group) was required to detect a difference of 20% between the control and intervention group's proportions of satisfaction, given a significance level of 0.05 and 80% power. Considering the novel context, we decided to collect answers from two-hundred women, 100 in each group, to assure enough power.

### Models of care

The midwife-led continuity of care model, modified to the Palestinian setting, implies that midwives who work in governmental hospitals was assigned to weekly visits to rural areas. Midwives drove from their base at their governmental hospitals in designated marked cars, to provide antenatal care in rural clinics and postnatal home-visits. Each midwife visited the same area and clinic each week, thereby following up the same case-load of women to enhance relational continuity. The obligation to work full time and the heavy workload at the hospital prevented the midwives from being on call to attend labour and birth, as such the women were not assured having a known midwife during labour. A more detailed framework of the model is described elsewhere.[17]

The regular model of governmental antenatal care was provided by midwives, nurses and physicians who only worked with primary health care and who had a variety of other responsibilities, like vaccination, regular health care and minor emergencies.

### Participants and data-collection

Women with a singleton pregnancy, who had registered for antenatal care at a rural governmental clinic in the West Bank, and who had given birth between the last one to six months, were asked to participate when they came with their child for vaccination at the same governmental clinic where they received antenatal care. Two midwives, who were not working with governmental primary health care, nor in the midwife-led continuity model, were trained in data collection. The research midwives travelled to rural villages scattered in different regions of the West Bank, that either offered the midwife-led continuity model or regular care. They invited eligible women to participate after providing them an information and consent form in Arabic, explaining the study. Women were assured anonymity if they participated, and that they would not be affected negatively if they did not accept to participate. To assure anonymity, the women were informed that neither their identity, village, clinic, nor birth facility could be traced. Their consent was given orally by accepting to answer the questionnaire by an interview. The research midwives collected the data in the women's homes or in a private place in the clinic. Each woman was given an Arabic version of the questionnaire. The research midwife then filled the questionnaire forms while interviewing the women to assure they understood the questions. The interview was estimated to take 30 minutes. The research midwives transferred the women's responses to the University of Oslo via the web-form, "nettskjema.no".

### The questionnaire

The questionnaire (supplementary file1) was based on previous studies measuring satisfaction with midwife-led continuity, and evaluated as suitable for this purpose.[19,20,13] The questionnaire included 62 questions measuring women`s satisfaction with antenatal, intrapartum and postpartum care using a 7-point Likert scale, where usually 1 signified "disagree strongly" and 7 signified "agree strongly". Women were further asked to what extent they received care during intrapartum and postpartum period from the provider they knew from antenatal care, and they were asked about their breastfeeding practice. The participants were invited to add recommendations to improve governmental services, in an open text section in the questionnaire. The content of the final questionnaire was tested for

contextual and cultural sensitivity with a group of five Palestinian midwives. After minor adjustments the questionnaire was translated to Arabic by a professional translator, retested and adjusted for accuracy.

### Outcomes

Primary outcome was the mean sum-score of satisfaction with care through the continuum of antenatal, intrapartum and postpartum period. Secondary outcomes were satisfaction with care related to the different episodes of care, and proportion of women that still practiced exclusive breastfeeding at timepoint of interview. Grade of continuity was measured by number of women who received care from their antenatal midwife during labour, at postnatal hospital ward and/or at home-visits.

### Statistical analysis

Difference in characteristics between the intervention and control groups were analysed by two independent samples t tests, Mann-Whitney U tests, chi-squared or Fisher's exact tests, as appropriate.

The Likert scale ordinal variables were highly skewed and first analysed by conducting ordinal regression because this method had been used in previous studies using similar Likert scales.[19] After fitting the ordinal regression, the proportional odds assumption was inspected by a Brant test, using brant command in Stata/SE, version 14. Results from the test showed that proportional odds assumption was violated for several ordinal outcomes.

Therefore, we summarized the answers, and the groups' mean sum-scores of satisfaction were compared by bootstrapping linear regression. The primary outcome, mean sum-score of satisfaction through the continuum of antenatal, intrapartum and postnatal care, included 53 different questions of satisfaction. Negative questions, such as: *I felt that nobody really cared for me during labour and birth,* were turned positive so that satisfaction could be interpreted equally in all questions and the mean sum-scores thereby read as 1(lowest) and 7 (highest). One question from the antenatal period was not included, as it investigated if occupation soldiers or settlers limited women's access to the clinic and not satisfaction with care. Neither were eight questions involving satisfaction with care during home-visits, as it only applied to the group receiving the midwife-led model. The questions of satisfaction included in the mean sum-score variables were assessed for internal consistency and Cronbach's Alpha was between 0.90 and 0.95.

Factors which could influence the difference between groups were included for adjusting. Adjusted bias-corrected and accelerated bootstrap estimates (BCa) with 95% confidence intervals were given for non-normally distributed ordinal outcomes and based on 10000 bootstraps.

For breastfeeding practice as binary outcome, multiple logistic regression analyses were used to test the difference between the groups and adjusting for possible confounding variables. Significance level was set at 0.05. The analyses were performed with IBM SPSS 25.

### Patient and public involvement

Women were not directly involved in the planning of the study, but in testing the questionnaire. The results will be disseminated in scientific publications, in public media and in local and international conferences.

### Ethical considerations

The Palestinian Ministry of Health approved the study and the research assistants' access to the health facilities, allowing them to contact women who had registered at the governmental clinic to ask them for consent to participate in the study.

Ethical approval for the study was granted from the Norwegian Regional Committee for Medical Health Research Ethics South East (REK) with id number: 2015/1235.

## RESULTS

### Participants characteristics

Between May 1st, 2016 to May 31st, 2017, 200 women from 20 villages answered the questionnaire, 100 who received the midwife-led continuity model and 100 who received regular care. There were 26 women who abstained from participating, of them 22 received regular care and 4 received midwife-led care. Groups characteristics, presented in table 1, were mainly homogenous. The time point of interview was median 16 weeks postpartum in both groups, with no statistically significant differences related to age, education, employment or parity. Less women who received the midwife-led model of care had parents living in the same village as themselves.

**Table1** Participants characteristics

| Characteristics | Midwife-led care (n=100) | Regular care (n=100) | p-value **** |
|---|---|---|---|
| Timepoint of interview/weeks since birth* | 16.0 (11.0-18.8) | 16.0 (8.0-22.8) | 0.499 |

| | | | |
|---|---|---|---|
| Age** | 26.6 (5.6) | 26.3 (5.6) | 0.688 |
| Age at marriage* | 20.3 (18.0-22.0) | 20.7 (18.0-22.8) | 0.812 |
| Age at first birth* | 21.5 (19.0-23.0) | 21.8 (19.3-23.0) | 0.997 |
| Nulliparous*** | 32 | 38 | 0.459 |
| Multiparous*** | 68 | 62 | 0.459 |
| Number of previous pregnancies* | 2.0 (1.0-3.0) | 2.0 (1.0-3.0) | 0.125 |
| Number of live born children* | 2.0 (1.0-3.0) | 2.0 (1.0-3.0) | 0.104 |
| **Education level*** ** | | | |
| Up to master's degree after high school | 46 | 37 | 0.251 |
| High school | 54 | 63 | 0.251 |
| **Employment*** ** | | | |
| Woman has employment (full- or part-time) | 15 | 10 | 0.393 |
| Woman not employed | 85 | 90 | 0.393 |
| Husband has regular employment | 64 | 49 | 0.020 |
| Husband employed now and then | 32 | 50 | 0.014 |
| Husband not employed | 4 | 1 | 0.369 |
| **Social*** ** | | | |
| Husband must live outside home to work | 9 | 15 | 0.119 |
| Women's parents live in same village | 34 | 63 | 0.001 |
| Not Smoking *** | 94 | 86 | 0.097 |

*n=number of women, no missing, *Median(IQR), **Mean(SD,*** % ****Mann-Whitney U tests, independent samples t- or chi-squared tests*

## Characteristics of obtained care

Women who received the midwife-led continuity model of care booked significantly earlier for antenatal care at the governmental clinic, reporting a gestational age of median 6.5 weeks, compared to median ten weeks gestation for the group who received regular care (table 2). The group receiving the midwife-led model of care had median nine antenatal visits, and only two women reported less than four visits, while the group receiving regular care had median six antenatal visits and 28 women reported having less than four visits at the governmental clinic. While 42% in the midwife-led group, received antenatal care exclusively from the governmental clinic, only 8% in the regular care group reported the same. Subsequently, women who had regular care received more additional care from private doctors and 33% gave birth at a private hospital, compare to only 11% of women who received the midwife-led care. There were no missing data except two women in the group receiving midwife-led care, who gave birth under transportation and therefore did not report satisfaction with intrapartum care. Only women who had received the midwife-led continuity model of care received home-visit after birth.

| **Table 2** Characteristics of obtained care | | | |
|---|---|---|---|
| **Characteristics** | **Midwife-led care (n=100)** | **Regular care (n=100)** | **p-value ***** |
| **Antenatal care (ANC)** | | | |
| Gestation at booking visit* | 6.5 (4.0-11.8) | 10.0 (5.0-19.5) | 0.003 |
| Number of ANC visits at government clinic* | 9.0 (8.0-10.0) | 6.0 (3.0-9.0) | 0.001 |
| Less than 4 ANC visits at government clinic** | 2 | 28 | 0.0001 |
| Number of ANC visits with doctor at government clinic* | 4.0 (3.0-5.0) | 5.0(2.0-8.0) | 0.066 |
| Number of ANC visits at private doctor* | 2.0 (0.0-3.0) | 6.0 (3.0-10.0) | 0.0001 |
| ANC care only from governmental clinic** | 42 | 8 | 0.0001 |
| Referred once or more to high risk care** | 36 | 22 | 0.004 |
| **Place of birth of last child**** | | | 0.035 |
| Governmental hospital | 87 | 67 | 0.0001 |
| Private hospital | 11 | 33 | 0.0001 |
| Under transportation | 2 | 0 | |
| Hours spent at postnatal ward postpartum* | 24.0 (18.0-24.0) | 15.0 (8.5-24.0) | 0.0001 |
| **Number receiving postnatal home-visits** | 76 | 0 | 0.0001 |

n=number of women, *Median(IQR), **% ***Mann-Whitney U or chi-squared tests

## Satisfaction with care

The groups' mean sum-scores, including crude and adjusted mean differences in satisfaction with care, are given in table 3. For the primary outcome, a statistically significant higher satisfaction with care was observed in favour of the group receiving the midwife-led care, through the continuum of pregnancy, intrapartum and postnatal period, with a crude mean sum-score of 5.2 (SD 0.86) versus 4.8 (SD 0.96) in the group receiving regular care. The adjusted mean difference between the groups was 0.6 (95% CI 0.35 to 0.83) p<0.0001. The statistically significant difference in favour of the midwife-led model persisted during the various periods of care. The adjusted mean difference in satisfaction with care during pregnancy was 0.4 (0.06 to 0.65) p=0.021 and with care during labour and birth 0.5 (0.14 to 0.87) p=0.008. The highest difference in satisfaction was with postpartum care, an adjusted mean difference of 0.8 (0.53 to 1.16) p<0.0001. Adjusting for the number of women who had given birth in private hospitals, influenced, but did not significantly change the primary outcome. Neither did it change satisfaction with care during pregnancy or postnatal period. However, a significant higher proportion of women who received regular care gave birth in private hospitals and adjusting for this factor significantly changed the difference in satisfaction with intrapartum care in governmental hospitals, in favour of the midwife-led model. We did not adjust for age, parity, employment, time since birth, or if the parents lived in the same village, as we found no significant influence from these covariates in univariate

analyses. The satisfaction with care during home-visits was generally high. However, it only applied to the group receiving the midwife-led continuity model of care. The detailed results in the full scales are presented in supplementary file 2 and shows which aspects of care that influenced the difference between the groups.

**Table 3** Satisfaction with antenatal, intrapartum and postpartum care

| | Mean sum-scores** | | Crude difference *** | Adjusted difference*** | |
|---|---|---|---|---|---|
| | Midwife-led care* | Regular care* | Mean (95%CI) | Adjusted mean(95%CI) | Adj. p-value |
| **Primary outcome** | | | | | |
| Satisfaction with all care through the whole continuum (53) | 5.2 (0.86) | 4.8 (0.96) | 0.5(0.25 to 0.73) | 0.6(0.37 to 0.81) | <0.0001 |
| **Descriptive outcomes** | | | | | |
| Satisfaction with care from midwives/nurses during pregnancy (6) | 6.2 (0.92) | 5.7 (1.22) | 0.6(0.25 to 0.84) | 0.6(0.22 to 0.82) | <0.001 |
| Satisfaction with pregnancy care from doctors (5) | 5.4 (1.50) | 5.2 (1.47) | 0.2(-0.18 to 0.66) | 0.2(-0.23 to 0.55) | 0.351 |
| Satisfaction with all care during pregnancy (15) | 5.7 (0.99) | 5.3 (1.19) | 0.4(0.08 to 0.68) | 0.4(0.06 to 0.64) | 0.021 |
| Satisfaction with midwives' care during labour and birth (5) | 5.5 (1.75) | 5.1 (1.79) | 0.5(-0.04 to 0.93) | 0.7(0.21 to 1.13) | 0.008 |
| Satisfaction with doctor's care during labour and birth (3) | 5.0 (1.69) | 4.7 (1.87) | 0.3(-0.20 to 0.78) | 0.5(0.06 to 0.95) | 0.038 |
| Satisfaction with all care during labour and birth (17) | 5.1 (1.29) | 4.7 (1.34) | 0.3(-0.04 to 0.68) | 0.5(0.18 to 0.83) | 0.006 |
| Satisfaction with care and advice related to baby after birth (5) | 4.8 (1.23) | 4.1 (1.44) | 0.7(0.41 to 1.01) | 0.8(0.44 to 1.21) | <0.0001 |
| Satisfaction with care related to yourself after birth (9) | 5.0 (1.07) | 4.3 (1.1) | 0.8(0.37 to 1.11) | 0.8(0.44 to 1.08) | <0.0001 |
| Satisfaction with all care after birth (21) | 5.0 (1.04) | 4.2 (1.14) | 0.8(0.46 to 1.08) | 0.8(0.50 to 1.19) | <0.0001 |

**100 women in each group, no missing except two women who gave birth under transportation in the group receiving midwife led care did not report satisfaction with care during labour and birth ** Mean(SD) sum-score is calculated from the 1-7 likert scale where 1 means very low satisfaction and 7 means very high ***BCa estimates with 95% confidence intervals, analysed by bootstrapping linear regression, adjusted for place of birth (private or governmental hospital), Number in bracelets reflects the number of questions included in the sum-score.*

## Breastfeeding

As the interview was done at an approximately equal timepoint of median 16 weeks after birth in both groups we compared the proportion of women who were still breastfeeding. Most women were still breastfeeding at this timepoint, respectively 96% receiving midwife-led care and 88% receiving regular care (table 4). Of these a statistically significant higher rate of

women receiving midwife-led care were still exclusively breastfeeding, 67% versus 46%. After adjusting for age, parity and number of weeks since birth the difference was still statistically significant with an adjusted odds ratio of 2.56 (95% CI 1.35 – 4.89) p=0.004. Only three women in the control group had never breastfed, and none in the midwife-led group.

**Table 4** Breastfeeding practice

| | Midwife-led care* | Regular care* | Difference between groups** OR(95%CI) | Adj. OR(95%CI) | Adj. p-value |
|---|---|---|---|---|---|
| Still exclusively breastfeeding | 67% | 46% | 2.38(1.34 to 4.23) | 2.56(1.35 - 4.88 | 0.004 |
| Still breastfeeding (exclusively and partly) | 96% | 88% | 3.27(1.02 to 10.52) | 2.76(0.84 - 9.09) | 0.096 |
| Never breastfed | 0 | 3% | | | 0.246 |

*100 women answered, no missing ** Odds ratio (OR) with 95% confidence intervals from binary logistic regression analysis, adjusted for age, parity and timepoint of interview/weeks since birth, regular care was set as reference

## Continuity measures

Investigating the midwife-led continuity model's actual continuity with care from the same midwife through the continuum, we found that 23% of the women received care from their antenatal-midwife during labour, and 34% received care from her at the hospital's postnatal ward. Of the 100 women, 69% received home-visit from their antenatal-midwife, while 7% received home-visits from the nurse who they also knew from the clinic. As many as 17% met their antenatal-midwife through the whole continuum of antenatal, intrapartum and postnatal period, while 8% did not receive care from their antenatal-midwife elsewhere.

| Table 5 Continuity measures (n=100) | % |
|---|---|
| Number who met their ANC-midwife during labour | 23 |
| Number who met their ANC-midwife at hospital's postnatal ward | 34 |
| Number who met their ANC-midwife at home-visit | 69 |
| Number who met their ANC-midwife through the whole continuum | 17 |
| Number who only met their midwife in ANC | 8 |
| Numbers of meetings with the same provider | 8 (7-9)* |

*n=number of women, only from the group receiving midwife led care, *median (IQR)*

## Women's recommendations

Free text recommendations to improve governmental services were recorded from 101 women, mainly from the group receiving regular care. The main recommendations from

women were to allow having a companion with them during labour and birth, to provide human, respectful and sensitive care during labour and birth, and to implement an appointment system for the antenatal visits.

## DISCUSSION

Compared with regular care, the midwife-led model was associated with a higher sum-score of satisfaction with care through the continuum of antenatal, intrapartum and postpartum period. The highest satisfaction reported in both groups, were with care during pregnancy, where the mean sum-score differed least. The difference between groups during pregnancy was most prominent related to satisfaction with being involved and the emotional support from the midwives. The general high satisfaction with pregnancy care could be explained by that this period is less demanding and stressful for most women and recall bias might have influenced.

Care during labour and birth was presented with the lowest satisfaction scores in both groups. This is not surprising considering the overcrowded and understaffed environment in the government hospitals labour wards, as previously described by other studies from Palestine.[15,16] Another important explanation could be the statement from a clear majority of women in both groups: "I wish someone from my family could accompany me during labour and birth". The request of having a companion during labour was confirmed by the women's main recommendation. The value of a companion is important to improve birth outcomes and improve women's birth experiences.[21] WHO recommends that health facilities gives every woman the option to experience labour with a companion of her choice.[22] Nevertheless, knowing a midwife at the labour ward seemed to influence the difference between the two groups' satisfaction with care during labour and birth, a difference that increased after adjusting for the subgroup of women who gave birth in private hospitals. Interestingly, the difference in satisfaction with care from doctors also increased to a significant level after this adjustment. This suggests that the enhanced relation between the woman and her midwife also seemed to reduce the alienation to doctors. An important contextual question revealed that women receiving the midwife-led model were less afraid of being stopped at Israeli military checkpoints on their way from the village to hospital. This reduced anxiety could be related to that women's relation with their midwife made them feel safer, also knowing they could call their midwife in an emergency. The increased satisfaction with care during the intrapartum period among women receiving midwife-led care, could reasonably be explained by that nearly a quarter was cared for during labour by the midwife they knew. The relational

continuity seemed to enhance women's perception of receiving respectful care during labour and birth. The most prominent difference between the two groups' satisfaction was with care during postpartum period, despite the exclusion of the high score of satisfaction with care related to home-visits. The highest difference between the groups was seen in satisfaction with care at the postnatal ward and could be explained by the high number who met their midwife from pregnancy there. The difference between the group's satisfaction with care in this study seems to be less prominent compared to studies of satisfaction with continuity models of care in high income countries.[19] Nevertheless, this study confirms the general findings of improved satisfaction with midwife-led continuity models of care.[8,19,23-25]

The results from this study also demonstrate an association between receiving the midwife-led model of care and increased duration of exclusive breastfeeding. The midwife-led model provided continuity with breastfeeding information and support during pregnancy and after birth in hospital and home-visits. McFadden *et al.* concluded in a systematic review that predictable, standard breastfeeding support during antenatal and/or postnatal care, tailored to women's needs and given face to face, seem to increase duration of exclusive breastfeeding.[26] Continuous postnatal breastfeeding support is also recommended.[27] Exclusive breastfeeding up to six month in life is considered an important protection against infections, malocclusions, and breastfeeding have in general several long term health benefits both for women and their children.[28]

Although midwives were prevented from being on call, a high number of women receiving the midwife-led model were cared for during labour and at the postnatal ward by the midwife they knew. The high rate of continuity was possible because all midwives worked full time at the hospital beside their outreaching program once a week.

This study implies that midwife-led continuity contributes to sustainable improvements within a system with limited resources, enabling midwives to improve quality of care to vulnerable women in their own population. The experience and findings from this implementation are an important contribution to reach the UN sustainable development goal number three towards 2030, promising good health and wellbeing for all.[29]

### Limitations and strengths

The main limitation of this study is the observational, retrospective design comparing groups with potential unmeasured confounders. Because the model had already been implemented randomization was not possible. It would have been an advantage to know village of origin

and in which governmental hospital the women gave birth, as it could represent potential bias. However, the women in both groups represented a quite similar rural population from villages in different regions in the West Bank.

Investigating such complex and sensitive outcomes of an implementation in a low-middle income setting is the main strength of this study. The pragmatic and novel approach, adapting the model to the Palestinian context and implementing it within the public health system provided a unique experience of how midwife-led continuity of care can work in a low-middle income setting. Engagement from local midwives, nurses and doctors who have been deeply involved in developing and adapting the model to the context, facilitated anchoring the model in the Palestinian public health system. The model was implemented with Norwegian funding in six governmental hospitals and 37 villages in the West Bank, but since February 2017 it has been administrated and sustained by the Palestinian Ministry of Health.[30] A strength of the study is the focus on satisfaction with care provided to the poorer part of the population, who are in most need of quality improvements. Another strength is the comprehensive questionnaire with a Likert scale used in previous studies that measured satisfaction with midwife-led continuity models, using the recommended focus on women's satisfaction with process of care and interpersonal behaviour throughout the continuum.[5,13,19,23]

## Conclusion

This study has investigated a midwife-led continuity model of care that has been adapted to a low-middle-income setting under long-term military occupation. The findings indicate that midwife-led continuity of care is associated with improved satisfaction with care also in such settings. There are increased user expectations for qualitative and safe care in low and middle-income countries, including respectful and sensitive care.[9,31] Further qualitative research could investigate how and why women find this model useful. There is a high potential to improve quality of maternal care in Palestine, by increasing number of midwives, by introducing more privacy in the labour ward to facilitate that women can experience labour with a companion of their choice, and by introducing midwife-led continuity of care to more women.

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## Contributors

BM was involved with the Implementation, study design, preparation of data collection, data analysis, data interpretation and writing. LMD was involved with study design, data analysis and writing. MiL was involved with study design, data interpretation and writing. MaL was involved with study design, data interpretation and writing. ID and DE were involved with the data collection and data interpretation. EF was involved in study design, data collection, data analysis, data interpretation and writing. BM drafted the article and tables. All authors have reviewed and approved the final manuscript. The corresponding author had full access to all the data in the study and had final responsibility for the decision to submit for publication.

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**Competing interests** EF is director of NORWAC. BM were partly employed by NORWAC until February 2017 as project manager for implementing the model.

## Ethics approval

The study was approved by the Norwegian Regional Committee for Medical Health research Ethics South East (REK) id number: 2015/1235. It was also approved by the Palestinian Ministry of Health.

## Data sharing statement

Data can be shared upon request to the first author

## References


1. Miller S, Abalos E, Chamillard M, et al. Beyond too little, too late and too much, too soon: a pathway towards evidence-based, respectful maternity care worldwide. *Lancet* 2016; **388**(10056): 2176-92.
2. Geller SE, Koch AR, Garland CE, MacDonald EJ, Storey F, Lawton B. A global view of severe maternal morbidity: moving beyond maternal mortality. *Reprod Health* 2018; **15**(Suppl 1): 98.
3. Bohren MA, Vogel JP, Hunter EC, et al. The mistreatment of women during childbirth in health facilities globally: a mixed-methods systematic review. *PLoS Med* 2015; **12**.
4. Lukasse M, Schroll AM, Karro H, et al. Prevalence of experienced abuse in healthcare and associated obstetric characteristics in six European countries. *Acta Obstet Gyn Scan* 2015; **94**(5): 508-17.
5. Srivastava A, Avan BI, Rajbangshi P, Bhattacharyya S. Determinants of women's satisfaction with maternal health care: a review of literature from developing countries. *BMC Pregnancy Childbirth* 2015; **15**: 97.
6. Sando D, Abuya T, Asefa A, et al. Methods used in prevalence studies of disrespect and abuse during facility based childbirth: lessons learned. *Reprod Health* 2017; **14**(1): 127.
7. World Health Organisation. WHO recommendations on antenatal care for a positive pregnancy experience. http://apps.who.int/iris/bitstream/10665/250796/1/9789241549912-eng.pdf?ua=1 World Health Organization; 2016. p. 152.
8. Sandall J, Soltani H, Gates S, Shennan A, Devane D. Midwife-led continuity models versus other models of care for childbearing women. *Cochrane Database Syst Rev* 2016; **4**: CD004667.
9. Van Lerberghe W, Matthews Z, Achadi E, et al. Country experience with strengthening of health systems and deployment of midwives in countries with high maternal mortality. *Lancet* 2014; **384**(9949): 1215-25.
10. Nair M, Yoshida S, Lambrechts T, et al. Facilitators and barriers to quality of care in maternal, newborn and child health: a global situational analysis through metareview. *Bmj Open* 2014; **4**(5): e004749.
11. Homer CS, Friberg IK, Dias MA, et al. The projected effect of scaling up midwifery. *Lancet* 2014; **384**(9948): 1146-57.
12. Homer C, Brodie P, Leap N. Midwifery continuity of care : a practical guide. Sydney ; New York: Churchill Livingstone/Elsevier; 2008.
13. Perriman N, Davis D. Measuring maternal satisfaction with maternity care: A systematic integrative review: What is the most appropriate, reliable and valid tool that can be used to measure maternal satisfaction with continuity of maternity care? *Women Birth* 2016; **29**(3): 293-9.
14. Wick L, Mikki N, Giacaman R, Abdul-Rahim H. Childbirth in Palestine. *Int J Gynaecol Obstet* 2005; **89**(2): 174-8.
15. Rahim HF, Wick L, Halileh S, et al. Maternal and child health in the occupied Palestinian territory. *Lancet* 2009; **373**(9667): 967-77.
16. Giacaman R, Abu-Rmeileh NM, Wick L. The limitations on choice: Palestinian women's childbirth location, dissatisfaction with the place of birth and determinants. *Eur J Public Health* 2007; **17**(1): 86-91.
17. Mortensen B, Lukasse M, Diep LM, et al. Can a midwife-led continuity model improve maternal services in a low-resource setting? A non-randomised cluster intervention study in Palestine. *Bmj Open* 2018; **8**(3): e019568.

18. Mortensen B. To be veiled or not to be - what unites is the question, Experiences from a continuity of Midwifery Care Model in Palestine and Norway. Master's thesis. Bodø, Norway: University of Nordland; 2011. p. 121.
19. Forster DA, McLachlan HL, Davey MA, et al. Continuity of care by a primary midwife (caseload midwifery) increases women's satisfaction with antenatal, intrapartum and postpartum care: results from the COSMOS randomised controlled trial. *BMC Pregnancy Childbirth* 2016; **16**: 28.
20. Waldenstrom U, Rudman A. Satisfaction with maternity care: how to measure and what to do. *Womens Health (Lond)* 2008; **4**(3): 211-4.
21. Bohren MA, Hofmeyr GJ, Sakala C, Fukuzawa RK, Cuthbert A. Continuous support for women during childbirth. *Cochrane Database Syst Rev* 2017; **7**: CD003766.
22. World Health Organisation. Standards for improving quality of maternal and newborn care in health facilities. http://apps.who.int/iris/bitstream/10665/249155/1/9789241511216-eng.pdf?ua=1 WHO; 2016.
23. Waldenstrom U, Brown S, McLachlan H, Forster D, Brennecke S. Does team midwife care increase satisfaction with antenatal, intrapartum, and postpartum care? A randomized controlled trial. *Birth* 2000; **27**(3): 156-67.
24. Fereday J, Collins C, Turnbull D, Pincombe J, Oster C. An evaluation of Midwifery Group Practice. Part II: women's satisfaction. *Women Birth* 2009; **22**(1): 11-6.
25. Harvey S, Rach D, Stainton MC, Jarrell J, Brant R. Evaluation of satisfaction with midwifery care. *Midwifery* 2002; **18**(4): 260-7.
26. McFadden A, Gavine A, Renfrew MJ, et al. Support for healthy breastfeeding mothers with healthy term babies. *Cochrane Database Syst Rev* 2017; **2**: CD001141.
27. Zhang Z, Zhu Y, Zhang L, Wan H. What factors influence exclusive breastfeeding based on the theory of planned behaviour. *Midwifery* 2018; **62**: 177-82.
28. Victora CG, Bahl R, Barros AJ, et al. Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect. *Lancet* 2016; **387**(10017): 475-90.
29. ten Hoope-Bender P, Lopes ST, Nove A, et al. Midwifery 2030: a woman's pathway to health. What does this mean? *Midwifery* 2016; **32**: 1-6.
30. Mortensen B. Palestinian Midwives on the Front Line. *Journal of Middle East Women's Studies* 2018; **14**(3): 379-83.
31. ten Hoope-Bender P, de Bernis L, Campbell J, et al. Improvement of maternal and newborn health through midwifery. *Lancet* 2014; **384**(9949): 1226-35.

# Women`s satisfaction of care through the continuum of pregnancy, birth and postnatal period

Side 1

## Consent and general information

- **I read the information sheet about the study, I registered at a Governmental clinic during pregnancy, my last pregnancy was singleton and I wish to participate** *

Yes
No

Dette elementet vises dersom et av følgende alternativer er valgt på spørsmål «I read the information sheet about the study, I registered at a Governmental clinic during pregnancy, my last pregnancy was singleton and I wish to participate»: Yes

- **What type of care were you offered at the local Governmental clinic?** *

Intervention: Continuity of Midwifery Care Model: care from a midwife also employed at the local hospital.
Control: Regular care from staff emplyed at the clinic

Dette elementet vises dersom et av følgende alternativer er valgt på spørsmål «I read the information sheet about the study, I registered at a Governmental clinic during pregnancy, my last pregnancy was singleton and I wish to participate»: Yes

- **If you had regular care, who provided care for you?**

Staff nurse
Practical nurse
Health worker
Male doctor
Female doctor
Midwife
I don`t know
Other

Dette elementet vises dersom et av følgende alternativer er valgt på spørsmål «I read the information sheet about the study, I registered at a Governmental clinic during pregnancy, my last pregnancy was singleton and I wish to participate»: Yes

- **Where did you receive care during pregnancy from others than governmental facilities? ***

  - [ ] UNRWA
  - [ ] Private doctor
  - [ ] NGO
  - [ ] Only Governmental
  - [ ] Other

## Demographic and social information

Dette elementet vises dersom et av følgende alternativer er valgt på spørsmål «I read the information sheet about the study, I registered at a Governmental clinic during pregnancy, my last pregnancy was singleton and I wish to participate»: Yes

- How old are you? *

Dette elementet vises dersom et av følgende alternativer er valgt på spørsmål «I read the information sheet about the study, I registered at a Governmental clinic during pregnancy, my last pregnancy was singleton and I wish to participate»: Yes

- What was your age when you got married? *

Dette elementet vises dersom et av følgende alternativer er valgt på spørsmål «I read the information sheet about the study, I registered at a Governmental clinic during pregnancy, my last pregnancy was singleton and I wish to participate»: Yes

- What was your age first time you gave birth? *

Dette elementet vises dersom et av følgende alternativer er valgt på spørsmål «I read the information sheet about the study, I registered at a Governmental clinic during pregnancy, my last pregnancy was singleton and I wish to participate»: Yes

- **What is the highest level of education you have completed? ***

  - ( ) Primary school
  - ( ) High School
  - ( ) Diploma 2 years after High school
  - ( ) Bachelor
  - ( ) Master
  - ( ) Phd
  - ( ) Other

- If other, what kind of education?

Dette elementet vises dersom et av følgende alternativer er valgt på spørsmål «I read the information sheet about the study, I registered at a Governmental clinic during pregnancy, my last pregnancy was singleton and I wish to participate»: Yes

- **Are you a paid employee? ***

  - Yes, full time
  - Yes, part time
  - No

- **Does your husband have a paid work? ***

  - Yes, regularly
  - Yes, now and then
  - No

- **Does your husband have a job requiring living outside home for longer periods?**

  - Yes
  - No

- **Where does your parents live? ***

  - In the same village/town as me
  - In another neighboring village
  - In another town in the West Bank
  - Outside West Bank

## Reproductive information

- How many pregnancies did you have that went beyond 6 months? *
- How many live born children do you have? *
- If you experienced stillbirth, how many times? *
- How many pregnancies did you have without pregnancy care at all? *

## Health information about you last pregnancy, birth and postnatal period

- How many weeks is it since your last birth? *

- At which pregnancy week did you register at the Governmental clinic? *
- How many pregnancy-visits did you have at the Governmental clinic last pregnancy? *

- **Do you smoke ***

  - [ ] No, never
  - [ ] Yes, cigarettes now and then
  - [ ] Yes, cigarettes daily
  - [ ] Yes, Argile (water-pipe) now and then
  - [ ] Yes, Argile (Water-pipe) daily

- **Mark if you experience any of the following complications during last pregnancy? ***

  - [ ] Anemia Hb 9 or less
  - [ ] Pre-eclampsia
  - [ ] Eclampsia
  - [ ] Placenta Previa
  - [ ] Vaginal bleeding
  - [ ] Reduced fetal growth
  - [ ] Gestational diabetes
  - [ ] Previous cesarean section
  - [ ] Pelvic pain
  - [ ] Violations in the home
  - [ ] Violations from occupation soldiers/settlers
  - [ ] Rhesus negative blood type.
  - [ ] Vomiting causing hospitalization
  - [ ] Other
  - [ ] I had had no complications during pregnancy

- If other, describe short what kind of pregnancy complications?
- How often did a doctor do the pregnancy check-ups in the governmental clinic? *
- How many pregnancy-visits did you have to a private doctor during last pregnancy? *
- If you used private doctor in addition to Governmental clinic, describe short why you choose to use both:

- **Where you referred to high risk care clinic, hospital or specialist doctor during pregnancy? ***

  - Yes, once
  - Yes, more than once
  - Yes, I was referred but I was not able to go
  - No, I was not referred

- **Mark if you experience any of the following complications during last birth? ***

  - Birth during transportation
  - Instrumental delivery: vacuum
  - Instrumental delivery: forceps
  - Hemorrhage - severe bleeding
  - Elective cesarean section
  - Eclampsia
  - Acute cesarean section
  - Premature birth before 37 weeks` pregnancy
  - Premature birth before 34 weeks` pregnancy
  - Premature birth before 30 weeks` pregnancy
  - other
  - I had no medical complications during birth

- If other, describe short what, And/or why cesarean section:

- **Did you experience any of the following complications related to YOURSELF after last birth? ***

  - I had anemia, 9 g/dl or less
  - I had Infection treated with antibiotics
  - Eclampsia
  - Perineal tears that caused much pain
  - Perineal tears causing infection and fever
  - Perineal tears that caused incontinence of faeces
  - Problems with breasts causing problems with breastfeeding
  - I had painful infection or problems with my breasts
  - Feeling so unhappy that I for days cried most of the time
  - Feeling so sad that harming myself sometimes occurred to me
  - other
  - No I had no complications after last birth

- If other explain in few words

- **Mark if your CHILD have any of the following complications after last birth? ***

  You can choose more than one alternative:

  - [ ] My child was transferred to intensive care after birth
  - [ ] My child had problems breathing that needed treatment
  - [ ] My child had problem sucking the breast
  - [ ] My child had jaundice that needed treatment
  - [ ] My child got infection treated with antibiotics
  - [ ] My child re-hospitalized after going home
  - [ ] My child had problems gaining weight
  - [ ] Other
  - [ ] My child had no complications

- If other, explain in few words:

- **Duration of breastfeeding your last child ***

  - ( ) I never breastfed my last child
  - ( ) I still breastfeed my child, without giving additional food/milk
  - ( ) I still breastfeed daily and also give additional food/milk
  - ( ) I stopped breastfeeding

- If you stopped breastfeeding, how many weeks did you breastfed your last child without giving additional food.

- **How often did you meet the same healthprovider from the Governmental clinic during the whole period of pregnancy, birth and postnatal period? ***

  - ( ) Two times
  - ( ) Three times
  - ( ) Four times
  - ( ) Five times
  - ( ) Six times
  - ( ) Seven times
  - ( ) Eight times
  - ( ) Nine times
  - ( ) More than nine times

- I met different people each time

- **If you met the same Governmental health provider more than once, please explain: ***

- I met the health provider from pregnancy during labour
- I met the health provider from pregnancy in postnatal ward at hospital
- I met the health provider from pregnancy postnatal home visit
- The person I met most times was the nurse
- The person I met most times was the Midwife
- The person I met most times was the doctor
- I don`t know the profession of the person I met most times

- **If you used the Governmental service less than four times during pregnancy, why?**

- No female doctor
- No midwife
- No regularity
- No ultrasound
- Bad quality
- Complicated to reach the clinic
- I don`t know
- Other

- If other, explain shortly:

## Your satisfaction of care during pregnancy

**Describe at what degree you were satisfied with the care you received from the Governmental clinic during pregnancy by choosing between 1 meaning that you totally disagree and 7 totally agree in the following statements:**

| | 1 Totally disagree | 2 | 3 | 4 | 5 | 6 | 7 Totally agree |
|---|---|---|---|---|---|---|---|
| At my pregnancy check-ups I was always asked whether I had any questions | | | | | | | |

| | 1 Totally disagree | 2 | 3 | 4 | 5 | 6 | 7 Totally agree |
|---|---|---|---|---|---|---|---|
| The midwives/nurses always kept me informed about what was happening related to my pregnancy | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| The doctor always kept me informed about what was happening related to my pregnancy | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I was always given an active say in decisions about my care in pregnancy | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I always felt my worries, anxieties or concerns about the pregnancy and the baby were taken seriously by the midwives/nurses | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I always felt my worries, anxieties or concerns about the pregnancy and the baby were taken seriously by the doctors | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| At my check-ups the midwives/nurses often seemed rushed and busy | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| At my check-ups the doctors often seemed rushed and busy | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Care in pregnancy was provided in a competent way | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I was happy with the emotional support I received in in | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

| | 1 Totally disagree | 2 | 3 | 4 | 5 | 6 | 7 Totally agree |
|---|---|---|---|---|---|---|---|
| pregnancy from midwives/nurses | | | | | | | |

| | 1 Totally disagree | 2 | 3 | 4 | 5 | 6 | 7 Totally agree |
|---|---|---|---|---|---|---|---|
| I was happy with the emotional support I received in in pregnancy from doctors | | | | | | | |
| I was happy with the physical care I received in pregnancy from midwives/nurses | | | | | | | |
| I was happy with the physical care I received in pregnancy from doctors | | | | | | | |
| My privacy was very well respected and taken care of from midwives/nurses | | | | | | | |
| I was afraid that I would have problems to reach pregnancy care because of occupation soldiers or settlers | | | | | | | |
| Describe your overall satisfaction with the care you received during last pregnancy at the MOH clinic (1 is very bad and 7 in very good) | | | | | | | |

## Your satisfaction of care during birth

- **Where did you give birth? ***

Governmental hospital

- Private hospital
- UNRWA hospital
- PRCS hospital
- Israeli hospital
- Under transportation (car)
- Ambulance
- Other

- If other, where?

**Describe at what degree you were satisfied with the care you received at hospital during labour and birth by choosing between 1 meaning that you totally disagree and 7 totally agree in the following statements:**

| | 1 I totally disagree | 2 | 3 | 4 | 5 | 6 | 7 I totally agree |
|---|---|---|---|---|---|---|---|
| The midwifes always kept me informed about what was happening during birth | | | | | | | |
| The doctors always kept me informed about what was happening during birth | | | | | | | |
| I was always given an active say in decisions about my care during labour and birth | | | | | | | |
| The midwives were encouraging | | | | | | | |
| The doctors were encouraging | | | | | | | |
| The midwives provided reassurance if I needed it | | | | | | | |
| The doctors provided reassurance if I needed it | | | | | | | |

| | 1 I totally disagree | 2 | 3 | 4 | 5 | 6 | 7 I totally agree |
|---|---|---|---|---|---|---|---|
| I felt nobody really cared for me during labour and birth | | | | | | | |
| I was happy with the emotional support I received from the midwives | | | | | | | |
| I was happy with the emotional support I received from the doctors | | | | | | | |

| | 1 I totally disagree | 2 | 3 | 4 | 5 | 6 | 7 I totally agree |
|---|---|---|---|---|---|---|---|
| Care during labour and birth was provided in a professional way | | | | | | | |
| I wish someone from my family could accompany me during labour and birth | | | | | | | |
| My privacy was well respected during labour and birth | | | | | | | |
| I felt badly treated by the midwives during labour and birth | | | | | | | |
| I felt badly treated by the doctors during labour and birth | | | | | | | |
| When labour started I was afraid that I would not reach hospital because of the military checkpoints and occupation soldiers or settlers | | | | | | | |

| | 1 I totally disagree | 2 | 3 | 4 | 5 | 6 | 7 I totally agree |
|---|---|---|---|---|---|---|---|
| Overall, how would you describe the care you received in labour and birth (1 very poor, 7 very good | | | | | | | |

## Your satisfaction with the care you received after birth

- How many hours did you spend in hospital after your last birth? *
- What was the birth-weight of your last child? *

**Describe at what degree you were satisfied with the care you received after birth in the hospital choosing between 1 meaning you totally disagree and 7 totally agree in the following statements:**

| | 1 I Totally disagree | 2 | 3 | 4 | 5 | 6 | 7 I Totally agree |
|---|---|---|---|---|---|---|---|
| I was given the advice I needed with breastfeeding at hospital | | | | | | | |
| I was given the advice I needed about how to handle, settle or look after my baby in the hospital | | | | | | | |
| I was given the advice I needed about any problems with the baby`s health and progress in the hospital | | | | | | | |
| I was given the advice I needed in hospital about my | | | | | | | |

| | 1 I Totally disagree | 2 | 3 | 4 | 5 | 6 | 7 I Totally agree |
|---|---|---|---|---|---|---|---|
| own health and recovery in after birth | | | | | | | |
| Care after birth in hospital was provided in a competent way | | | | | | | |
| Midwives in hospital were supportive after birth | | | | | | | |
| Doctors in hospital were supportive after birth | | | | | | | |
| I was happy by the emotional support from midwives after birth in hospital | | | | | | | |
| My privacy was taken good care of at the hospital after birth | | | | | | | |
| Overall, how would you describe the care you received in hospital after birth (1 is very poor and 7 is very good) | | | | | | | |

- **From where did you receive care for yourself and your baby after leaving hospital? ***

You can choose more than one alternative:

- [ ] Governmental clinic
- [ ] Governmental home-visit
- [ ] UNRWA clinic
- [ ] Private doctor
- [ ] NGO clinic
- [ ] Only family cared for me, the baby got vaccination
- [ ] No one cared for me, they only cared for the baby
- [ ] Home-visit from UNRWA/NGO

☐ Other

- If other, from whom did you receive care?

- **Who did the home-visit after birth? ***

  - ○ My midwife from pregnancy care
  - ○ The nurse from the clinic
  - ○ The doctor
  - ○ My midwife from pregnancy and the nurse from the clinic
  - ○ Other
  - ○ I had no home visit

- If other, who did the home visit?

- How many home visits did you receive?

- How many days after birth did you receive home visit?

If you received home visit after birth:

**Describe at what degree you were satisfied with the care you received after birth in your home choose between 1 meaning you totally disagree and 7 totally agree in the following statements:**

Dette elementet vises dersom et av følgende alternativer er valgt på spørsmål «From where did you receive care for yourself and your baby after leaving hospital?»: Governmental homevisit

| | 1 Totally disagree | 2 | 3 | 4 | 5 | 6 | 7 Totally agree |
|---|---|---|---|---|---|---|---|
| During the home visit the midwife/nurse gave me the advice I needed with breastfeeding | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| During home visit I was given the advice I needed to handle and look after my baby | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

| | 1 Totally disagree | 2 | 3 | 4 | 5 | 6 | 7 Totally agree |
|---|---|---|---|---|---|---|---|
| During the home visit I was given the advice I needed to look after my own health and recovery after birth | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I got enough time to ask all the questions I had during home visit | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I receive helpful information about family planning during the home visit | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I was happy for the emotional support I received from the midwife/nurse during home visit | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Overall, how would you describe the care you received for yourself at home visit (1 means very bad and 7 means very good) | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Overall, how would you describe the care your baby received at home visit (1 means very bad and 7 means very good) | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

| | yes | no | I don`t know |
|---|---|---|---|
| If you did not receive home visit after birth, would you like to have had the possibility | ○ | ○ | ○ |

**Describe at what degree you were satisfied with the care you received after birth in the Governmental clinic, choose between 1 meaning you totally disagree and 7 totally agree in the following statements:**

| | 1 Totally disagree | 2 | 3 | 4 | 5 | 6 | 7 Totally agree |
|---|---|---|---|---|---|---|---|
| I was given the advice I needed at the clinic about how to handle, settle or look after my baby | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| At the clinic I was given the advice I needed about any problems with the baby`s health and progress | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| At the clinic I was given the advice I needed about my own health and recovery after the birth | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| At the clinic, the nurse only had time to vaccinate the baby, no time for individual information | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| My privacy was taken good care of at the clinic | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I was happy for emotional support I received at the clinic after birth | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I received good advice regarding family planning and contraceptives at the clinic | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Overall, how would you describe the care your baby received at the clinic after birth | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

| | 1 Totally disagree | 2 | 3 | 4 | 5 | 6 | 7 Totally agree |
|---|---|---|---|---|---|---|---|
| (1 is very bad and 7 is very good) | | | | | | | |
| Overall, how would you describe the care you received for yourself at the clinic after birth (1 is very bad and 7 is very good) | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

| | 1 Very bad | 2 | 3 | 4 | 5 | 6 | 7 Very good |
|---|---|---|---|---|---|---|---|
| Overall how satisfied were you with all care after birth that you received from Government services on a scale from 1 (Very bad) to 7 (very good)? | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

| | 1 Very bad | 2 | 3 | 4 | 5 | 6 | 7 Very good |
|---|---|---|---|---|---|---|---|
| Overall how satisfied were you with the total Governmental services on a scale from 1 (very bad) to 7 (very good) | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

- Do you have any recommendations to improve the Governmental service?

Thank you very much for your participation, your answers will guide us to develop the future services.

Nettskjema v81.1

**Supplementary file 2 Original Likert scales**
**Satisfaction with care**

| Satisfaction with care during pregnancy | Midwife-led care | Regular care | Adj.Mean difference | 95%CI | adj.p value |
|---|---|---|---|---|---|
| At my pregnancy check-ups I was always asked whether I had any questions | 5.61(1.54) | 4.55(2.19) | 1.06 | 0.54 to 1.59 | <0.001 |
| The midwives/nurses always kept me informed about what was happening related to my pregnancy | 6.10(1.24) | 5.53(1.77) | 0.54 | 0.12 to 0.95 | 0.014 |
| The doctor always kept me informed about what was happening related to my pregnancy | 5.13(1.67) | 5.06(1.90) | -0.004 | -0.52 to 0.48 | 0.982 |
| I was always given an active say in decisions about my care in pregnancy | 4.40(1.84) | 4.31(2.06) | 0.08 | -0.45 to 0.65 | 0.768 |
| I always felt my worries, anxieties or concerns about the pregnancy and the baby were taken seriously by the midwives/nurses | 5.90(1.44) | 5.57(1.59) | 0.34 | -0.10 to 0.76 | 0.123 |
| I always felt my worries, anxieties or concerns about the pregnancy and the baby were taken seriously by the doctors | 5.36(1.69) | 5.15(1.87) | 0.20 | -0.34 to 0.69 | 0.461 |
| At my check-ups the midwives/nurses often seemed rushed and busy | 1.30(1.02) | 2.18(1.89) | -0.88 | -1.32 to -0.47 | <0.001 |
| At my check-ups the doctors often seemed rushed and busy | 2.03(1.90) | 2.38(2.10) | -0.33 | -0.90 to 0.25 | 0.246 |
| Care in pregnancy was provided in a competent way | 5.24(1.33) | 5.42(1.49) | -0.19 | -0.58 to 0.21 | 0.336 |
| I was happy with the emotional support I received in in pregnancy from midwives/nurses | 6.11(1.20) | 5.19(1.84) | 0.92 | 0.46 to 1.33 | <0.001 |
| I was happy with the emotional support I received in in pregnancy from doctors | 5.22(1.64) | 4.76(2.1) | 0.40 | -0.17 to 0.93 | 0.154 |
| I was happy with the physical care I received in pregnancy from midwives/nurses | 5.98(1.30) | 5.72(1.77) | 0.26 | -0.17 to 0.67 | 0.234 |
| I was happy with the physical care I received in pregnancy from doctors | 5.45(1.74) | 5.36(2.01) | 0.03 | -0.56 to 0.53 | 0.906 |

| | | | | | |
|---|---|---|---|---|---|
| My privacy was very well respected and taken care of from midwives/nurses | 6,58(0.89) | 6.43(1.01) | 0.26 | -0.17 to 0.67 | 0.234 |
| I was afraid that I would have problems to reach pregnancy care because of occupation soldiers or settlers | 1.03(0,30) | 1.14(0,87) | -0.10 | -0.31 to 0.06 | 0.275 |
| Describe your overall satisfaction with the care you received during last pregnancy at the MOH clinic | 5.57 | 5.38 | 0.16 | -0.18 to 0.46 | 0.335 |
| **Satisfaction with care during labour and birth** | | | | | |
| The midwifes always kept me informed about what was happening during labour and birth | 5.29(1.89) | 4.84(2.04) | 0.62 | 0.06 to 1.18 | 0.030 |
| The doctors always kept me informed about what was happening during labour and birth | 4.60(1.93) | 4.29(1.89) | 0.52 | -0.09 to 1.10 | 0.099 |
| I was always given an active say in decisions about my care during labour and birth | 3.91(2.05) | 3.8(2.24) | 0.49 | -0.11 to 1.07 | 0.103 |
| The midwives were encouraging | 5.27(1.99) | 4.94(1.14) | 0.56 | -0.05 to 1.15 | 0.067 |
| The doctors were encouraging | 4.70(2.02) | 4.44(2.35) | 0.46 | -0.18 to 1.12 | 0.166 |
| The midwives provided reassurance if I needed it | 5.41(2.13) | 4.85(2.12) | 0.79 | 0.19 to 1.39 | 0.010 |
| The doctors provided reassurance if I needed it | 4.79(2.18) | 4.32(2.36) | 0.73 | 0.10 to 1.37 | 0.027 |
| I felt nobody really cared for me during labour and birth | 2.51(2.24) | 2.54(2.22) | -0.29 | -0.93 to 0.33 | 0.363 |
| I was happy with the emotional support I received from the midwives | 5.19(2.14) | 4.67(2.22) | 0.79 | 0.18 to 1.39 | 0.013 |
| I was happy with the emotional support I received from the doctors | 4.52(2.08) | 4.32(2.36) | 0.47 | -0.17 to 1.11 | 0.158 |
| Care during labour and birth was provided in a professional way | 4.72(1.85) | 4.83(1.94) | 0.10 | -0.43 to 0.64 | 0.704 |
| I wish someone from my family could accompany me during labour and birth | 6.05(1.82) | 5.99(2.19) | 0.03 | -0.56 to 0.64 | 0.914 |

| | | | | | |
|---|---|---|---|---|---|
| My privacy was well respected during labour and birth | 6.00(1.49) | 5.23(1.96) | 1.00 | 0.52 to 1.50 | <0.001 |
| I felt abused from the midwives during labour and birth | 1.55(1.55) | 1.91(1.89) | -0.56 | -1.08 to -0.07 | 0.031 |
| I felt abused from the doctors during labour and birth | 1.51(1.47) | 1.68(1.72) | -0.33 | -0.85 to 0.13 | 0.168 |
| When labour started I was afraid that I would not reach hospital because of the military checkpoints and occupation soldiers or settlers | 1.36(1.36) | 2.24(2.15) | -0.79 | -1.34 to -0.24 | 0.008 |
| Overall, how would you describe the care you received in labour and birth (1 very poor, 7 very good | 5.14(1.53) | 4.88(1.75) | 0.51 | 0.06 to 0.98 | 0.028 |
| **Satisfaction during postnatal hospital stay** | | | | | |
| I was given the advice I needed with breast feeding at hospital | 4.48(2.24) | 3.19(2.30) | 1.35 | 0.69 to 2.19 | <0.001 |
| I was given the advice I needed about how to handle, settle or look after my baby in the hospital | 4.28(2.19) | 2.68(2.27) | 1.68 | 1.03 to 2.43 | <0.001 |
| I was given the advice I needed about any problems with the baby`s health and progress in the hospital | 4.45(2.24) | 2.83(2.29) | 1.72 | 1.02 to 2.53 | <0.001 |
| I was given the advice I needed in hospital about my own health and recovery in after birth | 4.37(2.33) | 3.03(2.20) | 1.42 | 0.78 to 2.11 | <0.001 |
| Care after birth in hospital was provided in a competent way | 4.81(1.87) | 3.69(1.99) | 1.20 | 0.61 to 1.88 | <0.001 |
| Midwives in hospital were supportive after birth | 5.48(1.85) | 4.05(2.12) | 1.52 | 0.92 to 2.17 | <0.001 |
| Doctors in hospital were supportive after birth | 4.701.87) | 3.25(2.30) | 1.53 | 0.90 to 2.26 | <0.001 |
| I was happy by the emotional support from midwives after birth in hospital | 5.42(1.95) | 3.68(2.16) | 1.81 | 1.19 to 2.47 | <0.001 |
| My privacy was taken good care of at the hospital after birth | 6.21(1.16) | 4.89(2.03) | 1.38 | 0.89 to 1.99 | <0.001 |

| | | | | | |
|---|---|---|---|---|---|
| Overall, how would you describe the care you received in hospital after birth (1 is very poor and 7 is very good) | 5.01(1.52) | 4.1(1.85) | 0.98 | 0.49 to 1.57 | <0.001 |
| **Satisfaction with care received from Governmental clinic after birth** | | | | | |
| I was given the advice I needed at the clinic about how to handle, settle or look after my baby | 4.83(1.84) | 4.37(2.21) | 0.49 | -0.10 to 1.04 | 0.097 |
| At the clinic I was given the advice I needed about any problems with the baby`s health and progress | 5.06(1.58) | 4.61(2.04) | 0.49 | -0.03 to 1.05 | 0.060 |
| At the clinic I was given the advice I needed about my own health and recovery after the birth | 4.38(2.00) | 4.03(2.27) | 0.35 | -0.25 to 0.94 | 0.244 |
| At the clinic the nurse only had time to vaccinate the baby, no time for individual information | 2.54(2.07) | 2.10(1.93) | 0.83 | -0.18 to 0.90 | 0.185 |
| My privacy was taken good care of at the clinic | 5.98(1.12) | 6.03(1.14) | -0.04 | -0.38 to 0.32 | 0.803 |
| I was happy for emotional support I received at the clinic after birth | 4.95(1.83) | 5.09(1.72) | -0.12 | -0.63 to 0.37 | 0.641 |
| I received good advice regarding family planning and contraceptives at the clinic | 4.51(2.05) | 3.74(2.21) | 0.76 | 0.18 to 1.32 | 0.012 |
| Overall, how would you describe the care your baby received at the clinic after birth (1 is very bad and 7 is very good) | 5.43(1.2) | 5.80(1.01) | -0.34 | -0.67 to -0.02 | 0.032 |
| Overall, how would you describe the care you received for yourself at the clinic after birth (1 is very bad and 7 is very good) | 4.61(1.44) | 4.79(1.15) | -0.17 | -0.60 to 0.24 | 0.447 |
| Overall how satisfied were you with all care after birth that you received from Government services | 4.79(1.15) | 4.93(1.14) | -0.12 | -0.46 to 0.19 | 0.460 |
| Overall how satisfied were you with the total Governmental services on a scale from 1 (very bad) to 7 (very good) | 5.04(1.35) | 4.88(1.15) | 0.16 | -0.19 to 0.51 | 0.366 |

| | |
|---|---|
| **Satisfaction during postnatal home visit** | |
| During the home visit the midwife/nurse gave me the advice I needed with breastfeeding | 5.91(1.42) |
| During home visit I was given the advice I needed to handle and look after my baby | 5.63(1.57) |
| During the home visit I was given the advice I needed to look after my own health and recovery after birth | 6.01(1.54) |

| | |
|---|---|
| I got enough time to ask all the questions I had during home visit | 5.51(1.37) |
| I receive helpful information about family planning during the home visit | 5.26(2.04) |
| I was happy for the emotional support I received from the midwife/nurse during home visit | 6.50(0.87) |
| Overall, how would you describe the care you received for yourself at home visit (1 means very bad and 7 means very good) | 6.05(0.98) |
| Overall, how would you describe the care your baby received at home visit (1 means very bad and 7 means very good) | 5.83(1.18) |

**STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *case-control studies***

| Section/Topic | Item # | Recommendation | Reported on page # |
|---|---|---|---|
| **Title and abstract** | 1 | (*a*) Indicate the study's design with a commonly used term in the title or the abstract | 3 |
| | | (*b*) Provide in the abstract an informative and balanced summary of what was done and what was found | 3 |
| **Introduction** | | | |
| Background/rationale | 2 | Explain the scientific background and rationale for the investigation being reported | 4 & 5 |
| Objectives | 3 | State specific objectives, including any prespecified hypotheses | 6 |
| **Methods** | | | |
| Study design | 4 | Present key elements of study design early in the paper | 3 & 6 |
| Setting | 5 | Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection | 6,7 & 8 |
| Participants | 6 | (a) Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls | 7 |
| | | (*b*) For matched studies, give matching criteria and the number of controls per case | |
| Variables | 7 | Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable | 8 |
| Data sources/ measurement | 8* | For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group | 7 & 8 |
| Bias | 9 | Describe any efforts to address potential sources of bias | 7 |
| Study size | 10 | Explain how the study size was arrived at | 6 |
| Quantitative variables | 11 | Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why | 8 |
| Statistical methods | 12 | (*a*) Describe all statistical methods, including those used to control for confounding | 8 & 9 |
| | | (*b*) Describe any methods used to examine subgroups and interactions | 8 |
| | | (*c*) Explain how missing data were addressed | - |
| | | (*d*) If applicable, explain how matching of cases and controls was addressed | - |
| | | (*e*) Describe any sensitivity analyses | - |
| **Results** | | | |

| | | | |
|---|---|---|---|
| Participants | 13* | (a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed | 9 & 10 |
| | | (b) Give reasons for non-participation at each stage | - |
| | | (c) Consider use of a flow diagram | - |
| Descriptive data | 14* | (a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders | 9 & 10 |
| | | (b) Indicate number of participants with missing data for each variable of interest | 9 & 10 |
| Outcome data | 15* | Report numbers in each exposure category, or summary measures of exposure | |
| Main results | 16 | (*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included | 11 & 12 |
| | | (*b*) Report category boundaries when continuous variables were categorized | - |
| | | (*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period | - |
| Other analyses | 17 | Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses | 12 & 13 |
| **Discussion** | | | |
| Key results | 18 | Summarise key results with reference to study objectives | 14 & 15 |
| Limitations | 19 | Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias | 16 |
| Interpretation | 20 | Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence | 15 & 16 |
| Generalisability | 21 | Discuss the generalisability (external validity) of the study results | 16 & 17 |
| **Other information** | | | |
| Funding | 22 | Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based | 17 |

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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# WOMEN'S SATISFACTION WITH MIDWIFE-LED CONTINUITY OF CARE – AN OBSERVATIONAL STUDY IN PALESTINE



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| | |

**Title page**

# WOMEN'S SATISFACTION WITH MIDWIFE-LED CONTINUITY OF CARE – AN OBSERVATIONAL STUDY IN PALESTINE

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**Word count** Abstract: 299 words, Article 4203 words (4520 words including acknowledgements and required statements)

## ABSTRACT

*Objectives:* A midwife-led continuity model of care had been implemented in the Palestinian governmental health system to improve maternal services in several rural areas. This study investigated if the model influenced women`s satisfaction with care, during antenatal-, intrapartum- and postnatal period.

*Design:* An observational case-control design was used to compare the midwife-led continuity model of care with regular maternity care.

*Participants and setting:* Women with singleton pregnancies, who had registered for antenatal care at a rural governmental clinic in the West Bank, were between one to six months after birth invited to answer a questionnaire rating satisfaction with care in 7-point Likert scales.

*Primary outcome* was the mean sum-score of satisfaction with care through the continuum of antenatal, intrapartum and postnatal period, where mean sum-scores range from 1 (lowest) to 7 (highest). Secondary outcome was exclusive breastfeeding.

*Results:* Two hundred women answered the questionnaire, one hundred who received the midwife-led model and one hundred who received regular care. The median timepoint of interview were 16 weeks postpartum in both groups. The midwife-led model was associated with a statistically significant higher satisfaction with care during antenatal, intrapartum and postnatal period, with a mean sum-score of 5.2, versus 4.8 in the group receiving regular care. The adjusted mean difference between the groups' sum-score of satisfaction with care was 0.6 (95% CI 0.35 to 0.85) $p<0.0001$. A statistically significant higher proportion of women who received the midwife-led continuity model of care were still exclusively breastfeeding at the timepoint of interview, 67% versus 46% in the group receiving regular care, an adjusted odds ratio of 2.56 (1.35 – 4.89)$p=0.004$.

*Conclusions:* There is an association between receiving midwife-led continuity of care and increased satisfaction with care through the continuum of pregnancy, intrapartum and postpartum period, and an increased duration of exclusive breastfeeding.

**Trial registration number** NCT03863600


**Key words:** Case-load Midwifery, Satisfaction with care, Experience, Continuity of care, Maternal care, Developing country

## STRENGTHS AND LIMITATIONS OF THE STUDY

- The study adds new information from a low-middle income country to existing evidence on midwife-led continuity of care
- The study's complete data obtained from face to face interviews brings information on satisfaction with care from a marginalized group of women
- The study investigated to what extent a pragmatic implementation could improve continuity with care in a low resource setting
- The main limitation of this study is the observational, retrospective design comparing groups with potential unmeasured confounders.
- Not knowing the woman's village of origin and in which governmental hospital the women gave birth, could represent potential bias. However, the women in both groups represented a quite similar rural population from villages in different regions in the West Bank.

## BACKGROUND

Yearly, more than 300 000 women die from preventable causes related to pregnancy and childbirth, and 99% of them are from low-and middle-income countries[1] It is estimated that in the shadow of each maternal death, between 50 and 100 women suffer severe maternal morbidity.[1,2] A new-born child's prospects of survival, good health, and wellbeing is closely linked to their mother's survival, health and wellbeing.[2] Several studies investigating disrespectful and abusive treatment of women in maternity care, suggest this may explain why many women choose not to use available services.[3,4] In a literature review from developing countries in 2015, Srivastava *et al*. investigated what determines women's satisfaction with maternal health care.[5] They found that being treated respectfully, in terms of courtesy and non-abuse, irrespective of socio-cultural or economic context, is especially important to women.[5] Interpersonal behaviour was the most prominent reported determinant of maternal satisfaction, more than structural factors as cleanliness and physical environment.[5] Around the world women seek dignity, empathy and respect while obtaining maternal care and women's experience with disrespectful care and abuse in health care has been investigated in both low- and high-income settings.[4,6] Based on the research evidence, the World Health Organization (WHO) has recommended interventions that scales up midwifery and facilitate continuity with care to enhance respectful relations in maternal care.[1,7-11]

Midwife-led continuity of care described in the literature, can be organized as *case-load*- or *team-midwifery* models.[12] In the case-load model one designated midwife cares for a group of up to 45 women, while in team-midwifery four to six midwives share the care of a group of up to 360 women. In both models, women are followed up through the continuum of pregnancy, intrapartum- and postnatal period. The case-load model facilitates an individual relationship between the woman and her midwife. Ideally, in both models, women will be cared for during labour by a midwife they know from antenatal care.[7,12] A Cochrane review on continuity of midwifery care models, conducted by Sandal *et al*. in 2016, reported improved health outcomes for women and babies. Several studies in the review also confirm satisfaction with midwife-led continuity models of care, but the studies lacked consistency in how satisfaction with continuity of care was measured.[8] Perriman and Davis identified in a systematic integrative review from 2015, four suitable instruments to measure satisfaction with continuity of care through the continuum of pregnancy, birth and the early postpartum period.[13]

**Palestinian context**

According to Ministry of Health's 2016 report there were 208 midwives employed at the West Bank's governmental hospitals covering 36 050 births and care in postnatal wards. Palestinian midwives worked in an overcrowded, understaffed and fragmented governmental maternity care system.[14,15] Midwives scope of practice within the governmental system was limited to labour and postnatal care in hospitals. If midwives provided antenatal care, they were in an assisting role.[15] In such environment it was challenging to establish good relations and to meet each woman's individual needs. In a study from 2006, Giacaman *et al*. identified that Palestinian women were not satisfied with the place they gave birth, and that their choice were constrained by availability, affordability and limited access due to Israeli military closures and sieges.[16] To address the challenge faced by Palestinian women living under Israeli occupation in rural areas in the West Bank, the Palestinian Ministry of Health implemented a modified midwife-led case-load model of care, in cooperation with a Norwegian humanitarian organization, The Norwegian Aid Committee (NORWAC). The model was implemented between 2013 to 2016 in six governmental hospitals from where midwives provided outreaching antenatal and postnatal care in 37 rural villages. The implementation was associated with increased number of antenatal visits, number of detected pregnancy complications referred to higher level of care, and number of postnatal home-visits.[17] It was further associated with reduced unplanned caesarean sections and induced

labour, and improved important maternal and neonatal outcomes.[18] When the midwife-led model was tested in the region of Ramallah between 2007 and 2011, the midwives described in a qualitative study, how the model enabled them to provide personalized care related to the individual woman's needs and how the broad scope of practice gave them new and important experience and knowledge.[19]

The aim of this study was to investigate if and how a modified case load midwife-led continuity model of care, in the governmental system in Palestine, influenced rural women's satisfaction with care, through the continuum of antenatal, intrapartum and postnatal period. A secondary aim was to explore the association between the model and duration of exclusive breastfeeding.

## METHODS

### Study design

An observational case-control design was used to compare satisfaction with care. The cases were women who had received the midwife-led continuity model and controls were women who had received regular maternity care, through the continuum of antenatal, intrapartum and postnatal period. Commom inclusion criteria for cases and controls were having a singleton pregnancy, having registered for antenatal care at a rural governmental clinic in the West Bank in the regions where the midwife-led model of care had been implemented, and having given birth between the last one to six months.

### Power and sample size

The power calculations were based on the results from a recent study in Australia, as we found no available studies on satisfaction with midwife-led continuity models of care in low – middle income countries.[20] A sample of 164 to 186 (82 to 93 in each group) was required to detect a difference of 20% between the control and intervention group's proportions of satisfaction, given a significance level of 0.05 and 80% power. Considering the novel context, we decided to collect answers from two-hundred women, 100 in each group, to assure enough power.

### Models of care

The midwife-led continuity of care model, modified to the Palestinian setting, implies that midwives who work in governmental hospitals was assigned to weekly visits to rural areas.

Midwives drove from their base at their governmental hospitals in designated marked cars, to provide antenatal care in rural clinics and postnatal home-visits. Each midwife visited the same area and clinic each week, thereby following up the same case-load of between 30 to 100 women to enhance relational continuity. The midwife from the regional hospital had an autonomous role and relieved the regular nurses and doctors at the rural governmental clinics from antenatal care. She involved physicians when needed and referred to higher level of care when complications occurred. The obligation to work full time and the heavy workload at the hospital prevented the midwives from being on call to attend labour and birth, as such the women were not assured having a known midwife during labour. A more detailed framework of the model is described elsewhere.[17,18]

Regular maternal care for women living in rural villages was offered from the governmental clinics and/or private medical doctors. Around 70% of the rural women registered for antenatal care in governmental clinics, where regular care providers were nurses or midwives and medical doctors.[17] Besides maternal care, governmental providers in regular care were also responsible for general patient treatment, vaccinations and minor emergency cases. The nurse or midwife in regular care would assist the physician by doing necessary tests, before the pregnant woman consulted the physician. Physicians alternated between clinics, while nurses were mainly permanent staff. Healthcare providers in community clinics offering regular care had no working relation to the hospitals. Women receiving private antenatal care could potentially meet their doctor if they gave birth at a private hospital.

**Participants and data-collection**

Women were asked to participate when they came with their child for vaccination at the same governmental clinic where they received antenatal care. Two midwives, who were not working with governmental primary health care, nor in the midwife-led continuity model, were trained in data collection. The research midwives travelled to rural villages scattered in different regions of the West Bank, that either offered the midwife-led continuity model or regular care. They invited eligible women to participate after providing them an information and consent form in Arabic, explaining the study. Women were assured anonymity if they participated, and that they would not be affected negatively if they did not accept to participate. To assure anonymity, the women were informed that neither their identity, village, clinic, nor birth facility could be traced. Their consent was given orally by accepting to answer the questionnaire by an interview. The research midwives collected the data in the

women's homes or in a private place in the clinic. Each woman was given an Arabic version of the questionnaire. The research midwife then filled the questionnaire forms while interviewing the women to assure they understood the questions. The research midwives tested how long time the interviews took and how to approach the women, by conducting five test-interviews each before starting the data-collection. These interviews did not result in adjustments of the questionnaires and were not included in the study. The interview was estimated to take 30 minutes. The research midwives transferred the women's responses to the University of Oslo via the web-form, "nettskjema.no".

### The questionnaire

The questionnaire (supplementary file1) was based on previous studies measuring satisfaction with midwife-led continuity and evaluated as suitable for this purpose.[20,21,13] The questionnaire included 62 questions measuring women`s satisfaction with antenatal, intrapartum and postpartum care using a 7-point Likert scale, where usually 1 signified "disagree strongly" and 7 signified "agree strongly". Women were further asked to what extent they received care during intrapartum and postpartum period from the provider they knew from antenatal care, and they were asked about their breastfeeding practice. The participants were invited to add recommendations to improve governmental services, in an open text section in the questionnaire. The content of the final questionnaire was tested for contextual and cultural sensitivity with a group of five Palestinian midwives. After minor adjustments the questionnaire was translated to Arabic by a professional translator, retested and adjusted for accuracy.

### Outcomes

Primary outcome was the mean sum-score of satisfaction with care through the continuum of antenatal, intrapartum and postpartum period. Secondary outcomes were satisfaction with care related to the different episodes of care, and proportion of women that still practiced exclusive breastfeeding at timepoint of interview. Grade of continuity was measured by number of women who received care from their antenatal midwife during labour, at postnatal hospital ward and/or at home-visits.

### Statistical analysis

Difference in characteristics between the intervention and control groups were analysed by two independent samples t tests, Mann-Whitney U tests, chi-squared or Fisher's exact tests, as appropriate.

The Likert scale ordinal variables were highly skewed and first analysed by conducting ordinal regression because this method had been used in previous studies using similar Likert scales.[19] After fitting the ordinal regression, the proportional odds assumption was inspected by a Brant test, using brant command in Stata/SE, version 14. Results from the test showed that proportional odds assumption was violated for several ordinal outcomes.

Therefore, we summarized the answers, and the groups' mean sum-scores of satisfaction were compared by bootstrapping linear regression. The primary outcome, mean sum-score of satisfaction through the continuum of antenatal, intrapartum and postnatal care, included 53 different questions of satisfaction. Negative questions, such as: *I felt that nobody really cared for me during labour and birth,* were turned positive so that satisfaction could be interpreted equally in all questions and the mean sum-scores thereby read as 1(lowest) and 7 (highest). One question from the antenatal period was not included, as it investigated if occupation soldiers or settlers limited women's access to the clinic and not satisfaction with care. Neither were eight questions involving satisfaction with care during home-visits, as it only applied to the group receiving the midwife-led model. The questions of satisfaction included in the mean sum-score variables were assessed for internal consistency and Cronbach's Alpha was between 0.90 and 0.95.

Factors which could influence the difference between groups were included for adjusting. Adjusted bias-corrected and accelerated bootstrap estimates (BCa) with 95% confidence intervals were given for non-normally distributed ordinal outcomes and based on 10000 bootstraps.

For breastfeeding practice as binary outcome, multiple logistic regression analyses were used to test the difference between the groups and adjusting for possible confounding variables.

Significance level was set at 0.05. The analyses were performed with IBM SPSS 25.

## Patient and public involvement

Participants were not directly involved in the planning of the study, but in testing the feasibility of the questionnaire. The results will be disseminated in scientific publications, in public media and in local and international conferences.

### Ethical considerations

The Palestinian Ministry of Health approved the study and the research assistants' access to the health facilities, allowing them to contact women who had registered at the governmental clinic to ask them for consent to participate in the study. There was no research ethic committee established in the West Bank that could grant local ethical approval. Ethical approval for the study was granted from the Norwegian Regional Committee for Medical Health Research Ethics South East (REK) with id number: 2015/1235.

## RESULTS

### Participants characteristics

Between May 1st, 2017 to May 31st, 2018, 200 women from 20 villages answered the questionnaire, 100 who received the midwife-led continuity model and 100 who received regular care. There were 26 women who abstained from participating, of them 22 received regular care and 4 received midwife-led care. Groups characteristics, presented in table 1, were mainly homogenous. The time point of interview was median 16 weeks postpartum in both groups, with no statistically significant differences related to age, education, employment or parity. Less women who received the midwife-led model of care had parents living in the same village as themselves.

**Table1** Participants characteristics

| Characteristics | Midwife-led care (n=100) | Regular care (n=100) | p-value **** |
|---|---|---|---|
| Timepoint of interview/weeks since birth* | 16.0 (11.0-18.8) | 16.0 (8.0-22.8) | 0.499 |
| Age** | 26.6 (5.6) | 26.3 (5.6) | 0.688 |
| Age at marriage* | 20.3 (18.0-22.0) | 20.7 (18.0-22.8) | 0.812 |
| Age at first birth* | 21.5 (19.0-23.0) | 21.8 (19.3-23.0) | 0.997 |
| Nulliparous*** | 32 | 38 | 0.459 |
| Multiparous*** | 68 | 62 | 0.459 |
| Number of previous pregnancies* | 2.0 (1.0-3.0) | 2.0 (1.0-3.0) | 0.125 |
| Number of live born children* | 2.0 (1.0-3.0) | 2.0 (1.0-3.0) | 0.104 |
| **Education level*** ** | | | |
| Up to master's degree after high school | 46 | 37 | 0.251 |
| High school | 54 | 63 | 0.251 |
| **Employment*** ** | | | |
| Woman has employment (full- or part-time) | 15 | 10 | 0.393 |
| Woman not employed | 85 | 90 | 0.393 |
| Husband has regular employment | 64 | 49 | 0.020 |
| Husband employed now and then | 32 | 50 | 0.014 |
| Husband not employed | 4 | 1 | 0.369 |
| **Social*** ** | | | |

| | | | |
|---|---|---|---|
| Husband must live outside home to work | 9 | 15 | 0.119 |
| Women's parents live in same village | 34 | 63 | 0.001 |
| Not Smoking *** | 94 | 86 | 0.097 |

*n=number of women, no missing, *Median(IQR), **Mean(SD,*** % ****Mann-Whitney U tests, independent samples t- or chi-squared tests*

## Characteristics of obtained care

Women who received the midwife-led continuity model of care booked significantly earlier for antenatal care at the governmental clinic, reporting a gestational age of median 6.5 weeks, compared to median ten weeks gestation for the group who received regular care (table 2). The group receiving the midwife-led model of care had median nine antenatal visits, and only two women reported less than four visits, while the group receiving regular care had median six antenatal visits and 28 women reported having less than four visits at the governmental clinic. While 42% in the midwife-led group, received antenatal care exclusively from the governmental clinic, only 8% in the regular care group reported the same. Subsequently, women who had regular care received more additional care from private doctors and 33% gave birth at a private hospital, compare to only 11% of women who received the midwife-led care. There were no missing data except two women in the group receiving midwife-led care, who gave birth under transportation and therefore did not report satisfaction with intrapartum care. Only women who had received the midwife-led continuity model of care received home-visit after birth.

**Table 2** Characteristics of obtained care

| **Characteristics** | **Midwife-led care (n=100)** | **Regular care (n=100)** | **p-value ***** |
|---|---|---|---|
| **Antenatal care (ANC)** | | | |
| Gestation at booking visit* | 6.5 (4.0-11.8) | 10.0 (5.0-19.5) | 0.003 |
| Number of ANC visits at government clinic* | 9.0 (8.0-10.0) | 6.0 (3.0-9.0) | 0.001 |
| Less than 4 ANC visits at government clinic** | 2 | 28 | 0.0001 |
| Number of ANC visits with doctor at government clinic* | 4.0 (3.0-5.0) | 5.0(2.0-8.0) | 0.066 |
| Number of ANC visits at private doctor* | 2.0 (0.0-3.0) | 6.0 (3.0-10.0) | 0.0001 |
| ANC care only from governmental clinic** | 42 | 8 | 0.0001 |
| Referred once or more to high risk care** | 36 | 22 | 0.004 |
| **Place of birth of last child**** | | | 0.035 |
| Governmental hospital | 87 | 67 | 0.0001 |
| Private hospital | 11 | 33 | 0.0001 |
| Under transportation | 2 | 0 | |
| Hours spent at postnatal ward postpartum* | 24.0 (18.0-24.0) | 15.0 (8.5-24.0) | 0.0001 |
| **Number receiving postnatal home-visits** | 76 | 0 | 0.0001 |

n=number of women, *Median(IQR), **% ***Mann-Whitney U or chi-squared tests

## Satisfaction with care

The groups' mean sum-scores, including crude and adjusted mean differences in satisfaction with care, are given in table 3. For the primary outcome, a statistically significant higher satisfaction with care was observed in favour of the group receiving the midwife-led care, through the continuum of pregnancy, intrapartum and postnatal period, with a crude mean sum-score of 5.2 (SD 0.86) versus 4.8 (SD 0.96) in the group receiving regular care. The adjusted mean difference between the groups was 0.6 (95% CI 0.35 to 0.83) p<0.0001. The statistically significant difference in favour of the midwife-led model persisted during the various periods of care. The adjusted mean difference in satisfaction with care during pregnancy was 0.4 (0.06 to 0.65) p=0.021 and with care during labour and birth 0.5 (0.14 to 0.87) p=0.008. The highest difference in satisfaction was with postpartum care, an adjusted mean difference of 0.8 (0.53 to 1.16) p<0.0001. Adjusting for the number of women who had given birth in private hospitals, influenced, but did not significantly change the primary outcome. Neither did it change satisfaction with care during pregnancy or postnatal period. However, a significant higher proportion of women who received regular care gave birth in private hospitals and adjusting for this factor significantly changed the difference in satisfaction with intrapartum care in governmental hospitals, in favour of the midwife-led model. We did not adjust for age, parity, employment, time since birth, or if the parents lived in the same village, as we found no significant influence from these covariates in univariate analyses. The satisfaction with care during home-visits was generally high. However, it only applied to the group receiving the midwife-led continuity model of care. The detailed results in the full scales are presented in supplementary file 2 and shows which aspects of care that influenced the difference between the groups. This scale also reveal that both groups scored equally high in wishing that someone from their family could accompany them during birth.

**Table 3** Satisfaction with antenatal, intrapartum and postpartum care

| | Mean sum-scores** | | Crude difference *** | Adjusted difference*** | |
|---|---|---|---|---|---|
| | Midwife-led care* | Regular care* | Mean (95%CI) | Adjusted mean(95%CI) | Adj. p-value |
| **Primary outcome** | | | | | |
| Satisfaction with all care through the whole continuum (53) | 5.2 (0.86) | 4.8 (0.96) | 0.5(0.25 to 0.73) | 0.6(0.37 to 0.81) | <0.0001 |
| **Descriptive outcomes** | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Satisfaction with care from midwives/nurses during pregnancy (6) | 6.2 (0.92) | 5.7 (1.22) | 0.6(0.25 to 0.84) | 0.6(0.22 to 0.82) | <0.001 |
| Satisfaction with pregnancy care from doctors (5) | 5.4 (1.50) | 5.2 (1.47) | 0.2(-0.18 to 0.66) | 0.2(-0.23 to 0.55) | 0.351 |
| Satisfaction with all care during pregnancy (15) | 5.7 (0.99) | 5.3 (1.19) | 0.4(0.08 to 0.68) | 0.4(0.06 to 0.64) | 0.021 |
| Satisfaction with midwives' care during labour and birth (5) | 5.5 (1.75) | 5.1 (1.79) | 0.5(-0.04 to 0.93) | 0.7(0.21 to 1.13) | 0.008 |
| Satisfaction with doctor's care during labour and birth (3) | 5.0 (1.69) | 4.7 (1.87) | 0.3(-0.20 to 0.78) | 0.5(0.06 to 0.95) | 0.038 |
| Satisfaction with all care during labour and birth (17) | 5.1 (1.29) | 4.7 (1.34) | 0.3(-0.04 to 0.68) | 0.5(0.18 to 0.83) | 0.006 |
| Satisfaction with care and advice related to baby after birth (5) | 4.8 (1.23) | 4.1 (1.44) | 0.7(0.41 to 1.01) | 0.8(0.44 to 1.21) | <0.0001 |
| Satisfaction with care related to yourself after birth (9) | 5.0 (1.07) | 4.3 (1.1) | 0.8(0.37 to 1.11) | 0.8(0.44 to 1.08) | <0.0001 |
| Satisfaction with all care after birth (21) | 5.0 (1.04) | 4.2 (1.14) | 0.8(0.46 to 1.08) | 0.8(0.50 to 1.19) | <0.0001 |

**100 women in each group, no missing except two women who gave birth under transportation in the group receiving midwife led care did not report satisfaction with care during labour and birth ** Mean(SD) sum-score is calculated from the 1-7 likert scale where 1 means very low satisfaction and 7 means very high ***BCa estimates with 95% confidence intervals, analysed by bootstrapping linear regression, adjusted for place of birth (private or governmental hospital), Number in bracelets reflects the number of questions included in the sum-score.*

## Breastfeeding

As the interview was done at an approximately equal timepoint of median 16 weeks after birth in both groups we compared the proportion of women who were still breastfeeding. Most women were still breastfeeding at this timepoint, respectively 96% receiving midwife-led care and 88% receiving regular care (table 4). Of these a statistically significant higher rate of women receiving midwife-led care were still exclusively breastfeeding, 67% versus 46%. After adjusting for age, parity and number of weeks since birth the difference was still statistically significant with an adjusted odds ratio of 2.56 (95% CI 1.35 – 4.89) p=0.004. Only three women in the control group had never breastfed, and none in the midwife-led group.

**Table 4** Breastfeeding practice

| | | | Difference between groups** | | |
|---|---|---|---|---|---|
| | **Midwife-led care*** | **Regular care*** | **OR(95%CI)** | **Adj. OR(95%CI)** | **Adj. p-value** |
| Still exclusively breastfeeding | 67% | 46% | 2.38(1.34 to 4.23) | 2.56(1.35 - 4.88 | 0.004 |
| Still breastfeeding (exclusively and partly) | 96% | 88% | 3.27(1.02 to 10.52) | 2.76(0.84 - 9.09) | 0.096 |

| | | | |
|---|---|---|---|
| Never breastfed | 0 | 3% | 0.246 |

*100 women answered, no missing ** Odds ratio (OR) with 95% confidence intervals from binary logistic regression analysis, adjusted for age, parity and timepoint of interview/weeks since birth, regular care was set as reference

### Continuity measures

Women who received regular care reported they often met the same provider during antenatal care, none in the control group reported they met the healthcare provider again during hospital or postnatal care. While investigating the midwife-led model's actual continuity with care from the same midwife through the continuum (table 5), we found that 23% of the women received care from their antenatal-midwife during labour, and 34% received care from her at the hospital's postnatal ward. Of the 100 women, 69% received home-visit from their antenatal-midwife, while 7% received home-visits from the nurse who they also knew from the clinic. As many as 17% met their antenatal-midwife through the whole continuum of antenatal, intrapartum and postnatal period, while 8% did not receive care from their antenatal-midwife elsewhere.

| **Table 5 Continuity measures (n=100)** | % |
|---|---|
| Number who met their ANC-midwife during labour | 23 |
| Number who met their ANC-midwife at hospital's postnatal ward | 34 |
| Number who met their ANC-midwife at home-visit | 69 |
| Number who met their ANC-midwife through the whole continuum | 17 |
| Number who only met their midwife in ANC | 8 |
| Numbers of meetings with the same provider | 8 (7-9)* |

*n=number of women, only from the group receiving midwife led care, *median (IQR)*

### Women's recommendations

Free text recommendations to improve governmental services were recorded from 101 women, 76 from the group receiving regular care and 24 from the group receiving midwife-led care. The recommendations were organized in 13 themes and coded in an excel sheet where their frequencies were calculated. The most prominent recommendation, expressed from 38 women were to allow bringing a companion to join them during labour and birth, 35 women recommended more human, respectful and sensitive care during labour and birth, while 24 women recommended to implement an appointment system for the antenatal visits.

## DISCUSSION

Compared with regular care, the midwife-led model was associated with a higher sum-score of satisfaction with care through the continuum of antenatal, intrapartum and postpartum period. The highest satisfaction reported in both groups, were with care during pregnancy, where the mean sum-score differed least. The difference between groups during pregnancy was most prominent related to satisfaction with being involved and the emotional support from the midwives. The general high satisfaction with pregnancy care could be explained by that this period is less demanding and stressful for most women and recall bias might have influenced.

Care during labour and birth was presented with the lowest satisfaction scores in both groups. This is not surprising considering the overcrowded and understaffed environment in the government hospitals labour wards, as previously described by other studies from Palestine.[15,16] Another important explanation could be the statement from a clear majority of women in both groups: "I wish someone from my family could accompany me during labour and birth". The request of having a companion during labour was confirmed by the women's main recommendation. The value of a companion is important to improve birth outcomes and improve women's birth experiences.[22] WHO recommends that health facilities gives every woman the option to experience labour with a companion of her choice.[23] Nevertheless, knowing a midwife at the labour ward seemed to influence the difference between the two groups' satisfaction with care during labour and birth, a difference that increased after adjusting for the subgroup of women who gave birth in private hospitals. Interestingly, the difference in satisfaction with care from doctors also increased to a significant level after this adjustment. This suggests that the enhanced relation between the woman and her midwife also seemed to reduce the alienation to doctors. An important contextual question revealed that women receiving the midwife-led model were less afraid of being stopped at Israeli military checkpoints on their way from the village to hospital. This reduced anxiety could be related to that women's relation with their midwife made them feel safer, also knowing they could call their midwife in an emergency. The increased satisfaction with care during the intrapartum period among women receiving midwife-led care, could reasonably be explained by that nearly a quarter was cared for during labour by the midwife they knew. The relational continuity seemed to enhance women's perception of receiving respectful care during labour and birth. The most prominent difference between the two groups' satisfaction was with care during postpartum period, despite the exclusion of the high score of satisfaction with care related to home-visits. The highest difference between the groups was seen in satisfaction with care at the postnatal ward and could be explained by the high number who met their

midwife from pregnancy there. The difference between the group's satisfaction with care in this study seems to be less prominent compared to studies of satisfaction with continuity models of care in high income countries.[20] Nevertheless, this study confirms the general findings of improved satisfaction with midwife-led continuity models of care.[8,20,24-26]

The results from this study also demonstrate an association between receiving the midwife-led model of care and increased duration of exclusive breastfeeding. The midwife-led model provided continuity with breastfeeding information and support during pregnancy and after birth in hospital and home-visits. McFadden *et al.* concluded in a systematic review that predictable, standard breastfeeding support during antenatal and/or postnatal care, tailored to women's needs and given face to face, seem to increase duration of exclusive breastfeeding.[27] Continuous postnatal breastfeeding support is also recommended.[28] Exclusive breastfeeding up to six month in life is considered an important protection against infections, malocclusions, and breastfeeding have in general several long term health benefits both for women and their children.[29]

Although midwives were prevented from being on call, a high number of women receiving the midwife-led model were cared for during labour and at the postnatal ward by the midwife they knew. The high rate of continuity was possible because all midwives worked full time at the hospital beside their outreaching program once a week.

This study implies that midwife-led continuity contributes to sustainable improvements within a system with limited resources, enabling midwives to improve quality of care to vulnerable women in their own population. The experience and findings from this implementation are an important contribution to reach the UN sustainable development goal number three towards 2030, promising good health and wellbeing for all.[30]

**Limitations and strengths**

The main limitation of this study is the observational, retrospective design comparing groups with potential unmeasured confounders. Because the model had already been implemented randomization was not possible. It would have been an advantage to know village of origin and in which governmental hospital the women gave birth, as it could represent potential bias. However, the women in both groups represented a quite similar rural population from villages in different regions in the West Bank.

Investigating such complex and sensitive outcomes of an implementation in a low-middle income setting is the main strength of this study. The pragmatic and novel approach, adapting

the model to the Palestinian context and implementing it within the public health system provided a unique experience of how midwife-led continuity of care can work in a low-middle income setting. Engagement from local midwives, nurses and doctors who have been deeply involved in developing and adapting the model to the context, facilitated anchoring the model in the Palestinian public health system. The model was implemented with Norwegian funding in six governmental hospitals and 37 villages in the West Bank, but since February 2017 it has been administrated and sustained by the Palestinian Ministry of Health.[31] A strength of the study is the focus on satisfaction with care provided to the poorer part of the population, who are in most need of quality improvements. Another strength is the comprehensive questionnaire with a Likert scale used in previous studies that measured satisfaction with midwife-led continuity models, using the recommended focus on women's satisfaction with process of care and interpersonal behaviour throughout the continuum.[5,13,20,24]

## Conclusion

This study has investigated a midwife-led continuity model of care that has been adapted to a low-middle-income setting under long-term military occupation. The findings indicate that midwife-led continuity of care is associated with improved satisfaction with care also in such settings. There are increased user expectations for qualitative and safe care in low and middle-income countries, including respectful and sensitive care.[9,32] Further qualitative research could investigate how and why women find this model useful. There is a high potential to improve quality of maternal care in Palestine, by increasing number of midwives, by introducing more privacy in the labour ward to facilitate that women can experience labour with a companion of their choice, and by introducing midwife-led continuity of care to more women.

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## Contributors

BM was involved with the Implementation, study design, preparation of data collection, data analysis, data interpretation and writing. LMD was involved with study design, data analysis and writing. MiL was involved with study design, data interpretation and writing. MaL was involved with study design, data interpretation and writing. ID and DE were involved with the data collection and data interpretation. EF was involved in study design, data collection, data analysis, data interpretation and writing. BM drafted the article and tables. All authors have reviewed and approved the final manuscript. The corresponding author had full access to all the data in the study and had final responsibility for the decision to submit for publication.

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**Competing interests** EF is director of NORWAC. BM were partly employed by NORWAC until February 2017 as project manager for implementing the model.

## Ethics approval

The study was approved by the Norwegian Regional Committee for Medical Health research Ethics South East (REK) id number: 2015/1235. It was also approved by the Palestinian Ministry of Health.

## Data sharing statement

Data can be shared upon request to the first author

## References

1. Miller S, Abalos E, Chamillard M, et al. Beyond too little, too late and too much, too soon: a pathway towards evidence-based, respectful maternity care worldwide. *Lancet* 2016; **388**(10056): 2176-92.
2. Geller SE, Koch AR, Garland CE, MacDonald EJ, Storey F, Lawton B. A global view of severe maternal morbidity: moving beyond maternal mortality. *Reprod Health* 2018; **15**(Suppl 1): 98.

3. Bohren MA, Vogel JP, Hunter EC, et al. The mistreatment of women during childbirth in health facilities globally: a mixed-methods systematic review. *PLoS Med* 2015; **12**.
4. Lukasse M, Schroll AM, Karro H, et al. Prevalence of experienced abuse in healthcare and associated obstetric characteristics in six European countries. *Acta Obstet Gyn Scan* 2015; **94**(5): 508-17.
5. Srivastava A, Avan BI, Rajbangshi P, Bhattacharyya S. Determinants of women's satisfaction with maternal health care: a review of literature from developing countries. *BMC Pregnancy Childbirth* 2015; **15**: 97.
6. Sando D, Abuya T, Asefa A, et al. Methods used in prevalence studies of disrespect and abuse during facility based childbirth: lessons learned. *Reprod Health* 2017; **14**(1): 127.
7. World Health Organisation. WHO recommendations on antenatal care for a positive pregnancy experience. http://apps.who.int/iris/bitstream/10665/250796/1/9789241549912-eng.pdf?ua=1 World Health Organization; 2016. p. 152.
8. Sandall J, Soltani H, Gates S, Shennan A, Devane D. Midwife-led continuity models versus other models of care for childbearing women. *Cochrane Database Syst Rev* 2016; **4**: CD004667.
9. Van Lerberghe W, Matthews Z, Achadi E, et al. Country experience with strengthening of health systems and deployment of midwives in countries with high maternal mortality. *Lancet* 2014; **384**(9949): 1215-25.
10. Nair M, Yoshida S, Lambrechts T, et al. Facilitators and barriers to quality of care in maternal, newborn and child health: a global situational analysis through metareview. *Bmj Open* 2014; **4**(5): e004749.
11. Homer CS, Friberg IK, Dias MA, et al. The projected effect of scaling up midwifery. *Lancet* 2014; **384**(9948): 1146-57.
12. Homer C, Brodie P, Leap N. Midwifery continuity of care : a practical guide. Sydney ; New York: Churchill Livingstone/Elsevier; 2008.
13. Perriman N, Davis D. Measuring maternal satisfaction with maternity care: A systematic integrative review: What is the most appropriate, reliable and valid tool that can be used to measure maternal satisfaction with continuity of maternity care? *Women Birth* 2016; **29**(3): 293-9.
14. Wick L, Mikki N, Giacaman R, Abdul-Rahim H. Childbirth in Palestine. *Int J Gynaecol Obstet* 2005; **89**(2): 174-8.
15. Rahim HF, Wick L, Halileh S, et al. Maternal and child health in the occupied Palestinian territory. *Lancet* 2009; **373**(9667): 967-77.
16. Giacaman R, Abu-Rmeileh NM, Wick L. The limitations on choice: Palestinian women's childbirth location, dissatisfaction with the place of birth and determinants. *Eur J Public Health* 2007; **17**(1): 86-91.
17. Mortensen B, Lukasse M, Diep LM, et al. Can a midwife-led continuity model improve maternal services in a low-resource setting? A non-randomised cluster intervention study in Palestine. *Bmj Open* 2018; **8**(3): e019568.
18. Mortensen B, Lieng M, Diep LM, Lukasse M, Atieh K, Fosse E. Improving Maternal and Neonatal Health by a Midwife-led Continuity Model of Care - An Observational Study in One Governmental Hospital in Palestine. EClinicalMedicine. 2019;10:84-91.
19. Mortensen B. To be veiled or not to be - what unites is the question, Experiences from a continuity of Midwifery Care Model in Palestine and Norway. Master's thesis. Bodø, Norway: University of Nordland; 2011. p. 121.
20. Forster DA, McLachlan HL, Davey MA, et al. Continuity of care by a primary midwife (caseload midwifery) increases women's satisfaction with antenatal,

intrapartum and postpartum care: results from the COSMOS randomised controlled trial. *BMC Pregnancy Childbirth* 2016; **16**: 28.
21. Waldenstrom U, Rudman A. Satisfaction with maternity care: how to measure and what to do. *Womens Health (Lond)* 2008; **4**(3): 211-4.
22. Bohren MA, Hofmeyr GJ, Sakala C, Fukuzawa RK, Cuthbert A. Continuous support for women during childbirth. *Cochrane Database Syst Rev* 2017; **7**: CD003766.
23. World Health Organisation. Standards for improving quality of maternal and newborn care in health facilities. http://apps.who.int/iris/bitstream/10665/249155/1/9789241511216-eng.pdf?ua=1 WHO; 2016.
24. Waldenstrom U, Brown S, McLachlan H, Forster D, Brennecke S. Does team midwife care increase satisfaction with antenatal, intrapartum, and postpartum care? A randomized controlled trial. *Birth* 2000; **27**(3): 156-67.
25. Fereday J, Collins C, Turnbull D, Pincombe J, Oster C. An evaluation of Midwifery Group Practice. Part II: women's satisfaction. *Women Birth* 2009; **22**(1): 11-6.
26. Harvey S, Rach D, Stainton MC, Jarrell J, Brant R. Evaluation of satisfaction with midwifery care. *Midwifery* 2002; **18**(4): 260-7.
27. McFadden A, Gavine A, Renfrew MJ, et al. Support for healthy breastfeeding mothers with healthy term babies. *Cochrane Database Syst Rev* 2017; **2**: CD001141.
28. Zhang Z, Zhu Y, Zhang L, Wan H. What factors influence exclusive breastfeeding based on the theory of planned behaviour. *Midwifery* 2018; **62**: 177-82.
29. Victora CG, Bahl R, Barros AJ, et al. Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect. *Lancet* 2016; **387**(10017): 475-90.
30. ten Hoope-Bender P, Lopes ST, Nove A, et al. Midwifery 2030: a woman's pathway to health. What does this mean? *Midwifery* 2016; **32**: 1-6.
31. Mortensen B. Palestinian Midwives on the Front Line. *Journal of Middle East Women's Studies* 2018; **14**(3): 379-83.
32. ten Hoope-Bender P, de Bernis L, Campbell J, et al. Improvement of maternal and newborn health through midwifery. *Lancet* 2014; **384**(9949): 1226-35.

# Women`s satisfaction of care through the continuum of pregnancy, birth and postnatal period

Side 1

## Consent and general information

- **I read the information sheet about the study, I registered at a Governmental clinic during pregnancy, my last pregnancy was singleton and I wish to participate ***

  Yes
  No

  Dette elementet vises dersom et av følgende alternativer er valgt på spørsmål «I read the information sheet about the study, I registered at a Governmental clinic during pregnancy, my last pregnancy was singleton and I wish to participate»: Yes

- **What type of care were you offered at the local Governmental clinic? ***

  Intervention: Continuity of Midwifery Care Model: care from a midwife also employed at the local hospital.
  Control: Regular care from staff emplyed at the clinic

  Dette elementet vises dersom et av følgende alternativer er valgt på spørsmål «I read the information sheet about the study, I registered at a Governmental clinic during pregnancy, my last pregnancy was singleton and I wish to participate»: Yes

- **If you had regular care, who provided care for you?**

  Staff nurse
  Practical nurse
  Health worker
  Male doctor
  Female doctor
  Midwife
  I don`t know
  Other

  Dette elementet vises dersom et av følgende alternativer er valgt på spørsmål «I read the information sheet about the study, I registered at a Governmental clinic during pregnancy, my last pregnancy was singleton and I wish to participate»: Yes

- **Where did you receive care during pregnancy from others than governmental facilities? ***

  - [ ] UNRWA
  - [ ] Private doctor
  - [ ] NGO
  - [ ] Only Governmental
  - [ ] Other

## Demographic and social information

Dette elementet vises dersom et av følgende alternativer er valgt på spørsmål «I read the information sheet about the study, I registered at a Governmental clinic during pregnancy, my last pregnancy was singleton and I wish to participate»: Yes

- How old are you? *

Dette elementet vises dersom et av følgende alternativer er valgt på spørsmål «I read the information sheet about the study, I registered at a Governmental clinic during pregnancy, my last pregnancy was singleton and I wish to participate»: Yes

- What was your age when you got married? *

Dette elementet vises dersom et av følgende alternativer er valgt på spørsmål «I read the information sheet about the study, I registered at a Governmental clinic during pregnancy, my last pregnancy was singleton and I wish to participate»: Yes

- What was your age first time you gave birth? *

Dette elementet vises dersom et av følgende alternativer er valgt på spørsmål «I read the information sheet about the study, I registered at a Governmental clinic during pregnancy, my last pregnancy was singleton and I wish to participate»: Yes

- **What is the highest level of education you have completed? ***

  - ( ) Primary school
  - ( ) High School
  - ( ) Diploma 2 years after High school
  - ( ) Bachelor
  - ( ) Master
  - ( ) Phd
  - ( ) Other

- If other, what kind of education?

Dette elementet vises dersom et av følgende alternativer er valgt på spørsmål «I read the information sheet about the study, I registered at a Governmental clinic during pregnancy, my last pregnancy was singleton and I wish to participate»: Yes

- **Are you a paid employee? ***

  - Yes, full time
  - Yes, part time
  - No

- **Does your husband have a paid work? ***

  - Yes, regularly
  - Yes, now and then
  - No

- **Does your husband have a job requiring living outside home for longer periods?**

  - Yes
  - No

- **Where does your parents live? ***

  - In the same village/town as me
  - In another neighboring village
  - In another town in the West Bank
  - Outside West Bank

## Reproductive information

- How many pregnancies did you have that went beyond 6 months? *
- How many live born children do you have? *
- If you experienced stillbirth, how many times? *
- How many pregnancies did you have without pregnancy care at all? *

## Health information about you last pregnancy, birth and postnatal period

- How many weeks is it since your last birth? *

- At which pregnancy week did you register at the Governmental clinic? *
- How many pregnancy-visits did you have at the Governmental clinic last pregnancy? *

- **Do you smoke ***

  - [ ] No, never
  - [ ] Yes, cigarettes now and then
  - [ ] Yes, cigarettes daily
  - [ ] Yes, Argile (water-pipe) now and then
  - [ ] Yes, Argile (Water-pipe) daily

- **Mark if you experience any of the following complications during last pregnancy? ***

  - [ ] Anemia Hb 9 or less
  - [ ] Pre-eclampsia
  - [ ] Eclampsia
  - [ ] Placenta Previa
  - [ ] Vaginal bleeding
  - [ ] Reduced fetal growth
  - [ ] Gestational diabetes
  - [ ] Previous cesarean section
  - [ ] Pelvic pain
  - [ ] Violations in the home
  - [ ] Violations from occupation soldiers/settlers
  - [ ] Rhesus negative blood type.
  - [ ] Vomiting causing hospitalization
  - [ ] Other
  - [ ] I had had no complications during pregnancy

- If other, describe short what kind of pregnancy complications?
- How often did a doctor do the pregnancy check-ups in the governmental clinic? *
- How many pregnancy-visits did you have to a private doctor during last pregnancy? *
- If you used private doctor in addition to Governmental clinic, describe short why you choose to use both:

- **Where you referred to high risk care clinic, hospital or specialist doctor during pregnancy? ***

  - Yes, once
  - Yes, more than once
  - Yes, I was referred but I was not able to go
  - No, I was not referred

- **Mark if you experience any of the following complications during last birth? ***

  - Birth during transportation
  - Instrumental delivery: vacuum
  - Instrumental delivery: forceps
  - Hemorrhage - severe bleeding
  - Elective cesarean section
  - Eclampsia
  - Acute cesarean section
  - Premature birth before 37 weeks` pregnancy
  - Premature birth before 34 weeks` pregnancy
  - Premature birth before 30 weeks` pregnancy
  - other
  - I had no medical complications during birth

- If other, describe short what, And/or why cesarean section:

- **Did you experience any of the following complications related to YOURSELF after last birth? ***

  - I had anemia, 9 g/dl or less
  - I had Infection treated with antibiotics
  - Eclampsia
  - Perineal tears that caused much pain
  - Perineal tears causing infection and fever
  - Perineal tears that caused incontinence of faeces
  - Problems with breasts causing problems with breastfeeding
  - I had painful infection or problems with my breasts
  - Feeling so unhappy that I for days cried most of the time
  - Feeling so sad that harming myself sometimes occurred to me
  - other
  - No I had no complications after last birth

- If other explain in few words

- **Mark if your CHILD have any of the following complications after last birth? ***

  You can choose more than one alternative:

  - [ ] My child was transferred to intensive care after birth
  - [ ] My child had problems breathing that needed treatment
  - [ ] My child had problem sucking the breast
  - [ ] My child had jaundice that needed treatment
  - [ ] My child got infection treated with antibiotics
  - [ ] My child re-hospitalized after going home
  - [ ] My child had problems gaining weight
  - [ ] Other
  - [ ] My child had no complications

- If other, explain in few words:

- **Duration of breastfeeding your last child ***

  - ( ) I never breastfed my last child
  - ( ) I still breastfeed my child, without giving additional food/milk
  - ( ) I still breastfeed daily and also give additional food/milk
  - ( ) I stopped breastfeeding

- If you stopped breastfeeding, how many weeks did you breastfed your last child without giving additional food.

- **How often did you meet the same healthprovider from the Governmental clinic during the whole period of pregnancy, birth and postnatal period? ***

  - ( ) Two times
  - ( ) Three times
  - ( ) Four times
  - ( ) Five times
  - ( ) Six times
  - ( ) Seven times
  - ( ) Eight times
  - ( ) Nine times
  - ( ) More than nine times

- I met different people each time

- **If you met the same Governmental health provider more than once, please explain: ***

- I met the health provider from pregnancy during labour
- I met the health provider from pregnancy in postnatal ward at hospital
- I met the health provider from pregnancy postnatal home visit
- The person I met most times was the nurse
- The person I met most times was the Midwife
- The person I met most times was the doctor
- I don`t know the profession of the person I met most times

- **If you used the Governmental service less than four times during pregnancy, why?**

- No female doctor
- No midwife
- No regularity
- No ultrasound
- Bad quality
- Complicated to reach the clinic
- I don`t know
- Other

- If other, explain shortly:

## Your satisfaction of care during pregnancy

**Describe at what degree you were satisfied with the care you received from the Governmental clinic during pregnancy by choosing between 1 meaning that you totally disagree and 7 totally agree in the following statements:**

| | 1 Totally disagree | 2 | 3 | 4 | 5 | 6 | 7 Totally agree |
|---|---|---|---|---|---|---|---|
| At my pregnancy check-ups I was always asked whether I had any questions | | | | | | | |

| | 1 Totally disagree | 2 | 3 | 4 | 5 | 6 | 7 Totally agree |
|---|---|---|---|---|---|---|---|
| The midwives/nurses always kept me informed about what was happening related to my pregnancy | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| The doctor always kept me informed about what was happening related to my pregnancy | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I was always given an active say in decisions about my care in pregnancy | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I always felt my worries, anxieties or concerns about the pregnancy and the baby were taken seriously by the midwives/nurses | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I always felt my worries, anxieties or concerns about the pregnancy and the baby were taken seriously by the doctors | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| At my check-ups the midwives/nurses often seemed rushed and busy | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| At my check-ups the doctors often seemed rushed and busy | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Care in pregnancy was provided in a competent way | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I was happy with the emotional support I received in in | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

| | 1 Totally disagree | 2 | 3 | 4 | 5 | 6 | 7 Totally agree |
|---|---|---|---|---|---|---|---|
| pregnancy from midwives/nurses | | | | | | | |

| | 1 Totally disagree | 2 | 3 | 4 | 5 | 6 | 7 Totally agree |
|---|---|---|---|---|---|---|---|
| I was happy with the emotional support I received in in pregnancy from doctors | | | | | | | |
| I was happy with the physical care I received in pregnancy from midwives/nurses | | | | | | | |
| I was happy with the physical care I received in pregnancy from doctors | | | | | | | |
| My privacy was very well respected and taken care of from midwives/nurses | | | | | | | |
| I was afraid that I would have problems to reach pregnancy care because of occupation soldiers or settlers | | | | | | | |
| Describe your overall satisfaction with the care you received during last pregnancy at the MOH clinic (1 is very bad and 7 in very good) | | | | | | | |

## Your satisfaction of care during birth

- **Where did you give birth? ***

Governmental hospital

- Private hospital
- UNRWA hospital
- PRCS hospital
- Israeli hospital
- Under transportation (car)
- Ambulance
- Other

- If other, where?

**Describe at what degree you were satisfied with the care you received at hospital during labour and birth by choosing between 1 meaning that you totally disagree and 7 totally agree in the following statements:**

| | 1 I totally disagree | 2 | 3 | 4 | 5 | 6 | 7 I totally agree |
|---|---|---|---|---|---|---|---|
| The midwifes always kept me informed about what was happening during birth | | | | | | | |
| The doctors always kept me informed about what was happening during birth | | | | | | | |
| I was always given an active say in decisions about my care during labour and birth | | | | | | | |
| The midwives were encouraging | | | | | | | |
| The doctors were encouraging | | | | | | | |
| The midwives provided reassurance if I needed it | | | | | | | |
| The doctors provided reassurance if I needed it | | | | | | | |

| | 1 I totally disagree | 2 | 3 | 4 | 5 | 6 | 7 I totally agree |
|---|---|---|---|---|---|---|---|
| I felt nobody really cared for me during labour and birth | | | | | | | |
| I was happy with the emotional support I received from the midwives | | | | | | | |
| I was happy with the emotional support I received from the doctors | | | | | | | |

| | 1 I totally disagree | 2 | 3 | 4 | 5 | 6 | 7 I totally agree |
|---|---|---|---|---|---|---|---|
| Care during labour and birth was provided in a professional way | | | | | | | |
| I wish someone from my family could accompany me during labour and birth | | | | | | | |
| My privacy was well respected during labour and birth | | | | | | | |
| I felt badly treated by the midwives during labour and birth | | | | | | | |
| I felt badly treated by the doctors during labour and birth | | | | | | | |
| When labour started I was afraid that I would not reach hospital because of the military checkpoints and occupation soldiers or settlers | | | | | | | |

| | 1 I totally disagree | 2 | 3 | 4 | 5 | 6 | 7 I totally agree |
|---|---|---|---|---|---|---|---|
| Overall, how would you describe the care you received in labour and birth (1 very poor, 7 very good | | | | | | | |

## Your satisfaction with the care you received after birth

- How many hours did you spend in hospital after your last birth? *
- What was the birth-weight of your last child? *

**Describe at what degree you were satisfied with the care you received after birth in the hospital choosing between 1 meaning you totally disagree and 7 totally agree in the following statements:**

| | 1 I Totally disagree | 2 | 3 | 4 | 5 | 6 | 7 I Totally agree |
|---|---|---|---|---|---|---|---|
| I was given the advice I needed with breastfeeding at hospital | | | | | | | |
| I was given the advice I needed about how to handle, settle or look after my baby in the hospital | | | | | | | |
| I was given the advice I needed about any problems with the baby`s health and progress in the hospital | | | | | | | |
| I was given the advice I needed in hospital about my | | | | | | | |

| | 1 I Totally disagree | 2 | 3 | 4 | 5 | 6 | 7 I Totally agree |
|---|---|---|---|---|---|---|---|
| own health and recovery in after birth | | | | | | | |
| Care after birth in hospital was provided in a competent way | | | | | | | |
| Midwives in hospital were supportive after birth | | | | | | | |
| Doctors in hospital were supportive after birth | | | | | | | |
| I was happy by the emotional support from midwives after birth in hospital | | | | | | | |
| My privacy was taken good care of at the hospital after birth | | | | | | | |
| Overall, how would you describe the care you received in hospital after birth (1 is very poor and 7 is very good) | | | | | | | |

- **From where did you receive care for yourself and your baby after leaving hospital? ***

You can choose more than one alternative:

- [ ] Governmental clinic
- [ ] Governmental home-visit
- [ ] UNRWA clinic
- [ ] Private doctor
- [ ] NGO clinic
- [ ] Only family cared for me, the baby got vaccination
- [ ] No one cared for me, they only cared for the baby
- [ ] Home-visit from UNRWA/NGO

☐ Other

- If other, from whom did you receive care?

- **Who did the home-visit after birth? ***

○ My midwife from pregnancy care
○ The nurse from the clinic
○ The doctor
○ My midwife from pregnancy and the nurse from the clinic
○ Other
○ I had no home visit

- If other, who did the home visit?
- How many home visits did you receive?
- How many days after birth did you receive home visit?

If you received home visit after birth:

**Describe at what degree you were satisfied with the care you received after birth in your home choose between 1 meaning you totally disagree and 7 totally agree in the following statements:**

Dette elementet vises dersom et av følgende alternativer er valgt på spørsmål «From where did you receive care for yourself and your baby after leaving hospital?»: Governmental homevisit

| | 1 Totally disagree | 2 | 3 | 4 | 5 | 6 | 7 Totally agree |
|---|---|---|---|---|---|---|---|
| During the home visit the midwife/nurse gave me the advice I needed with breastfeeding | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| During home visit I was given the advice I needed to handle and look after my baby | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

| | 1 Totally disagree | 2 | 3 | 4 | 5 | 6 | 7 Totally agree |
|---|---|---|---|---|---|---|---|
| During the home visit I was given the advice I needed to look after my own health and recovery after birth | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I got enough time to ask all the questions I had during home visit | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I receive helpful information about family planning during the home visit | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I was happy for the emotional support I received from the midwife/nurse during home visit | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Overall, how would you describe the care you received for yourself at home visit (1 means very bad and 7 means very good) | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Overall, how would you describe the care your baby received at home visit (1 means very bad and 7 means very good) | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

| | yes | no | I don`t know |
|---|---|---|---|
| If you did not receive home visit after birth, would you like to have had the possibility | ○ | ○ | ○ |

**Describe at what degree you were satisfied with the care you received after birth in the Governmental clinic, choose between 1 meaning you totally disagree and 7 totally agree in the following statements:**

| | 1 Totally disagree | 2 | 3 | 4 | 5 | 6 | 7 Totally agree |
|---|---|---|---|---|---|---|---|
| I was given the advice I needed at the clinic about how to handle, settle or look after my baby | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| At the clinic I was given the advice I needed about any problems with the baby`s health and progress | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| At the clinic I was given the advice I needed about my own health and recovery after the birth | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| At the clinic, the nurse only had time to vaccinate the baby, no time for individual information | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| My privacy was taken good care of at the clinic | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I was happy for emotional support I received at the clinic after birth | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I received good advice regarding family planning and contraceptives at the clinic | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Overall, how would you describe the care your baby received at the clinic after birth | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

| | 1 Totally disagree | 2 | 3 | 4 | 5 | 6 | 7 Totally agree |
|---|---|---|---|---|---|---|---|
| (1 is very bad and 7 is very good) | | | | | | | |
| Overall, how would you describe the care you received for yourself at the clinic after birth (1 is very bad and 7 is very good) | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

| | 1 Very bad | 2 | 3 | 4 | 5 | 6 | 7 Very good |
|---|---|---|---|---|---|---|---|
| Overall how satisfied were you with all care after birth that you received from Government services on a scale from 1 (Very bad) to 7 (very good)? | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

| | 1 Very bad | 2 | 3 | 4 | 5 | 6 | 7 Very good |
|---|---|---|---|---|---|---|---|
| Overall how satisfied were you with the total Governmental services on a scale from 1 (very bad) to 7 (very good) | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

- Do you have any recommendations to improve the Governmental service?

Thank you very much for your participation, your answers will guide us to develop the future services.

Nettskjema v81.1

**Supplementary file 2 Original Likert scales**
**Satisfaction with care**

| Satisfaction with care during pregnancy | Midwife-led care | Regular care | Adj.Mean difference | 95%CI | adj.p value |
|---|---|---|---|---|---|
| At my pregnancy check-ups I was always asked whether I had any questions | 5.61(1.54) | 4.55(2.19) | 1.06 | 0.54 to 1.59 | <0.001 |
| The midwives/nurses always kept me informed about what was happening related to my pregnancy | 6.10(1.24) | 5.53(1.77) | 0.54 | 0.12 to 0.95 | 0.014 |
| The doctor always kept me informed about what was happening related to my pregnancy | 5.13(1.67) | 5.06(1.90) | -0.004 | -0.52 to 0.48 | 0.982 |
| I was always given an active say in decisions about my care in pregnancy | 4.40(1.84) | 4.31(2.06) | 0.08 | -0.45 to 0.65 | 0.768 |
| I always felt my worries, anxieties or concerns about the pregnancy and the baby were taken seriously by the midwives/nurses | 5.90(1.44) | 5.57(1.59) | 0.34 | -0.10 to 0.76 | 0.123 |
| I always felt my worries, anxieties or concerns about the pregnancy and the baby were taken seriously by the doctors | 5.36(1.69) | 5.15(1.87) | 0.20 | -0.34 to 0.69 | 0.461 |
| At my check-ups the midwives/nurses often seemed rushed and busy | 1.30(1.02) | 2.18(1.89) | -0.88 | -1.32 to -0.47 | <0.001 |
| At my check-ups the doctors often seemed rushed and busy | 2.03(1.90) | 2.38(2.10) | -0.33 | -0.90 to 0.25 | 0.246 |
| Care in pregnancy was provided in a competent way | 5.24(1.33) | 5.42(1.49) | -0.19 | -0.58 to 0.21 | 0.336 |
| I was happy with the emotional support I received in in pregnancy from midwives/nurses | 6.11(1.20) | 5.19(1.84) | 0.92 | 0.46 to 1.33 | <0.001 |
| I was happy with the emotional support I received in in pregnancy from doctors | 5.22(1.64) | 4.76(2.1) | 0.40 | -0.17 to 0.93 | 0.154 |
| I was happy with the physical care I received in pregnancy from midwives/nurses | 5.98(1.30) | 5.72(1.77) | 0.26 | -0.17 to 0.67 | 0.234 |
| I was happy with the physical care I received in pregnancy from doctors | 5.45(1.74) | 5.36(2.01) | 0.03 | -0.56 to 0.53 | 0.906 |

| | | | | | |
|---|---|---|---|---|---|
| My privacy was very well respected and taken care of from midwives/nurses | 6,58(0.89) | 6.43(1.01) | 0.26 | -0.17 to 0.67 | 0.234 |
| I was afraid that I would have problems to reach pregnancy care because of occupation soldiers or settlers | 1.03(0,30) | 1.14(0,87) | -0.10 | -0.31 to 0.06 | 0.275 |
| Describe your overall satisfaction with the care you received during last pregnancy at the MOH clinic | 5.57 | 5.38 | 0.16 | -0.18 to 0.46 | 0.335 |
| **Satisfaction with care during labour and birth** | | | | | |
| The midwifes always kept me informed about what was happening during labour and birth | 5.29(1.89) | 4.84(2.04) | 0.62 | 0.06 to 1.18 | 0.030 |
| The doctors always kept me informed about what was happening during labour and birth | 4.60(1.93) | 4.29(1.89) | 0.52 | -0.09 to 1.10 | 0.099 |
| I was always given an active say in decisions about my care during labour and birth | 3.91(2.05) | 3.8(2.24) | 0.49 | -0.11 to 1.07 | 0.103 |
| The midwives were encouraging | 5.27(1.99) | 4.94(1.14) | 0.56 | -0.05 to 1.15 | 0.067 |
| The doctors were encouraging | 4.70(2.02) | 4.44(2.35) | 0.46 | -0.18 to 1.12 | 0.166 |
| The midwives provided reassurance if I needed it | 5.41(2.13) | 4.85(2.12) | 0.79 | 0.19 to 1.39 | 0.010 |
| The doctors provided reassurance if I needed it | 4.79(2.18) | 4.32(2.36) | 0.73 | 0.10 to 1.37 | 0.027 |
| I felt nobody really cared for me during labour and birth | 2.51(2.24) | 2.54(2.22) | -0.29 | -0.93 to 0.33 | 0.363 |
| I was happy with the emotional support I received from the midwives | 5.19(2.14) | 4.67(2.22) | 0.79 | 0.18 to 1.39 | 0.013 |
| I was happy with the emotional support I received from the doctors | 4.52(2.08) | 4.32(2.36) | 0.47 | -0.17 to 1.11 | 0.158 |
| Care during labour and birth was provided in a professional way | 4.72(1.85) | 4.83(1.94) | 0.10 | -0.43 to 0.64 | 0.704 |
| I wish someone from my family could accompany me during labour and birth | 6.05(1.82) | 5.99(2.19) | 0.03 | -0.56 to 0.64 | 0.914 |

| | | | | | |
|---|---|---|---|---|---|
| My privacy was well respected during labour and birth | 6.00(1.49) | 5.23(1.96) | 1.00 | 0.52 to 1.50 | <0.001 |
| I felt abused from the midwives during labour and birth | 1.55(1.55) | 1.91(1.89) | -0.56 | -1.08 to -0.07 | 0.031 |
| I felt abused from the doctors during labour and birth | 1.51(1.47) | 1.68(1.72) | -0.33 | -0.85 to 0.13 | 0.168 |
| When labour started I was afraid that I would not reach hospital because of the military checkpoints and occupation soldiers or settlers | 1.36(1.36) | 2.24(2.15) | -0.79 | -1.34 to -0.24 | 0.008 |
| Overall, how would you describe the care you received in labour and birth (1 very poor, 7 very good | 5.14(1.53) | 4.88(1.75) | 0.51 | 0.06 to 0.98 | 0.028 |
| **Satisfaction during postnatal hospital stay** | | | | | |
| I was given the advice I needed with breast feeding at hospital | 4.48(2.24) | 3.19(2.30) | 1.35 | 0.69 to 2.19 | <0.001 |
| I was given the advice I needed about how to handle, settle or look after my baby in the hospital | 4.28(2.19) | 2.68(2.27) | 1.68 | 1.03 to 2.43 | <0.001 |
| I was given the advice I needed about any problems with the baby`s health and progress in the hospital | 4.45(2.24) | 2.83(2.29) | 1.72 | 1.02 to 2.53 | <0.001 |
| I was given the advice I needed in hospital about my own health and recovery in after birth | 4.37(2.33) | 3.03(2.20) | 1.42 | 0.78 to 2.11 | <0.001 |
| Care after birth in hospital was provided in a competent way | 4.81(1.87) | 3.69(1.99) | 1.20 | 0.61 to 1.88 | <0.001 |
| Midwives in hospital were supportive after birth | 5.48(1.85) | 4.05(2.12) | 1.52 | 0.92 to 2.17 | <0.001 |
| Doctors in hospital were supportive after birth | 4.701.87) | 3.25(2.30) | 1.53 | 0.90 to 2.26 | <0.001 |
| I was happy by the emotional support from midwives after birth in hospital | 5.42(1.95) | 3.68(2.16) | 1.81 | 1.19 to 2.47 | <0.001 |
| My privacy was taken good care of at the hospital after birth | 6.21(1.16) | 4.89(2.03) | 1.38 | 0.89 to 1.99 | <0.001 |

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|---|---|---|---|---|---|
| Overall, how would you describe the care you received in hospital after birth (1 is very poor and 7 is very good) | 5.01(1.52) | 4.1(1.85) | 0.98 | 0.49 to 1.57 | <0.001 |
| **Satisfaction with care received from Governmental clinic after birth** | | | | | |
| I was given the advice I needed at the clinic about how to handle, settle or look after my baby | 4.83(1.84) | 4.37(2.21) | 0.49 | -0.10 to 1.04 | 0.097 |
| At the clinic I was given the advice I needed about any problems with the baby`s health and progress | 5.06(1.58) | 4.61(2.04) | 0.49 | -0.03 to 1.05 | 0.060 |
| At the clinic I was given the advice I needed about my own health and recovery after the birth | 4.38(2.00) | 4.03(2.27) | 0.35 | -0.25 to 0.94 | 0.244 |
| At the clinic the nurse only had time to vaccinate the baby, no time for individual information | 2.54(2.07) | 2.10(1.93) | 0.83 | -0.18 to 0.90 | 0.185 |
| My privacy was taken good care of at the clinic | 5.98(1.12) | 6.03(1.14) | -0.04 | -0.38 to 0.32 | 0.803 |
| I was happy for emotional support I received at the clinic after birth | 4.95(1.83) | 5.09(1.72) | -0.12 | -0.63 to 0.37 | 0.641 |
| I received good advice regarding family planning and contraceptives at the clinic | 4.51(2.05) | 3.74(2.21) | 0.76 | 0.18 to 1.32 | 0.012 |
| Overall, how would you describe the care your baby received at the clinic after birth (1 is very bad and 7 is very good) | 5.43(1.2) | 5.80(1.01) | -0.34 | -0.67 to -0.02 | 0.032 |
| Overall, how would you describe the care you received for yourself at the clinic after birth (1 is very bad and 7 is very good) | 4.61(1.44) | 4.79(1.15) | -0.17 | -0.60 to 0.24 | 0.447 |
| Overall how satisfied were you with all care after birth that you received from Government services | 4.79(1.15) | 4.93(1.14) | -0.12 | -0.46 to 0.19 | 0.460 |
| Overall how satisfied were you with the total Governmental services on a scale from 1 (very bad) to 7 (very good) | 5.04(1.35) | 4.88(1.15) | 0.16 | -0.19 to 0.51 | 0.366 |

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| **Satisfaction during postnatal home visit** | |
| During the home visit the midwife/nurse gave me the advice I needed with breastfeeding | 5.91(1.42) |
| During home visit I was given the advice I needed to handle and look after my baby | 5.63(1.57) |
| During the home visit I was given the advice I needed to look after my own health and recovery after birth | 6.01(1.54) |

| | |
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| I got enough time to ask all the questions I had during home visit | 5.51(1.37) |
| I receive helpful information about family planning during the home visit | 5.26(2.04) |
| I was happy for the emotional support I received from the midwife/nurse during home visit | 6.50(0.87) |
| Overall, how would you describe the care you received for yourself at home visit (1 means very bad and 7 means very good) | 6.05(0.98) |
| Overall, how would you describe the care your baby received at home visit (1 means very bad and 7 means very good) | 5.83(1.18) |

**STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *case-control studies***

| Section/Topic | Item # | Recommendation | Reported on page # |
|---|---|---|---|
| **Title and abstract** | 1 | (*a*) Indicate the study's design with a commonly used term in the title or the abstract | 3 |
| | | (*b*) Provide in the abstract an informative and balanced summary of what was done and what was found | 3 |
| **Introduction** | | | |
| Background/rationale | 2 | Explain the scientific background and rationale for the investigation being reported | 4 & 5 |
| Objectives | 3 | State specific objectives, including any prespecified hypotheses | 6 |
| **Methods** | | | |
| Study design | 4 | Present key elements of study design early in the paper | 3 & 6 |
| Setting | 5 | Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection | 6,7 & 8 |
| Participants | 6 | (a) Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls | 7 |
| | | (*b*) For matched studies, give matching criteria and the number of controls per case | |
| Variables | 7 | Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable | 8 |
| Data sources/ measurement | 8* | For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group | 7 & 8 |
| Bias | 9 | Describe any efforts to address potential sources of bias | 7 |
| Study size | 10 | Explain how the study size was arrived at | 6 |
| Quantitative variables | 11 | Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why | 8 |
| Statistical methods | 12 | (*a*) Describe all statistical methods, including those used to control for confounding | 8 & 9 |
| | | (*b*) Describe any methods used to examine subgroups and interactions | 8 |
| | | (*c*) Explain how missing data were addressed | - |
| | | (*d*) If applicable, explain how matching of cases and controls was addressed | - |
| | | (*e*) Describe any sensitivity analyses | - |
| **Results** | | | |

| | | | |
|---|---|---|---|
| Participants | 13* | (a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed | 9 & 10 |
| | | (b) Give reasons for non-participation at each stage | - |
| | | (c) Consider use of a flow diagram | - |
| Descriptive data | 14* | (a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders | 9 & 10 |
| | | (b) Indicate number of participants with missing data for each variable of interest | 9 & 10 |
| Outcome data | 15* | Report numbers in each exposure category, or summary measures of exposure | |
| Main results | 16 | (*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included | 11 & 12 |
| | | (*b*) Report category boundaries when continuous variables were categorized | - |
| | | (*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period | - |
| Other analyses | 17 | Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses | 12 & 13 |
| **Discussion** | | | |
| Key results | 18 | Summarise key results with reference to study objectives | 14 & 15 |
| Limitations | 19 | Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias | 16 |
| Interpretation | 20 | Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence | 15 & 16 |
| Generalisability | 21 | Discuss the generalisability (external validity) of the study results | 16 & 17 |
| **Other information** | | | |
| Funding | 22 | Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based | 17 |

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.