Decreased fetal movements in late pregnancy - importance today?

by

Julie Victoria Holm Tveit

Department of Perinatal Research

Women and Children's Division

Oslo University Hospital, Rikshospitalet

The Faculty of Medicine

University of Oslo

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…if you can dream it, you can do it….

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I dedicate this thesis to my late father.

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List of papers

I. Tveit JVH, Saastad E, Stray-Pedersen B, Børdahl PE, Frøen JF. Maternal characteristics and pregnancy outcomes in women presenting with decreased fetal movements in late pregnancy. *Acta Obstetricia et Gynecologia. 2009; 88: 1345-1351*

II. Tveit JVH, Saastad E, Stray-Pedersen B, Børdahl PE, Frøen JF. Concerns for decreased foetal movements in uncomplicated pregnancies – Increased risk of foetal growth restriction and stillbirths among women being overweight, advanced age or smoking. *The Journal of Maternal-Fetal & Neonatal Medicine, October 2010; 23(10): 1129-1135*

III. Tveit JVH, Saastad E, Stray-Pedersen B, Børdahl PE, Flenady V, Fretts R, Frøen JF. Reduction of late stillbirth with the introduction of fetal movement information and guidelines - a clinical quality improvement. *BMC Pregnancy and Childbirth 2009, 9:32* Correction: Tveit JVH, Saastad E, Stray-Pedersen B, Børdahl PE, Flenady V, Fretts R, Frøen JF. Reduction of late stillbirth with the introduction of fetal movement information and guidelines - a clinical quality improvement. *BMC Pregnancy and Childbirth 2010, 10:49*

IV. Saastad E, Tveit JVH, Flenady V, Stray-Pedersen B, Fretts R, Børdahl PE, Frøen JF. Implementation of uniform information on fetal movement in a Norwegian population reduced delayed reporting of decreased fetal movement and stillbirths in primiparous women – a clinical quality improvement. *BMC Research Notes 2010, 3:2*

The papers are referred to by their Roman numeral throughout the thesis.

Abbreviations

BMI	Body mass index
CI	Confidence interval
CTG	Cardiotocography
DFM	Decreased fetal movements
FGR	Fetal growth restriction
FM	Fetal movements
FMC	Fetal movement counting
LMP	Last menstrual period
MBRN	Medical Birth Registry in Norway
NIPH	Norwegian Institute of Public Health
NST	Nonstress test
OR	Odds ratio
PTB	Preterm birth
SGA	Small for gestational age
RCT	Randomized controlled trial
WHO	World Health Organization

1. Introduction

1.1. Fetal movements – general aspects

Fetal activity is one of the first signs of fetal life perceived by the pregnant woman. The first written report on fetal movements (FM) might date back to biblical times with the description of Rebekah's twin pregnancy, about which it was said "the children struggled together within her" (Genesis 25:22) (1).

Passive unstimulated activity starts as early as 7 weeks of gestation and becomes more sophisticated and coordinated by the end of pregnancy (2). The movements can be visualized with the aid of ultrasound , and the development of the movement pattern in the intrauterine environment of the fetus can be followed throughout the pregnancy (3). Up to about 20 weeks of gestation the entire fetus can be visualized within the field of a single real-time array transducer. This allows for a quantification of FM and a detailed evaluation of the movement quality (3). It is not possible to visualize the entire fetus after about 20 weeks of gestation, and small movements might go unnoticed. However, real-time ultrasound scan observations have been and are still the most accurate method of assessing fetal body movements for research purposes (4).

Pregnant women are usually able to sense FM at 18 – 20 weeks of gestation (5); multiparous can, however, feel the movements from 16 weeks of gestation (6). The movements are at first weak and can be difficult to distinguish from intestinal activity. As integration proceeds, the movements become more complex, regular, and sustained.

In general, FM can be divided into two categories: generalized and small movements (6). Generalized FM are usually perceived by the mother and include movements such as stretching, kicking and rollovers. The small movements, which are not perceived by the mother, include activities such as grip movements, nonnutritive sucking, tongue protrusion, flexing and stretching of fingers and toes, and breathing movements (6). Perceived fetal activity in late gestation is related to the strength of the generalized movements. Vigorous or sustained activity results from combined lower limb and trunk motion and is commonly referred to as stretching, kicking, and rollovers (6;7).

Several research groups have described the onset and development of FM, classifying them according to patterns (4;8). De Vries et al. were one of the first groups to classify various spontaneous patterns of movement between 7 and 19 weeks of gestation using ultrasound observations (4;8;9). General movements of the head, trunk, and extremities first appear between 8.5 and 9.5 weeks of gestation. During a 60-minute viewing period, a fetus is described as being active for about 14% of the time. By 14-19 weeks of gestation, the fetus is very active, with the longest period without general movements lasting only 5-6 minutes (4). A decrease in the frequency per hour of generalized or gross movements at 24 -32 weeks of gestation has been noted by several authors (10;11). There is a conflict of opinion regarding the difference between the second and the third trimesters in the quantity of general movements experienced. It has been suggested that as a fetus approaches term, the activity level plateaus (10;11) or decreases either slightly or considerably, depending upon the author (12;13). This could be due to several confounding factors such as large inter-individual variability in the quantity of FM, fetal activity cycles, and variation in the methodology used (12). Rayburn et al. suggested that the change in

the pattern of FM during the last trimester is the result of a combination of improved coordination due to fetal neurological maturation (14), reduced amniotic fluid volume, and increased fetal size (6). However, the same authors and others have proposed that as the pregnancy proceeds, the weekly number of FM increases, reaching their peak sometime between 29 and 38 weeks of gestation (6). Sadovsky et al. reported that the quality of movements changes with gestational age, whereas the proportion of strong and rolling movements increases until 37 weeks of gestation. The proportion of weak movements exhibited the opposite developmental trend (15). Previous reports also suggest that there are significant diurnal variations in normal fetal activity that change gradually with gestation (16;17). Periods of quietness and activity are prolonged with gestation (14). Although the movements might be sensed differently by the mother, there is no evidence that activity is reduced towards term in normal healthy pregnancy during the active periods (17;18).

1.2. Maternal perception of FM and factors influencing the movement pattern

A range of methodologies have been used for objective measurements of FM, but every method has its limitations and a gold standard is difficult to define. Maternal perception of FM arises first and foremost as a result of pressure against body-wall structures, and thus the mother's perception reflects gross FM or limb movements (16;19). The reported mean proportion of movements perceived by the mother and documented during ultrasound monitoring at the same time has ranged from 37% to 88%, increasing with the strength of gross movements and contributing parts involved (20-28). A common factor in these studies is that the mother is lying down and focusing on fetal activity, which constitutes the only situation in which maternal

perception and objective measures of FM are strongly correlated with actual fetal activity. In other settings, both the actual frequency of movements as well as the mother's ability to perceive them are influenced by factors such as activity and exercise (29), anxiety (30), administration of corticosteroids (betamethasone and dexamethasone) (6;31-33), blood sugar (34), intrauterine growth restriction (19;35), maternal position (36), major fetal malformations (37;38), obesity (39), placenta localization (16), smoking (40), sedating drugs (6), stress (41), and sound and vibroacoustic stimulation (42;43). Parity has not been found to affect maternal perception of FM in the third trimester (16). Although multiparous might be able to perceive FM earlier in pregnancy than primiparous, the latter reach the perception level of the former relatively early in the third trimester (17).

1.3. Decreased fetal movements

Throughout history, maternal perception of FM has been a reassuring sign of fetal well-being, while the absence of FM has been regarded as a reason for alarm. Although a lack of FM was proposed by Raynalde as a sign of intrauterine death as early as 1545 (44), the view on the clinical importance of FM throughout the centuries has been conflicting. In the late 19th century, the need for objective measures led to the use of tambours (45) and auscultation of "bruit de choc foetal" (46;47). While some researchers argued that FM were not clinically significant, others believed they demonstrated good health (1). Research on FM in the 20th century was scarce before the introduction in the early 1970s of two-dimensional ultrasonography, with the ability to produce a number of images per minute rendering this tool able to provide real-time imaging. This made it possible to observe the fetus in its own intrauterine

environment (9), and early reports by Mathews (1972) (48) and Sadovsky and Yaffe (1973) (49) suggest that FM are valuable indicators of fetal well-being (1;50).

Fetal activity serves as an indirect measure of the function and integrity of the developing central nervous system. Decreased fetal movements (DFM) have a well-established role as an adaptive response to suboptimal intrauterine environments (figure 1), which are mostly due to uteroplacental insufficiency and might lead to either acute or chronic fetal hypoxia (51). The fetal physiological response to hypoxia is a dose-dependent redistribution of oxygenated blood to the essential organs: the brain, heart, and adrenals glands (52). This ”brain-sparing” is accompanied by general energy saving – which means less or no FM (53-55). Thus, in its early stages DFM is an adaptive and protective reflex, while in later stages it could represent a final decompensation that is associated with increasing injury. Episodes of low fetal activity are normal in healthy fetuses when related to diurnal variations that change

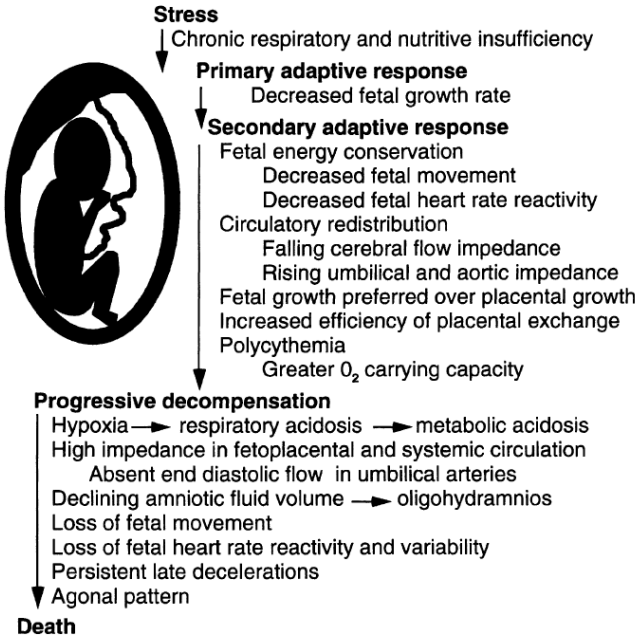


Figure 1. Doppler velocimetry for fetal surveillance. Adverse perinatal outcome and fetal hypoxia. In Maulik, D (ed) Doppler ultrasound in obstetrics and gynecology, 1997; 349 New York, Springer Verlag. Copyright©1997 Springer-Verlag.
Note that the depicted sequence is an approximation and the actual course may vary depending upon the characteristics of the chronic deprivation and the individual fetal ability to cope.

gradually with gestation (16;17). However, they might be a sign of fetal compromise and be associated with a wide variety of pregnancy pathologies (7;56-59). Possible causes for decreased fetal activity might be linked to the mother and/or the baby and include abnormal amniotic fluid, fetal abnormalities, reduced maternal perception, and fetal complications/fetal compromise (38;60). The inter- and intra-individual differences between the fetuses, as well as the perception of individual mothers, are probably the major component of the variations in FM and the source of the challenge of what constitutes a decrease in fetal activity. However, knowledge of those pregnancies that are more likely to be affected by DFM within a total population and their increased risk of adverse pregnancy outcomes is limited.

1.4. DFM and the risk of adverse outcomes

Maternal reporting of DFM is a frequent reason for unplanned health consultations throughout the third trimester, and a common challenge in obstetric care – the frequency ranges from 4% - 16% of all pregnancies in various populations (1;61) and 6% in a recent study (62). In pregnancies deemed to be at high risk, a reduction in FM is associated with various pregnancy pathologies (1;49;63). However, most consultations regarding DFM occur in low-risk pregnancies. Women with concerns about DFM often reportedly constitute a heterogeneous group, and health care professionals have had changing views on whether a subjective maternal perception of DFM is sufficient to identify risk. Even though smaller studies indicate increased risk, the proportion of cases of DFM with known complications before being examined for DFM has yet to be established (1). This could conceal that mothers with known-risk pregnancies are vigilant to fetal FM and thus more prone to report DFM. If so, a

higher frequency of adverse outcomes in this group might be a self-fulfilling prophecy. One of the largest and most often referred to study to date (*n*=425), indicates that outcomes are better in pregnancies with DFM in than in control pregnancies (60). However, some of the core outcomes were not reported (e.g., fetal growth restriction, FGR), and the most severe cases of DFM (i.e., absence of FM) were excluded. The reduced risk of preterm birth (PTB) was probably attributable to a large proportion of cases of DFM only being present at term (i.e., they were not eligible for assessing the risk of PTB). In addition, the cases in the present study were also capture retrospectively by diagnosis, which could lead cases of DFM being identified as those left with no better diagnosis after examination for DFM. A similar criticism can be applied to many previous reports.

Among the most common reasons for critique of care by audits of stillbirth performed by multi-professional are misdiagnosis and mismanagement of FGR, and reports of DFM (64;65). The most frequently reported associations between DFM and adverse outcomes is that between infants who are small for gestational age (SGA) and FGR (5;33;58;61;66-73). FGR in the third trimester represents severe risk for death, injury, and permanent disability (74-76). About half of unexplained stillbirths have a birthweight less than the 10th percentile when corrected for gestational age and parental characteristics (77). In support of the association with DFM, growth-restricted fetuses exhibit significantly lower activity rates than fetuses with normal growth at all gestational ages, when evaluated by ultrasound (78-80), and almost always display a dose-dependent reduction in FM during hypoxia (55;80-83). Other adverse outcomes or conditions during pregnancy that are associated with DFM are congenital malformations and chromosomal abnormalities (3;84;85), fetomaternal transfusion (86), intrauterine infections (87), low Apgar scores and acidemia (55;88),

low birthweight (3;85), hypoglycemia (3;85), oligohydramnios (89-91), PTB (3;61;71;72;85), perinatal brain injury and disturbed neurodevelopment (92;93), threatening preterm labor (3;85), umbilical cord complications and placental insufficiencies (3;71;85), and emergency deliveries, inductions of labor and cesarean sections, stillbirth, and neonatal deaths (49;61;69;72;88). After excluding women electively delivered by induction of labor or cesarean section, Valentine and coworkers (1986) reported an increase in the incidence of preterm labor among women presenting with DFM preterm (prior to 37 weeks) (33).

1.5. Management of DFM

Existing guidelines for the management of routine antenatal care from the UK (National Institute of Clinical Excellence) and in Norway focus on demedicalization of pregnancy, with reduced frequency of standard antenatal visits and fewer screening tests (94;95). In this way, pregnant women will assume more responsibility for their baby's health, but the optimal information and tools that would empower them to do so and provide awareness to act on signs of complications have not been identified. The guidelines for uncomplicated pregnancies provide little guidance on DFM for pregnant women and their care providers (96;97). No evidence-based guidelines for the management of DFM exist, controlled trials are lacking, and evidence for various management plans is scarce (7;98). While they acknowledge the importance of DFM by recommending that women should be informed about the need to contact health care professionals if they perceive DFM, few, if any, provide further guidance as to how to define or manage DFM (94;99;100). Consequently, management varies significantly, ranging from the use of the nonstress test (NST) or cardiotocography

(CTG) as the sole screening tool (61), to hospitalization for clinical examination of all women with DFM for CTG every 8 hours for 48 hours, ultrasound examination including a structured biophysical profile, umbilical artery Doppler, Kleihauer-Betke's test, maternal hemoglobin testing, amnioscopy if more than 37 weeks of gestation, and repeated antepartum testing after discharge (7;61;68;71;98;101).

1.6. FM assessment and fetal movement counting

Maternal perception of FM is the oldest screening tool for assessing fetal well-being. It is a universally implemented self-screening method that can be administered and interpreted individually by all pregnant women, with or without the participation, support, and guidance of health care professionals (61). Maternal vigilance toward DFM and prompt maternal action might prevent adverse pregnancy outcomes, as excessive delay in maternal reporting of DFM is associated with prenatal deaths (58;69;102).

A much-debated issue is whetever women should routinely receive uniform information about FM, and whether this should include formal fetal movement counting (FMC) (103). The concept of FMC is based on the presumption that the maternal perception of FM reflects fetal activity, or at least gross fetal body or limb movements (103). FMC is a method used by the mother to quantify FM. While early reports by Sadovsky and Yaffe (49), Pearson and Weaver (69), and Leader et al. (104) suggest that such counting is valuable in evaluating the antepatum condition of the child, others have doubted these conclusions (1).

Various methods of maternal counting with different alarm limits have been published (1;7;57). Two main categories of counting methods exist, using either a

"fixed time" or "fixed number" approach. The "Daily Movement Count" (49) reflects 12 hours of maternal FMC through both rest and daily activities i.e., "fixed time". This method was later modified to a shorter and repeated interval of counting (1). The "Count to ten" or "Cardiff" method measures the time it takes to feel ten movements, i.e., "fixed number" (105). The latter method is the most user-friendly, since a shorter time is needed to perform counting for normal pregnancies. This counting method were the mother is lying down focusing on FM has also been shown to have the highest compliance and acceptance rates (57;106;107).

The daily routine of briefly monitoring fetal activity could provide guidance and support to the pregnant mother, encouraging vigilance and daily attention to their pregnancy, using fetal activity as a sign of well-being (103). While this formal self-screening tool appears to be popular among pregnant women (108;109), it has experienced fluctuating popularity and support among health-care professionals over the last few decades (1). One in six Australian obstetricians, and one in three UK obstetricians believe that maternal screening of FM is of no benefit (96), and many contemporary guidelines for antenatal care in the UK and Norway state that "routine movement counting" in normal pregnancies should not be offered (94;100;110). In contrast, the USA has several guidelines on FM, two of which recommend formal FMC for normal pregnancies (111;112). This variation in clinical practice might be attributable to differences in the interpretation of published data on DFM.

There have been many attempts to establish a definition of DFM based on a given cut-off value, and around a dozen kick charts and limits have been published (103). However, with the large normal inter- and intra-individual variability in FM, no specific alarm limit has so far proven superior to the mother's subjective perception of reduced fetal activity (1;98;113). The only definition of DFM based on focused

counting data in a total population that has subsequently been tested as a screening tool in a total population, is the rule of "ten movements within 2 hours" in a study by Moore and Piacquadio (114). This is currently the method of FMC recommended by the American Academy of Pediatrics and the American College of Obstetricians and Gynecologists (99). Many other formal definitions of DFM have been proposed, most of which are based on counting through both rest and activity (1;103;115). However, the most important clinical definition and understanding of DFM is still the mother's own perception of a decrease in FM (1;98;113).

1.7. Effects of increased maternal awareness toward FM in populations

Even though the effectiveness of formal FMC and distinct alarm limits has been disputed, the majority of populations in which increased awareness, vigilance, and FMC have been introduced have seen reduced rates of stillbirth (1;102;103;114). Four controlled trials (one randomized) have compared FMC versus no FMC and suggest that there is a benefit of FMC in reducing the risk of stillbirth (102;114;116-119). Two of these trials were conducted in total populations (114;119), while two were conducted in mixed low- and high-risk populations within single institutions (116-118). Three studies (Neldam 1983, Westgate and Jamieson 1986, Lobb et al. 1985) based their alarm limits on the Daily Movement Count data, while one utilized the "count to ten" or "Cardiff" method of Pearson and Weaver 1976 (69) (Moore and Piacquadio 1990) (114). The first study, by Westgate and Jamieson published in 1986, was performed in New Zealand (in 1981-1984). Comparing FMC versus no FMC, they reported a relative risk of stillbirth of 0.76 (95% confidence interval (CI) 0.55 - 1.04), and 0.56 (95% CI 0.35 - 0.90), respectively, for stillbirths perceived as having

been avoidable (119). The second study, by Moore and Piacquadio, was conducted in the USA in 1989 and 1990, and found that the comparable risks of stillbirth were 0.42 (95% CI 0.23 - 0 .76) and 0.25 (95% CI 0.07 - 0.88), respectively (114;120). Both studies were conducted in total populations and as prospective cohorts with a control period followed by an intervention period. The study by Steen Neldam published in 1986 (50) and the study by Lobb and coworkers in 1985 (116) were both conducted in mixed low-and high-risk populations within single institutions. Even though the study by Neldam is the only randomized controlled trial (RCT) to date of antepartum testing of any kind versus no testing that has found reduced mortality, it has been found by some researchers to be methodologically substandard since the randomization procedure was based on the mother's initial even or odd booking number when included in the study (57). However, the relative risks of stillbirths and avoidable stillbirths in that study were reported to be 0.25 (95% CI 0.07 - 0.88), and 0.27 (95% CI 0.08 - 0.93), respectively. The study of Lobb and coworkers compared two units at Liverpool Maternity Hospital in the UK with "competing" protocols based on a pre-existing difference in protocol. The unit using FMC reported relative risks of stillbirth to be 0.92 (95% CI 0.6 - 1.35) and 0.86 (95% CI 0.49 - 1.52), respectively, for stillbirths perceived as avoidable (116).

The encouraging results from previous studies of whole populations have, however, been overshadowed by the negative findings from a large multicenter cluster RCT reported by Grant and coworkers in 1989 (102). That study failed to demonstrate the same benefit of counting using a kick chart for all pregnancies versus only for risk pregnancies in the same population (102). This is the most referred-to and influential publication on maternal counting, and as such is often cited as evidence against FMC (1;94;100). Still, the trial had a number of limitations (1;57). Of greatest importance is

the issue of contamination between the groups through the use of "within-hospital" clusters in which pregnant women in the same community were either urged to perform FMC or informed in writing that they were included in an FMC study and that they were not supposed to count FM. The problem of contamination is compounded by the use of kick charts for control-group women, on the basis of clinical discretion, as a part of the trial design. While no difference was shown in the stillbirth rate across the study groups, the overall late-gestation stillbirth rate fell during the study period from 4/1000 to 2.8/1000 (1;102).

The lowered overall stillbirth rates seen in the observational cohorts and during the cluster RCT might be equally attributed to increased awareness and vigilance as the actual FMC methods and alarm limits. Indeed, the cluster RCT used extreme limits (ten movements in 10 hours for 2 days or no movements for 1 full day) and based their "count to ten" method on the mother's perception through the day, and not on focused counting while lying down. Thus, the women took 162 minutes to count ten movements versus the average of 20 minutes reported in focused counting (17;114;121). Despite the extreme nature of such limits, they are still widely used (111). Today, there is no evidence that formal FMC, with its fixed alarm limits, is superior to maternal common sense, and thus no evidence to support the introduction of such counting in any total population using the existing alarm limits of FMC (103). However, promoting awareness by recommending that women count FM on a daily basis in the third trimester could provide additional awareness and be a supportive tool in the individual pregnancy that helps the expectant mother to identify significant changes. Nevertheless, the establishment of a single, definitive limit, which would arguably be better than maternal perception of DFM, is precluded by inter-individual variations, and does not exist (3).

2. Aims of the study

The overall aims of this thesis were:

I. To describe the epidemiology of maternal concerns regarding DFM and the risk of adverse outcome, and to evaluate the risk of adverse outcome related to maternal characteristics and maternal care-seeking behavior among affected women. To describe the management provided and the concern associated with DFM before any intervention.

II. To evaluate the effect of a clinical improvement intervention that aims to reduce the risk of adverse outcomes by implementing guidelines for management and provision of information on fetal activity in a total population.

The specific aims of the individual substudies were as follows:

- Paper I: To identify women affected by DFM in a total population, the risk of adverse outcomes, and the management provided.
- Paper II: To determine whether clinical characteristics of women in uncomplicated pregnancies presenting with DFM would help target subgroups of women at the highest risk. Furthermore, whether DFM in complicated pregnancies identified additional needs for intensified management.
- Paper III: To examine two cohorts of women with DFM before and during two consensus-based interventions aiming to improve care through: (1) written information to women about fetal activity and DFM, including an invitation to monitor FM, and (2) guidelines for the management of DFM for health care professionals.

- Paper IV: To evaluate an intervention of implementation of uniform information on fetal activity to women during the antenatal period.

3. Materials and methods

Two data sources were used for the papers reported in this thesis. Data from the Fetal Movement Intervention Assessment (Femina) study were used in papers I-IV, and data from the cross-sectional study were used in papers I and IV. Both studies have been described in detail in each paper in this thesis - this chapter provides an overview.

3.1. The Femina study

Women with a singleton pregnancy of at least 28 weeks gestation or more who reported a concern for DFM (either by spontaneous reporting or upon questioning) and women with a stillborn infant were registered prospectively for quality-assurance purposes at 14 delivery units in eastern Norway and the city of Bergen. The registrations were a part of the international collaboration, Femina. The pregnant population from the 14 hospitals has an annual birth rate of about 33,000 covering both urban and rural districts. Recurrent visits (from which a previous consultation for DFM was already registered) were excluded as we intended to report the number of women newly reporting DFM. The outcome of these pregnancies was our primary outcome, and these were the numbers needed to report outcomes (per pregnancy, not consultation, because this would introduce duplications and dependent data to the analysis).

There was a dual capture of deaths in the Femina study. Primarily, deaths were registered retrospectively by clinical study site coordinators (midwife or obstetrician) reporting births, deaths and causes of death monthly from the clinical logs and

hospital records. All hospitals provided monthly reports. In addition, women presenting with a complaint of DFM were captured prospectively, prior to the registration of outcome,to ensure completeness of data, but stillbirths not initially identified by DFM were excluded, as were pregnancies with a gestational age under 28 weeks and multiple pregnancies.

To ensure unbiased registrations for quality assurance-purposes, maternal consent was not sought. Key components of quality in health care is to ensure that health care is delivered consistently (to all patient groups alike), and that health care counteracts disparity by being accessible to all (122). To make sure the quality assurance had the ability to measure these aspects of quality in health care delivery, it was organized as local data collections in the individual hospitals. Only unidentifiable data was sent to the project coordinators. The most vulnerable minorities in our population are typically also the ones that health care fail to provide quality care (123). The choice to collect data without maternal consents was based on consensus among participating hospitals, consistent with Norwegian legislation at that time, and approved by the Regional Committees for Medical Research Ethics (REK. Ref. no. S–04018).

3.1.1. Data collection

The overall registrations started in June 2004 (by April 2005 all 14 hospitals were included) and ended in March 2007. The routine provision of information about fetal activity, including an invitation to monitor FM, and guidelines for management of DFM, were implemented in November 2005. The data presented in papers I and II were based on registrations taken during the preintervention period, from June 2004 to October 2005, while the data presented in papers III and IV were based on a

registration period that included 7 months of baseline observation followed by 17 months of intervention: from April 1, 2005 to March 31, 2007.

In Norway, almost all pregnant women attend the antenatal program, which is free of charge and is covered by the public health care services. The place of birth is arranged antenatally, in most cases the woman delivers at the local hospital, but she can apply for another delivery ward. The community midwives and general practitioners are in charge of the antenatal program, and without the possibility to perform a NST or ultrasound examinations locally, they usually refer the concerned mothers to the nearby hospital with a maternity ward. Hence, the pregnant women in Norway typically contact maternity wards directly (often the delivery ward where they plan to give birth) with any acute concerns for DFM. There are no private delivery wards in Norway. Women fulfilling the inclusion criteria were registered prospectively by their caregiver at the time she presented at the hospital. Pregnancy outcome was collected independently from the medical files after delivery by a study coordinator at each hospital. Data were anonymized and submitted to the study-coordinating centre.

Since there is no general consensus on any quantitative limit between "normal" and "abnormal" fetal activity for health care providers or the pregnant woman in Norway (115), a DFM-case was defined as *any woman presenting with concerns for DFM, irrespective of whether this was based on her subjective opinion or it emerged during an antenatal visit for other reasons*. DFM reported during visits for other pregnancy complications, and pregnancies in which any complications or anomalies were noted and indicated as preexisting on the data-collection form were defined as "DFM in a complicated pregnancy".

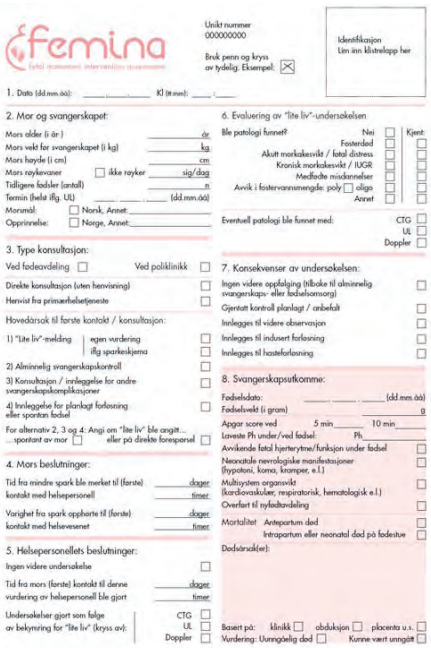
Comparisons of Femina data with data from the Medical Birth Registry in Norway (MBRN)

In addition to the original registrations, the numbers of births and stillbirths from the study population were obtained from the MBRN (124) to assess overall trends in stillbirth, for the most updated period available: April 2005 to December 2006. The final data set from the MBRN for 2007 in Norway was completed and released in December 2009.Upon receipt of these complete data we found discrepancies upon the data we had previously received from and published (paper III)). The MBRN performed an inquiry into the two data deliveries, and on February, 17, 2010, the MBRN issued a public report (Vollset, 29th of January 2010; available on request from the MBRN) which rectified the first set of data we had used (discussed further in section 5.6).

3.1.2. Outcome measures

Outcome measures for papers I - III were based on data provided on the Femina registration forms.

"Maternal characteristics and potential risk factors for DFM" were dichotomized as follows; advanced maternal age (≥ 35 years), overweight (defined as a pre-pregnancy body mass index, BMI, of > 25 kg/m^2), smoking habits, primiparity (primiparous versus multiparous), and fetal gender.


femina

Unikt nummer
00000000

Bruk penn og kryss av tydelig. Eksempel: ☒

Identifikasjon
Lim inn klistrelapp her

1. Dato (dd.mm.åå): _____ Kl (tt:mm): ____

2. Mor og svangerskapet:
Mors alder (i år) _____ år
Mors vekt før svangerskapet (i kg) _____ kg
Mors høyde (i cm) _____ cm
Mors røykevaner ☐ ikke røyker _____ sig/dag
Tidligere fødsler (antall) _____ n
Termin (helst ifg. UL) _____ _____ _____ (dd.mm.åå)
Morsmål: ☐ Norsk, Annet:_____
Opprinnelse: ☐ Norge, Annet:_____

3. Type konsultasjon:
Ved fødeavdeling ☐ Ved poliklinikk ☐
Direkte konsultasjon (uten henvisning) ☐
Henvist fra primærhelsetjeneste ☐
Hovedårsak til første kontakt / konsultasjon:
1) "Lite liv"-melding | egen vurdering ☐ | ifg sparkeskjema ☐
2) Alminnelig svangerskapskontroll ☐
3) Konsultasjon / innleggelse for andre svangerskapskomplikasjoner ☐
4) Innleggelse for planlagt fødsling eller spontan fødsel ☐
For alternativ 2, 3 og 4: Angi om "lite liv" ble angitt ... spontant av mor ☐ eller på direkte forespørsel ☐

4. Mors beslutninger:
Tid fra mindre spark ble merket til (første) kontakt med helsepersonell _____ dager _____ timer
Varighet fra spark opphørte til (første) kontakt med helsevesenet _____ dager _____ timer

5. Helsepersonellets beslutninger:
Ingen videre undersøkelse ☐
Tid fra mors (første) kontakt til denne vurdering av helsepersonell ble gjort _____ dager _____ timer
Undersøkelser gjort som følge av bekymring for "lite liv" (kryss av): CTG ☐ UL ☐ Doppler ☐

6. Evaluering av "lite liv"-undersøkelsen
Ble patologi funnet? Nei ☐ Kjønt:
Fosterdød ☐ ☐
Akutt morkakesvikt / fetal distress ☐ ☐
Kronisk morkakesvikt / IUGR ☐ ☐
Medfødte misdannelser ☐ ☐
Avvik i fostervannsmengde: poly ☐ oligo ☐ ☐
Annet ☐ ☐
Eventuell patologi ble funnet med: CTG ☐ UL ☐ Doppler ☐

7. Konsekvenser av undersøkelsen:
Ingen videre oppfølging (tilbake til alminnelig svangerskaps- eller fødselsomsorg) ☐
Gjentatt kontroll planlagt / anbefalt ☐
Innlegges til videre observasjon ☐
Innlegges til indusert forløsning ☐
Innlegges til hasteforløsning ☐

8. Svangerskapsutkomme:
Fødselsdato: _____ _____ _____ (dd.mm.åå)
Fødselsvekt (i gram) _____ g
Apgar score ved 5 min _____ 10 min _____
Laveste Ph under/ved fødsel: Ph_____
Avvikende fetal hjertertyrtme/funksjon under fødsel ☐
Neonatale nevrologiske manifestasjoner (hypotoni, koma, kramper, e.l.) ☐
Multisystem organsvikt (kardiovaskulær, respiratorisk, hematologisk e.l.) ☐
Overført til nyfødtavdeling ☐
Mortalitet Antepartum død ☐ Intrapartum eller neonatal død på fødestue ☐
Dødsårsak(er):
Basert på: klinikk ☐ obduksjon ☐ placenta u.s. ☐
Vurdering: Uunngåelig død ☐ Kunne vært unngått ☐

"Maternal behavior" (timeliness of maternal help-seeking behavior) was measured as expectance/ time lapsed before contacting health professionals if the woman perceived absence or DFM; dichotomized at > 24 hours with absent FM and > 48 hours with DFM (58;102). The circumstances under which the women's concerns were presented were also registered. The covariates related to "maternal care-seeking behavior" in paper II were stratified according to expectance/the amount of time that lapsed before contacting health professionals. This stratification was based on previous knowledge of the impact of maternal expectance (considered seriousness) and frequent used advice of fetal surveillance (58;102). Maternal behaviors were stratified as follows;

- 1: > 24 hours with absent FM with no preceding decrease in fetal activity.
- 2: > 24 hours with absent FM with a preceding decrease in fetal activity of > 48 hours.
- 3: >12 hours with absent FM without a preceding decrease in fetal activity.
- 4: < 12 hours with absent FM without a preceding decrease in fetal activity.
- 5: > 48 hours with DFM without a perceived absence of fetal activity.
- 6: < 48 hours with DFM without perceived absence of fetal activity before contacting health professionals.

"Outcomes related to pathology detected and pregnancy outcomes" were as follows:

- All deaths from 28 completed weeks of gestation or if no available ultrasound data, based on last menstrual period (LMP), autopsies and other clinical information of the timing of death (this included all antepartum, intrapartum, and neonatal deaths in the delivery room, although as only one such neonatal

death was included, all deaths are described in short as stillbirths in the following).

- Severe neonatal depression, defined as an Apgar score <3 at 5 minutes postpartum. Symptoms of multi-system organ failure and pH < 7 in the umbilical artery or fetal capillary scalp, if obtained.
- PTB (28^0–36^6 weeks, only live PTBs included).
- FGR (< 10th percentile of birth weight adjusted for gender and mother's height, weight, parity, and ethnicity) (125).
- Fetal reassuring heart rate tracings judged clinically as non-reassuring and leading to intervention in labor.
- Oligohydramnios defined as an amniotic fluid index of < 5 cm or at < 2.5th percentile, and polyhydramnios defined as an amniotic fluid index of > 25 cm or at > 97.5th percentile.

"Management by health care provider" included investigations undertaken for reduced FM, interpretation, and consequences (follow-up).

3.1.3. The quality-improvement intervention

Femina differs from most other research efforts in that it did not only involve "classical" epidemiological and intervention studies, but at the same time the collected data were utilized for such research so as actually identify improvement opportunities and improve the quality of care and management of pregnancies. While research should primarily provide aggregated data and results that are valid for any similar population, quality-improvement should provide data and results that are valid for the individual participating institution. Yet, the data and results regarding the

effects of quality improvement should provide research-quality data for other institutions to evaluate and consider.

The aims of the quality-improvement initiative were to increase focus on fetal activity, to provide standardized best knowledge information about fetal activity to the health care providers and to the pregnant population in order to secure timely identification of risk pregnancies for optimal observation and treatment, and finally, to provide uniform management guidelines based on consensus on the best available knowledge. When we initiated our study, there were no universally accepted guidelines for the management of DFM. Although several studies had presented guidelines for management, including NST, and ultrasound and Doppler examinations (61;68;71;99;101), most of these recommendations were based on limited evidence. An initial survey of all 55 birth clinics in Norway found a wide range of definitions of DFM used to inform women, varying from three kicks per hour to an absence of activity of more than 24 hours (115). There were large variations in the examinations that were performed, and how and to what extent these risk pregnancies were identified in the population. Similarly, there was no information as to what extent pregnant women had been given the information needed to enable them to seek adequate assistance and whether they received sufficient information to avoid unnecessary repeated consultations. There were variations as to what extent their concerns were evaluated by telephone contact alone, as well as to the time women waited before contacting health care professionals, and how much time passed between that contact and receiving the needed attention, examinations, and care.

With all this in mind, and on this background, 14 delivery units in eastern Norway and the city of Bergen were engaged in a quality-assessment intervention of management

and outcomes of pregnancies presenting with DFM. Our observations prior to the intervention indicated significant differences in management between hospitals - none had provided the women with written information – and there were indications of co-variation between management and pregnancy outcomes (61). Almost all hospitals routinely performed an NST, about half performed ultrasound scanning, and some carried out umbilical artery Doppler examinations (61). The risk of adverse outcomes increased with the severity (perceived absence of DFM) and the duration of DFM. Undesirable behavior was frequent, with one-third of the women not presenting before an absence of FM was perceived: one-quarter of these women waited for more than 24 hours before contacting health care professionals (paper I). Among the 14 participating clinics, the women received a wide range of advice in terms of the normal frequency of FM: varying from 25 kicks per hour to 3 kicks per 24 hours (79). Women who received such information regarding fetal activity during pregnancy seemed to be more concerned about FM, but showed no improvement in pregnancy outcomes (115).

Based on these significant differences, our quality-improvement intervention aimed to improve care through two consensus-based interventions: (1) establishing guidelines for the management of DFM for health-care professionals, and (2) providing written information to women about fetal activity and DFM, including an invitation to monitor FM.

Development of guidelines

A systematic review of all currently published literature was undertaken to determine the optimal management for women with DFM. A group of experts together with Chairs of midwifery and obstetrics of all participating hospitals and developed a best-knowledge- and consensus-based approach to the best-practice management of DFM and the information provided to pregnant women. In our own quality assessment of care prior to the intervention, NST and ultrasound examination were found to be the most useful tools for fetal surveillance in DFM, while an umbilical artery Doppler examination failed to add significant information among 3014 cases of DFM. Ultrasound scanning was, beyond comparison, the most important tool, being the source of information in 86.2% of cases where abnormalities were detected (98).

Flow chart provided at each delivery ward included in the study, guiding health professionals how to handle women with DFM

Our results are consistent with the evidence for antepartum testing in other high-risk pregnancies. The use of NST/CTG as the sole screening tool in risk pregnancies has largely been abandoned. Although studies are old, the likely benefit effect, if there is one, would discourage such practice (126). The use of a Doppler evaluation of flow patterns in umbilical arteries in risk pregnancies has been indicated to reduce mortality, but there is no evidence of benefits when FGR and hypertensive disorders are excluded (127). This finding is supported by Dubiel et al., among others, who found no additional benefit of Doppler in the evaluation of DFM (5). The use of

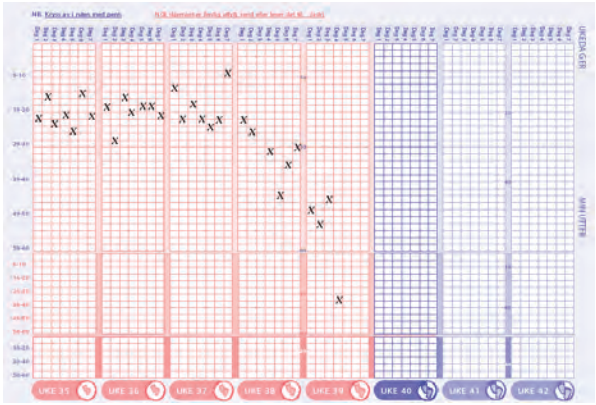
ultrasound for the initial assessment of growth and liquor volume in pregnancies at risk of FGR remains unchallenged as the optimal standard (98).

In brief, our implemented guidelines recommended: a standard clinical evaluation for all women reporting DFM, an NST, and an ultrasound scan to quantify FM, amniotic fluid volume, and fetal anatomy and growth. Consensus included that all pathologies or other reasons for further follow-up found at the initial examinations should be according to the existing evidence-based guidelines for that specific condition (95). A mother presenting with a concern of DFM was to be examined within 2 hours if absence of FM was suspected, otherwise within 12 hours (flow chart) (guidelines published in detail) (98).

Kicks count (Tell Trivselen) – information about FM including an invitation to monitor fetal activity

We developed a brochure of information that aimed to increase maternal awareness and vigilance to significant decreases in fetal activity, and to aid health-promoting behavior. This was provided as part of the routine information given to women at the standard ultrasound assessment at 17-19 weeks of pregnancy (to which 98 % of the population adhere). At the same time as the intervention started all general practitioners, midwives, specialist and antenatal care centers were informed either by writing or by a visit from one or two members of the study group, at least once. In

addition to Norwegian, the brochure was available in Somali, Urdu, English, Turkish, and Arabic which were considered to be the languages covering the majority of the non-Norwegian speaking group of pregnant women with communication difficulties in Norwegian and English, and shown in previous studies to be disadvantaged in pregnancy outcomes (123). Provided in the brochure was information on expected normal fetal activity (19), differences in perception related to different fetal activities (19) and maternal position (36), the inter- and intra-individual variation between fetuses (128), lowered ability to perceive fetal activity among obese women (39), the effect of smoking on fetal activity (129), interpretation of variation in fetal activity, and instructions on when to contact health-care professionals if experiencing DFM (114). The purpose of our study was not to study the use of kick chart per se. However, an invitation to use a kick chart was included as both a supportive tool for maternal daily awareness and recognition of change in FM and to contribute to research on maternal perceptions of FM. The kick chart and the instructions on how to use it was a modified version of a "count-to-ten" chart (114), which did not include the standard table to note time to count, but instead included a visual chart for drawing a graph of the baby's activity level (the visual impression of such a graph was thought to be more intuitive and educating than a table of numbers) (107). The suggested alarm limits for contacting health care professionals were based on the literature, consensus among all participating hospitals, and data from Femina during the preintervention



period. The woman was informed that her subjective assessment of a decrease in fetal activity was the most important marker of DFM – taking priority over all formal limits.

Furthermore, the brochure included certain "rules of thumb" about fetal activity. The primary indicator of DFM was defined as her perception of a major and lasting reduction in the normal activity of the baby. The invitation to use the included kick chart was meant to be a guide to help the women to identify DFM. The woman was advised to contact health care professionals for further examinations in the following situations: 1) never to wait to the next day if the baby did not kick for 1 day or, 2) if the baby kicked less and less in the course of a day/days, or 3) if she felt less than ten FM in 2 hours at a time of the day when the baby was usually active, and she perceived this as a reduction. If in doubt as to what characterized "normal" activity versus DFM, the woman was advised according to the most validated definition for focused counting (99;114); a healthy baby very rarely produces less than ten movements over a 2 hours period when it is usually active. If the woman sensed a persisting decrease in activity during the day, she was advised to contact the maternity ward. The informational brochure on FM for the mothers and new guidelines for health care professionals were implemented in November 2005 in all hospitals included in the Femina trial.

3.2. The cross-sectional study

All Norwegian-speaking mothers with a singleton live-born baby delivered in the third trimester were invited to answer a structured questionnaire anonymously at the maternity ward before discharge. Each institution was asked to recruit all deliveries

for a period of one week or a minimum of 50 deliveries if this number was not achieved in one week. The questionnaire was designed specifically for these studies as there are no published validated tools for maternal awareness and concerns about fetal activity available, and no normative standards exist. The questionnaire included descriptive information about the mother, mode of delivery and the newborn baby, and focused on maternal awareness of FM, concerns during the pregnancy due to DFM, and her subsequent behavior if concerned about a decrease in movement. Statements were in the form of the so-called four-response Likert scale, ranging from "totally agree" to "totally disagree", in addition to an "I don't know" alternative. Wherever relevant, questions were used with "yes", "no", and "I don't know" as answering alternatives. Details of the validity and reliability of the questionnaire and results from the baseline survey are presented elsewhere (79).

3.2.1. Outcome measures

The primary outcome measure in paper IV, "maternal behavior" before and after the introduction of the intervention, was measured and dichotomized as described above for papers I and III (58;102). "Maternal awareness "of fetal activity was measured by self-reported maternal assessment of the degree to which she paid attention it. "Maternal concern" was measured by the mother's description of whether she had been concerned about DFM as "often", "now and then", "seldom", or "never", dichotomized to being concerned twice or more versus being concerned once or never. "Pregnancy outcomes " for women with DFM were stillbirth, SGA infant with a birthweight lower than 10th percentile (adjusted for fetal gender and mother's height, weight, parity and ethnicity) (125) as a marker of long-standing fetal

compromise (40;80), and emergency cesarean section as a marker of low fetal reserves in labor (130). The FM "counting group" included women who used the FM chart more than once a week, as opposed to the others, referred to as the noncounting group. "Receiving information" was based on maternal self-reporting of their recollection of having received information from antenatal care providers about fetal activity.

3.3. Statistical analysis in papers I-IV

All statistical analysis were performed with SPSS version 14.0 (paper IV) and 15.0 (SPSS, Chicago IL, USA) using cross tabulations, with χ^2 tests and logistic regressions to find crude (unadjusted) and adjusted odds ratios (OR) with their 95% CI. In analysis where logistic regression analysis were used, variables with a *p* value of < 0.2 in the univariate analysis were entered into a multivariate model, followed by a backward stepwise model excluding the nonsignificant variables. The final model was tested for goodness-of-fit. The level of statistical significance was set at $p< 0.05$. For associations between DFM and the risk of adverse pregnancy outcomes (paper I), all women presenting with a perception of DFM were compared to pregnancies never examined for DFM collected as a cross-sectional sample (reference group). Among pregnancies that were uncomplicated until registration for DFM, cases with normal outcomes (birthweight between the 10th and 90th percentiles, term delivery, and liveborn infant) were compared to cases with adverse outcomes for associations between maternal characteristics, maternal care-seeking behavior, and the risk of adverse outcomes in uncomplicated pregnancies (paper II). In addition, all pregnancies with known complications prior to their complaint of DFM were studied separately (paper II). Women reporting DFM prior the intervention period were

compared with women with concerns of DFM during the intervention for associations between the quality-improvement intervention and pregnancy outcomes (papers III and IV). The cross-sectional populations before and during the intervention were compared to detect probable associations between maternal characteristics, concerns, and awareness (paper IV). Although there were no differences in potential maternal case mix prior to and during the intervention period, all outcomes in papers I (Table I and III), II (Table 1), III (Table 1), and IV (Tables 2-4) were adjusted for potential confounding factors - such as maternal age, BMI, smoking habits, and primiparity - in the multivariate analysis due to prior knowledge of their impact on pregnancy outcomes and health-promoting behavior. Maternal country of origin was only adjusted for in the multivariate analysis in paper IV, with the sub-groups Western (women born in Western Europe, North America and Oceania) and non-Western (women born elsewhere). Outcomes in paper II (Table 1) were also adjusted for maternal expectance (maternal care-seeking behavior) before contacting health care professionals, and stratified according to our stratification scheme. Cross tabulations with χ^2 tests were used when estimating frequencies of cases categorized according to maternal risk factors and care-seeking behavior and for associations between new findings detected when examined for DFM in uncomplicated versus complicated pregnancies (paper II).

The power of the sample size in each paper was calculated using the software http://biostat.mc.vanderbuilt.edu/twiki/bin//view/Main/PowerSampleSize.

3.4. Ethical approval

The studies were approved by the Regional Committees for Medical Research Ethics (REK. Ref. no. S–04018) and Personal Data Act, and advised by The Norwegian Data Inspectorate.

4. Summary of results

4.1. Paper I: Maternal characteristics and pregnancy outcomes in women presenting with DFM in late pregnancy

The aim of this study was to identify maternal characteristics in women presenting with DFM in a total population, the risk of adverse outcomes, and the management provided. A total of 2374 singleton, third-trimester pregnancies presenting with a perception of DFM were registered from June 2004 through October 2005. Pregnancies never examined for DFM were collected as a cross-sectional sample from the same population (references, $n = 614$). We found that DFM mothers were more often smokers, overweight and primiparous. Of the women presenting with DFM, 32% of the women presented with perceived absence of FM, of which 25% waited for more than 24 hours without any movements. Abnormal findings were identified in 16% of the examinations. Being affected by DFM resulted in an adverse pregnancy outcome in 26% of the cases, including PTB and FGR. An intervention or repeated consultations were performed in 41% of the cases, including 14% admissions to maternity ward. None of the included hospitals had written guidelines for the management of DFM. We found that a perception of DFM was significantly associated with adverse pregnancy outcomes such as PTB, FGR and stillbirth. Guidelines for management and information to pregnant women were needed.

4.2. Paper II: Concerns for DFM in uncomplicated pregnancies – increased risk of FGR and stillbirth among women being overweight, advanced age or smoking

The main objectives of this study were to identify whether clinical characteristics of women in uncomplicated pregnancies presenting with DFM would help target subgroups of women at the highest risk. Furthermore, whether DFM in complicated pregnancies identifies additional needs for intensified management. A total of 2374 pregnancies presenting with a perception of DFM were registered between June 2004 and October 2005. Among pregnancies that were uncomplicated until registration for DFM, cases with good outcomes (birthweight between the 10th and 90th percentiles, term delivery, and live born child) were compared to cases with adverse outcomes. We found that in uncomplicated pregnancies with DFM, maternal overweight, advanced age and smoking identified subgroups of cases at increased risk of FGR and stillbirth. Maternal care-seeking behavior did not modify this risk. DFM of longer duration, and in particular the perceived absence of movements, identified cases at increased risk of stillbirth, irrespective of other maternal characteristics. Primiparity was not associated with increased risk, despite delayed reporting of DFM.

When women with complicated pregnancies reported DFM, additional indications for follow-up were found in one-third of cases. Maternal overweight, advanced age, smoking, and the duration of the perceived decrease of FM were in conclusion clinical characteristics that helped identifying pregnancies that should be targeted for intensified management of their complaint of DFM. We found that time mattered and that knowledge based-information is needed to improve fetal health.

4.3. Paper III: Reduction of late stillbirth with the introduction of FM information and guidelines – a clinical-improvement intervention

Original and published paper:

In this clinical-quality improvement intervention we intended to examine to cohorts of women with DFM before and during two consensus-based interventions aiming to improve care through: (1) written information to women about fetal activity and DFM, including an invitation to monitor FM, and (2) guidelines for the management of DFM for health care professionals. All singleton, third-trimester pregnancies presenting with a perception of DFM were registered, and outcomes collected independently at all 14 hospitals. The quality-assessment period included April 2005 through October 2005, and the two interventions were implemented from November 2005 through March 2007. The baseline versus intervention cohorts included: 19,407 versus 46,143 births, respectively, and 1215 versus 3038 women with DFM, respectively. Reports of DFM did not increase during the intervention. The stillbirth rate among women with DFM fell during the intervention from 4.2% to 2.4%, (OR 0.51, 95% CI 0.32-0.81) and 3.0/1000 versus 2.0/1000 in the overall study population (OR 0.67, 95% CI 0.48-0.93). There was no increase in the rates of PTB, FGR, transfers to neonatal care or severe neonatal depression among women with DFM during the intervention. The use of ultrasound in management increased, while additional follow-up visits and admissions for induction were reduced. It was concluded that improved management of DFM and provision of uniform information to women during pregnancy was associated with fewer stillbirths.

Correction: Reduction of late stillbirth with the introduction of FM information and guidelines – a clinical-improvement intervention

In a subsequent study intending to replicate and validate the original estimates of effects on mortality in the total population in an independent data collection (MBRN) we found the original MBRN data were flawed. Subsequently a full validation of deaths in both Femina and the MBRN was performed. In this validation we found two duplicates in the Femina material. Still, the effect estimate in the Femina dataset in the total population remained virtually identical at OR 0.7 (OR 0.69, 95% CI 0.50-0.96). We found that, due to comparability issues in the lowest gestational age groups (28 to 31 weeks), valid and comparable replication opportunities in the combined and cross-validated material of MBRN and Femina were best in smaller subsets (32+ weeks) of the original data collection. The effect estimates in this group were nearly identical at OR 0.7 in both the Femina dataset, MBRN and combined and cross-validated dataset, and thus replicated the estimate of the total cohort, however with CI's above one. We concluded that although the validation procedures lent support to the original effect estimates, data collections in Femina and the MBRN were similarly incomplete. When all possible comparisons on total mortality were taken into account – both in the original Femina data collection and in all comparisons with the MBRN – all comparisons were at borderline significance (upper limit of 95% CI's closely below or above one, slightly versus not significant), and we therefore suggested cautiousness in interpretation of the exact effect estimate and called for further studies and RCTs.

4.4. Paper IV: Implementation of uniform information on fetal movement in a Norwegian population reduced delayed reporting of decreased fetal movement and stillbirths in primiparous women – a clinical quality improvement

The study aimed to evaluate an intervention of implementation of uniform information on fetal activity to women during the antenatal period. In a prospective before-and-after study singleton, third-trimester women presenting DFM in the third trimester across 14 hospitals in Norway were included. Outcome measures were maternal behavior regarding reporting of DFM, concerns, and stillbirth. In addition, cross-sectional studies of all women giving birth were undertaken to assess maternal concerns about fetal activity, and population-based data from the MBRN. Pre- and post-intervention cohorts included 19,407 versus 46,143 births and 1215 versus 3038 women with DFM. We found that, among primiparous women with DFM, a reduction in delayed reporting of DFM (≥48 hrs) OR 0.61 (95% CI 0.47-0.81) and stillbirths OR 0.36 (95% CI 0.19-0.69) was shown in the post-intervention period. No difference was shown in rates of consultations for DFM or maternal concerns. Stillbirth rates and maternal behavior among women who were of non-Western origin, smokers, overweight or >34 years old were unchanged.

Implementation of uniform information on fetal activity for women in the third trimester was associated with less primiparous women with delayed reporting of DFM, and less stillbirths were recorded for primiparous women reporting DFM. The information did not appear to increase maternal concerns or rate of consultation. Due to different imperfections in different clinical settings, further studies in other populations replicating these findings were required.

Following on our validation of the material, no corrections were submitted for this publication, as the overall results were given only with reference to the corrected material while all new analyses in this material were unaffected by the two duplicates found during validation with the MBRN.

5. Discussion

This thesis is based on four original papers whose overall aim was to improve insight into DFM in late pregnancy. Femina is the first report to describe women with DFM in Norway, and it involves a large prospective and population-based cohort of women with DFM. When we started our study, there was no doubt that a reduction in fetal activity was associated with severe adverse outcomes in risk pregnancies (1;49;63). However, since there was controversy regarding whether women in low-risk pregnancies presenting with DFM should be considered as risk pregnancies, and if so, for what reason, our research focused on identifying these women, their increased risk of adverse outcomes, and the management provided. In addition, we assessed whether certain clinical characteristics would help us to target subgroups of women with DFM in uncomplicated as well as complicated pregnancies, at the highest risk. Furthermore, the effects of a clinical-improvement intervention, involving implementing guidelines for patient management and routinely providing uniform information about fetal activity to pregnant women, were assessed. Methodological aspects of the study as well as the results of each paper are discussed in this section.

5.1. Methodological considerations - Femina

Study

Measurement errors, both random and systematic, can influence the results of a study. Random errors are reduced primarily by enlarging the sample size (131). A reduction of random errors will improve the study's precision. Systematic errors occur when measurements differ from the truth in a systematic way (132). These are more

difficult to detect and cannot be analyzed statistically because all data are erroneous in the same direction. A reduction in systematic errors will improve the validity of the results.

Random errors

Random errors, or poor precision, are the entirely arbitrary divergence of a measurement (in either direction) from the true value. These are actually nothing more than variability in the data that we cannot readily explain (132). Random errors occur in the process of selecting study subjects who are always a figurative sample of a larger population, and can never be completely ruled out. Random errors are primarily reduced by enlarging the sample size (131). Femina involves a large population-based cohort and random errors are thus unlikely to threaten the general applicability of the results.

Systematic errors- (bias)

A study can be biased because of the way in which the subjects have been selected (selection bias), the way the study variables are measured or classified (misclassification), or because of some confounding factors that are not completely controlled (confounding).

Selection bias

Selection bias is a systematic error in a study that can stem from the procedures used to select subjects and from factors that influence study participation. This occurs when the association between exposure and disease differs for those who participate and those who do not participate in the study (133). As a result, the observed occurrence

of diseases and the relationship between exposure and disease will differ from the true values in the population. In our study, such bias could have been introduced by health care professionals including cases affected either by registration fatigue over time or increased enthusiasm by the general awareness caused by the intervention. However, this would probably neither affect the results on outcome rates in the total population nor the outcomes among cases with DFM. Only a systematically skewed registration toward more or less severe cases of DFM would affect these results, and our design separating inclusion from outcome registration would counteract such effects.

Deaths were registered by a duplicate approach in Femina. Primarily, a study coordinator (midwife or obstetrician) at each site reported births, deaths and causes of death monthly after extracting and validating these data from the clinical logs and medical records. There were no missing monthly reports. In addition, stillbirths were captured prospectively by the attending obstetrician or midwife registering women who presented with a complaint of DFM, prior to the diagnosis and registration of outcome. However, misregistrations may occur as human failure always is a potential source of missed or erroneous key variables such as vital status, dates, gestation, birthweight or plurality. Such bias may then affect the robustness of the data in the study.

Misclassification

Errors in the measurement of outcome might occur in a study, which could lead to *misclassification* of participants with the respect to their exposure status and/or outcome (disease). In other words, some might be labeled as “exposed” (or as a “case”) when they were actually “unexposed” (or a “noncase”) (132).

In Femina, the intervention might have increased awareness of FM among health-care professionals, and the proportion of women classified as a "case" (woman with DFM) might have changed. However, there is no reason to believe that such misclassification has taken place, since the rate of women referred from primary health-care during the intervention period did not increase and the well-known association between FGR and DFM remained unchanged throughout our period of observation. Furthermore, the diagnosis of DFM was based on a subjective maternal perception of DFM irrespective of whether this was based on her subjective opinion or emerged during an antenatal visit for other reasons. Since definition of DFM remained unchanged throughout the whole study period, it is unlikely that DFM was misclassified. However, since there is no universal definition of DFM, such a concern can vary among individuals and both under- and over-reporting is possible.

Recall bias

Recall bias arises when case subjects are more likely to overestimate or underestimate their exposure than controls. If an exposure is more likely to cause a disease, then case subjects might be more likely to recall or to exaggerate their past exposure than controls, leading to an overestimation of the effect of the exposure on the disease. The opposite effect occurs if case subjects tend to underestimate their exposure because they feel guilty about it (132). In Femina, any concern regarding DFM was registered prospectively. Recall biases as such among the exposed women are therefore not likely. However, the study design leads difficulties in identifying an equally unselected control group. DFM are not coded in either the electronic medical files of the Norwegian hospital system or in the MBRN, and there is no International Statistical Classification of Diseases and Related Health Problems (10th Revision)

code for DFM. Identifying a nonexposed/reference group requires maternal consent and participation, and the use of a cross-sectional sample questionnaire with retrospective questions to these women could have introduced recall bias. The participation rate could be skewed by women with a particular interest in fetal activity (typically those who have experienced some concern for DFM) being overrepresented. This could, in turn, cause an underestimation of the true results in our study. Yet, since the incidence of adverse outcomes in the nonexposed/reference group was low, it is reasonable to believe that the impact of recall bias would be low (79).

Confounding

Confounding refers to a mixing or mudding of effects that can occur when the relationship we are interested in is confused by the effect of something else (132). All outcomes in our statistical multivariate analysis were adjusted for possible confounding factors. The potential effect of confounding was therefore considered to be low in our study. However, in research there are always possible existing confounding factors that are difficult to either rule out or imagine.

Loss to follow-up

Losses to follow-up reduce the numbers supplying information, and thus slightly weaken the analysis slightly (134). In our study, the loss to follow-up rate was low, 2.2% prior to versus 2.1% during intervention, and mainly due to birth at another hospital (none were deaths), and therefore not related to the outcome being studied.

5.1.1 Femina: a clinical quality improvement – a multi-intervention bundle

Our quality assessment was conducted as a multi-intervention bundle that aimed to improve the in-hospital management of DFM, including clinical examination, the use of NST and ultrasound, recommended time-lines for health care professionals, and excluding the use of Doppler examination. It included general information about fetal activity, recommendations for maternal care-seeking, several rules of thumb for recognizing DFM, even though it was not a study to evaluate the use of a kick chart per se, it included an FM chart as a supportive tool. It also included awareness among health care professionals, since all obstetricians, general practitioners, community midwives, and others contributing to antenatal care in our population were informed in writing about the ongoing intervention. While the design of RCTs remains the gold standard for studying the effects of interventions, observational studies remain a rich source of information in situations where an RCT simply cannot be performed for practical or ethical reasons, or is counterproductive. Femina was conducted at all hospitals located in the eastern part of Norway, and an RCT of either information or vigilance was neither wanted nor feasible within our single local population. Implementing only parts of the bundle as a response to the findings of our own quality-assurance data prior to the intervention was not an option in our high-resource setting with a highly educated population. It was considered unacceptable to inform women about DFM without securing professional management of DFM according to the consensus of best practice. It was equally considered unacceptable to perform quality assurance of management of DFM without informing the women to the best of our knowledge about their important role in identifying and reporting DFM. Performing this as an RCT would have to be achieved through randomization of entirely separate populations – which would probably not only be an immense task,

but it would probably also require participating hospitals,health care professionals and total populations to be willing to be randomized to no interventions to improve information, despite obvious unwanted performance in the population. Also in terms of the DFM management the initial quality assurance study found that most large university clinics and leading authorities in the field already had a customary clinical management close to the consensus-based guidelines used in this project. It would probably not have been possible to obtain consensus from hospitals to reduce their level of care to study the effects in an RCT.

Observational studies do not provide estimates of effectiveness with the same degree of evidence as RCT. To improve the quality and evidence of effectiveness or causation provided by observational studies, the GRADE (135) and STROBE (136) tools have identified several virtues of observational studies that provide higher quality evidence which link closely with the Bradford Hill criteria for causation (135;137). These include;

- Large population based cohort
- Hard outcomes
- A low “loss to follow-up rate”
- No recruitment bias
- Adjusting for plausible confounders
- Time series analysis

The Femina study was therefore designed to provide the opportunity to collect such data needed for the highest possible observational evidence. We aimed to perform our

quality improvement project in a large population-based cohort, measuring hard outcomes such as stillbirth and keeping identifiable files in hospital to minimize loss to follow up. We also aimed to include patients prior to registration of outcomes to avoid recruitment bias, collect core health indicators to adjust for confounders and follow the intervention in a time series.

5.2. Methodological considerations – the cross-sectional study

Systematic errors

Selection bias

As discussed in section 5.1, participation in cross-sectional studies could be skewed by women with a particular interest in fetal activity – typically those who have experienced it –being overrepresented. However, since the number of adverse outcomes in the nonexposed group was low, it is reasonable to assume that the impact of recall bias would be reduced (79).

Recall bias

Retrospective completion of the questionnaire could have introduced recall bias, since women with adverse outcomes (such as SGA) might believe (in hindsight) that they must have experienced DFM, affecting their reporting of their awareness of FM. However, as discussed in paper IV, only 16 fetuses (1.1%) were diagnosed as growth restricted by examination because of DFM, 35 babies (2.2%) had a birthweight of less than 2500 g, and 53 babies (3.8%) were born preterm (79). It is therefore reasonable to assume that this low rate of adverse outcomes would reduce the impact of recall bias on the mothers' reporting of their awareness of fetal activity.

Response rate

A low response rate in cross-sectional studies has an impact on the validity of the results. In our study, the response rates in the in cross-sectional groups was intermediate (60.4% and 66.3%, paper IV). However, analyzing the hospitals in the cross-sectional group prior to the intervention with a low versus a high response rate did not disclose any differences in covariates or outcome measures. In addition, independent data from the MBRN confirmed that the population in the nonexposed group was comparable to the rest of Norway (79;124). However, this was considered as one of the limitations of the cross sectional study.

Confounding

All outcomes were adjusted for potential confounding factors. However, as discussed above, there are always possible existing confounding factors that are difficult to either rule out or imagine.

5.3. Frequency of DFM

Maternal reporting of DFM is a frequent reason for unplanned health consultations through the third trimester. We found that respectively 6.3% and 6.6% of women before and during the intervention, presented with a concern about DFM. The frequency of DFM in our data appears to be in accordance with those of previous studies, ranging from 4% to16% in various populations (1;61;71). However, codes for visits due to consultations for DFM in the electronic medical files of the Norwegian hospital system are lacking: thus, no validation of the completeness of registrations of cases of DFM was possible with the anonymity of files used in this study. However,

since the registrations were conducted in a total population without maternal consent the frequencies in our population may, in all probability, reflect the real frequencies of consultations in the population.

There is no doubt that the management of women presenting with DFM is a challenge in antenatal care and consumes significant health-care resources. With frequencies of women with DFM ranging from 6.3% to 6.6%, around 4000 Norwegian women are examined for DFM each year. To reduce both underreporting of significant changes and overuse of time-consuming and frequently unnecessary investigations among these women, universally accepted guidelines for the management of DFM and the routine provision of uniform information to pregnant women are needed.

5.4. Maternal reporting of DFM in a total population and the risk of adverse pregnancy outcomes (paper I)

Some subgroups of pregnant women, such as mothers of advanced age, who are overweight, and who smoke, or primiparous, are known to be at increased risk for adverse outcomes, but not to the extent that they are defined as high-risk pregnancies in the guidelines for antenatal care in either Norway (95) or the UK (110;138). We observed that these same groups of women are more likely to present with DFM, and when affected, the risk of adverse outcomes such as FGR and PTB increased twofold and fivefold, respectively (paper I).

Our results are consistent with those of previous studies. Smoking during pregnancy has been linked to various adverse outcomes, and the pathophysiological mechanism suggested includes reduced uteroplacental blood flow and fetal hypoxia, which explain the decrease in FM (40). Being overweight is known to be hazardous to

the pregnant women and their fetus, and there are reports of increased adverse outcomes in overweight women with a BMI of 25 to 29.9. kg/m^2 (39). The association between primiparity and increased risk of perceiving DFM has been demonstrated previously and indicates that primiparous might perceive less FM early in the third trimester, but that they relatively quickly reach the level of multiparous (17). An increased risk for PTB among women affected by DFM is consistent with previous results from Valentine and her coworkers (33). Even though several subsequent studies have failed to detect such an association (60;68;71), these studies have included all their cases including those presenting at term and thus not at risk of PTB. When including only the at-risk population, some of these studies would have found an association (111). Bekedam et al. and Gangnon et al. have shown that growth-restricted fetuses move less than appropriately grown fetuses and that their movements are qualitatively abnormal (35;81). This would explain our findings, suggesting that women with DFM have a doubled risk of FGR. Valentine et al. also found the same association between DFM and an increased risk of birthweight <2500 g or birth of SGA infants (33).

One of the largest and most often referred to study indicates no increased risk of adverse outcomes among women with DFM in a total population (60): our findings contradict this, and we propose that women in a low-risk population experiencing DFM are significantly at risk for adverse pregnancy outcome and should be treated as such.

5.5. Concerns for DFM in uncomplicated pregnancies – maternal characteristics and care-seeking behavior, and the risk of adverse outcomes (paper II)

That maternal characteristics and care-seeking behavior can be used to identify subgroups of women with DFM in uncomplicated pregnancies who should be targeted for intensified management, has not been reported previously reported. Maternal overweight, advanced age and smoking were found to identify subgroups of cases at increased risk of FGR and stillbirth. This risk was unaffected by maternal care-seeking behavior. Previous studies have indicated that overweight women might have an impaired ability to detect FM (16). With increased risk and limited ability to perceive changes in fetal activity, only the more dramatic changes might be felt by the mother, and one would expect them to have fewer delayed reports of DFM without a perceived absence. One would also expect them to be overrepresented among women with DFM with worse outcomes than others due to their risk. These were indeed the findings reported in paper II and also supported by our findings in papers I and IV. However, since no measure for the quality or change in FM perceived by the mother was included, our study could not fully explore such aspects of behavior. Still, our data do strongly suggest that overweight mothers are at increased risk among women with DFM, and that this is independent of their care-seeking behavior, which appears to be good, although their ability to feel changes might not be.

Since DFM is associated with both maternal smoking and adverse outcomes, these women might be expected to be more concerned about their pregnancy and show a higher level of awareness. We have shown (paper IV) that smoking pregnant women do not show a higher awareness toward FM and are no more concerned for DFM than their nonsmoking counterparts. Even so, smokers are ultimately still overrepresented among cases of DFM (paper I). This is consistent with the results in

paper II showing that smokers exhibit no different care-seeking behavior than others, but did have higher rates of adverse outcomes independent of their actions.

Advanced maternal age in our population was associated with low awareness of fetal activity (paper IV) and a tendency to be underrepresented among women with DFM (paper I). We found no differences in maternal care-seeking behavior between cases of advanced maternal age and others (paper II). Overall, it might seem that the mothers of more advanced age have less focus and concerns regarding fetal activity, but when they perceive DFM they seek care like other expectant mothers, but have an increased risk related to the inherent biology of high age, independent of their care-seeking behavior.

Even though primiparous women were overrepresented among women experiencing DFM (paper I), had significantly higher awareness of fetal activity, and were in general almost twice as concerned for DFM as others (paper IV), they were not associated with increased risk per se (paper II). The actual increased risk of adverse outcomes in primiparity could therefore be a combination of the inherent biology and delayed care-seeking. Maternal inexperience and uncertainty could explain much of this when combined with inconsistent information from health-care professionals about FM, leading to greater concern with no improved outcome (paper IV).

The finding that perception of DFM might identify additional indications for intensified management in already identified high-risk or complicated pregnancies has not been shown in any population based study. Additional findings were detected in one-third of women with well-known complications presenting with DFM. Since there are scarce clinical resources for DFM, identification of cases of DFM with the highest risk should provide opportunities to guide research toward more targeted

examinations relevant to DFM. Increased maternal awareness toward fetal activity and advice from health care professionals might be of value in the management of these high-risk pregnancies.

DFM of longer duration, in particular the perceived absence of FM, identified cases at increased risk of stillbirth, irrespective of other maternal characteristics. The association between an excessive delay in maternal reporting of a perception of absent fetal activity and the risk of stillbirth confirmed by our data indicates an urgent need for knowledge-based information to pregnant women. Maternal care-seeking behavior is an important predictor of pregnancy outcome, and time matters. Still, the span from the most obvious absence of FM to a more subtle perception of a reduction in fetal activity makes it difficult to predict the severity of both the event itself and the risk associated with it. Yet, at both ends of the scale our data indicate increased risk of adverse outcomes – there is no clear-cut limit below which women presenting their concerns for DFM are at the same risk as women without DFM.

5.6. Guidelines for the management of DFM and the provision of uniform information to pregnant women as a part of the clinical quality improvement intervention – considerations, consequences (papers III and IV) and corrections (paper III)

The core concepts of GRADE, and it's links to the Bradford Hill criteria, has been developed to facilitate the understanding of causality in any evaluation of whether an observed exposure (or intervention) is causally associated with the observed outcome (135;137): Did the quality intervention work, or were the observed results unlikely to be the consequence of the intervention?

5.6.1. Considerations of the quality improvement intervention

To understand the effects of the quality improvement intervention, it is important to examine the potential for improvement or harm of each part of the bundle:

1. Information and awareness regarding DFM:

All variations of this support of maternal self-screening (whether it is any use of information, thumb rules, FMC, etc) remain pure screening tools that do not provide any form of treatment or prevention that could change health outcomes – unless there is an intervention associated with it. Based on our previous studies, and consistent with literature, we found that Norwegian women were indeed identifying pregnancies of increased risk when they reported DFM, but they presented their concerns to health care providers with delays deemed to be adding unneeded risk. The findings that women did reduce such risk behavior significantly and contacted health professionals in a more timely fashion (paper IV) support a clear effect of the intervention. It may also provide a plausible pathway for stillbirth prevention without modifying the composition of the population of women presenting with DFM (which was not seen). Potential side-effects would include that not only the natural cohort of DFM would present in a more timely fashion, but also a larger proportion of the normal population would present unneededly in what would not be identified as DFM even by mothers of high awareness prior to the intervention. This would have caused the total consultation rate for DFM to go up (which was not seen, paper III). It would also, since FGR cannot be treated by any screening, dilute the well- known association between FGR and DFM (FGR rates would decline, which was not seen) in the absence of significant changes in the risk profile of the DFM cohort (as discussed in section 5.1.). An increase in the FGR rate among women with DFM would,

conversely, be a highly unexpected but positive change indicating improved detection of FGR through awareness towards FM – but this was not observed (paper III).

2. Guidelines for health professionals:

The effects of the implementation of new guidelines were followed by several indicators. Primarily the process indicators revealing whether there actually was an uptake of the new guidelines. We found that there was an increased use of ultrasound as intended. The new guidelines also promoted that there was no need for the frequent use of routinely scheduled follow up or admissions for observation or delivery in cases where no complications or objectively worrying symptoms were found despite full examination according to guidelines. This was also seen in the results. We found fewer planned follow up consultations and admissions for observation or delivery, and further in the observation of a trend towards fewer PTB. The latter, PTB, is an outcome that would only be amenable to change through iatrogenic effects and there would be few biologically plausible reasons to suspect that either the screening part of the intervention or the implementation of guidelines for clinical examinations in DFM would have a directly causal effect on the rate of PTB. An increase in PTB (without a significant change in the risk profile of the DFM patients) would have indicated an adverse effect of the intervention by a change in behavior by health care professionals towards more liberal elective deliveries in the preterm period. The fact that the information part of the bundle, potentially leading to more timely reporting of a small subgroup of DFM with a severely compromised fetus, could lead to an increase of an even smaller group in need of close follow up or immediate delivery (even preterm) to prevent stillbirth: This would not have any observable impact on the overall rate of

follow up consultations, admissions and PTB in the total cohort of women presenting with DFM – of which the vast majority would have no complications.

In all, the quality improvement intervention bundle – with a more timely presentation of significant DFM without more consultations for DFM, reduced associations with FGR or change in risk profile, and a better evaluation and detection of compromised fetuses without an increased iatrogenic rate of PTB - seems to provide a plausible background to understand the reduction of the stillbirth rate.

The concerns that the intervention would increase the use of health-care resources and iatrogenic damage were not observed in our population. However, the effect of the intervention on subsequent examinations was monitored continuously, since significant changes/increases would have led to modifications of our implemented guidelines.

5.6.2. Consequences of the quality improvement intervention:

As discussed above, the lowered stillbirth rate among women with DFM might, not only be associated with improved quality of management of DFM, but just as likely be a result of an increased maternal awareness, ensuring vigilance to FM on a daily basis and improving the value of the existing "self-screening" performed by pregnant women with or without a kick chart. Our suggestion of "alarm limits" for when to contact health-care services was recommended as a rule of thumb only, and the information that we provided to the pregnant women emphasized that their subjective perception of a significant and sustained reduction in FM was the primary indicator of DFM and cause to seek professional help (papers III and IV). However, if DFM was perceived, these might have given those women useful limits and thereby contributed

to a reduction in unnecessary expectance. Increased maternal awareness ensuring vigilance to FM on a daily basis and improved self-screening for any significant decrease or absence of FM could have contributed to the decreased stillbirth rates among the primiparous observed during the intervention period (paper IV). The reduced stillbirth rate might seem reasonable since the actual increased risk of adverse outcomes in primiparity might be due their delayed care-seeking behavior (paper II). Since primiparous women had a significantly higher awareness of fetal activity, and were in general almost twice as concerned for DFM as others (paper IV), there are reasons to believe that they might be more prone to change their behavior receiving helpful information from health care professionals about FM.

Even though overweight women in the cross-sectional populations described higher awareness of fetal activity, reported more concern because of DFM, and came more often to the hospital during nighttime for an examination during the intervention, we were not able to change their ability to identify and act on significant decrease of FM. The stillbirth rates were not reduced. This is not surprising given that their increased risk could be explained by the inherent risk of obesity independent of their care-seeking behavior (paper II). With limited ability to perceive changes in fetal activity only the more dramatic changes might be felt by the mother, which could explain the increased risk for adverse pregnancy outcomes in these women.

Information about fetal activity provided in the brochure was more specific than the previous information from our health authorities (100) and emphasized maternal assessment of fetal activity relative to the activity pattern for her *own* child (128). This was reflected in the mothers' basis for their concern during the intervention (as reported by women in the cross-sectional studies); mothers in the intervention cohort did not report more frequent concern, but when they were

concerned, this was more often related to the activity level earlier in the *actual* pregnancy. They more often assessed that their perception of DFM was a true reason for being concerned (their perception of DFM was *not* normal for *their* baby), which was interpreted as increased confidence with their own assessment of their baby's activity level. Being concerned was associated with being examined at hospital both at baseline and during the intervention. However, the rates of women who reported being examined at the hospital remained unchanged. The provision of uniform information with useful limits to pregnant women might have contributed to reduce both the under-reporting of significant changes as well as overuse of unnecessary time-consuming and frequently unnecessary investigations.

5.6.3. Corrections in paper III: New data from the MBRN, comparisons, validation, replication and conclusions

As indicated in our study protocol, we aimed to reproduce the effect estimates on stillbirth rates from our population-based Femina data with fully independent MBRN data. We published a partial comparison in paper III based on existing data at that time, but the complete data set for Norway for 2007, needed for this final comparison, was only released by the MBRN in December, 2009. Upon receipt of these complete data discrepancies were found, and therefore the MBRN performed an inquiry into the two data deliveries. On February, 2010, the MBRN issued a public report which confirmed that the previous data set to our project was inaccurate – both in terms of completeness and in terms of the plurality that included multiples while supposed to include only singletons.

The data we first received were already published in paper III, and therefore a correction was published in BMC Pregnancy and Childbirth to correct the original article accordingly (correction, paper III).

New data from the MBRN and cross-validation with Femina dat; limitations in comparison

When these differences in the received data set were found, a full cross-validation of the clinical Femina data collection against the MBRN data was initiated. However, the Femina data and the data from the MBRN differed in some aspects: 1) Femina did not register cases born after ≥ 28 weeks if death occurred prior to 28 weeks. Time of intrauterine death is not reported to the MBRN. 2) In Femina the clinicians reported the best estimate of gestational age (combining clinical assessment, LMP, ultrasound screening and autopsies). The MBRN is based on the LMP and ultrasound alone, and 3) Femina included immediate neonatal deaths in the delivery room, which would by definition not be captured as a stillbirth in the MBRN. Thus, there were limitations in how easily and completely these two datasets could be compared and validated against each other. In their report the MBRN found that gestational age alone (which was what the original and inaccurate file was built on) was insufficient to track third trimester stillbirths due to missing data on gestation in the MBRN, and thus a direct comparison with, and validation of, the complete Femina data collection (based on gestation) could not be performed.

Validation and replication of the Femina dataset and estimates; two approaches

We therefore proceeded with two approaches: 1) a validation of the Femina dataset, and 2) a replication (validation) of the Femina estimates of reduced mortality in the total population using subsets of MBRN and of the combined data sources.

In comparing the numbers in subgroups we found discrepancies between the MBRN and Femina in the number of deaths registered, and due to the concerns this raised, the Norwegian Institute of Public Health (NIPH) combined Femina and MBRN registrations on day and hospital of birth, birth weight and gestational age to compare case by case. The probability of identical details for all four variables in separate cases was negligible in our setting – e.g. two deaths on the same day in the same delivery unit only occurred once in our two-year study, and their gestation and weight differed. We regarded a case to be validated if both datasets agreed. For the cases only found in one of the datasets the hospitals in question were requested to re-confirm these cases to the NIPH.

In part 1) we validated the Femina dataset using the MBRN data (and any re-confirmations from hospitals) to secure that all deaths in Femina were in fact deaths, and conversely that cases of DFM registered in Femina as live-borns were not among deaths in the MBRN. Two duplicates in the Femina material were found by this procedure: The dual prospective and retrospective capture of stillbirths in Femina, described above, lead to two stillbirths being reported twice from different hospitals. The two duplicate reports did not mention that the stillbirth had occurred in another hospital, and slight differences in the details reported made them go unrecognized. In all further results and discussions of them, these two duplicates have been excluded. Excluding these two duplicates, the corrected and validated estimate of stillbirth

reduction in the total population in our Femina dataset remained essentially identical at OR 0.7 (OR 0.69, 95% CI 0.50 – 0.96 vs. the former OR 0.67, 95% CI 0.48 – 0.93).

In preparation for part 2) we compared two subsets ("Cat. 28": ≥ 28 completed weeks of gestation and/or ≥ 1000 grams birth weight, and "Cat. 32": ≥ 32 completed weeks of gestation and/or ≥ 1500 grams birth weight) of the Femina and the MBRN datasets and found discrepancies in numbers. In the largest subset, Cat. 28, 10% of stillbirths were not found in the MBRN, and 7% were not found in Femina. The MBRN and other Nordic birth registries are often, for many good reasons, looked upon as an international "Gold standard" for vital registries in terms of completeness, even though our finding of 10% of stillbirths as either unreported or non-retrievable from the MBRN is in line with previous findings (56). It is room to hypothesize as to whether the design of dual prospective and retrospective capture of stillbirths in the Femina data collection may have contributed to a slightly better capture (7% missing) than the MBRN, and registrations of pregnancies rather than births have been suggested to improve capture of adverse birth outcomes (139). However, this is only a subjective conclusion. Both 7% and 10% are not considered as high as errors in clinical research databases have shown to range between 2.3 to 26.9%, most of them non-random, however, affecting the interpretation of the study results (140). Yet, throughout the field of medicine, the reporting of the most severe adverse events by health care professionals is hampered by numerous barriers, including human error, practical or technical difficulties etc. (139;141;142). We observed that in the missing reports to the MBRN, 28% of all missing reports came from one single hospital – representing 28% of their third trimester stillbirths, and 38% of term stillbirths in that hospital. In reporting to Femina we found no similar systematic misreporting by any hospital, except that three deaths from one hospital in one month were missed,

indicating an inexplicably flawed reporting for that specific month. Additional stillbirths left unreported both to the MBRN and Femina cannot be ruled out, but there is no data to support or refute this. Although possibly an ideal, the capture of 100% of stillbirths including those not reported to the MBRN or Femina and potentially misclassified as neonatal deaths or misclassified by diagnosis in hospital registries, ill-registered birth weight or gestational age, or altogether unregistered home deliveries, would not be doable within the limitations of medical research. If at all possible, it would entail full disclosure of personal identifiers to the researchers involved, which would only be possible by maternal consent and completeness would not be achieved. Of the reasons discussed above, and for the purpose of replication and validation of the effect estimate Femina, we regarded the combined datasets of the MBRN and Femina as the best possible available source for replication of the effect estimates from the Femina studies – despite the imperfections of each of the two data sources.

Comparability and sample size

In addition to the issue of individual completeness of the two datasets, there were two more limitations to the potential for replication of the effect estimates in Femina: Comparability and sample size.

The issue of *comparability* around the gestational age of 28 weeks between the MBRN and Femina has also been discussed previously (section 3.1.), and this would have the potential to provide invalid comparisons although the addition of a birth weight limit (1000 grams) would improve this somewhat. The MBRN also reported in their statement on the data deliveries to our project that the completeness of stillbirth reports increased with gestation, an experience recognized in all settings (139). With the existing limitations for comparisons at the limits around 28 weeks and 1000

grams, the MBRN suggested in their statement to report cases of ≥ 32 weeks and 1500 grams (Cat. 32) to minimize bias in comparisons. We agree that this would improve comparability, and that this probably would represent the most robust data for comparing the point estimates (odds ratios). Indeed, in evaluating the datasets for comparisons we found that reporting of early deaths (28 – 31 weeks) to Femina remained unchanged during the intervention (increased by 9%, 7 vs. 18 cases among 19035 vs. 44967 births) while reporting to the MBRN apparently increased by 80% (4 vs. 17 cases) – largely because 38% of deaths in the category 28 -31 weeks were not reported to the MBRN in the period prior to the intervention (3 of 8 cases). In all – the only significant discrepancies in effect estimates between the Femina data, MBRN data and the cross-validated dataset were found among deaths from 28 – 31 weeks of gestation deemed to be the least comparable portion of the datasets. Above 32 weeks or 1500 grams, the estimates were virtually identical.

In terms of *sample size*, subsets of data collections cannot be used for a complete re-analysis of the results in terms of both the estimate of effect and the estimates of variance, CI's and thus overall statistical significance. In our setting, it would mean that the smallest subset (Cat 32) – although deemed to be the most suitable for replication of the effect estimate – would be the least suitable for a replication of the CI's. Replicating the effect estimate between datasets is an essential component of our understanding of the evidence for effect sizes in e.g. meta-analyses of the Cochrane database (143). In performing these analyses in meta-analyses, however, the value under scrutiny is the point estimate (in this case, odds ratio), and the CI's (as a measure of size and variation) are only included in this so-called Cochran's Q analysis of heterogeneity of meta-analyses for the purpose of weighting the individual datasets proportion of the overall analysis. While CI's are important

measures in any setting or analysis, replications of effect size can provide substantial support to an effect estimate even when each individual dataset may have insufficient power to demonstrate significance by itself. The effect estimates in our replication in Cat 32 were found to be OR 0.7 (Femina 0.74, MBRN 0.71, Cross-validated 0.72) compared with the original OR 0.7 (Femina total 0.69) – in statistical terms virtually identical.

Conclusions; neither of the datasets had optimal robustness, more studies needed

Yet, when taking all possible comparisons and data materials made available through the Femina and MBRN datasets into account, all CI's were borderline significant (upper limit of 95% CI's closely below or above 1, slightly versus not significant), and effect estimates in the range of OR 0.7 to 0.8. We therefore concluded that although the validation and replication procedures leant support to the original effect estimates, and thus the overall conclusions of the study, neither the Femina nor the MBRN data collections have optimal robustness, and we called for cautiousness in interpretation of effect estimates and for more studies to confirm our findings.

5.7. Kick chart or not - does it cause anxiety and what are the benefits?

The ritual of daily movement counting might increase maternal awareness and improve the mother's perception of changes in fetal activity. However, since the proportion of women using the chart in our population was relatively low (paper IV), it is more likely that these effects are attributable to increased awareness by the simple act of *receiving* a chart, and not by actually *using* it. There is still no evidence that formal FMC is superior to maternal common sense, and thus no evidence to support

the introduction of such counting in any total population using the existing alarm limits of FMC (103). Nevertheless, women do monitor FM and, irrespective of the viewpoint of health-care professionals, guidance to improve awareness and understanding of the significance of DFM is needed.

Promoting awareness by recommending women to count FM on a daily basis in the third trimester could provide additional vigilance in the individual pregnancy and help the expectant mother to identify significant changes. However, a single defining limit which would be better than a subjective maternal perception of DFM does not exist due to inter-individual variations (3).

Fear of increased maternal concern and anxiety (144) as well as increased costs for examinations (96;111) might constitute some of the reasons why many health-care professionals choose not to recommend an FM chart to their low-risk patients. However, previous reports have indicated that FMC does not cause anxiety (108), and another study even indicates that FMC could enhances the maternal-fetal attachment (109).

The purpose of our intervention was not to study and evaluate the use of a kick chart per se. However, it should be noted that the consultation rate did not increase during the intervention and the use of a kick chart was associated with a reduced risk of being examined in the hospital because of DFM (18% in the noncounting group versus 9% in the counting group: $p = 0.045$). In addition, women who did use a kick chart did not report increased concern and were not examined any more frequently in the hospital (paper IV). Previous reports have indicated that the key factor for high compliance with the use of an FM chart is effective communication and encouragement from a health-care professional (19;102;145). Indeed, this is supported by the findings of our study (paper IV). Satisfaction with the information about the

rationale for fetal monitoring and the technique of recording were associated with more frequent use of a kick chart and increased the mother's assessment that a kick chart was important and useful. It appeared "safe" with regard to both maternal well-being and the use of health-care resources (paper IV).

5.8. What is the most valuable definition of DFM?

In our population preceding the intervention, 9% of the included maternity units regarded the limits for DFM to be "absence of FM for 24 hours" or the extreme opposite, with women reporting that they were informed to expect the baby to kick at least 25 times per hour (115). The information we provided to the women during the intervention emphasized that her subjective perception of a significant and sustained reduction in FM was the primary indicator of DFM, and the indicator to seek help from health-care professional. The woman was advised *never* to wait until the next day if the baby did not kick for 1 day or kicked less and less in the course of a day/days. Daily counting of FM was only suggested as a tool to aid monitoring FM, guiding the woman with "ten FM within 2 hours" as a secondary rule of thumb in situations where she felt in doubt. Even though this appears to be the only validated definition of DFM for focused counting, our surveys from Norway, the UK, and Australia indicate that it has little support among obstetricians. The most highly approved definitions of DFM are still "ten movements in 10 hours" or other limits derived from "Daily Movement Counts" (96;103;115). However, such limits represent extreme deviations from normality and they might cause more harm than good.

Whilst beneficial effects were reported among the four studies comparing formal FMC versus no counting, this might result from a combination of high

awareness and maternal common sense in terms of defining DFM as the given alarm limits for each study. None of the studies actually demonstrated that their definition of DFM was beneficial, and none prevented women from presenting with their own subjective perception of DFM. Promoting awareness, vigilance, and FMC could require the maternal perception of a significant and sustained reduction in fetal activity to remain the main definition of DFM. Any alarm limits, such as “ten FM in 2 hours” should be used for guidance purposes only. New and individually adjusted definitions of DFM are needed.

6. Concluding remarks and future perspectives

The goals of antepartum fetal surveillance in cases of DFM are to avoid imminent fetal jeopardy (101), and to identify pregnancies at increased risk of stillbirth and other adverse pregnancy outcomes. Antepartum health-care should provide appropriate care in order to reduce this risk while avoiding unnecessary interventions (99). The results of this study can be summarized as follows:

- Women experiencing DFM in a total population are at risk of adverse pregnancy outcome such as PTB and FGR, and should be managed as such (paper I).
- Maternal characteristics and the duration of the perceived decrease of FM in uncomplicated pregnancies could help identify pregnancies that should receive intensified management. A concern for DFM among women with complicated pregnancies might identify indications for additional follow-ups. Research is needed to define the optimal management of subgroups of cases of DFM (paper II).
- Women are often poorly informed about the significance of fetal activity. Information could increase maternal awareness toward fetal activity in the individual pregnancy and help the expectant mother to identify significant changes (paper III and IV).
- Time matters and the provision of guidelines and knowledge-based information to pregnant women are needed to prevent delayed reporting of DFM and thus to improve fetal health (paper III and IV).

- Improved definitions and RCTs are needed to identify the optimal management of pregnancies with DFM and any future use of FMC techniques (paper III).
- Both no information and bad information is harmful and good information must be knowledge based. The routine of daily FMC in the third trimester could provide additional vigilance. However, there is as yet no evidence that formal FMC with fixed alarm limits is superior to maternal common sense. Thus, there is no evidence to support the introduction of such counting in any total population, or rationale to perform trials using the existing alarm limits of FMC. Better tools are needed to identify the pregnancy at risk by assessing FM patterns, and they will have to be individually adjusted to identify change, and not level, of activity (paper III).
- Observational studies are at risk of bias. RCT's are considered to provide the strongest evidence regarding an intervention. A higher difference is required in observational evidence. The precise effect of optimal information to pregnant women about DFM, and the optimal management of complaints for DFM, still remains to be identified in RCT's.
- We found that through our validation and replication procedures that neither the Femina nor the MBRN data collections had optimal robustness. All CI's were borderline significant (upper limit of 95% CI closely below or above 1; slightly versus not significant), and the effect estimates in the range of OR 0.7 to 0.8. We call for cautiousness in interpretation of the effect estimates. More studies; especially RCT's are needed to confirm our findings.

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8. Appendices

Appendix 1: Femina registration chart - Norwegian

Appendix 2: “Kicks count”; folder – Norwegian

Appendix 3: “Kicks count”; folder – English

Appendix 4: “Kicks count”; folder – Urdu

Appendix 5: “Kicks count”; folder – Somali

Appendix 6: “Kicks count”; folder – Turkish

Appendix 7: “Kicks count”; folder – Arabic

Appendix 8: The cross sectional questionnaire

femina
fetal movement intervention assessment

Bruk kulepenn og skriv / kryss av tydelig. Eksempel: ☒☒☒

Identifikasjon
Lim inn klistrelapp her

1. Undersøkelsesdato og tidspunkt (dd.mm.åå): ☐☐.☐☐.☐☐ Kl (tt:mm): ☐☐:☐☐

2. Mor og svangerskapet:

Mors alder (i år) ☐☐ år
Mors vekt før svangerskapet (i kg) ☐☐☐ kg
Mors høyde (i cm) ☐☐☐ cm
Mors røykevaner ☐ ikke røyker ☐☐ sig/dag
Tidligere svangerskap: Lev. fødte ☐ Dødfødte ☐ Spont.ab ☐
Kjente sykd./risikofaktorer: _____
Termin (helst iflg. UL) ☐☐.☐☐.☐☐ (dd.mm.åå)
Morsmål: ☐ Norsk, Annet: ☐☐☐☐☐☐☐☐☐☐
Opprinnelse: ☐ Norge, Annet: ☐☐☐☐☐☐☐☐☐☐

3. Hovedårsak til konsultasjonen:

Konsultasjonen fant sted ved fødeavdeling ☐
ved poliklinikk ☐

Mors begrunnelse for "lite liv"?

Mor kjente "lite liv" og rapporterte dette ☐
ELLER
Mor brukte sparkeskjema og rapporterte "lite liv" i henhold til retningslinjer ☐
ELLER
Mor anga "lite liv" på direkte forespørsel ☐

Når rapporterte mor "lite liv"?

Mor ringte eller kom til undersøkelse på eget initiativ ☐
Ved alminnelig svangerskapskontroll ☐
Ved konsultasjon/innleggelse for andre svangerskapskomplikasjoner ☐
Ved innleggelse pga planlagt forløsning eller spontan fødsel ☐

4. Varighet av "lite liv":

Fra når opplevde mor at det var mindre fosterbevegelser?
(dd.mm.åå): ☐☐.☐☐.☐☐ Kl (tt:mm): ☐☐:☐☐

Når var siste gang mor kjente fosterbevegelser?
(dd.mm.åå): ☐☐.☐☐.☐☐ Kl (tt:mm): ☐☐:☐☐

Når tok mor første gang kontakt med helsepersonell pga "lite liv"?
(dd.mm.åå): ☐☐.☐☐.☐☐ Kl (tt:mm): ☐☐:☐☐

Mors opplevelser av fosteraktivitet ved ankomst sykehuset

Mor kjenner fortsatt "lite liv" ☐
ELLER
Mor har hatt normal fosteraktivitet i ☐☐ timer og ☐☐ minutter

5. Utførte undersøkelser ved sykehuset:

CTG ☐
UL (måling av fostervannsmengde) ☐
UL (måling av fostervekst/-størrelse) ☐
Doppler/flow-måling ☐
Annet _____

6. Evaluering av "lite liv"-undersøkelsen

Ble patologi funnet? Ja ☐ Nei ☐
Hvis ja, sjekk alle punkter og kryss av om patologien var ukjent eller kjent før denne undersøkelsen

	Ukjent	Kjent
Fosterdød	☐	☐
Akutt morkakesvikt / føtal distress	☐	☐
Non-reaktiv CTG	☐	☐
Kronisk morkakesvikt / veksthemming	☐	☐
Patologisk Doppler-flow	☐	☐
Medfødte misdannelser	☐	☐
Avvik i fostervannsmengde: poly ☐ oligo	☐	☐
Reduserte fosterbevegelser	☐	☐
Annet	☐	☐

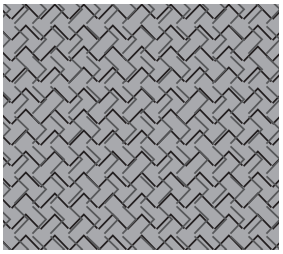
Eventuell patologi ble funnet med: CTG ☐
UL ☐
Doppler ☐

7. Konsekvenser av undersøkelsen:

Ingen videre oppfølging (tilbake til alminnelig svangerskaps- eller fødselsomsorg) ☐
Gjentatt kontroll planlagt / anbefalt om ☐☐ dager
Innlegges til videre observasjon ☐
Innlegges til indusert forløsning ☐
Innlegges til hasteforløsning ☐

femina
fetal movement intervention assessment

Bruk kulepenn og skriv / kryss av tydelig. Eksempel: ☒☒☒



1. Undersøkelsesdato og tidspunkt (dd.mm.åå): ☐☐.☐☐.☐☐ Kl (tt:mm): ☐☐:☐☐

2. Mor og svangerskapet:

Mors alder (i år) ☐☐ år
Mors vekt før svangerskapet (i kg) ☐☐☐ kg
Mors høyde (i cm) ☐☐☐ cm
Mors røykevaner ☐ ikke røyker ☐☐ sig/dag
Tidligere svangerskap: Lev. fødte ☐ Dødfødte ☐ Spont.ab ☐
Kjente sykd./risikofaktorer: _____
Termin (helst iflg. UL) ☐☐.☐☐.☐☐ (dd.mm.åå)
Morsmål: ☐ Norsk, Annet: ☐☐☐☐☐☐☐☐☐☐
Opprinnelse: ☐ Norge, Annet: ☐☐☐☐☐☐☐☐☐☐

3. Hovedårsak til konsultasjonen:

Konsultasjonen fant sted ved fødeavdeling ☐
ved poliklinikk ☐

Mors begrunnelse for "lite liv"?

Mor kjente "lite liv" og rapporterte dette ☐
ELLER
Mor brukte sparkeskjema og rapporterte "lite liv" i henhold til retningslinjer ☐
ELLER
Mor anga "lite liv" på direkte forespørsel ☐

Når rapporterte mor "lite liv"?

Mor ringte eller kom til undersøkelse på eget initiativ ☐
Ved alminnelig svangerskapskontroll ☐
Ved konsultasjon/innleggelse for andre svangerskapskomplikasjoner ☐
Ved innleggelse pga planlagt forløsning eller spontan fødsel ☐

4. Varighet av "lite liv":

Fra når opplevde mor at det var mindre fosterbevegelser?
(dd.mm.åå): ☐☐.☐☐.☐☐ Kl (tt:mm): ☐☐:☐☐

Når var siste gang mor kjente fosterbevegelser?
(dd.mm.åå): ☐☐.☐☐.☐☐ Kl (tt:mm): ☐☐:☐☐

Når tok mor første gang kontakt med helsepersonell pga "lite liv"?
(dd.mm.åå): ☐☐.☐☐.☐☐ Kl (tt:mm): ☐☐:☐☐

Mors opplevelser av fosteraktivitet ved ankomst sykehuset

Mor kjenner fortsatt "lite liv" ☐
ELLER
Mor har hatt normal fosteraktivitet
i ☐☐ timer og ☐☐ minutter

5. Utførte undersøkelser ved sykehuset:

CTG ☐
UL (måling av fostervannsmengde) ☐
UL (måling av fostervekst/-størrelse) ☐
Doppler/flow-måling ☐
Annet _____

6. Evaluering av "lite liv"-undersøkelsen

Ble patologi funnet? Ja ☐ Nei ☐
Hvis ja, sjekk alle punkter og kryss av om patologien var ukjent eller kjent før denne undersøkelsen

	Ukjent	Kjent
Fosterdød	☐	☐
Akutt morkakesvikt / føtal distress	☐	☐
Non-reaktiv CTG	☐	☐
Kronisk morkakesvikt / veksthemming	☐	☐
Patologisk Doppler-flow	☐	☐
Medfødte misdannelser	☐	☐
Avvik i fostervannsmengde: poly ☐ oligo	☐	☐
Reduserte fosterbevegelser	☐	☐
Annet	☐	☐

Eventuell patologi ble funnet med: CTG ☐
UL ☐
Doppler ☐

7. Konsekvenser av undersøkelsen:

Ingen videre oppfølging (tilbake til alminnelig svangerskaps- eller fødselsomsorg) ☐
Gjentatt kontroll planlagt / anbefalt om ☐☐ dager
Innlegges til videre observasjon ☐
Innlegges til indusert forløsning ☐
Innlegges til hasteforløsning ☐

Veiledning til utfylling og bruk av skjema for rapportering av ”lite liv”

En ”lite liv”-konsultasjon er definert som:

En profesjonell vurdering av enkeltsvangerskap ≥28 begrunnet i bekymring for lav fosteraktivitet*.

* Uavhengig av om bekymringen kommer fra kvinnen eller helsepersonell, og uavhengig av om bekymringen er bakgrunn for konsultasjonen eller om den kommer fram under annen konsultasjon eller innleggelse av andre årsaker. Kun kliniske konsultasjoner i avdelingen skal inkluderes, ikke telefonkonsultasjoner.

Bruk av skjemaet:

Sett en klistrelapp med kvinnens identifikasjon eller skriv kvinnens navn og fødselsdato kun på første arkets øverste høyre hjørne. Fyll ut alle felt 1-7 og legg hele skjemaet (begge ark) i samleboks for Femina-skjemaer. Koordinator fyller ut utkomme og sender del 2 til Femina sentralt.

8. Svangerskapsutkomme:

Gutt ☐ Jente ☐

Fødselsvekt (i gram) ☐☐☐☐ g

Fødselsdato: ☐☐.☐☐.☐☐ (dd.mm.åå)

Fødselsmåte

- Normal vaginal ☐
- Instrumentell vaginal ☐
- Elektivt sectio ☐
- Hastesectio ☐

Indikasjon for inngrep under fødsel

- Protrahert fødselsforløp ☐
- Maternelle forhold ☐
- Føtale forhold ☐

Fødselens start

- Spontan ☐
- Indusert ☐
- Planlagt ☐

Apgar score ved 5 min ☐☐ 10 min ☐☐

Laveste pH under/ved fødsel: pH ☐,☐☐

- Avvikende føtal hjerterytme/funksjon under fødsel ☐
- Neonatale nevrologiske manifestasjoner (hypotoni, koma, kramper, e.l.) ☐
- Multisystem organsvikt (kardiovaskulær, respiratorisk, hematologisk e.l.) ☐
- Overført til nyfødtavdeling ☐

Årsak: _____

_____

Mortalitet

- Antepartum død ☐
- Intrapartum død ☐
- Neonatal død på fødestue ☐
- Kvinnen kom ikke til sykehuset pga “lite liv” ☐

Dødsårsaker:

Basert på: klinikk ☐ obduksjon ☐ placenta u.s. ☐

Vurdering: Uunngåelig død ☐ Kunne vært unngått ☐

Takk for ditt bidrag!

Design: Marianne Ricketts www.mariannedesign.no

Teller du spark kan du bidra til forskningen

Husk at barnet skal sparke hver dag!

Bli kjent med barnet ditt!

Kjenn etter hver dag!

... Spark er mer enn bare kos ...

tell trivselen

www.telltrivselen.no

BLI KJENT MED BARNET DITT!

Du har nå kommet så langt i svangerskapet at du kanskje har kjent barnet sparke. Svangerskapskontrollene vil hjelpe deg med å følge barnets trivsel, men det er du som mamma som kan bli best kjent med det før det blir født. Det barnet sier med sparkingen, er viktig!

Etter fødselen vil du bruke mye tid til å ta deg av barnet. Vi oppfordrer deg til å bruke litt tid hver dag i svangerskapet til å bli kjent med barnet ved å kjenne etter bevegelser. Her finner du informasjon om hva det betyr når det sparker, og veiledning i hvordan du kan følge med på at barnet ditt trives.

Det er en god vane å sette av tid til å bli kjent med barnet!

HVA SIER SPARKINGEN OM TRIVSEL?

I morkaken overføres alt barnet trenger. Så lenge forsyningene er gode, sparker barnet. Blir det lite forsyninger fra morkaken, eller barnet blir sykt, må det spare på kreftene for å kunne fortsette å vokse - sparkingen avtar. Røyker du, vil både morkake og barnet rammes, og sparkingen vil avta. Om svikten i morkaken blir alvorlig, hemmes veksten, og barnet kan bli sykt eller skadet. Da kan det også tåle fødselen dårligere. Dette skjer sjelden dersom barnet sparker normalt!

Av og til er det stille. Det som betyr noe, er dersom den vanlige sparkingen avtar mye. Når du kjenner den vanlige rytmen på livet der inne, er dette et tegn på at barnet har det bra. At du kjenner etter sparkene, bidrar også til at du knytter deg nærmere barnet ditt. Det er derfor det er fint å telle trivselen!

Derfor teller vi trivselen!

Når det sparker i magen - hva betyr det?

HVA GJØR BARNET DER INNE?

Barnet ditt vil være aktivt i hele svangerskapet. Det det gjør mest av, er pustebevegelser du ikke kjenner. Slik utvides lungene, mens det øver seg til tiden etter fødselen. Av og til får det hikke, som du kjenner som regelmessige små rykk.

Barnet utfører både store og små bevegelser inne i magen din. Små gripebevegelser, suging på tommelen eller bøying og strekking av fingre og tær kjenner du nok ikke. De aller fleste spark og dytt barnet gjør der inne, kjenner du derimot godt i siste del av svangerskapet. Større kropps-bevegelser er også ofte tydelige og kan komme når du endrer stilling fra stående til liggende. Da blir barnet snudd litt, og kan svare med å flytte litt på seg, slik det ofte dytter tilbake om du dytter litt på det.

AV OG TIL ER DET STILLE...

Barnet ditt sover mange ganger i løpet av dagen og da er det stille. Søvnperiodene blir lengre utover i svangerskapet, men selv nær termin sover barnet sjelden mer enn en time om gangen. De fleste er mest aktive på kvelden, og mange også tidlig om morgenen.

Det kan være stor forskjell fra barn til barn på hvor mye og kraftig de "sparker" – med spark mener vi her alle typer bevegelser. Barn som sparker mye, er ofte mer aktive etter fødselen også. Det er ikke kjent å være forskjell på gutter og jenter.

Noen mødre kjenner sparkene dårligere enn andre. Hvis morkaken ligger på fremsiden av livmoren eller du er overvektig, kjenner du mindre. Du kan øve deg på å kjenne etter spark samtidig som du ser om magen beveger seg. Du kjenner sparkene best når du ligger, og minst når du står, går eller er opptatt med noe.

Foto: Per Oscar Skjellnan • www.peroscar.no
Design: Marianne Bratt Ricketts • www.mariannedesign.no

Har du spørsmål? Se www.telltrivselen.no

TELLE TRIVSELEN?

Å kjenne etter spark hver dag er en god vane. Sparkeskjemaet er et enkelt hjelpemiddel som du kan bruke hvis du vil, og som gir deg og jordmoren/legen din en oversikt over barnets sparking. Skjemaet gjør det lettere å se hva som er normalt for ditt barn. Selv om sparking er viktig for alle, er sparkeskjemaet best egnet etter uke 28 i svangerskapet, og dersom du ikke har tvillinger.

HVORDAN DELTA I FORSKNINGEN?

Fyller du ut sparkeskjemaet og leverer det etter fødselen, bidrar du også til viktig forskning om hvordan man kan kjenne igjen svangerskap med behov for ekstra hjelp på grunnlag av sparkeaktiviteten. Om du ønsker å delta i slik forskning, finner du informasjon om dette på folderens bakside.

HVORDAN TELLER MAN?

Start å telle trivselen når du er kommet til uke 28 i svangerskapet. Skriv inn datoen du begynner og terminen din på skjemaet.

Tell til 10 – ta tiden fra du kjenner det første sparket (så du vet at barnet er våkent). Alle bevegelser gjelder som "spark", men hikke skal du ikke telle! Flere bevegelser samtidig gjelder for ett "spark". Det går fortest om du ligger/sitter avslappet og kjenner ordentlig etter. Om barnet sover, er det lov å vekke det med litt klapping/dytting på magen eller ved at du drikker noe kaldt.

Sett et kryss i ruten på skjemaet for tiden det tok å telle 10 spark og hvilken dag det er.

Tell omtrent på samme tid hver dag - hvis du kan. Velg en tid på døgnet når det passer deg best å sette av litt tid og når du vet at barnet pleier å være aktivt. Start tellingen innen de samme to timene hver dag. Skriv på skjemaet i hvilket tidsrom du pleier å telle.

Gjør du det slik, vil de fleste oftest bruke under 15 minutter på å telle trivselen.

Hvor mye skal barnet sparke - og hva om det avtar?

Etter å ha brukt sparkeskjemaet i en uke eller to, vil du nok se at sparkingen varierer litt fra dag til dag, men at dagene stort sett ligner på hverandre. Slik vil det fortsette for et barn som trives, selv om måten du føler bevegelser på endrer seg under svangerskapet. Det viktigste er at du ikke opplever stor og vedvarende nedgang i forhold til normal aktivitet for barnet ditt! Sparkeskjemaet hjelper deg å se dette.

Hvis du er bekymret for barnet ditt, bør du uansett grunn søke råd og hjelp. Er du bekymret fordi barnet ditt gradvis sparker mindre ettersom ukene går, bør du ta med deg sparkeskjemaet til neste svangerskapskontroll.

I noen tilfeller bør du ta direkte kontakt med fødeavdelingen:

- Hvis barnet ditt ikke sparker en dag, skal du aldri vente til neste dag.
- Hvis barnet sparker stadig mindre i løpet av dagen/dager, og du kjenner "lite liv".

Er du i tvil om hva som er "lite liv", bør du vite at det er svært sjelden at et friskt barn sparker mindre enn 10 spark i løpet av to timer du vet den pleier å være aktiv. Har du følt at det har sparket så lite hele dagen, bør du kontakte fødeavdelingen. Om du ikke vet om det har sparket så lite i tiden før du startet dagens telling, bør du følge med. Sørg da for å telle igjen innen de neste 12 timene og kontakt fødeavdelingen dersom resultatet gjentar seg.

Jeg begynte å telle i dag (dato, dd.mm.åå) ☐☐.☐☐.☐☐ Jeg har termin (dd.mm.åå) ☐☐.☐☐.☐☐ Jeg pleier å telle mellom kl: ☐☐.☐☐ og kl: ☐☐.☐☐

MINUTTER

5 min per boks

	UKE 28							UKE 29							UKE 30							UKE 31							UKE 32							UKE 33							UKE 34						
UKEDAGER	Dag 1	Dag 2	Dag 3	Dag 4	Dag 5	Dag 6	Dag 7	Dag 1	Dag 2	Dag 3	Dag 4	Dag 5	Dag 6	Dag 7	Dag 1	Dag 2	Dag 3	Dag 4	Dag 5	Dag 6	Dag 7	Dag 1	Dag 2	Dag 3	Dag 4	Dag 5	Dag 6	Dag 7	Dag 1	Dag 2	Dag 3	Dag 4	Dag 5	Dag 6	Dag 7	Dag 1	Dag 2	Dag 3	Dag 4	Dag 5	Dag 6	Dag 7	Dag 1	Dag 2	Dag 3	Dag 4	Dag 5	Dag 6	Dag 7
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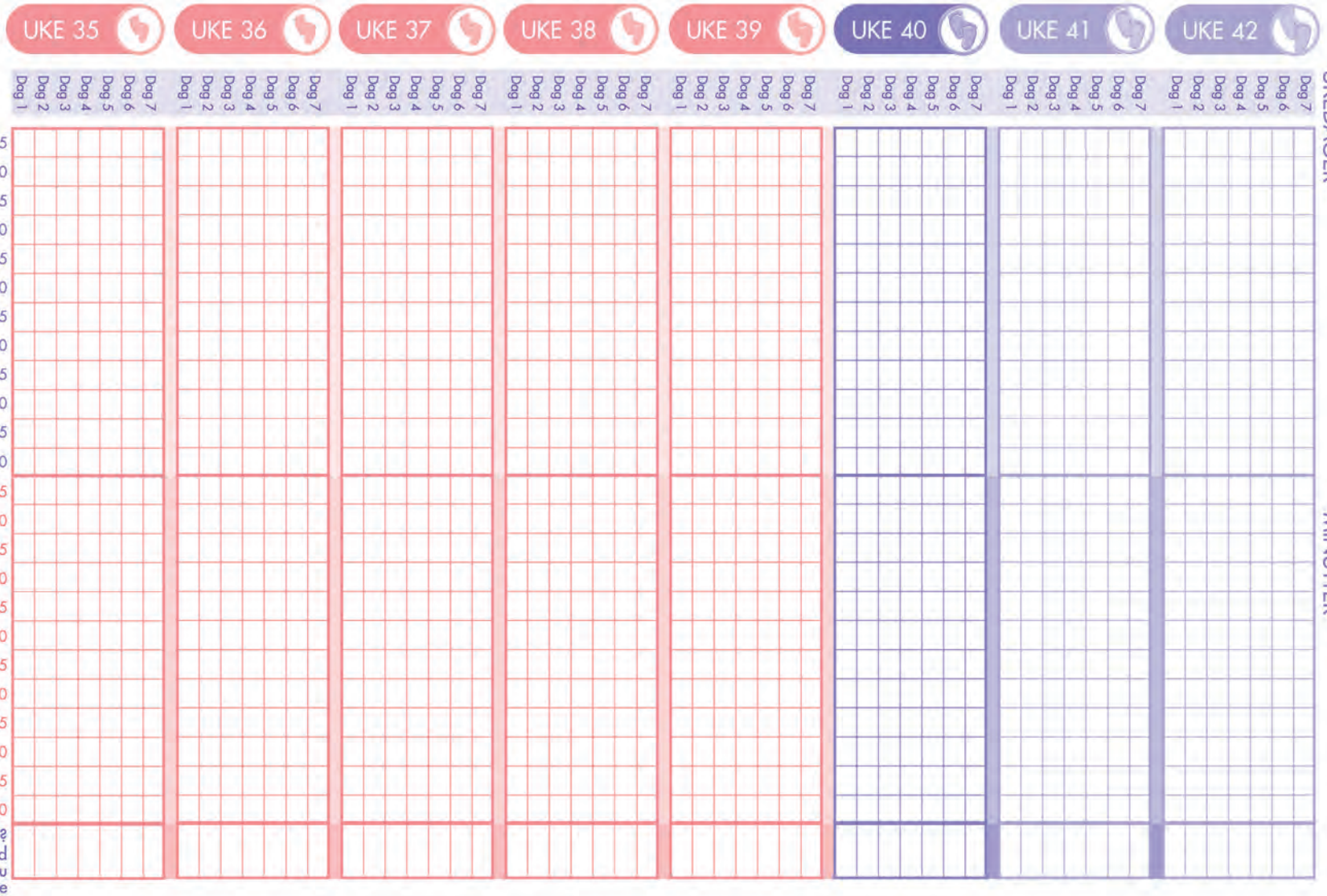
Hvis du brukte mer enn 2 timer, skriv ned tiden du brukte																																																	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76-80
81-85
86-90
91-95
96-100
101-105
106-110
111-115
116-120
Over 2t? Skriv ned tiden du brukte

DELTA I FORSKNING OM SAMMENHENGENE MELLOM SPARKEAKTIVITET OG HELSE?

Vi vil gjerne be deg delta i forskningen ved å levere inn denne folderen etter at du har født barnet ditt - tvillinger skal ikke være med. Dette er uavhengig av om du har brukt sparkeskjemaet ditt eller ei.

HVEM OG HVORFOR?

I regi av Folkehelseinstituttet, Perinatalt forskningssenter ved Rikshospitalet, Sanitetskvinnene og Landsforeningen uventet barnedød gjøres det nå undersøkelser om sammenhengene mellom barns sparkeaktivitet i magen, og deres fremtidige helse. Vi vet at alvorlig nedgang eller opphør av sparkeaktivitet er forbundet med risiko for sykdom og død, men vet lite om hvordan dette og annen informasjon om barnets sparkeaktivitet i magen kan brukes til å fremme barns helse på kort og lang sikt.

DET ER HELT FRIVILLIG Å DELTA

For forskningens del er det viktig at flest mulig leverer inn denne folderen før de forlater føde- / barselavdelingen etter fødsel. Folderen er verdifull for forskningen selv om du ikke skulle ha brukt sparkeskjemaet eller ikke vil gi noen opplysninger om deg selv. Er du under 18 år, bør du spørre dine foresatte.

DU KAN BIDRA TIL FORSKNINGEN PÅ EN AV TRE MÅTER AVHENGIG AV HVOR MYE INFORMASJON DU GIR:

1. Hvis du deltar i Den norske mor & barn undersøkelsen, kan du samtykke ved å la informasjonen fra folderen din knyttes til undersøkelsen. Du kan angi ditt personnummer og signere her:

Signatur: _____ Personnummer: ☐☐ ☐☐ ☐☐ ☐☐☐☐☐

2. Du kan gi samtykke til at informasjonen fra folderen din knyttes til Medisinsk fødselsregister ved å angi ditt fødsels-og personnummer og signere her:

Signatur: _____ Personnummer: ☐☐ ☐☐ ☐☐ ☐☐☐☐☐

3. Vil du være anonym fyller du ut opplysningene nederst på denne siden og gir ditt samtykke ved å krysse av her: ☐

ER DET TRYGT Å DELTA?

Folkehelseinstituttet har ansvaret for fortrolighet og sikkerhet for dine opplysninger. Instituttet har konsesjon fra Datatilsynet og tilråding fra Forskningsetisk komité til å ta vare på informasjon om deg og barnet ditt.
Så snart Folkehelseinstituttet har registrert dine opplysninger og knyttet deg til informasjonen du har gitt samtykke til, vil din informasjon anonymiseres. Dette betyr at folderen din destrueres og all identifiserende informasjon fjernes før forskere får se informasjonen.

HVOR SKAL JEG LEVERE FOLDEREN?

Det finnes tydelig merkede postkasser på alle føde- og barselavdelinger. Spør personalet om du er i tvil.

I hvilken svangerskapsuke fødte du?..... ☐☐
(uke 40 er termin)

HVORDAN FØDTE DU?

Vanlig fødsel (vaginal)..... ☐
Keisersnitt som var planlagt ..... ☐
Keisersnitt underveis i fødselen .... ☐
Barnets kjønn Gutt ☐ Jente ☐
Barnets fødselsvekt ☐☐☐☐ gram

HVORDAN GIKK DET MED BARNET?

Barnet var friskt ..... ☐
Barnet ble innlagt på nyfødtavdeling/barneavdeling ☐

Din alder ..... ☐☐ år
Din vekt før svangerskapet ..... ☐☐☐ hele kg
Din høyde ..... ☐☐☐ hele cm

Hvor mange barn har du født før? ☐☐

Røykte du den siste måneden av dette svangerskapet?
Nei ..... ☐
Av og til ... ☐ ☐☐ sigaretter per uke
Daglig ..... ☐ ☐☐ sigaretter per dag

Har du annet morsmål enn norsk? Ja ☐ Nei ☐
Hvis JA, hvilket språk? ☐☐☐☐☐☐☐☐☐☐

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folkehelseinstituttet

Rikshospitalet

LANDSFORENINGEN UVENTET BARNEDØD

BLI MED I TREKNINGEN!!

Leverer du inn folderen din kan du være med i en månedlig trekning av **Libero/Natusan produkter** til en verdi av **kr. 1000,-**

Vil du være med i trekningen? JA ☐ NEI ☐

Navn ..... tel .....

Kontaktadresse:
Julie Holm Tveit/Frederik Frøen/
Eli Saastad
FEMINA
Nasjonalt folkehelseinstitutt, EPAM
Postboks 4404 Nydalen
N-0403 Oslo
Tel: +47 23 07 02 26
+47 23 41 94
Fax: +47 23 40 82 52


... Kicks are more
than just bonding ...
kicks count
www.telltrivselen.no

GET TO KNOW YOUR BABY!

You have come so far into your pregnancy that you might have already felt your baby kick. Your pregnancy check-up will help you keep an eye on your baby's well-being, but you the mother are the one who can "know" your baby best before it is born. What the baby is telling you with its kicks is important!

After the birth you will be spending a lot of time on the care of your baby. We encourage you to use a little time each day now during your pregnancy to get to know your baby by feeling for its movements. Here you will find information about what it means when it kicks, and some tips on how you can check your baby's well-being.

It's a good habit to set aside time to get to know your baby!

WHAT DO THE KICKS SAY ABOUT WELL-BEING?

Your baby gets everything it needs from you through the placenta. As long as the supplies are good the baby will kick. If the placenta does not supply enough or the baby becomes ill, it must save energy to continue to grow so there are less kicks. If you smoke, both the placenta and your baby are affected, and there will be less kicking. If the placenta becomes very weak, growth is inhibited, and the baby could become seriously ill or injured. The baby may also have trouble in birth. This seldom happens if the baby is kicking normally!

Sometimes the baby is calm. What is important is if the usual kicking becomes much less. When you feel the normal life rhythm in there, this is a sign that your baby is fine. By feeling for the kicks you are connecting with your baby, that's why it's good to count kicks!

That's why we count kicks!

When it kicks in the womb – what does this mean?

WHAT IS YOUR BABY DOING IN THERE?

Your baby will be active during the entire pregnancy. What it does the most is breathing movements that you don't feel. That's how the lungs are expanded; your baby is practising for life out of the womb. Once in a while it will have a hiccup, which you feel as regular small twitches.

Your baby will make minor and more pronounced movements in your womb. You probably will not feel small gripping movements, sucking on the thumb or bending and stretching of the fingers and toes. However, you will feel most of your baby's kicks and nudging inside you very well during the last part of the pregnancy. More pronounced body movements are also often easy to notice and can for example come when you change from a sitting to a lying position. Then your baby will be turned a little bit and may answer by moving itself a little, just like it might push back at you if you push a little on it.

SOMETIMES IT'S CALM....

Your baby will sleep many times in the course of a day and then it doesn't move at all. The periods of sleep are longer the further you come into your pregnancy, but even as you approach the expected date of delivery your baby will seldom sleep more than an hour at a time. Most babies are most active in the evening, and many also early in the morning.

There can be great variations from baby to baby at to how often and how hard they "kick" – by kick we mean here all types of movement. Babies who kick a lot are often also more active after the birth. Whatever the variations, they can be just as healthy. There is nothing to suggest that girls and boys are different.

Some mothers have more trouble feeling the kicks than others. If the placenta is on the front side of the womb, or you are overweight, you will feel the kicks less. You can practise feeling for kicks the same time you check to see if your stomach moves. You feel the kicks best when you are lying down, and least when you stand, walk or are busy with something.

Photo: Per Oscar Skjellnan
Design: Marianne Bratt Ricketts • www.mariannedesign.no

If you have any questions, go to www.telltrivselen.no

KICKS COUNT?

Feeling for kicks every day is a good habit, and the kick count form is an easy way of keeping count to give you and the midwife/doctor an overview of your baby's kicking. This makes it easier to see what is normal for your baby. Even though kicking is important for all expectant mothers, the kick count form is most suitable for the period from the 28th week of the pregnancy, and if you do not have twins.

If you fill in the form and hand it in after giving birth, you will be contributing to important research on how we can recognize pregnancies that need extra help on the basis of the kicks. If you would like to take part in this type of research you will find information about this on the back page of the folder.

HOW DOES ONE COUNT?

Start counting the kicks when you have made it into the 28th week of your pregnancy. Write in the date when you start and your expected delivery date on the form.

Count to 10 – take the time from when you feel the first kick (so you know the baby is awake). All movements count as a "kick", but don't count hiccups! Several movements at the same time count as one "kick". The quickest way to do this is to relax and lie or sit down and concentrate on feeling for kicks. If your baby is asleep, you can wake it with a little clapping/pushing on the stomach or by drinking something cold.

Tick the box in the form for the time it took until you counted 10 kicks and what day it was.

Count at approximately the same time of day every day – as long as you can. Choose a time of the day when you know you have a little time to spare and when your baby is usually active – preferably in the morning before you get up. Start counting within the same two-hour period every day. Write on the form the time of the day you usually count.

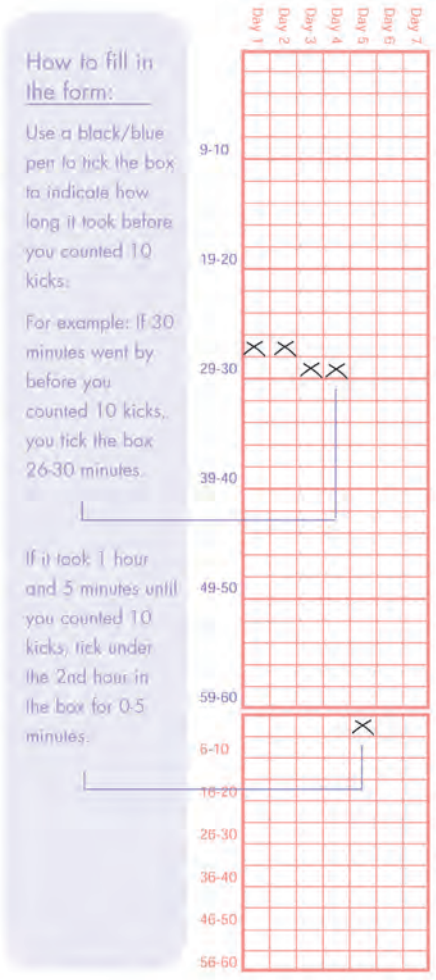
Doing it this way, most will use less than 15 minutes to count the kicks.

How to fill in the form:

Use a black/blue pen to tick the box to indicate how long it took before you counted 10 kicks.

For example: If 30 minutes went by before you counted 10 kicks, you tick the box 26-30 minutes.

If it took 1 hour and 5 minutes until you counted 10 kicks, tick under the 2nd hour in the box for 0-5 minutes.



How much should the baby kick – and what if the number of kicks declines?

After having used the kick count form for a week or two, you will probably see that the kicking varies from day to day, but for the most part the days appear to be quite similar. This will continue to be the case for a child who has good well-being, even if the way you feel the movements changes during the pregnancy. The most important thing is that you do not experience a major and lasting reduction in the normal activity of your baby! The kick count form will help you check this.

If you are worried about your baby, you should ask for help and advice regardless the reason. If you are worried because your child gradually kicks less as the weeks go by, you should take your kick count form to the next pregnancy check-up.

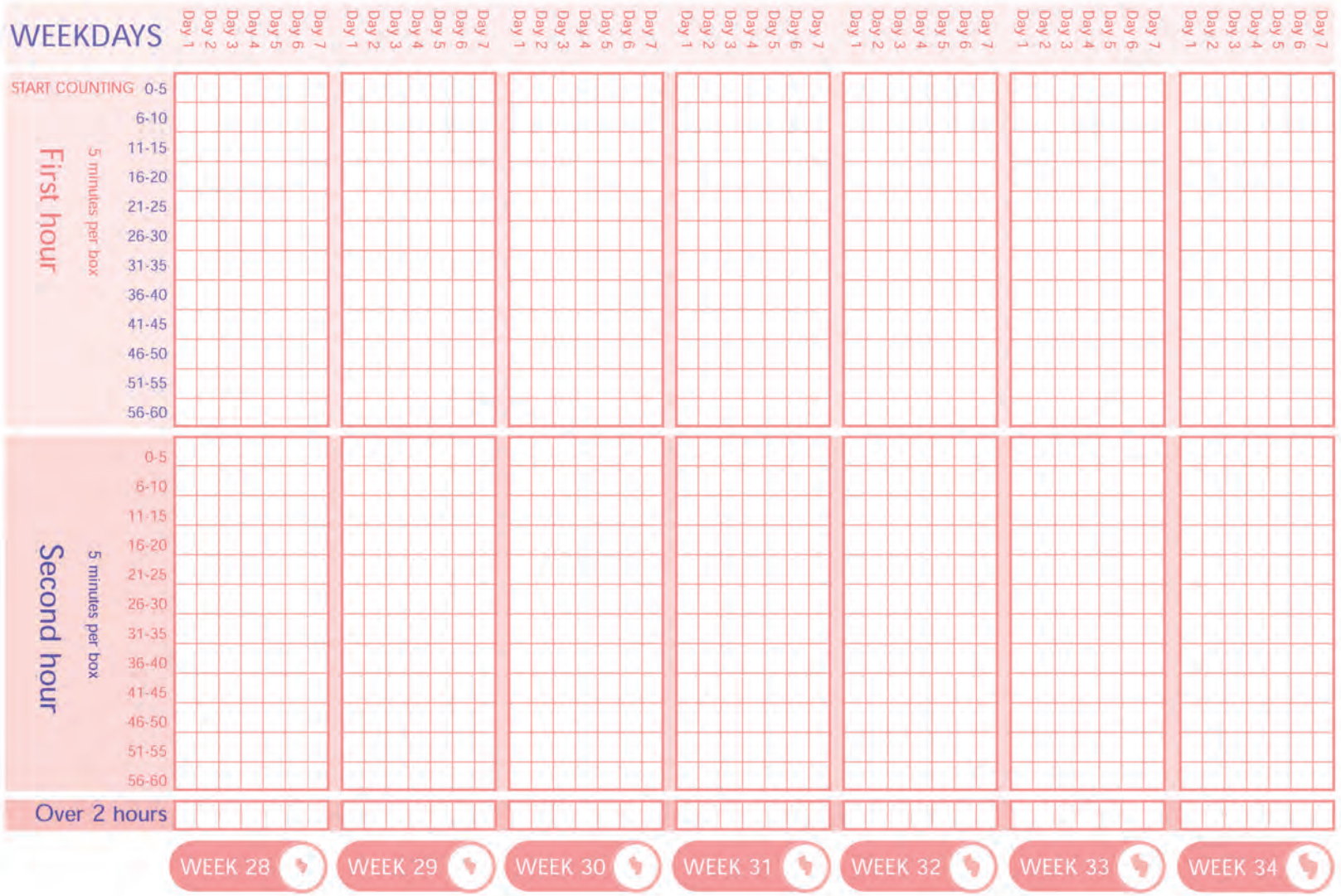
In some cases you should contact the maternity ward directly:

- If your baby does not kick one day, you must never wait to the next day.
- If your baby kicks less and less in the course of a day/days, and you feel "little life".

If you are in doubt as to what is "little life", we can tell you that very rarely does a healthy child kick less than 10 times in the course of two hours of time that you know it is active. If you feel that it has kicked very little the whole day, you should contact the maternity ward. If you don't know if it has kicked so few times in the period of time before you started the day's counting, you should keep checking. Make sure you count again within the next 12 hours and contact the maternity ward if the result is the same.

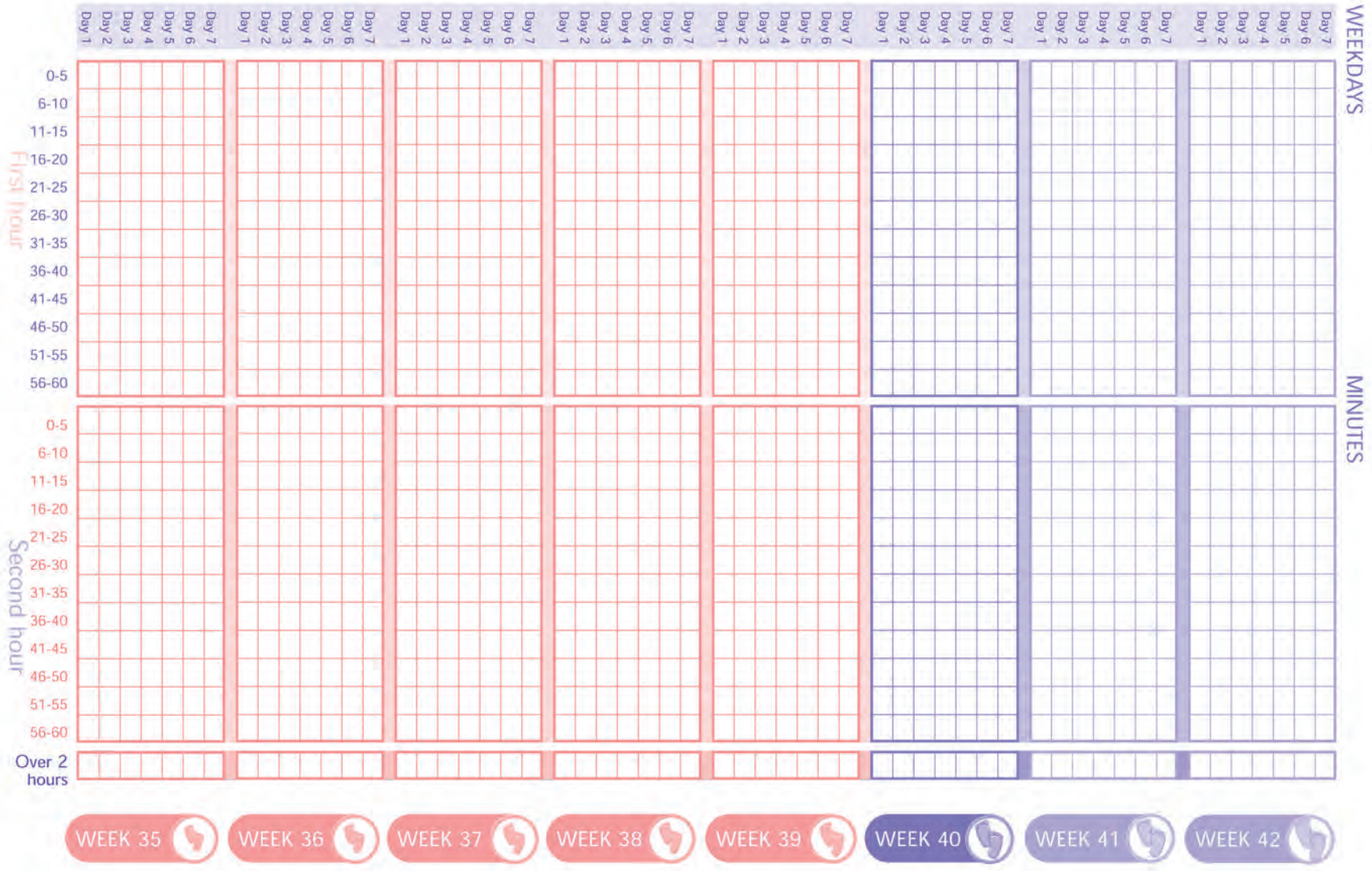
Note: Tick the box with a pen

I start counting today (date, dd.mm.yy) ☐☐.☐☐.☐☐ My due date is (dd.mm.yy) ☐☐.☐☐.☐☐ I normally count between (time): ☐☐.☐☐ and ☐☐.☐☐



NB. Make a cross in the square using a pen

When you have filled in the form send it or hand it in to:



DO YOU WANT TO TAKE PART IN RESEARCH ON THE CONNECTION BETWEEN A BABY'S KICKING AND ITS HEALTH?

We would like to ask you to take part in this research by handing in this folder after you have given birth to your baby – if you delivered one baby — regardless of whether you have used the kick counting form or not.

WHO AND WHY?

The Norwegian Institute of Public Health, Rikshospitalet University Hospital and the Directorate of Health and Social Affairs are undertaking studies of connections between a baby's kicking in the womb and its future health. We know that a steep reduction in or cessation of kicking is connected with a risk of illness or death, but we know little about how this and other information about the child's kicking in the womb can be used to promote the child's health in the short and long term.

PARTICIPATION IS ENTIRELY VOLUNTARY, AND YOU CAN CONTRIBUTE A LOT OR A LITTLE

The best for the research is that as many as possible hand in their folder before they leave the maternity ward after giving birth. The folder is valuable to the research even if you have not used the kick counting form or do not want to give any information about yourself. But the more information you give, the more valuable your contribution. If you are under 18 years of age, you should ask your parents/guardian. You choose yourself how much you want to contribute so:

DO YOU WANT TO BE ANONYMOUS?

Then fill in the information at the bottom of this page and give your consent by ticking here: ☐

CAN YOU CONTRIBUTE MORE?

You can give your consent to allow the information from your folder to be connected with the medical birth register by giving your date of birth and national identity number (fødsels- og personnummer) and signing here:

Signature: _____ National identity number ☐☐ ☐☐ ☐☐ ☐☐☐☐☐

OR

If you are participating in the Norwegian mother & child study, you can give your consent to allow the information from your folder to be connected with the medical birth register by giving your date of birth and national identity number and signing here:

Signature: _____ National identity number ☐☐ ☐☐ ☐☐ ☐☐☐☐☐

IS IT SAFE TO PARTICIPATE?

The Norwegian Institute of Public Health is responsible for the confidentiality and security of your information. The institute is licensed by the Data Inspectorate and approved by the Research Ethics Committee to store information about you and your child. As soon the Institute has registered your information and connected you to the information you have consented to, your information will be made anonymous. This means that the folder will be destroyed and all identifying information will be removed before the researchers can look at the information.

WHERE SHOULD I HAND OVER THE FOLDER?

There are clearly marked boxes in all maternity wards. Ask one of the hospital staff if you are in doubt.

I don't want to give any information..... ☐

In which week of the pregnancy was the delivery?... ☐☐
(week 40 is the expected delivery week)

HOW DID YOU DELIVER?

Normal delivery (vaginal)..... ☐
Planned Caesarean ..... ☐
Caesarean decided during labour ..... ☐
Emergency Caesarean ..... ☐
Child's gender Boy ☐ Girl ☐
Child's weight at birth ☐☐☐☐ grams

HOW DID IT GO WITH THE CHILD?

The child was healthy..... ☐
The child was admitted to the postnatal/children's ward ☐
The child died ..... ☐

How old are you?..... ☐☐ yrs
Your weight before pregnancy ..... ☐☐ whole kg
Your height ..... ☐☐ whole cm
How many children have you already given birth to? ☐☐

Did you smoke the last month of this pregnancy?
No ☐
Sometimes ☐ ☐☐ cigarettes per week
Daily ☐ ☐☐ cigarettes per day

Do you have another native language than Norwegian? Yes ☐ No ☐
If yes, which language? ☐☐☐☐☐☐☐☐☐☐

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folkehelseinstituttet
Rikshospitalet

Thanks for your help!

[urdu]

پیٹ میں بچے کی حرکت
محض کھیل اور مزا نہیں

kicks count

www.kickscount.no

اپنے بچے سے دوستی کیجئے!

اب آپ کے حمل کو اتنا عرصہ گزر چکا ہے کہ شاید آپ کو بچے کی ضربات یا حرکات محسوس ہوتی ہوں گی۔ معائنہ حمل سے آپ کو بچے کی صحت اور خیریت کا تو پتہ چلتا رہتا ہے لیکن ماں کی حیثیت سے آپ ہی ہیں جو بچے کی پیدائش سے پہلے اس کی سب سے قریبی دوست بن سکتی ہیں۔ بچہ اپنی حرکت کے ذریعے جو کچھ بتاتا ہے، وہ اہم ہے!

ولادت کے بعد آپ کا بہت سا وقت بچے کو سنبھالنے میں گزرا کرے گا۔ ہمارا آپ کو مشورہ ہے کہ آپ حمل کے دوران روزانہ تھوڑا سا وقت اپنے بچے کی حرکتوں کے ذریعے اس سے جان پہچان حاصل کرنے میں گزاریں۔ یہاں آپ کو ایسی معلومات دی جا رہی ہیں کہ بچے کے حرکت کرنے کا کیا مطلب ہے اور یہ رہنمائی کی جا رہی ہے کہ آپ اپنے بچے کی صحت اور اطمینان کا کیسے جائزہ لے سکتی ہیں۔

یہ اچھی عادت ہے کہ اپنے بچے سے جان پہچان بنانے کیلئے کچھ وقت مخصوص رکھا جائے!

بچے کی حرکت سے اس کی خیریت کے بارے میں کیا پتہ چلتا ہے؟

بچے کو آپ سے ضرورت کی تمام چیزیں پلاسینٹا کے ذریعے ملتی ہیں۔ جب تک بچے کو درست فراہمی جاری رہے، اس کی حرکت جاری رہتی ہے۔ اگر پلاسینٹا سے بچے کی ضروریات درست طور پر پوری نہ ہوں یا وہ بیمار ہو جائے تو اسے اپنی نشوونما جاری رکھنے کیلئے اپنی طاقت بچا کر رکھنا پڑتی ہے لہذا اس کی حرکت کم ہو جاتی ہے۔ اگر آپ تمباکو نوشی کرتی ہیں تو اس سے پلاسینٹا اور بچے، دونوں پر اثر پڑے گا اور بچے کی حرکت کم ہو جائے گی۔ اگر پلاسینٹا کے فعل میں شدید خلل پڑ گیا تو نشوونما رک جائے گی اور بچے کے شدید بیماری یا نقائص میں مبتلا ہونے کا خطرہ ہے۔ اس صورت میں بچہ پیدائش کے عمل کو بھی ٹھیک طرح برداشت نہیں کر پاتا۔ اگر بچے کی حرکت نارمل انداز میں جاری رہے تو ایسا بہت ہی کم ہوتا ہے۔

کبھی کبھار بالکل سکون رہتا ہے۔ جو بات اہم ہے، وہ یہ ہے کہ معمول کی حرکت بہت کم ہو جائے۔ جب آپ کو اپنے اندر زندگی کا عام ردھم محسوس ہوتا رہے تو یہ بچے کی خیریت کی علامت ہے۔ بچے کی ضربات محسوس ہونے سے آپ کو اپنے بچے سے مزید لگاؤ محسوس ہوتا ہے۔ اس لئے بچے کی حرکتوں کو گن کر اس کی خیریت معلوم کرتے رہنا اچھا ہے!

اس لئے ہم حرکات کی گنتی کرتے ہیں!

جب بچہ پیٹ میں ضربات لگائے تو اس کا کیا مطلب ہے؟

بچہ اندر کیا کر رہا ہے؟

آپ کا بچہ حمل کا تمام عرصہ حرکت کرتا رہتا ہے۔ اس کی سب سے عام حرکت سانس لینے سے واقع ہوتی ہے جو آپ کو محسوس نہیں ہوتی۔ اس طرح پھیپھڑے پھیلتے ہیں اور بچہ پیدائش کے بعد کے وقت کیلئے مشق کرتا رہتا ہے۔ کبھی کبھار اسے ہچکی لگ جاتی ہے جو آپ کو لگاتار ہلکے ہلکے جھٹکوں کی طرح محسوس ہوتی ہے۔

بچہ آپ کے پیٹ میں چھوٹی بڑی، سبھی طرح کی حرکتیں کرتا رہتا ہے۔ ننھی سی گرفت، انگوٹھا چوسنا یا ہاتھوں پیروں کی انگلیوں کو موڑنا اور پھیلانا تو آپ کو محسوس نہیں ہوتا ہو گا۔ البتہ بچے کی بڑی جسمانی حرکات جیسے پاؤں مارنا یا دھکیلنا آپ کو حمل کے آخری حصے میں بڑی اچھی طرح محسوس ہوتی ہیں۔ بڑی جسمانی حرکات تو اکثر واضح ہوتی ہیں اور ایسی صورتوں میں واقع ہوتی ہیں جیسے اگر آپ کھڑی رہنے کے بعد لیٹنے لگیں۔ ایسے میں بچہ تھوڑا سا مڑ جاتا ہے اس لئے اسے اپنی پوزیشن تھوڑی سی بدلنی پڑتی ہے یعنی اگر آپ بچے کو تھوڑا سا دھکیلیں گی تو وہ بھی واپس دھکیلے گا۔ تو وہ بھی واپس دھکیلے گا۔

کبھی کبھار حرکت نہیں ہوتی . . .

آپ کا بچہ دن میں کئی مرتبہ سوتا ہے اور تب وہ بالکل پرسکون رہتا ہے۔ حمل کا عرصہ بڑھنے کے ساتھ ساتھ بچے کی نیند کے اوقات بڑھتے جاتے ہیں لیکن ولادت کے قریب آ کر بھی کم ہی ایسا ہوتا ہے کہ بچہ ایک وقت میں ایک گھنٹے سے زیادہ سوئے۔ زیادہ تر بچے شام کے وقت زیادہ چست ہوتے ہیں اور کئی بچے صبح سویرے بھی چست ہوتے ہیں۔

مختلف بچوں کی "ضربات" کی کثرت اور طاقت میں بہت فرق ہو سکتا ہے ضربات سے یہاں ہماری مراد ہر قسم کی حرکات ہیں۔ جو بچے زیادہ حرکت کرتے ہیں، وہ اکثر پیدائش کے بعد بھی زیادہ چست رہتے ہیں۔ تاہم وہ بھی اتنے ہی صحتمند ہوتے ہیں۔ لڑکوں اور لڑکیوں میں فرق نہیں پایا جاتا۔

بعض ماؤں کو دوسری ماؤں کی نسبت حرکت اتنی اچھی طرح محسوس نہیں ہوتی۔ اگر پلاسینٹا رحم کے سامنے کی طرف لگا ہوا ہو یا آپ کا جسم بھاری ہو تو آپ کو کم محسوس ہوتا ہے۔ آپ کو جب پیٹ ہلتا ہوا نظر آئے تو آپ ساتھ ساتھ حرکت محسوس کرنے کی کوشش کیا کریں۔ جب آپ لیٹی ہوں تو حرکت سب سے زیادہ محسوس ہوتی ہے، کھڑے ہوئے، چلتے ہوئے یا مصروفیت کے دوران حرکت سب سے کم محسوس ہوتی ہے۔

فوٹو : Per Oscar Skjellnan • www.peroscar.no
ڈیزائن: Marianne Bratt Ricketts • www.mariannedesign.no

کیا آپ کوئی سوال پوچھنا چاہتی ہیں؟ دیکھئے www.telltrivselen.no

حرکت شمار کر کے خیریت معلوم کرنا؟

روزانہ حرکت محسوس کرنے کی کوشش کرنا اچھی عادت ہے اور حرکت شمار کرنے کا چارٹ ایک آسان ذریعہ ہے جس سے آپ کو اور آپ کی دائی/ڈاکٹر کو بچے کی حرکت کا جائزہ حاصل ہو جاتا ہے۔ اس سے آسانی سے پتہ چل جاتا ہے کہ آپ کے بچے کیلئے کیا نارمل ہے۔ اگرچہ حرکت سب کیلئے اہم ہے، حرکت شمار کرنے کا چارٹ حمل کے 28 ویں ہفتے کے بعد استعمال کرنا زیادہ مناسب ہے نیز تب مناسب ہے جب آپ کے پیٹ میں جڑواں بچے نہ ہوں۔ اگر آپ حرکت کا چارٹ بھر کر ولادت کے بعد دے دیں تو آپ اس اہم تحقیق میں بھی مددگار بنیں گی کہ بچے کی حرکتوں کی بنیاد پر حمل کے وہ کیس کیسے دریافت کئے جائیں جن میں اضافی مدد کی ضرورت ہے۔ اگر آپ اس تحقیق میں شامل ہونا چاہتی ہیں تو اس فائل کی پچھلی طرف درج معلومات پڑھئے۔

حرکتوں کا شمار کیسے کیا جاتا ہے؟

جب آپ حمل کے 28 ویں ہفتے تک پہنچ جائیں تو حرکتیں شمار کرنا شروع کر دیں۔آغاز کی تاریخ اور ولادت کی متوقع تاریخ چارٹ پر لکھیں۔

10تک گنیں۔ پہلی مرتبہ حرکت محسوس ہونے کے بعد سے وقت نوٹ کرنا شروع کریں (تاکہ آپ کو پتہ چل جائے کہ بچہ جاگ رہا ہے)۔ تمام حرکتیں "ضربات" کے زمرے میں آتی ہیں البتہ آپ بچکی کو شمار نہ کریں! بیک وقت کئی حرکتیں ہوں تو انہیں ایک "ضرب یا ایک حرکت" شمار کریں۔ اگر آپ لیٹ جائیں/ سکون سے بیٹھ جائیں اور خوب دھیان دیں تو یہ کام جلدی پورا ہو جائے گا۔ اگر بچہ سو رہا ہو تو اسے جگانے میں کوئی برج نہیں۔ اسے جگانے کیلئے آپ اپنے پیٹ کو تھوڑا تھپتھپائیں/دھکیلیں یا کوئی ٹھنڈا مشروب پی لیں۔

چارٹ کے خانے میں اتنے وقت پر کراس لگائیں جو 10 مرتبہ حرکت محسوس کرنے میں لگا اور دن پر بھی نشان لگائیں۔

جہاں تک ممکن ہو، روزانہ تقریباً ایک ہی وقت پر گنا کریں۔ دن یا رات کا کوئی ایسا وقت چن لیں جب آپ کیلئے وقت نکالنا آسان ہو اور آپ کو پتہ ہو کہ بچہ اس وقت حرکت کیا کرتا ہے – صبح بستر سے نکلنے سے پہلے بہتر رہے گا۔ ہر روز انہی دو گھنٹوں کے اندر گنتی شروع کیا کریں۔ چارٹ پر لکھیں کہ آپ کس وقت گنتی کرتی ہیں۔

ان باتوں پر عمل کرنے والی اکثر خواتین کو حرکتیں شمار کرنے میں 15 منٹ سے کم لگتے ہیں۔

بچے کو کتنی حرکت کرنی چاہئے اور اگر حرکت کم ہو جائے تو؟

ایک یا دو ہفتے حرکت کا چارٹ استعمال کرنے کے بعد آپ دیکھیں گی کہ ہر روز بچے کی حرکتوں میں کچھ فرق ہوتا ہے لیکن پھر بھی عمومی طور پر یہ دن ایک جیسے ہوتے ہیں۔ ایک صحتمند بچے کی کیفیت یہی ہوتی ہے خواہ حمل کے دوران آپ کو حرکتیں مختلف طور پر محسوس ہوتی رہیں۔ سب سے اہم بات یہ ہے کہ آپ کے بچے کی نارمل حرکت میں بہت زیادہ یا مستقل کمی نہیں آنی چاہئے! حرکتوں کے چارٹ سے آپ کیلئے یہ دیکھنا آسان ہو جاتا ہے۔

اگر آپ کو اپنے بچے کے بارے میں تشویش ہے تو وجہ خواہ کچھ بھی ہو، آپ کو مشورہ اور مدد طلب کرنی چاہئے۔ اگر آپ کو اس وجہ سے فکر ہے کہ ہفتے گزرنے کے ساتھ ساتھ آپ کے بچے کی حرکت بتدریج کم ہوتی جا رہی ہے تو اگلے معائنہ حمل کیلئے آپ بچے کی حرکت کا چارٹ ساتھ لے آئیں۔

بعض صورتوں میں آپ کو براہ راست ہسپتال کے شعبہ پیدائش سے رابطہ کرنا چاہئے:

- اگر کسی دن آپ کا بچہ حرکت نہ کرے تو ہرگز اگلے دن تک انتظار نہ کیجئے۔
- اگر ایک دن یا کئی دنوں کے دوران بچے کی حرکت لگاتار کم ہوتی جائے اور آپ کو "زندگی کا کم احساس ہو"۔

اگر آپ کو ٹھیک سے معلوم نہ ہو کہ "زندگی کا کم احساس" ہونے کا کیا مطلب ہے تو یہ سمجھ لیجئے کہ ایسا انتہائی کم ہوتا ہے کہ ایک صحتمند بچہ اپنےمعمول میں چست رہنے کے وقت میں دو گھنٹے کے دوران 10 مرتبہ سے کم حرکت کرے۔ اگر آپ کو محسوس ہو کہ سارا دن بچے نے بہت کم حرکت کی ہے تو آپ کو ہسپتال کے شعبہ میٹرنٹی سے رابطہ کرنا چاہئے۔ اگر آپ کو یہ معلوم نہ ہو کہ کیا اس دن کی گنتی شروع کرنے سے پہلے بھی بچے کی حرکت بہت کم رہی ہے تو آپ کو دھیان رکھنا چاہئے۔ اگلے 12 گھنٹوں کے اندر اندر ضرور دوبارہ حرکتیں گنیں اور اگر نتیجہ پہلے کی طرح برآمد ہو تو ہسپتال کے شعبہ میٹرنٹی سے رابطہ کریں۔

گنتی فارم کس طرح بھرا جائے:
نیلے/کالے پین سے خانے میں کراس (کانا) لگائیے۔ جب آپ 10 مرتبہ حرکت شمار کر چکیں تو آپ اس خانوں والے چارٹ میں کراس لگا کر واضح کریں کہ اس میں کتنا وقت لگا۔

مثال:
مثال کے طور پر اگر آپ کو 10 مرتبہ حرکت محسوس کرنے میں 30 منٹ لگے ہوں تو آپ چارٹ کے اس خانے میں کراس لگائیں 26-30 منٹ۔

اگر آپ کو 10 مرتبہ حرکت شمار کرنے میں 1 گھنٹہ اور 5 منٹ لگے ہوں تو آپ دوسرے گھنٹے والے حصے میں 0-5 منٹ پر کراس لگائیں۔

میرے بچے کی پیدائش کی متوقع تاریخ (تاریخ، مہینہ اور سال)

□□.□□.□□

میں نے اج سے گنتی شروع کی ہے(تاریخ، ماہ اورسال) □□.□□.□□ ضروری ہدایت: خانے میں پین سے کراس لگائیں۔

میں اس وقت گنتی کرتی ہوں۔ بجے: □□.□□ بجے: □□.□□

ہفتے کے دن

ہفتہ 1 ہفتہ 2 ہفتہ 3 ہفتہ 4 ہفتہ 5 ہفتہ 6 ہفتہ 7

منٹ

گنتی شروع کریں

0-5
6-10
11-15
16-20
21-25
26-30
31-35
36-40
41-45
46-50
51-55
56-60

ہر باکس 5 منٹ کا ہے
پہلا گھنٹہ

0-5
6-10
11-15
16-20
21-25
26-30
31-35
36-40
41-45
46-50
51-55
56-60

ہر باکس 5 منٹ کا ہے
دوسرا گھنٹہ

2 گھنٹے سے زیادہ

ہفتہ 28 | ہفتہ 29 | ہفتہ 30 | ہفتہ 31 | ہفتہ 32 | ہفتہ 33 | ہفتہ 34

جب چارٹ مکمل ہو جائے تو اس پتے پر بھیج دیں یا پہنچا دیں۔ (adr.)

ضروری ہدایت: خانے میں پن سے کراس لگائیں۔

ہفتے کے دن

منٹ

پہلا گھنٹہ

دوسرا گھنٹہ

	دن 1	دن 2	دن 3	دن 4	دن 5	دن 6	دن 7
0-5							
6-10							
11-15							
16-20							
21-25							
26-30							
31-35							
36-40							
41-45							
46-50							
51-55							
56-60							

	دن 1	دن 2	دن 3	دن 4	دن 5	دن 6	دن 7
0-5							
6-10							
11-15							
16-20							
21-25							
26-30							
31-35							
36-40							
41-45							
46-50							
51-55							
56-60							
2 گھنٹے سے زیادہ							

بفتہ 35 | بفتہ 36 | بفتہ 37 | بفتہ 38 | بفتہ 39 | بفتہ 40 | بفتہ 41 | بفتہ 42

پیٹ میں بچے کی حرکت اور صحت کے باہمی تعلق کے بارے میں تحقیق میں شمولیت

اگر آپ نے ایک بچے کو جنم دیا ہے تو ہم آپ کو دعوت دیتے ہیں کہ بچے کی پیدائش کے بعد آپ یہ فائل مکمل کر کے دے دیں اور اس طرح تحقیق میں شامل ہو جائیں۔ اس سے کوئی فرق نہیں پڑتا کہ آپ نے بچے کی حرکتوں کا چارٹ استعمال کیا ہے یا نہیں۔

کون اور کیوں؟

Folkehelseinstituttet (انسٹیوٹ اف پبلک ہیلتھ) ، Rikshospitalet کے دوران حمل طبی حالات کے تحقیقی مرکز یعنی Kvinneklinikken Rikshospitalet-Radiumhospitalet HF ،Perinatalmedisinsk forskningssenter یعنی ان دو ہسپتالوں سے منسلک خواتین کلینک اور Sanitetskvinnene (ناروجین عورتوں کی تنظیم برائے عوامی صحت) کے تحت یہ تحقیق کی جا رہی ہے کہ پیٹ میں بچوں کی حرکت اور ان کی آئندہ صحت کا آپس میں کیا تعلق ہے۔ ہم جانتے ہیں کہ حرکت میں شدید کمی آنے یا حرکت بند ہو جانے سے بیماری اور موت کا خطرہ ہوتا ہے لیکن ہمیں اس بارے میں زیادہ علم نہیں کہ ان معلومات اور پیٹ میں بچے کی حرکت کے بارے میں دیگر معلومات کو مستقبل قریب و بعید میں بچوں کی صحت کے فروغ کیلئے کس طرح استعمال کیا جا سکتا ہے۔

تحقیق میں شامل ہونا آپ کی اپنی مرضی پر منحصر ہے اور آپ خواہ تھوڑی مدد کریں یا زیادہ، ٹھیک ہے۔

تحقیق کیلئے یہ اہم ہے کہ شعبہ پیدائش / زچہ بچہ سے رخصت ہونے سے پہلے زیادہ سے زیادہ عورتیں یہ فائل بھر کر دیں۔ یہ فائل تحقیق کیلئے اس صورت میں بھی فائدہ مند ہے کہ آپ نے حرکتوں کا چارٹ استعمال نہ کیا ہو یا آپ اپنے بارے میں معلومات نہ دینا چاہتی ہوں۔ البتہ آپ جتنی زیادہ معلومات دیں گی، اس کی قدر و قیمت بھی اتنی ہی بڑھ جائے گی۔

اگر آپ کی عمر 18 سال سے کم ہے تو اپنے سرپرستوں سے پوچھئے۔آپ یوں طے کر سکتی ہیں کہ آپ کس حد تک حصہ لیں گی:

کیا آپ اپنا نام خفیہ رکھنا چاہتی ہیں؟

اس صورت میں آپ نیچے دیئے گئے سوالات کا جواب لکھ دیجئے اور یہاں کراس لگا کر اپنی طرف سے اجازت دے دیجئے : ☐

کیا آپ زیادہ مدد کر سکتی ہیں؟

آپ اپنا شناختی(پرسنل) نمبر یہاں درج کر کے اور دستخط کر کے اجازت دے سکتی ہیں کہ آپ کی فائل سے حاصل کردہ معلومات کو میڈیکل رجسٹر پیدائش میں شامل کر لیا جائے:

دستخط: _____ شناختی نمبر: ☐☐☐☐☐ ☐☐ ☐☐ ☐☐ ☐☐

یا

اگر آپ 'ماں اور بچے کے ناروجن سروے' میں حصہ لے رہی ہیں تو آپ اپنا پرسنل نمبر یہاں درج کر کے اور دستخط کر کے یہ اجازت دے سکتی ہیں کہ آپ کی فائل سے معلومات حاصل کر کے سروے میں شامل کر لی جائیں:

دستخط: _____ شناختی نمبر: ☐☐☐☐☐ ☐☐ ☐☐ ☐☐

کیا اس تحقیق میں شامل ہونا محفوظ ہے؟

انسٹیوٹ اف پبلک ہیلتھ (Folkehelseinstituttet) کی ذمہ داری ہے کہ آپ کی معلومات کو صیغہ راز میں اور محفوظ رکھے۔ انسٹیوٹ نےڈاٹا کے حصول کے نگران ادارے (Datatilsynet) سے اجازت اور اخلاقیاتی کمیٹی برائے تحقیق (Forskningsetisk komité) سے آپ کے اور آپ کے بچے کے بارے میں معلومات محفوظ رکھنے کیلئے ہدایات حاصل کی ہیں۔ جونہی انسٹیوٹ آپ کی معلومات رجسٹر کرلے گا اور جہاں آپ نے معلومات آگے فراہم کرنے کی اجازت دی ہے، وہاں معلومات مہیا کر لے گا تو ان معلومات سے آپ کا نام حذف کر دیا جائے گا۔ اس کا مطلب ہے کہ محققین کو معلومات پہنچنے سے پہلے آپ کی فائل ضائع کر دی جائے گی اور آپ کی شناخت کے بارے میں تمام معلومات غائب کر دی جائیں گی۔

میں فائل کہاں دوں؟

تمام ہسپتالوں کے شعبہ پیدائش اور شعبہ زچہ بچہ میں اس مقصد کیلئے ڈبے موجود ہیں جن پر وضاحت سے لکھا ہوا ہے۔ اگر آپ کو ٹھیک سے سمجھ نہ آئے تو عملے سے پوچھ لیجئے۔

میں کوئی معلومات نہیں دینا چاہتی ..... ☐

حمل کے کس ہفتے میں آپ نے بچے کو جنم دیا؟.. ☐☐

(ہفتہ 40 میں ولادت ہوتی ہے)

عام ولادت(براستہ شرمگاہ)..... ☐

بڑا آپریشن، پہلے سے طے شدہ..... ☐

بڑا آپریشن جس کا فیصلہ دوران ولادت کیا گیا..... ☐

بڑا آپریشن جو جلدی میں کرنا پڑا..... ☐

بچے کی جنس لڑکا ☐ لڑکی ☐

پیدائش کے وقت بچے کا وزن ☐☐☐ گرام

بچہ صحتمند تھا..... ☐

بچے کو نومولودوں/بچوں کے شعبے میں داخل کیا گیا... ☐

بچہ فوت ہو گیا... ☐

آپ کی عمر..... ☐☐ سال

حمل سے پہلے آپکا وزن ..... ☐☐☐ پورے کلو

آپ کا قد..... ☐☐☐ پورے سینٹی میٹر

آپ نے بچے کو کیسے جنم دیا؟

آپ پہلے کتنے بچوں کو جنم دے چکی ہیں؟ ☐☐

کیا اس حمل کے آخری ماہ کے دوران آپ سگرٹ پیتی رہی ہیں؟

نہیں ..... ☐

کبھی کبھار. ..... ☐ ہفتے میں اتنے سگرٹ ☐☐

روزانہ..... ☐ دن میں اتنے سگرٹ ☐☐

بچے کی کیفیت؟

کیا آپکی مادری زبان ناروجن کے سوا کوئی اور ہے؟ ہاں☐نہیں☐

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folkehelseinstituttet

Rikshospitalet - Radiumhospitalet HF

Oversatt ved Tolketjenesten i Oslo.
November 2005

مدد کیلئے شکریہ!

[somali]

...Gujada ilmaha uurku ma aha farxad muujin keliya ee ...

kicks count

www.kickscount.no

ISBARTA ILMAHAAGA!

Hadda uur waxoogaa ah ayaad leedahay waxana laga yaabaa in aad dareemayso ilmaha gujadiisa. Shaqaalaha caafimaadka ee ku caawiya muddada uurka ayaa kugu caawin doona sida aad ula soconayso xaaladda ilmaha, laakiin adiga oo hooyadii ah ayaa noqon kara qofka sida ugu fiican uga war haya xaaladda ilmaha inta aanu dhalan. Waxa uu ilmuhu ku muujinayo gujadu waa muhiim.

Umusha ka dib waxa aad wakhti badan ku isticmaali doontaa sidii aad ilmaha wax ugu qaban lahayd. Waxa aanu kugula talinaynaa in aad inta aad uurka leedahay maalin walba wakhti yar ku isticmaasho sidii aad u baran lahayd ilmaha adiga oo baranaya dhaqdhaqaaqiisa. Halkan waxa aad ka heli kartaa warbixin iyo talooyin ku saabsan maxay xambaarsan tahay gujada ilmuhu iyo sidee ula socon kartaa in ilmuhu ku qanacsan yahay xaaladdiisa.

Waa caado wanaagsan in wakhti la siiyo barashada xaaladda ilmaha!

MAXAY GUJADU KA SHEEGAYSAA KU QANACSANAANTA ILMAHA EE XAALADDIISA?

Wax kasta oo ilmuhu u baahan yahay waxa ay u soo maraan mandheerta. Inta ay nafaqadu ilmaha si fiican ugu socoto gujadiisuna way socon. Haddii ay yaraato nafaqada soo gaadhaysaa ama uu ilmuhu xanuunsado, waxa markaa dhacaysa in uu dhaqaalaysto awoodda si uu koritaankiisu u sii socdo, waxana uu markaa yareeyaa gujadii. Haddii aad sigaarka cabto, waxa uu saamayn ku samaynayaa mandheerta iyo ilmaha labadaba, isla markaana gujadii way yaraanaysaa. Haddii dhaawaca gaadhay mandheertu uu halis yahay, waxa istaagaya koritaankii ilmaha, isla markaana ilmuhu xoog ayuu u xanuunsanayaa ama dhaawac ayaa soo gaadhaya. Waxa sidoo kale markaa dhici karta in uu xamili waayo soo dhalashada. Arrintan waxa ay dhacdaa marmar iyo dhif haddii gujada ilmuhu ay caadi soo ahayd.

Marmarka qaar ilmuhu wuu iska deggan yahay iyada oo aanay dhibi jirin. Arrinta muhuumka ahi waa haddii gujadii ilmaha ee caadiga ahayd in badan la waayo. Inta aad dareensan tahay dhaqdhaqaaqa caadiga ah ee nolosha ilmaha calooshaada ku jira, waxa ay muujinaysaa in ilmuhu fiican yahay. In aad dareento gujooyinka ilmuhu, waxay ka qayb qaadanaysaa sida aad xidhiidh ula yeelanayso ilmahaaga aad uurka ku siddo. Sababtaas awgeed ayay u muhiim tahay in aad tiriso gujada ilmaha oo markhaati u ah in uu ku qanacsan yahay xaaladdiisa!

Sidaa darteed ayaynu u tirinaa farxad muujinta.

Marka ilmuhu caloosha kaa gujiyo - waa maxay macnaheedu?

MUXUU ILMUHU KA QABTAA CALOOSHA DHEXDEEDA?

Ilmahaagu waxa uu noqonayaa mid firfircoon muddada uurka oo idil. Waxa ugu badan ee uu calоosha dhexdeeda ka sameeyaa waa dhaqdhaqaaq neefsasho oo aanad adigu dareemayn. Sidaa ayayna sambabadu ku kala durkaan oo ay ugu diyaar garoobaan wakhtiga dhalmada ka dib. Marmarka qaar ayuu ilmuhu higgoodaa oo aad dareentaa bootimo yaryar oo si nadaamsan u soo baxaya.

Ilmuhu waxa uu calooshaada dhexdeeda ka samaynayaa dhaqdhaqaaqyo waaweyn iyo kuwa yaryar labadaba. Dhaqdhaqaaqyo yaryar, suul nuugid ama kala bixin faraha gacmaha iyo lugaha oo uu ilmuhu sameeyo ayaa laga yaabaa in aanad adigu dareemin. Laakiin inta ugu badan ee gujooyinka iyo riixniinka uu ilmuhu calоosha ka dhex sameeyo waad dareentaa gaar ahaan marxaladaha ugu dambeeya ee uurka. Waxa kale oo inta badan muuqda dhaqdhaqaaqyada jidheed ee waaweyn oo iman kara tusaale ahaan marka aad iska bedesho xaalad ee aad jiifsato adiga oo taagnaa. Markaa ilmuhu wuu is yara rogaa, wuuna yara dhaqdhaqaaqaa isaga oo ku soo caabinaya marka aad yara riixdo.

MARMAR WAA BILAA XARAKO...

Marar badan ayuu maalintii ilmuhu hurdaa oo markaa aanad dareemayn wax xarako ah haba yaraatee. Inta ilmuhu hurdayaa way dheeraataa marba marka ka dambaysa, laakiin marka wakhtiga umushu soo dhowaado dhif iyo naadir ayuu ilmuhu seexdaa wax ka badan saacad markiiba. Carruurta uurka ku jirta inta ugu badani waxa ay firfircoon yihiin galabtii, qaar badanina sidoo kale waxa ay firfircoon yihiin subaxa hore.

Carruurtu aad ayay ugu kala duwan tahay dhinaca inta goor ee ay sameeyaan gujo, iyo sida u xoog badan karto gujadu. Gujada halkan waxa looga jeedaa dhammaan noocyada dhaqdhaqaaq ee ilmuhu sameeyo. Ilmaha gujada badan leh uurku, waxa uu noqdaa mid firfircooni badan dhalashada ka dibna. Laakiin kan gujada badan iyo ka degganiba waxa ay labaduba noqon karaan kuwo isku si u caafimaad qaba. Lama oga in ay kala duwan yihiin wiilasha iyo gabdhuhu dhinaca gujada.

Hooyooyinka qaar ayaa dareenkooda gujooyinku uu ka liitaa kuwa kale. Haddii mandheertu ay ku jirto dhinaca hore ee ilmagaleenka ama uu adiga miisaankaagu weyn yahay, waxa aad dareemaysaa gujooyin ka yar kuwa hooyooyinka kale. Waxa aad ku tababaran kartaa sida feejignaan loogu yeesho gujada isla markaana adiga oo eegaya in calooshu dhaqdhaqaaqayso. Gujooyinka waxa aad sida ugu fiican u dareemi kartaa marka aad jiifto, inta ugu yarna marka aad taagan tahay, soconayso ama aad wax ku mashquulsan tahay.

Sawir: Per Oscar Skjellnan • www.peroscar.no
Qaab: Marianne Bratt Ricketts • www.mariannedesign.no

Su'aal ma qabtaa ? Eeg bogga internett ka: www.telltrivselen.no

TIRINTA FARXAD MUUJINTA?

In la dareemo gujo maalin walba waa caado wanaagsan, foomka gujaduna waa caawiye fudud oo sawir ka siinaya adiga iyo umulisadaada/ dhakhtarkaaga dhaqdhaqaaqa ilmaha. Arrintani waxa ay fududaynaysaa in la arko in xaaladda ilmahaagu tahay caadi. Inkasta oo ay gujadu u fiican tahay dhammaan, haddana foomka gujadu waxa uu ku sii fiican yahay marka laga gudbo toddobaadka 28.aad ee uurka, iyo haddii aanad mataano sidin. Haddii aad soo buuxiso foomka gujada oo aad dhiibto umulidda ka dib, waxa aad caawimo ka gaysanaysaa cilmibaadhis muhiim ah oo ku saabsan sidii loo ogaan lahaa xaaladda u baahan caawimo dheeraad ah iyada oo laga tixraacayo dhaqdhaqaaqa gujada. Haddii aad doonayso in aad ka qayb qaadato cilmibaadhista sidan ah, waxa aad ka helin kartaa warbixin arrintan ku saabsan dhinaca dambe ee galka.

SIDEE TIRINTA LOO SAMAYNAYAA?

Bilow tirinta farxad muujinta marka la soo gaadho toddobaadka 28.aad ee uurka. Foomka ku qor taariikhda aad bilaabayso iyo wakhtiga umushu ku beegan tahay.

Tiri ilaa 10 – qabo wakhtiga oo ka bilow marka aad dareento gujada ugu horraysa (markaa waxa aad og tahay in ilmuhu soo jeedo). Dhammaan dhaqdhaqaaqyada waxa aad ka soo qaadaysaa in ay yihiin "gujo", laakiin higgada kuma tirinaysid. Dhaqdhaqaaqyada dhowrka ah ee hal mar wada dhaca waxad ka dhigaysaa hal gujo. Waxa ay ugu fiican tahay marka aad jiifto/ ama u fadhido si deggan oo aad si fiican u dhegaysanayso. Haddii ilmuhu hurdo, waa la ogol yahay in aad kiciso adiga oo isticmaalaya sacab yar/caloosha oo aad riixdo ama adiga oo caba wax qabow.

Isku tallaab ku muuji halka loogu talagalay ee foomka wakhtiga ay qaadatay in aad tiriso 10 gujo iyo taariikhda maalintaas.

Maalin walba xilli isku mid ah tirada samee – sida ugu badan ee suuragal ah. Ka dooro wakhtiga kugu habboon 24 ka saacadood si aad wakhti yar u siisid arrintan weliba marka aad og tahay in ilmuhu soo jeedo oo firfircoon yahay- waxa ugu fiican subaxa hore inta aanad kicin. Tirinta bilow maalin walba laba saacadood oo isla wakhtigii ku beegan gudahood. Foomka ku qor wakhtiga aad caadaysatay in aad tiriso gujada.

Haddii aad sidaa samayso, waxa ay inta ugu badani ku isticmaalaan tirinta farxad muujinta in ka yar 15 daqiiqo.

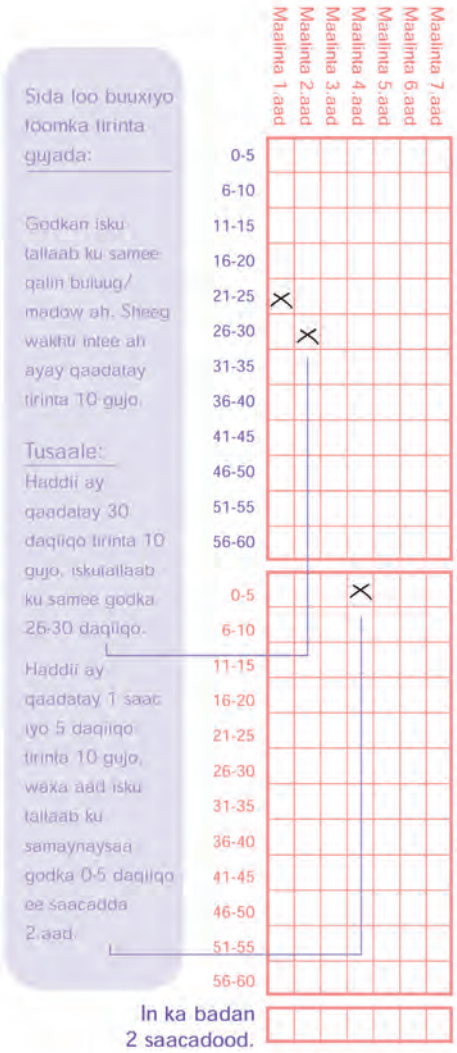
Gujo intee le'eg ah ayay tahay in ilmuhu sameeyo - maxaase dhacaya haddii uu joojiyo?

Marka aad isticmaasho foomka gujada hal ama laba toddobaad ayaad arki kartaa in gujadu ay waxoogaa kala duduwan tahay oo maalinba si tahay, laakiin ay maalmuhu guud ahaan isku dhowdhow yihiin. Sidaa ayay u soconaysaa hawsha ilmaha ku qanacsan xaaladda uu jiraa in kastoo habka aad u dareemayso dhaqdhaqaaqu uu is bedbedelayo inta aad uurka leedahay. Waxa ugu muhiimsani waa in aanad firfircoonida caadiga ah ee ilmaha ka dareemin hoos u dhac weyn oo joogto ah. Foomka gujada ayaa kugu caawinaya in aad aragto xaaladdan.

Haddii aad u werwersan tahay ilmahaaga, sababtu waxa ay doonto ha ahaatee, waxa kula gudboon in aad raadsato caawimo iyo talobixin. Haddii sababta werwerku tahay in ilmahaagii uu si tartiib ah u soo yaraynayo dhaqdhaqaaqii, wakhtigiina uu socdo, waxa habboon in aad soo qaaddo foomka gujada maalinta aad ballanta hubinta caafimaadkaaga iyo ka ilmaha leedahay.

Xaaladaha qaar ayay habboon tahay in aad toos ula soo xidhiidho qaybta dhalmada ee dhakhtarka:

- Haddii aad ilmaha ka weydo wax dhaqdhaqaaq ah maalin dhan, weligaa ha sugin maalinta xigta.
- Haddii dhaqdhaqaaqa ilmuhu sii yaraado maalin/ maalmo, oo aad dareento "dhaqdhaqaaq yaraan".



Haddii aad is weydiiso maxaa ah "dhaqdhaqaaq yari", waxa habboon in aad ogaato in ilmo caafimaad qabaa ay dhif tahay in uu dhaqdhaqaaqo oo gujo sameeyo in ka yar 10 goor laba saacadood gudahood oo aad og tahay in ay tahay wakhtigii uu firfircoonaan jiray. Haddii aad dareento in dhaqdhaqaaqiisu yaraa maalintii oo dhan, waxa habboon in aad la soo xidhiidho qaybta dhalmada ee dhakhtarka. Haddii aanad kala ogayn in dhaqdhaqaaqiisu yaraa intii ka horraysay marka aad bilowday tirinta dhaqdhaqaaqa maalintaa, waxa fiican in aad si fiican ula socoto xaaladdiisa. Isku day markaa in aad dhaqdhaqaaqiisa tiriso mar kale 12 ka saacadood ee soo socda oo la xidhiidh qaybta dhalmada ee dhakhtarka haddii arrintu is bedeli weydo.

F/G: Iskutallaabta qodka waxa aad ku samaynaysaa qalin biiroo.

Waxan bilaabay in aan tiriyo maanta (taariikhda, maalinta, bisha, sannadka) __ __ . __ __ . __ __

Waxa la ii qabtay in aan umulo (taariikhda, maalinta, bisha, sannadka) __ __ . __ __ . __ __

Waxa sida caadiga ah aan tiriyaa inta u dhexaysa saacadda: __ __ . __ __ iyo saacadda: __ __ . __ __

Saacadda 1.aad — 5 daqiiqo halkii sanduuqba.

Saacadda 2.aad — 5 daqiiqo halkii sanduuqba.

Maalmaha toddobaadka	Maalinta 1.aad	Maalinta 2.aad	Maalinta 3.aad	Maalinta 4.aad	Maalinta 5.aad	Maalinta 6.aad	Maalinta 7.aad	Maalinta 1.aad	Maalinta 2.aad	Maalinta 3.aad	Maalinta 4.aad	Maalinta 5.aad	Maalinta 6.aad	Maalinta 7.aad	Maalinta 1.aad	Maalinta 2.aad	Maalinta 3.aad	Maalinta 4.aad	Maalinta 5.aad	Maalinta 6.aad	Maalinta 7.aad	Maalinta 1.aad	Maalinta 2.aad	Maalinta 3.aad	Maalinta 4.aad	Maalinta 5.aad	Maalinta 6.aad	Maalinta 7.aad	Maalinta 1.aad	Maalinta 2.aad	Maalinta 3.aad	Maalinta 4.aad	Maalinta 5.aad	Maalinta 6.aad	Maalinta 7.aad	Maalinta 1.aad	Maalinta 2.aad	Maalinta 3.aad	Maalinta 4.aad	Maalinta 5.aad	Maalinta 6.aad	Maalinta 7.aad	Maalinta 1.aad	Maalinta 2.aad	Maalinta 3.aad	Maalinta 4.aad	Maalinta 5.aad	Maalinta 6.aad	Maalinta 7.aad
Saacadda 1.aad START TELLING 0-5																																																	
6-10																																																	
11-15																																																	
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In ka badan 2 saacadood																																																	
	Toddobaadka 28.aad							Toddobaadka 29.aad							Toddobaadka 30.aad							Toddobaadka 31.aad							Toddobaadka 32.aad							Toddobaadka 33.aad							Toddobaadka 34.aad						

Daqiiqado

F/G: Iskutallaabta godka waxa aad ku samaynaysaa qalin biiroo.

Marka foomka la buuxiyo, u dir ama u qee (cinwaanka).

Maalmaha toddobaadka

Daqiiqado

Saacadda 1.aad

Saacadda 2.aad

0-5
6-10
11-15
16-20
21-25
26-30
31-35
36-40
41-45
46-50
51-55
56-60

In ka badan 2 saacadood

Maalinta 1.aad
Maalinta 2.aad
Maalinta 3.aad
Maalinta 4.aad
Maalinta 5.aad
Maalinta 6.aad
Maalinta 7.aad

Toddobaadka 35.aad
Toddobaadka 36.aad
Toddobaadka 37.aad
Toddobaadka 38.aad
Toddobaadka 39.aad
Toddobaadka 40.aad
Toddobaadka 41.aad
Toddobaadka 42.aad

KA QAYB QAADO CILMIBAADHIS KU SAABSAN XIDHIIDHKA KA DHEXEEYA DHAQDHAQAAQA GUJO EE ILMAHA UURKA KU JIRA IYO CAAFIMAADKA ?

Waxa aanu jecelay in aan kaa codsano in aad ka qayb qaadato cilmibaadhistan adiga oo soo xeraynaya galkan marka aad umusho ka dib – haddii aad ilmo dhasho. Arrintani way ka madax bannaan tahay oo kuma xidhna in aad isticmaashay foomkaaga gujada iyo in kale.

KUMA IYO WAAYO?

Hay'adaha "Folkehelseinstituttet" (Mac-hadka caafimaadka bulshada), Xarunta cilmibaadhista daawada la xidhiidha arrimaha dhalmada ee Dhakhtarka "Rikshospitalet", Waaxda caafimaadka haweenka ee dhakhtarada "Rikshospitalet – Radium hospitalet" iyo haweenka fayo-dhowrka ayaa waxa ay wadajir u wadaan baadhitaan ku saabsan xidhiidhada ka dhexeeya dhaqdhaqaaqa gujo ee uu ilmuhu ku sameeyo caloosha hooyada iyo caafimaadkiisa mustaqbal. Waxa aynu og nahay in hoos u dhaca xoogga ah ee dhaqdhaqaaqa gujo ama dhaqdhaqaaq la,aantu ay ku xidhiidhsan tahay halis xanuun iyo dhimasho ilmaha ku iman karta, waxase aynaan wax badan ka ogayn sida arrintan iyo warbixinaha kale ee ku saabsan dhaqdhaqaaqa gujo ee ilmuhu caloosha ku sameeyo loogu isticmaali karo horumarinta caafimaadka ilmaha wakhtiga dhow iyo kan dheer labadaba.

WAAD U MADAX BANNAAN TAHAY KA QAYBQAADASHADA, ISLA MARKAANA WAXA AAD UGA QAYB QAADAN KARTAA SI YAR AMA SI XOOG AH.

Hawshan cilmibaadhista waxa u fiican in inta ugu badani ay soo xerayso galkan inta aanay ka bixin qaybta dhalmada/baxnaanada umusha ka dib. Galkani qiimo badan ayuu u leeyahay cilmibaadhista, xataa haddii aanad isticmaalin foomka gujada ama haddii aanad doonayn in aad warbixin ka bixiso naftaada. Laakiin dabcan faa'iidadu kor ayay u kacaysaa mar kasta oo wax ku darsigaagu bato. Haddii aad ka yar tahay 18 sano jir, waxa habboon in aad weydiiso waalidkaaga. Adiga ayaa dooranaya inta aad doonayso in aad ku darsato barnaamijka.

MA DOONAYSAA IN AAD AHAATO QOF AAN LA GARANAYN?

Buuxi markaa warbixinaha ku qeexan dhinaca ugu hoosaysa ee bogga, isla markaana halkan iskutallaab saar si aad noo siiso ogolaanshahaaga: ☐

INTAN WAX KA BADAN MA KU DARSAN KARTAA ?

Waxa aad bixin kartaa ogolaansho si loogu xidho warbixinta galkaaga Diiwaanka dhalmada ee caafimaadka (Medisinsk fødselsregister)adiga oo dhiibaya lambarka dhalashadaada isla markaana saxeexaya halkan:

Saxeex: _____ Lambarka qofka ("shanta lambar ee ugu danbeeya lambarka dhalashada").

☐☐ ☐☐ ☐☐ ☐☐☐☐

AMA

Haddii aad ka qayb qaadanayso barnaamijka "Baadhitaanka hooyada iyo ilmaha norwejiga" waxa aad bixin kartaa ogolaansho si warbixinta galkaaga loogu xidho baadhitaanka adiga oo dhiibaya lambarka dhalashadaada, halkana saxeexaya:

Saxeex: _____ Lambarka qofka ("shanta lambar ee ugu danbeeya lambarka dhalashada").

☐☐ ☐☐ ☐☐ ☐☐☐☐

MA LAGU KALSOON KARAA KA QAYB QAADASHADA ?

Mac-hadka caafimaadka bulshada ayaa ka masuul ah ilaalinta sirta iyo ammaanka warbixintaada. Mac-hadku waxa uu ogolaansho ka haystaa hay'adda ilaalinta warbixinta (Datatilsynet), isla markaana waxa uu talo bixin ku saabsan ilaalinta warbixinaha ku saabsan adiga iyo ilmaahaaga ka helaa guddida anshaxa cilmibaadhista (Forskningsetisk komité).
Marka ugu horraysa ee Mac-hadka caafimaaadka bulshadu uu diiwaangeliyo warbixintaada oo uu isku xidho adiga iyo warbixinta aad ogolaanshaha ka bixisay, ayuu warbixintaada ka dhigayaa mid aan la garanayn cidda ay khusayso. Taa macnaheedu waxa weeye galkaaga wuu baabi'inayaa, dhammaan warbixinta qofka lagu garan karana waa la masaxayaa inta aan loo gudbin cilmibaadhayaasha.

YAAN U DHIIBAYAA GALKA WARBIXINTA?

Dhammaan qaybaha dhalmada- iyo baxnaanada waxa ku yaalla sanduuqyo si fiican loo calaamadiyey. Waydii shaqaalaha haddii shaki kaa galo.

Ma doonayo in aan warbixin bixiyo..... ☐

Ma doonayo in aan warbixin bixiyo..... ☐☐
(toddobaadka 40.aad baa lagu umulaa)

HALKEE KU UMUSHAY?

Dhalmo dabeeci ah ..... ☐
Qalliin hore loo qorsheeyey ..... ☐
Qalliin la go'aamiyey intii fooshu socotay .... ☐
Qalliin degdeg ah ..... ☐
Nooca ilmaha Wiil ☐ Gabar ☐
Miisaanka ilmuhu ku dhashay ☐☐☐☐ garaam

XAALADDA ILMAHA KA WARRAN?

Ilmuhu wuu caafimaad qabay ..... ☐
Ilmaha waxa la dhigay qaybta carruurta hadda dhalatay / qaybta carruurta ee dhakhtarka ☐
Ilmihii wuu dhintay ..... ☐

Da'daada ..... ☐☐ sano
Miisaankaaga uurka ka hor ..... ☐☐☐ kg buuxa
Dhererkaaga ..... ☐☐☐ cm buuxa

Imisa carruur ah ayaad hore u dhashay? ☐☐

Miyaad sigaar cabtay bishii ugu dambaysay ee uurkan?
Maya ..... ☐
marmar ... ☐ ☐☐ Sigaar todobaadkii
Maalin walba .. ☐ ☐☐ Sigaar maalintii

Afkaaga hooyo ma ka duwan yahay norwejiga ?
HAA ☐ MAYAI ☐
Haddii jawaabtu HAA tahay, magacii afkaaga hooyo? ☐☐☐☐☐☐☐☐☐☐

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folkehelseinstituttet
Rikshospitalet – Radiumhospitalet HF

Waad ku mahadsan tahay caawimada!

Oversatt ved Tolketjenesten i Oslo.
November 2005

[tyrkisk]

...tekmenin böylesi
can sağlığı...

kicks count

www.kickscount.no

Çocuğunuzu tanıyın!

Hamileliğiniz o kadar ilerledi ki, belki de çocuğun tekmelediğini hissetmeye başladınız. Hamilelik kontrolleri size, çocuğun ana karnındaki gelişimini izlemenizde yardımcı olacaktır ama, anne olarak, doğumdan önce çocuğu en iyi siz tanıma imkanına sahipsiniz. Çocuğun, tekmeleme yoluyla anlatmak istediği şeyler, önemlidir!

Doğum sonrası çocuğunuzla ilgilenmeye çok zaman harcayacaksınız. Biz size, hamileliğiniz sırasında her gün, çocuğun hareketlerini hissetmek yoluyla onunla tanışmaya biraz zaman ayırmanızı tavsiye ederiz. Burada, çocuk tekmelediğinde bunun ne anlama geldiğine ilişkin bilgi ve çocuğun hayatından memnun olup olmadığını nasıl izleyebileceğiniz konusunda tavsiyeler bulacaksınız.

Çocuğunuzla tanışmaya zaman ayırmanız iyi bir alışkanlık olur!

Tekmeleme, çocuğun hoşnutluğu açısından ne anlama geliyor?

Çocuğun ihtiyacı olan her şey plasenta yoluyla sizden ona nakledilir. Bu tedarik işlemi iyi gittiği sürece, çocuk tekmeler. Plasentadan nakledilen tedarik az olduğunda, veya çocuk hastalandığında, büyümeye devam edebilmek için gücünü idareli kullanmak zorundadır – böylece tekmeleme azalır. Sigara içiyorsanız, hem plasenta ve hem de çocuk etkilenecek ve tekmeleme azalacaktır. Plasentanın işlevinin ciddi bir şekilde zayıflaması halinde, bu çocuğun büyümesini engeller ve çocuk ciddi olarak hastalanabilir veya zarar görebilir. Böylece doğuma dayanıklılığı da zayıflayabilir. Çocuğun normal olarak tekmelemesi durumunda bu ihtimal çok seyrek olarak ortaya çıkar!

Bazen çocuk sessiz sedasızdır. Burada dikkat edilecek nokta, çocuğun olağan tekmelesinin çok azalması durumudur. Karnınızdaki olağan hayat ritmini hissettiğiniz sürece, bu çocuğun durumunun iyi olduğuna işaret eder. Çocuğun hareketlerini hissetme çabanız, çocuğunuzla aranızda daha yakın bir bağ kurulmasına katkıda bulunur. O nedenle, çocuğun tekmelemesini hesaba katmak doğru bir davranıştır.

O nedenle çocuğun tekmelemesini hesaba katarız!

Karnınızda tekmeleme hissettiğinizde – bu ne anlama gelir?

Çocuk karnınızda neler yapıyor?

Çocuğunuz tüm hamilelik boyunca hareket halinde olacaktır. Onun en çok yaptığı, sizin hissetmediğiniz, soluk alıp verme hareketleridir. Doğum sonrası için alıştırmalar yaparken, böylece akciğerleri genişlemektedir. Çocuğu ara sıra hıçkırık tutar, siz bunu düzenli küçük irkilmeler olarak hissedersiniz.

Çocuk karnınızda, hem büyük, hem de küçük hareketler yapar. Elle küçük kavrama hareketlerini, baş parmağını emmesini veya el ve ayak parmaklarını kapayıp açmasını pek hissetmezsiniz. Bunun yanısıra, hamileliğin son döneminde, çocuğun karnınızda tekme ve itme gibi hareketlerinin pek çoğunu gayet iyi hissedersiniz. Örneğin siz ayakta durur durumdan yatar duruma geçtiğinizde ortaya çıkan daha büyük beden hareketleri de genellikle açık seçik hissedilir. Bu durumda çocuk da biraz dönmekte, sizin onu hafifçe ittiğinizde onun da genellikle iterek karşılık verdiği durumlarda olduğu gibi, yer değiştirmektedir.

Bazen sessiz sedasız....

Gün boyunca çocuğunuz pek çok kez uyur ve o anlarda tamamen sessizdir. Hamilelik ilerledikçe uyku süreleri de uzar, ama tahmini doğum tarihi yaklaştığında bile çocuk seyrek olarak her keresinde bir saatten fazla uyur. Çocukların çoğu en çok akşamları, ve bir çoğu da sabah erken saatlerde hareket halindedir.

Ne kadar yoğun ve güçlü "tekmeledikleri" konusu çocuktan çocuğa büyük farklılık gösterebilir – burada, tekmeleme ile her türlü hareketi kastediyoruz. Çok tekmeleyen çocuk genellikle doğum sonrası da daha hareketli olur. Bu, çocuğun sağlığı açısından bir gösterge değildir. Bu konuda kız çocuklarla erkek çocuklar arasında bilinen bir farklılık yoktur.

Bazı anneler, tekmelemeleri diğer annelere göre daha az hisseder. Eğer plasenta rahmin ön yanında yer alıyorsa veya fazla kiloluysanız, daha az hissedersiniz. Karnınızın hareket edip etmediğine bakarken aynı zamanda tekmelemeyi hissetmeye çalışarak kendi kendinize deneme yapabilirsiniz. Tekmelemeyi en iyi yatar durumdayken, en az da ayakta dururken, yürürken veya bir şeylerle meşgul olurken hissedersiniz.

Fotoğraf: Per Oscar Skjellnan
Çizim: Marianne Bratt Ricketts • www.mariannedesign.no

Sorunuz var mı? Bakınız, www.telltrivselen.no

Tekmelemeyi hesaba katmak ne anlama geliyor?

Çocuğun hareketlerini her gün hissetmeye çalışmak iyi bir alışkanlıktır, ve tekme sayma şeması, çocuğun tekmelemesi konusunda size ve ebeye/doktora fikir veren basit bir yardımcı malzemedir. Bu, çocuğunuz için nelerin normal olduğunu daha kolay görmenizi sağlar. Tekmeleme herkes için önemli olsa da, eğer ikiz çocuklara hamile değilseniz, tekme sayma şeması kullanıma, en çok hamileliğin 28. haftasından sonra elverişlidir. Tekme sayma şemasını doldurup doğumdan sonra iade edecek olursanız, tekmeleme faaliyetinden yola çıkarak, hamilelikte ekstra yardıma ihtiyaç olup olmadığının nasıl anlaşılabileceği konusunda yapılan önemli araştırmalara da katkıda bulunmuş olursunuz. Böyle bir araştırmaya katılmak isterseniz, bu konudaki bilgileri dosyanın arka yüzünde bulabilirsiniz.

Nasıl hesap edilir?

Hamileliğin 28. haftasına geldiğinizde tekmeleri hesap etmeye başlayın. Başladığınız tarihi ve size verilmiş olan tahmini doğum tarihini şemaya yazın.

10 tekme sayın. İlk tekmeyi hissettiğiniz andan itibaren saat tutun (böylece çocuğun uyanık olduğunu bilirsiniz). Bütün hareketler "tekmeleme" sayılır, fakat hıçkırıkları hesaba katmayacaksınız! Aynı anda meydana gelen bir çok hareket, bir "tekme" sayılır. Bunu en çabuk, yatar/rahat otururur vaziyette ve hareketleri iyice hissetmeye çalışarak yapabilirsiniz. Eğer çocuk uyuyorsa, onu, karnınızı okşayarak/iterek veya soğuk bir şeyler içerek uyandırmanın bir sakıncası yoktur.

Şemada, 10 tekme sayana kadar geçen zaman ve hangi gün olduğunu gösteren haneye çarpı işareti koyun.

Mümkün olduğunca, her gün yaklaşık aynı zamanda saymaya başlayın. Gün içinde, biraz zaman ayırabileceğiniz, size en uygun ve çocuğun hareketli olduğu anı seçin – tercihen sabah yataktan kalkmadan önce. Sayıma her gün aynı iki saat içinde başlayın. Genel olarak hangi saatlerde saydığınızı şemaya yazın.
Böyle yapılacak olursa, pek çok anne büyük olasılıkla 15 dakika içinde tekme sayma işlemini bitirecektir.

Bebek ne kadar tekmelemeli – ve tekmeleme azalırsa ne olur?

Tekme sayma şemasını bir veya iki hafta kullandıktan sonra, tekmelemenin günden güne biraz farklılık gösterdiğini ama, günlerin büyük oranda birbirine benzediğini göreceksiniz. Hamilelik sırasında çocuğun hareketlerini hissedişinizde değişiklik meydana gelse bile, halinden memnun olan bir çocuk için durum bu şekilde gelişecektir. En önemlisi, çocuğunuzun faaliyetlerinde, normal faaliyetlerine kıyasla, büyük ve sürekli bir düşüş olmamasıdır! Tekme sayma şeması, bunu gözlemekte size yardımcı olur.

Çocuğunuz için endişeleniyorsanız, nedeni ne olursa olsun, yardım ve tavsiye almak için başvurmanızda yarar vardır. Çocuğunuzun haftalar ilerledikçe giderek daha az tekmelemesi sizi endişelendiriyorsa, bir sonraki hamilelik kontrolüne giderken tekme sayma şemasını yanınıza alın.

Bazı durumlarda direk olarak hastahanenin doğum bölümü ile temasa geçmelisiniz:

- *Eğer çocuğunuz bir gün tekmelemiyorsa, **kesinlikle** bir sonraki güne kadar beklemeyin.*
- *Eğer çocuk bir gün/günler içinde giderek daha az tekmeliyorsa, ve siz karnınızda "az canlılık" hissediyorsanız.*

"Az canlılık" ile ne kastedildiğinden emin değilseniz, sağlıklı bir çocuğun, genellikle faal olduğu iki saat içinde, en az 10 kez tekmelediğini bilmenizde yarar var. Gün boyunca çocuğun çok az tekmelediğini hissettiyseniz, hastahanenin doğum bölümü ile temasa geçmelisiniz. Eğer çocuğun günlük tekmelerini saymaya başlamadan önce de çok az tekmeleyip etmediğini bilmiyorsanız, durumu izlemeniz gerekir. Sonraki 12 saat içinde sayımı tekrarlayın ve sonuç değişmiyorsa hastahanenin doğum bölümü ile temasa geçin.

"Helsekort for gravide" için

Not: Haneyi tükenmez kalemle işaretleyin

Bugün saymaya başladım (tarih, gün.ay.yıl) □□.□□.□□

Genellikle şu saatler arasında sayıyorum saat: □□.□□ ve

saat: □□.□□

Tahmini doğum yapma zamanım (tarih, gün.ay.yıl)

□□.□□.□□

HAFTANIN GÜNLERİ

1. gün 2. gün 3. gün 4. gün 5. gün 6. gün 7. gün

SAYMAYA BAŞLAYIN

DAKİKALAR

İlk saat

her hane için 5 dakika

0-5
6-10
11-15
16-20
21-25
26-30
31-35
36-40
41-45
46-50
51-55
56-60

2. saat

her hane için 5 dakika

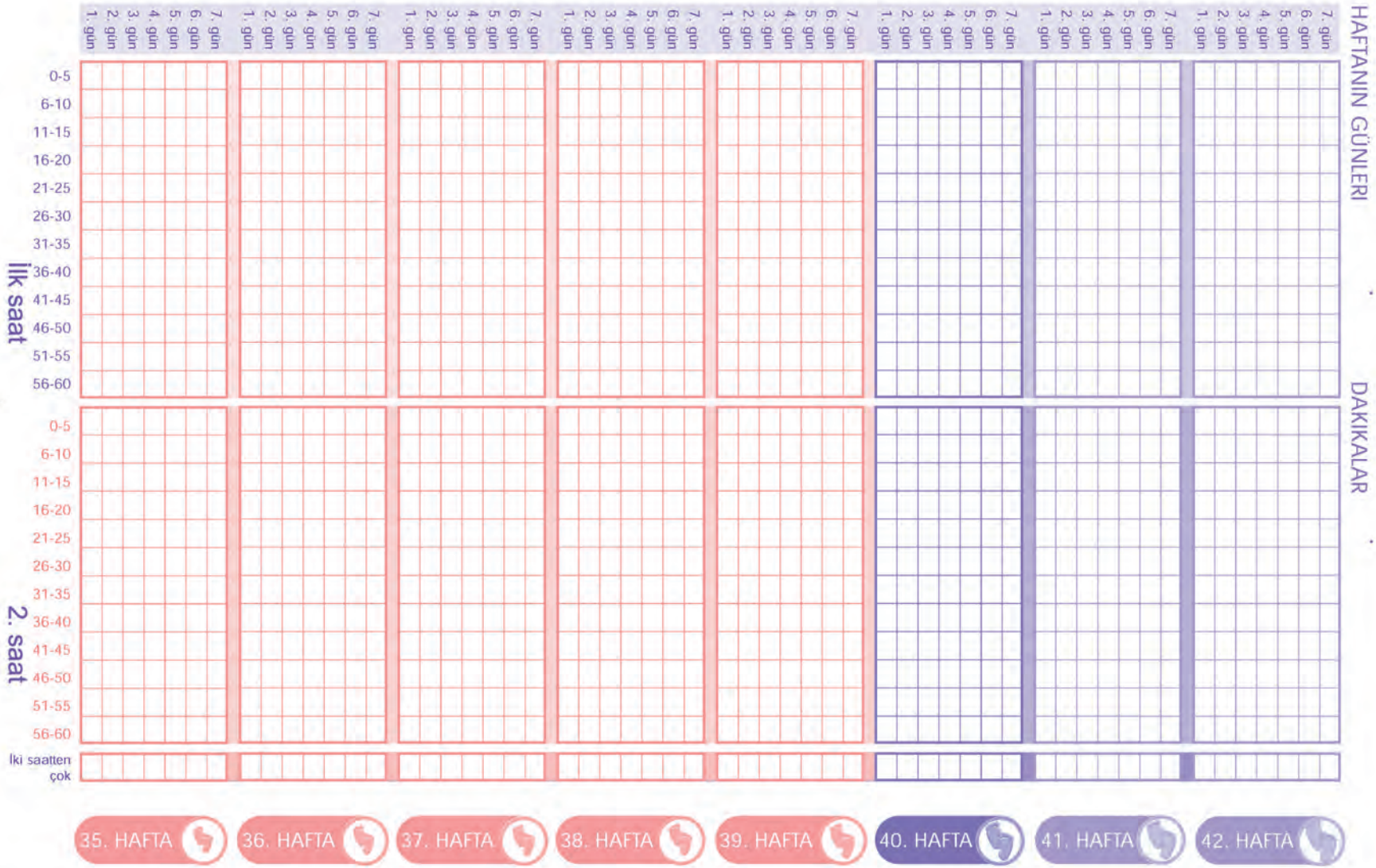
0-5
6-10
11-15
16-20
21-25
26-30
31-35
36-40
41-45
46-50
51-55
56-60

İki saatten çok

28. HAFTA
29. HAFTA
30. HAFTA
31. HAFTA
32. HAFTA
33. HAFTA
34. HAFTA

Not: Haneyi tükenmez kalemle işaretleyin

Şemayı doldurduğunuzda şu adrese gönderin veya teslim edin:



Tekmeleme faaliyeti ve sağlık arasındaki bağlantıyla ilgili araştırmaya katılmak ister misiniz?

Çocuk doğurmanız halinde, çocuğunuzu doğurduktan sonra, **bu dosyayı iade ederek** araştırmaya katılmanızı arzu ediyoruz. Tekme sayma şemasını kullanmış olsanız da olmasanız da araştırmaya katılabilirsiniz.

Kim ve ne için?
Şimdilerde, Folkehelseinstituttet (Halk Sağlığı Enstitüsü), Perinatalmedisinsk forskningssenter, kvinneklinikken Rikshospitalet-Radiumhospitalet HF (Devlet Hastahanesi Doğum Süreci Tıbbi Araştırma Merkezi, Kadın Kliniği-Radyum Hastahanesi) ve Sanitetskvinnene (Sıhhiye Kadınları) yönetiminde çocuğun ana karnındaki tekmeleme faaliyetleri ve gelecekteki sağlık durumu arasındaki bağlantıyla ilgili araştırmalar yapılmaktadır. Tekmeleme faaliyetinde düşüş veya bu faaliyetin kesilmesinin hastalık ve ölüm tehlikesi yarattığını biliyoruz ama, bu ve çocuğun ana karnındaki tekmeleme faaliyetiyle ilgili diğer bilgilerin, çocuğun kısa ve uzun vadede sağlık durumunun korunmasında nasıl kullanılabileceği konusundaki bilgilerimiz yeterli değil.

Araştırmaya katılım tamamen gönüllüdür, az veya çok katkıda bulunabilirsiniz.
Araştırma açısından, mümkün olduğunca çok sayıda kişinin, doğum sonrası, doğum/loğusa bölümünden ayrılmadan önce, bu dosyayı iade etmeleri önemlidir. Tekmeleme şemasını kullanmamış olsanız veya kendiniz hakkında bilgi vermek istemiyor olsanız bile, bu dosya, araştırma açısından değer arzetmektedir. Ancak bu değer siz katkı sağladıkça artar. Eğer 18 yaşından küçükseniz, velilerinize danışmanız gerekir. Ne derece katkıda bulunacağınızı şöyle seçebilirsiniz:

Anonim kalmak ister misiniz?
O takdirde bu yazının sonundaki bilgileri doldurun ve buraya çarpı işareti koyarak **onay** verdiğinizi belirtin: ☐

Daha fazla katkıda bulunabilir misiniz? Doğum tarihi ve kimlik numaranızı belirterek ve burayı imzalayarak, dosyanızdaki bilgilerin Tıbbi Doğum Kayıtlarına eklenmesine **onay** verebilirsiniz:
İmza:_____ kimlik numarası ☐☐ ☐☐ ☐☐ ☐☐☐☐☐

Veya
Eğer Norveçli anne ve çocuk araştırmasına katılıyorsanız, kimlik numaranızı belirterek ve burayı imzalayarak, dosyanızdaki bilgilerin araştırmaya eklenmesine **onay** verebilirsiniz:
İmza:_____ kimlik numarası ☐☐ ☐☐ ☐☐ ☐☐☐☐☐

Araştırmaya katılım güvenli midir?
Halk Sağlığı Enstitüsü, verdiğiniz bilgilerin gizli kalması ve güvenliğinden sorumludur. Enstitü, sizinle ve çocuğunuzla ilgili bilgilerin korunması konusunda Bilgisayar Kayıt Denetmenliğinden (Datatilsynet) ruhsat ve Araştırma Etiği Komitesinden (Forskningsetisk komité) tavsiye almıştır.
Halk Sağlığı Enstitüsü, hakkınızdaki bilgilerinizi kaydettikten ve onay verdiğiniz bilgilerin size ait olduğunu belirttikten hemen sonra, sizinle ilgili bilgileri anonim hale getirecektir. Bu, dosyanızın yok edilmesi ve araştırmacılar görmeden önce, hakkınızdaki tüm kimlik belirten bilgilerin ortadan kaldırılması anlamına gelmektedir.

Dosyayı nereye vereceğim?
Tüm doğum ve loğusa bölümlerinde kolaylıkla görülen kutular mevcuttur. Emin olamazsanız personele sorun.

Herhangi bir bilgi vermek istemiyorum..... ☐

Hamileliğin kaçıncı haftasında doğum yaptınız? ..... ☐☐
(40. hafta tahmini doğum tarihidir)

Nasıl doğum yaptınız?
Normal doğum (döl yoluyla)..... ☐
Önceden planlanmış sezaryen..... ☐
Doğum sırasında karar verilen sezaryen..... ☐
Acil sezaryen..... ☐

Çocuğun cinsiyeti Oğlan ☐ Kız ☐
Çocuğun doğum kilosu ☐☐☐☐ gram

Çocuğun durumu nasıl gitti?
Çocuğun sağlığı yerindeydi..... ☐
Çocuk, yeni doğanlar bölümüne/çocuk bölümüne yatırıldı ☐
Çocuk vefat etti..... ☐

Sizin yaşınız..... ☐☐ yaş

Hamilelik öncesi kilonuz..... ☐☐☐ kg olarak

Boyunuz..... ☐☐☐ cm olarak

Daha önce kaç çocuk doğurdunuz..... ☐☐

Bu hamileliğinizin son ayında sigara içiyor muydunuz?
Hayır..... ☐
Ara sıra.... ☐ ☐☐ sigara, **haftada**
Günlük..... ☐ ☐☐ sigara, **günde**

Norveççe dışında anadiliniz var mı? EVET ☐ HAYIR ☐

Cevap EVET ise, hangi dil? ☐☐☐☐☐☐☐☐☐☐

Yardımlarınız için teşekkürler!

folkehelseinstituttet
Rikshospitalet - Radiumhospitalet HF

Oversatt ved Tolketjenesten i Oslo.
November 2005

[arabisk]

...ضربات الطفل هي ليست للتسلية فقط...

kicks count

www.kickscount.no

تعرفي على طفلك

لقد قطعت الآن شوطاً طويلاً في حملك، ومن المرجح أنك بدأت تشعرين بضربات الطفل. تساعدك مراجعات الحمل الطبية في متابعة مدى ارتياح الطفل، ولكنك كأم تبقين الوحيدة التي بإمكانها معرفة مدى ارتياحه حتى قبل ولادته. إن ما يعبر عنه الطفل بضرباته يعتبر مهماً.

سوف تقضين وقتاً طويلاً بعد الولادة من أجل الاعتناء بطفلك، لذا نحثك على استخدام بعض من وقتك يومياً للتعرف على طفلك أثناء حملك وذلك من خلال متابعتك لحركته. سوف تجدين هنا معلومات وافيه عن معنى الضربات، وكذلك التوجيهات لمعرفة كيفية متابعتها وذلك للتأكد من مدى ارتياح طفلك.

إن تخصيص وقت للتعرف على الطفل هو عادة جيدة.

كيف تخبر الضربات عن مدى الارتياح؟

ينتقل بواسطة المشيمة كل مايحتاجه الطفل منك. يبقى الطفل يتحرك لطالما أن هذا الانتقال يتم بشكل جيد. أما إذا كان هذا الانتقال ضعيفاً أو إذا الطفل مريضاً فتضعف عندها حركته، وذلك لأنه يتوجب عليه اختزان طاقاته من أجل استخدامها في النمو. إذا كنت تدخنين، فإن ذلك يؤثر على الطفل والمشيمة بشكل مباشر وبالتالي تضعف حركة الطفل. إذا أصبح تقاعس المشيمة كبيراً، يؤخر هذا عملية النمو، ويمكن أن يؤدي إلى مرض خطير عند الطفل أو إصابته بأذى. كما يصبح تحمله للولادة ضعيفاً، إن ماذكر يحدث نادراً وخاصة إذا كانت ضربات الطفل طبيعية.

يعم الهدوء في بعض الأحيان، ولكن هذا لايعني شيئاً، إلا إذا كان هناك تباطؤ كبير في ضربات الطفل المعتادة. عندما تشعرين بدلائل حياة متوازنة في داخلك، فهذه إشارة بأن طفلك وضعه جيد. إن شعورك بضربات طفلك يساعدك على التقرب منه أكثر. لهذا فمن الجيد أن تعدي ضرباته لتتابعي ارتياحه.

لهذا السبب تعد ضربات الطفل

ماذا يعني أن يضرب الطفل في أحشائك؟

ماذا يفعل الطفل في الداخل؟

يبقى الطفل نشيطاً طوال فترة الحمل. إن أكثر مايفعله هو حركات تنفس لاتشعرين بها. وهكذا تتوسع رئتاه من خلال التمارين التي يقوم بها ليهيء نفسه لما بعد الولادة. يصاب الطفل في بعض الأحيان بالحازوقة والتي تشعرين بها على شكل رعشة بسيطة ومنتظمة.

يقوم الطفل بإجراء حركات صغيرة وكبيرة في أحشائك. إن الحركات الصغيرة كمص سبابته أو انحنائه أومد أصابع يديه وقدميه هي حركات لاتشعرين بها، أما معظم الضربات والدفع الذي يقوم به الطفل في الداخل تشعرين به بشكل واضح وذلك في الفترات الأخيرة من الحمل. تكون معظم حركات جسمه الكبيرة واضحة، ويمكن أن تحدث مثلاً: عندما تغيرين من وضعية الوقوف إلى الاستلقاء، عندها يميل الطفل ويحرك نفسه قليلاً رداً على حركتك هذه، كما يقوم غالباً بالدفع عندما تدفعيه قليلاً.

أحياناً يعم الهدوء

ينام طفلك مرات عديدة في اليوم، عندها يعم الهدوء بشكل تام. تطول فترات نوم الطفل مع التقدم في الحمل. ولكن نادراً ما ينام أكثر من ساعة في كل مرة وذلك عند اقتراب موعد ولادته. يكون معظمهم أكثر نشاطاً في المساء، والكثيرون منهم أيضاً يكونون أكثر نشاطاً في الصباح الباكر.

يمكن أن يكون هناك اختلاف كبير بين طفل وآخر في حجم وقوة ضرباته، ونقصد بالضربات هنا جميع أشكال الحركات. الأطفال الذين يتحركون أكثر من غيرهم يكونون في الغالب أكثر نشاطاً بعد الولادة أيضاً. ومن الممكن أن يتمتع الجميع بنفس القدرمن العافية. لم يعرف بعد بأن هناك اختلاف بين الذكور والإناث.

إن احساس بعض الأمهات بالحركة أضعف من غيرهن. فإذا كان توضع المشيمة أمام الرحم أو إذا كانت الأم بدينة يصبح الاحساس بالحركة أضعف. يمكنك التدرب على الاحساس بالحركة في نفس الوقت الذي ترين فيه بطنك يتحرك. إن شعورك بالضربات يكون أكثر عندما تستلقين وأقل عندما تقفين أو تمشين أو عندما تكونين مشغولة بشيء ما.

الصورة : Per Oscar Skjellnan
التصميم : Marianne Bratt Ricketts • www.mariannedesign.no

هل عندك سؤال؟ انظري في الموقع: www.telltrivselen.no

عد الضربات؟

إن تحسس ضربات الطفل كل يوم، تعتبر عادة جيدة، إن الاستمارة الخاصة بالضربات هي من أبسط وسائل المساعدة التي تعطيك أنت والقابلة القانونية والطبيب نظرة عامة عن ضربات الطفل. وبالتالي يصبح من السهل معرفة ماهو الطبيعي بالنسبة لطفلك. بالرغم من أن ضربات الطفل مهمة للجميع، ولكن استمارة الضربات يمكن الاعتماد عليها بعد الاسبوع 28 من الحمل، وذلك في حال أنك لاتحملين بتوأم.

املئي استمارة الضربات أثناء حملك، وسلميها بعد ولادتك، تكونين بذلك قد ساعدت أيضا في الأبحاث المهمة الجارية حول كيفية معرفة المرء بالحمل وتقدير احتياجه إلى مساعدة إضافية بناء على نشاط الضربات. إذا أردت المشاركة في مثل هذه الأبحاث، يمكنك الحصول على معلومات خاصة بذلك من خلال الملحق المثبت خلف الورقة.

كيف يعد المرء؟

ابدئي بعد الضربات عندما تكونين في الاسبوع 28 من الحمل، سجلي في الاستمارة تاريخ بدايتك في العد وكذلك تاريخ ولادتك المتوقع.

عدي عشرة ضربات ـ احسبي الوقت من بدء احساسك بالضربة الأولى (عندما تتأكدين بأن طفلك مستيقظ).
جميع الحركات تحسب كضربات، ولكنك لن تعدين الحازوقة. تعد الحركات المتراكبة كضربة واحدة. يمكن أن تتم الحركات بسرعة وتتحسسيها بشكل واضح سواء كنت في وضع الاستلقاء أو الجلوس أو الراحة. يحق لك في حال أن الطفل كان نائما أن تجعليه يستيقظ إما بالضغط قليلاعلى البطن أو بدفعه أو بشرب شراباً باردا.

ضعي إشارة ضرب في المربع الصغير في الاستمارة للوقت الذي استخدمتيه في عد 10 ضربات وفي أي يوم تم ذلك.

ابدئي العد في نفس الوقت تقريباً من كل يوم، وللمدة التي تستطيعينها. اختاري وقتاً مناسباً لك خلال اليوم وخصصي منه فترة قصيرة تعرفين فيها ان طفلك يكون عادة نشيطاً خلالها، ويفضل أن يكون ذلك في الصباح قبل نهوضك. ابدئي العد ضمن نفس الساعتين من كل يوم. سجلي في الاستمارة في أي وقت تبدئين فيه العد عادة.
إذا قمت بالعد بهذا الشكل فإنك ستستعملين أقل من 15 دقيقة لعد الضربات مثل غالبية الحوامل.

كيف يمكنك إملاء استمارة العد:
ضعي اشارة ضرب في المربع، بقلم أسود أو أزرق. بعد أن تكوني قد انتهيت من عد 10 ضربات، ضعي اشارة ضرب في المربع الذي يبين الزمن الذي استغرقه عمل ذلك

مثال:
لقد استغرق عد 10 ضربات 30 دقيقة، ضعي اشارة ضرب في المربع 26 - 30 دقيقة.

في حال استغرق عد 10 ضربات ساعة و5 دقائق، ضعي اشارة ضرب في حقل الساعة الثانية ساعتين في المربع 0-5 دقائق.

كم هي عدد الضربات التي يقوم بها الطفل ـ وماذا لو تباطأت؟

يمكنك وبعد استخدامك لاستمارة الضربات لمدة اسبوع أو اسبوعين، ملاحظة أن الضربات تختلف من يوم إلى آخر، ولكنها تتشابه بشكل عام في جميع الأيام، وتستمربنفس الشكل لطفل يشعر بالارتياح، على الرغم من أن طريقة شعورك بالحركة قد تتغير خلال فترة حملك به. من المهم ألا تشعرين بضعف كبير ومستمر في حركة طفلك بالمقارنة مع نشاطه المعتاد. إن استمارة الضربات تساعدك على كشف ذلك.

إذا كنت قلقة بشأن طفلك، يستحسن بك مهما كانت أسباب قلقك، طلب المساعدة والنصيحة. أما إذا كان قلقك ناتجاً عن شعورك بضعف تدريجي في حركة طفلك مع تقدم أسابيع الحمل، فعليك عندها أخذ استمارة الضربات هذه عند ذهابك لمتابعة فحص الحمل.

يستحسن بك الاتصال مباشرة بقسم الولادة وذلك في الحالات التالية:

- إذا لم يتحرك طفلك يوماً كاملاً، عليك ألا تنتظري أبداً إلى اليوم الذي يليه.
- إذا كانت ضربات الطفل ضعيفة بشكل مستمر خلال اليوم/ أيام، وتشعرين بضعف في الحركة.

إذا كنت في شك حول مامعنى "ضعف في الحركة" ، فعليك أن تعلمي أنه من النادر جداً لطفل معافى أن يضرب أقل من 10 ضربات خلال ساعتين وتعرفين أنه نشيط في العادة. يستحسن بك الاتصال بقسم الولادة، وذلك إذا شعرت أن ضرباته كانت ضعيفة طوال اليوم. تابعي حركة الطفل، خاصة إذا كنت لاتعرفين فيما إذا كانت حركته ضعيفة في الفترة التي لم تبدئي فيها العد اليومي بعد. اسعي للعد ثانية في ال12 ساعة القادمة واتصلي بقسم الولادة في حال ان النتائج كانت متماثلة.

إلى "helsekort for gravide"

إن موعد ولادتي المتوقع (التاريخ، اليوم، الشهر، السنة) ☐☐.☐☐.☐☐

لقد بدأت العد هذا اليوم (التاريخ، اليوم،الشهر،السنة) ☐☐.☐☐.☐☐

لقد تعودت على العد بين الساعة: ☐☐.☐☐ و الساعة: ☐☐.☐☐

ملاحظة: استخدمي قلم حبر في وضع اشارة الضرب

أيام الاسبوع

ابدئي العد

دقائق

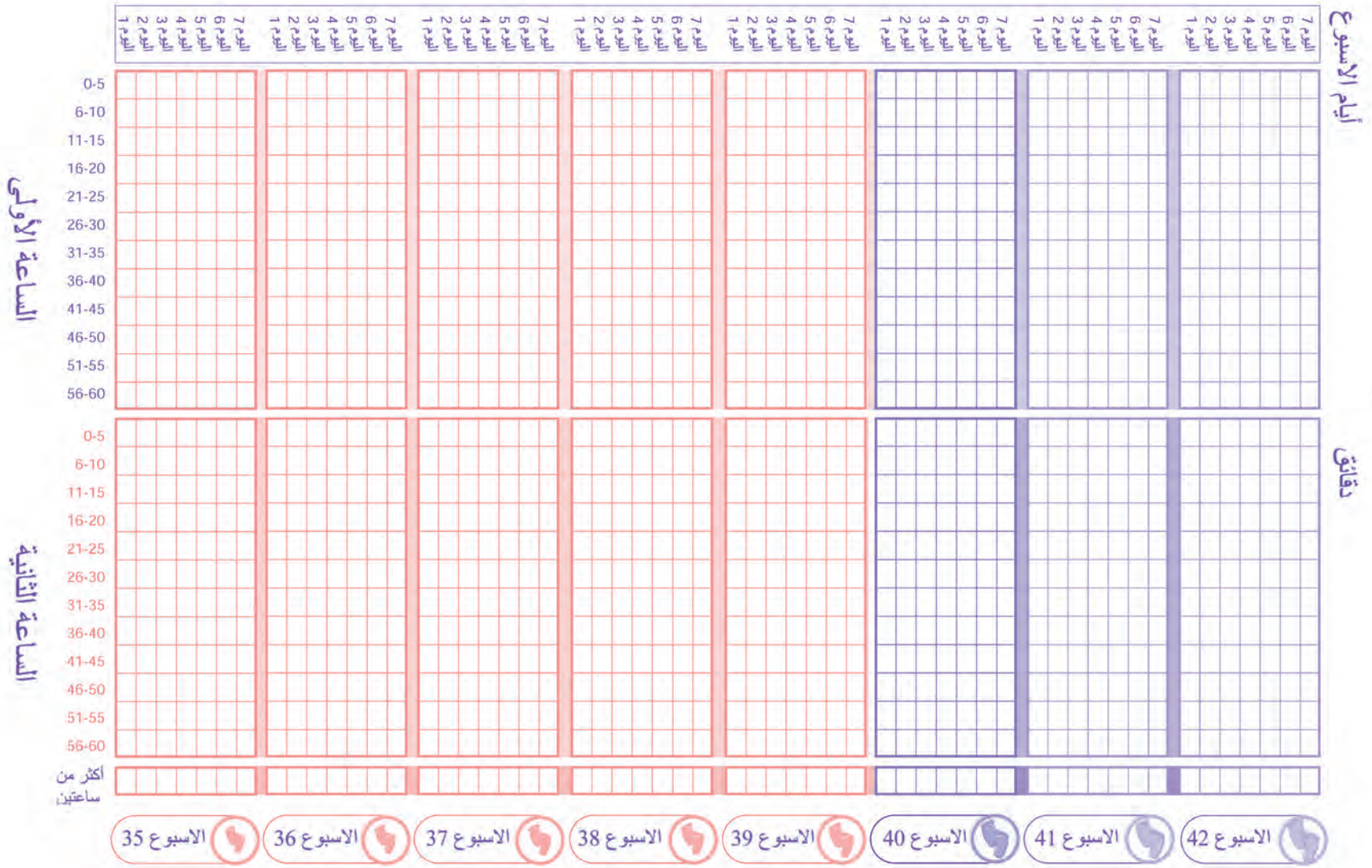
5 دقائق لكل مربع
الساعة الأولى

5 دقائق لكل مربع
الساعة الثانية

0-5
6-10
11-15
16-20
21-25
26-30
31-35
36-40
41-45
46-50
51-55
56-60
أكثر من ساعتين

الاسبوع 34 | الاسبوع 33 | الاسبوع 32 | الاسبوع 31 | الاسبوع 30 | الاسبوع 29 | الاسبوع 28

ملامظة: استخدمي قلم حبر في وضع اشارة الضرب عندما تنتهين من إملاء الاستمارة أرسليها على العنوان:



شاركي في البحث القائم حول العلاقة بين نشاط ضربات الجنين وصحته.

نرغب في دعوتك للمشاركة في البحث، وذلك عن طريق تسليم هذه الاستمارة بعد ولادتك، وذلك في حال أنك ولدت طفلاً واحداً، ومشاركتك هذه غير مرتبطة باستخدامك لاستمارة الضربات أو عدمه.

من ولماذا؟

تجرى حالياً وبإشراف المعهد الصحي الشعبي (Folkehelseinstituttet) ، و المركز الطبي للبحوث المتعلقة بفترة ماقبل وبعد الولادة، و العيادة النسائية في مشفى (Rikshospitalet Radiumhospitalet HF) ، و جمعية النساء المسعفات، أبحاث حول العلاقة بين نشاط ضربات الطفل في البطن ومستقبله الصحي. نحن نعلم أن الضعف الكبير في ضربات الطفل أوتوقفها مرتبط بخطورة تعرضه للأمراض أو وفاته. ولكن معرفتنا قليلة حول كيفية استخدام ذلك وبمساعدة معلومات أخرى متعلقة بنشاط ضربات الطفل في البطن للوصول إلى طفل معافى على المدى القريب والبعيد.

المشاركة طوعية، ويمكنك المساهمة بذلك إما قليلاً أو كثيراً .

من المهم ولصالح البحث المجرى أن تقوم أكثر هن بتسليم هذه الاستمارة وذلك قبل مغادرتهن قسم الولادة والنفاس.
إن لهذه الاستمارة قيمة كبيرة في البحث، حتى وإن لم تستخدمي استمارة الضربات أو أنك لاترغبين في إعطاء معلومات عن نفسك. تزداد هذه القيمة بقدر مساهمتك.
يستحسن بك إذا كنت لم تبلغي الثامنة عشر من العمر استشارة أولياء أمرك. يمكنك وكلائي تحديد مدى مساهمتك الشخصية في البحث :

هل تريدين أن تبقي غير معلنة؟

دوني المعلومات في أسفل هذه الصفحة، وامنحي موافقتك وذلك بوضع اشارة ضرب هنا : ☐

هل بإمكانك المساهمة أكثر ؟

يمكنك منح الموافقة على جعل المعلومات الواردة في استمارتك

تزتبط مباشرة ببيانات الولادة الطبية، وذلك من خلال تدوين تاريخ ميلادك ورقمك الشخصي والتوقيع هنا: الرقم الشخصي: ☐☐☐☐☐ ☐☐ ☐☐

التوقيع: _____

أو

إذا كنت ستشاركين في البحث الثروبجي وهو " الأم والطفل "، يمكنك عندها منح موافقتك لجعل المعلومات الواردة في استمارتك تستخدم في البحث وذلك بكتابة رقمك الشخصي والتوقيع هنا: الرقم الشخصي: ☐☐☐☐☐ ☐☐ ☐☐

التوقيع: _____

هل المشاركة آمنة؟

تقع على عاتق معهد الصحة الشعبي مسؤولية الحفاظ على سرية المعلومات الخاصة بك. يملك المعهد إجازة خاصة من قبل دائرة مراقبة الحاسوب، كما تقدم له الارشادات من قبل لجنة البحوث الخاصة بالأخلاق المهنية وذلك من أجل المحافظة على المعلومات الخاصة بك وبطفلك.
يقوم معهد الصحة الشعبي في أقرب وقت يتم فيه تسجيل المعلومات الخاصة بك، وربطك بالمعلومات التي وافقت على منحها، بجعل تلك المعلومات غير معلنة. هذا يعني أن استمارتك تتلف وجميع المعلومات الخاصة بهويتك تمحى وذلك قبل اطلاع الباحثين عليها.

أين بإمكاني تسليم الاستمارة؟

هناك صندوق معنون في جميع أقسام الولادة والنفاس. اسألي العاملين هناك إذا لم تجديه.

لاأريد اعطاء أية معلومات ..... ☐

في أي من أسابيع حملك تمت ولادتك؟ ..... ☐☐
(الاسبوع رقم 40 هو اسبوع الولادة)

كيف تمت ولادتك؟

ولادة طبيعية (مهبلية)..... ☐

ولادة قيصرية مخطط لها..... ☐

ولادة قيصرية تم تقريرها أثناء الولادة ..... ☐

ولادة قيصرية سريعة ..... ☐

جنس المولود ذكر ☐ أنثى ☐

وزن الطفل عند الولادة ☐☐☐ غرام

كيف سارت الأمور مع الطفل؟

كان الطفل معافى..... ☐

تم إدخال الطفل إلى قسم حديثي الولادة /قسم الأطفال.... ☐

توفي الطفل ..... ☐

عمرك..... ☐☐سنة

وزنك قبل الحمل ..... ☐☐☐ بعدد صحيح من الكغ

طولك..... ☐☐☐ بعدد صحيح من السم

كم عدد الأطفال الذين أنجبتيهم مسبقاً ☐☐

هل قمت بالتدخين في الشهر الأخير من حملك هذا؟

لا ..... ☐

بعض الأحيان ..... ☐ ☐☐ سيجارة في الاسبوع

يومياً ..... ☐ ☐☐ سيجارة في اليوم

هل لغتك الأم هي لغة أخرى غير النرويجية؟..... نعم ☐ لا ☐

إذا كان الجواب نعم، فما هي اللغة؟ ☐☐☐☐☐☐☐☐☐☐

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folkehelseinstituttet

Rikshospitalet - Radiumhospitalet HF

شكراً للمساعدة

Oversatt ved Tolketjenesten i Oslo.
November 2005

Spørreskjema om barnets aktivitet før fødsel

A. BARNETS AKTIVITET FØR DET BLE FØDT (de tre siste månedene)

1. Beskriv barnets aktivitet slik det stort sett var på en gjennomsnittlig dag

	Stemmer helt	Stemmer delvis	Stemmer ganske dårlig	Stemmer ikke	Vet ikke
Barnet sparket mye stort sett hele dagen ……..					
Jeg kjente mye spark hver dag ……..……					
Mot slutten av svangerskapet hadde barnet lengre perioder hvor det var stille ..					
Jeg kjente sparkene annerledes mot slutten av svangerskapet ……					

2. Hadde barnet ditt vanligvis perioder på døgnet hvor det var spesielt stille eller aktivt?

		Barnet var **mest aktivt**	Barnet var **mest stille**
Ja	→	om morgenen	om morgenen
Nei		om formiddagen	om formiddagen
Vet ikke		om ettermiddagen	om ettermiddagen
		om kvelden	om kvelden
		om natta	om natta

3. Hvordan reagerte barnet…

	Barnet ble mer aktivt	Barnet ble ikke påvirket	Barnet ble mer stille	Vet ikke
… dersom du var sulten? ……				
… etter at du hadde spist eller drukket?……				
… dersom du var stresset eller redd?……				
… dersom du dyttet borti barnet? ……				

4. Hvordan kjente du aktivitet fra barnet ditt?

	Ofte	Av og til	Sjelden	Aldri	Vet ikke
Jeg kjente at barnet sparket/dyttet ……					
Jeg kjente at barnet snudde seg fra side til side ……					
Jeg kunne stort sett kjenne hvordan barnet lå …… *(hvor hodet, ryggen og beina var)*					

5. Hva betydde det for deg at barnet sparket?

	Stemmer helt	Stemmer delvis	Stemmer ganske dårlig	Stemmer ikke	Vet ikke
Jeg opplevde sparking fra barnet positivt ……					
Jeg så på det som et tegn på at barnet hadde det bra ……					
Jeg ble kjent med barnet mitt ved at jeg kjente liv fra det ……					
Det var viktig for meg å kjenne at barnet sparket hver dag ……					
Jeg tenkte ikke noe særlig over det ……					

B. INFORMASJON

6. Fikk du informasjon på svangerskapskontrollen om hva du burde forvente av barnets aktivitet?

Nei Ja Vet ikke/husker ikke

7. Hvis JA, hvilken informasjon fikk du?

	Stemmer helt	Stemmer delvis	Stemmer ganske dårlig	Stemmer ikke	Vet ikke
At jeg skulle "kjenne liv hver dag" ……					
At det er "normalt at man kjenner mindre liv på slutten av svangerskapet" …….					
At det var "viktig å registrere dersom barnet ble mer stille enn før" ……					
At gravide normal skal kjenne et visst antall bevegelser over en viss periode …					

fyll evt inn antall spark i løpet av time(r)

8. Hvor stor rolle synes du disse har hatt for å passe på at barnet ditt hadde det bra?

	Stor rolle	Ganske stor rolle	Ganske liten rolle	Ubetydelig rolle	Vet ikke	Ikke aktuelt
Jordmor på svangerskapskontrollen ……..						
Egen lege …….....						
Jeg selv ……..						

C. OM SPARKESKJEMA

Sparkeskjema er et skjema hvor den gravide skal telle antall spark over en viss periode og registrere dette i et skjema.

9. Har du hatt et slikt skjema? Nei → Hvis **NEI**, gå til spørsmål **12**

Ja

10. Hvis JA, hvor ofte har du brukt det? **Daglig** | **2-6 ganger i uka** | **En gang i uka** | **Sjelden** | **Aldri** | **Vet ikke**

11. Hvordan opplevde du å få og å bruke sparkeskjema?

	Stemmer	**Stemmer delvis**	**Stemmer ganske dårlig**	**Stemmer ikke**	**Vet ikke**
Jeg fikk god informasjon om **hvordan** jeg skulle bruke sparkeskjemaet ……..					
Jeg fikk god informasjon om **hvorfor** jeg skulle bruke sparkeskjemaet ……					
Det var tidkrevende ……					
Jeg syntes at jeg ble bedre kjent med barnet ……					
Jeg ble usikker på hva som skulle telle med……..					
Det var veldig greit å få framstilt barnets aktivitet i et skjema ……..					
Det ble for mye oppmerksomhet rundt barnets aktivitet ……...					

D. OM LITE LIV

12. Har du i dette svangerskapet vært bekymret for at barnet sparket lite?
Dersom du har svart ALDRI her, gå videre til spørsmål 24

	Ofte	**Av og til**	**En gang**	**Aldri**	**Vet ikke**

13. Hvorfor syntes du at ditt barn var stille?

	Stemmer	**Stemmer delvis**	**Stemmer ganske dårlig**	**Stemmer ikke**	**Ikke aktuelt**
Barnet sparket mindre enn før - det hadde vært mer aktivt tidligere i svangerskapet					
Det virket som om barnet sparket mindre enn mine venninners barn ……..					
Jeg har født før, og dette barnet var mindre aktivt enn de(t) forrige barna(et) …					
Det sparket mindre enn anbefalinger jeg har sett eller hørt ……					

14. Hva tenkte du om at barnet ditt var stille?

	Stemmer	**Stemmer delvis**	**Stemmer ganske dårlig**	**Stemmer ikke**	**Vet ikke**
Jeg tenkte at det var normalt for mitt barn ……..					
Jeg var redd for at barnet mitt var sykt eller ikke hadde det bra ……..….					
Jeg var redd for at barnet skulle dø ……					
At jeg ikke kjente godt nok etter og at det var en unødvendig bekymring …….					

15. Beskriv hvordan du forholdt deg dersom du var bekymret for at barnet sparket lite?
Dersom det var flere ganger, beskriv de gangene du var mest bekymret.

I hvilken svangerskapsmåned var du?	**7.måned**	**8.måned**	**9.måned**
Hvor søkte du råd (sett ett eller flere kryss)			
Jeg kontaktet venninne(r) og familie……..……			
Jeg leste i bøker og blader om svangerskap ……			
Jeg leste egen brosjyre om sparkeaktivitet og sparketelling …..			
Jeg leste på informasjonssider om gravide på internett …….			
Jeg ringte egen lege/jordmor på svangerskapskontrollen …….			
Jeg ringte til sykehuset ……			

16. Dersom du ringte til helsepersonell, hvilke(t) råd fikk du (sett gjerne flere kryss)

At jeg skulle se det an i timer

At jeg skulle legge meg ned og telle spark over en viss periode: Telle spark innen timer
At jeg skulle drikke noe søtt og se om barnet ble mer aktivt
At jeg skulle drikke noe kaldt og se om barnet ble mer aktivt
At det virket normalt og at det ikke var noe å bekymre seg over
At jeg kunne vente til neste dag før jeg tok videre kontakt med helsepersonell
At jeg skulle komme direkte til undersøkelse

17. Hva gjorde du?	**7.måned**	**8.måned**	**9.måned**
Jeg følte ikke behov for undersøkelse av helsepersonell			
Jeg dro direkte til legen/jordmoren min ……..…….			
Jeg dro direkte til sykehuset/fødeavdelingen ……			
Jeg dro direkte til legevakta ……..……..			

E. UNDERSØKELSER

18. Hvem var det som undersøkte deg dersom du var til undersøkelse hos helsepersonell på grunn av at barnet sparket lite? 7.måned 8.måned 9.måned

Jordmor/lege på svangerskapskontrollen .....

Jordmor/lege på sykehus/fødeavdeling.....

19. Hvilke undersøkelser ble gjort for å finne ut hvordan barnet ditt hadde det (sett ett eller flere kryss)?

CTG (registrering av barnets hjertelyd ved at det festes belter rundt magen din og du trykker på en sparkeknapp)

Ultralyd (for eksempel måling av barnets størrelse og fostervannsmengde)

Doppler (måling av blodstrømshastighet ved hjelp av ultralyd slik at du hører barnets puls)

Vet ikke

20. Ble det funnet noe galt ved undersøkelsen? Nei Ja Vet ikke

21. Hvis JA, hva ble funnet?

Barnet var akutt truet på grunn av morkakesvikt .....

Barnet hadde vokst for lite (veksthemmet) .....

Det var for mye fostervann .....

Det var for lite fostervann .....

Barnet hadde misdannelser .....

Annet _____

F. ETTER UNDERSØKELSEN

22. Hva skjedde etter denne undersøkelsen?

Jeg ble anbefalt å fortsette til vanlig svangerskapskontroll

Jeg fikk kontrolltime på sykehuset etter dager

Jeg ble innlagt til observasjon

Jeg ble innlagt for at fødselen skulle settes i gang

Jeg ble innlagt til hasteforløsning/keisersnitt

23. Dersom du ble sendt hjem, hvordan hadde du det?

Jeg var beroliget .....

Jeg tenkte ikke mer over det .....

Jeg var engstelig, men tok det ikke opp med helsepersonell flere ganger .....

Jeg var engstelig og snakket med helsepersonell om det

Jeg var engstelig og var til nye kontroller på grunn av at barnet var stille .....

G. OM FØDSELEN OG BARNET

24. I hvilken svangerskapsuke fødte du (uke 40 er termin)? .....

25. Hvordan fødte du?

Vanlig fødsel (vaginal) .....

Keisersnitt som var planlagt .....

Keisersnitt som ble bestemt underveis i fødselen .....

Hastekeisersnitt .....

26. Barnets kjønn: Gutt Jente

27. Barnets fødselsvekt: gram

28. Ble barnet flyttet til nyfødtavdeling/barneavdeling?

Nei Ja

29. Hvis JA, hvor gammelt var barnet da?

dager timer

30. Hvordan går det med barnet nå?

Barnet har det bra sammen med meg på barsel .....

Barnet er innlagt på nyfødtavdeling/barneavdeling .....

H. NOEN OPPLYSNINGER OM DEG

31. Hvor mange barn har du født før?

32. Røykte du de siste 3 månedene før du ble gravid?

Nei .....

Av og til: sigaretter per uke (gj.snittlig)

Daglig: sigaretter per dag (gj.snittlig)

33. Røykte du den siste måneden av dette svangerskapet?

Nei .....

Av og til: sigaretter per uke (gj.snittlig)

Daglig: sigaretter per dag (gj.snittlig)

34. Hvilken sivilstand har du nå?

Gift Samboer Enslig Skilt/separert Enke

35. Din høyeste fullførte utdanning?

9-årig grunnskole .....

3-årig videregående skole .....

Høyskole, universitet inntil 4 år .....
(cand.mag, sykepleier, ingeniør, lærer)

Universitet, høyskole, mer enn 4 år .....
(hovedfag, mastergrad, embetseksamen)

BESVARES AV ALLE

36. Alder: ..... år

37. Din høyde: ..... hele cm

38. Vekt før svangerskapet: .... hele kg

NEI JA

39. Har du annet morsmål enn norsk? .....

40. Hvis JA, hvilket morsmål? _____

Takk for hjelpen!

PAPER I

I

Tveit JVH, Saastad E, Stray-Pedersen B, Børdahl PE, Frøen JF. Maternal characteristics and pregnancy outcomes in women presenting with decreased fetal movements in late pregnancy. *Acta Obstetricia et Gynecologia. 2009; 88: 1345-1351*

PAPER II

Tveit JVH, Saastad E, Stray-Pedersen B, Børdahl PE, Frøen JF. Concerns for decreased foetal movements in uncomplicated pregnancies – increased risk of fetal growth restriction and stillbirths among women being overweight, advanced age or smoking. *The Journal of Maternal-Fetal & Neonatal Medicine, October 2010; 23(10): 1129-1135*

II

PAPER III

Tveit JVH, Saastad E, Stray-Pedersen B, Børdahl PE, Flenady V, Fretts R, Frøen JF. Reduction of late stillbirth with the introduction of fetal movement information and guidelines - a clinical quality improvement. *BMC Pregnancy and Childbirth 2009, 9:32*

Correction: Tveit JVH, Saastad E, Stray-Pedersen B, Børdahl PE, Flenady V, Fretts R, Frøen JF. Reduction of late stillbirth with the introduction of fetal movement information and guidelines - a clinical quality improvement. *BMC Pregnancy and Childbirth 2010, 10:49*

III

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Reduction of late stillbirth with the introduction of fetal movement information and guidelines – a clinical quality improvement

Julie Victoria Holm Tveit*[1,2], Eli Saastad[2,3], Babill Stray-Pedersen[1], Per E Børdahl[4,5], Vicki Flenady[6], Ruth Fretts[7] and J Frederik Frøen*[2,7]

Address: [1]Division of Obstetrics and Gynecology, and Centre for Perinatal Research, Rikshospitalet University Hospital, University of Oslo, Medical Faculty, Norway, [2]Norwegian Institute of Public Health, Division of Epidemiology, Oslo, Norway, [3]Akershus University College, and University of Oslo, Medical faculty, Norway, [4]Department of Obstetrics and Gynecology, Haukeland University Hospital, Bergen, Norway, [5]Institute for Clinical Medicine, Section for Gynaecology and Obstetrics, University of Bergen, Norway, [6]Department of Obstetrics and Gynecology, University of Queensland, Mater Mothers' Hospital, South Brisbane, Australia and [7]Brigham and Women's Hospital, Div. of Maternal-Fetal Medicine, Harvard Medical School, Boston, MA, USA

Email: Julie Victoria Holm Tveit* - julievh@medisin.uio.no; Eli Saastad - eli.saastad@fhi.no; Babill Stray-Pedersen - babill.stray-pedersen@medisin.uio.no; Per E Børdahl - per.e.bordahl@helse-bergen.no; Vicki Flenady - vicki.flenady@mater.org.au; Ruth Fretts - rfretts@vmed.org; J Frederik Frøen* - frederik.froen@fhi.no

* Corresponding authors

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Abstract

Background: Women experiencing decreased fetal movements (DFM) are at increased risk of adverse outcomes, including stillbirth. Fourteen delivery units in Norway registered all cases of DFM in a population-based quality assessment. We found that information to women and management of DFM varied significantly between hospitals. We intended to examine two cohorts of women with DFM before and during two consensus-based interventions aiming to improve care through: 1) written information to women about fetal activity and DFM, including an invitation to monitor fetal movements, 2) guidelines for management of DFM for health-care professionals.

Methods: All singleton third trimester pregnancies presenting with a perception of DFM were registered, and outcomes collected independently at all 14 hospitals. The quality assessment period included April 2005 through October 2005, and the two interventions were implemented from November 2005 through March 2007. The baseline versus intervention cohorts included: 19,407 versus 46,143 births and 1215 versus 3038 women with DFM, respectively.

Results: Reports of DFM did not increase during the intervention. The stillbirth rate among women with DFM fell during the intervention: 4.2% vs. 2.4%, (OR 0.51 95% CI 0.32–0.81), and 3.0/1000 versus 2.0/1000 in the overall study population (OR 0.67 95% CI 0.48–0.93). There was no increase in the rates of preterm births, fetal growth restriction, transfers to neonatal care or severe neonatal depression among women with DFM during the intervention. The use of ultrasound in management increased, while additional follow up visits and admissions for induction were reduced.

Conclusion: Improved management of DFM and uniform information to women is associated with fewer stillbirths.

Background

Maternal perception of fetal movements (FM) is a universally implemented self-screening, administered and interpreted individually by all pregnant women, with or without guidance from health care professionals [1]. Maternal reporting of decreased fetal movements (DFM) is a frequent reason for unplanned health consultations through the third trimester ranging between 4%–16% in various populations [1-3] and 5% in a previous report [2]. Pregnancies affected by DFM are at increased risk of adverse outcome such as fetal growth restriction (FGR), preterm birth and fetal death [4-9].

There is no universally accepted methodology for assessing DFM. Every method has its limitations and a "gold standard" is difficult to define. Maternal perception of FM arises first and foremost as a result of pressure against body-wall structures, and thus the mother's perception reflects gross FM or limb movements [10,11]. The proportion of movements perceived by the mother and documented during ultrasound monitoring at the same time ranges from 37% to 88% [12]. A common factor in these studies is that the mother is lying down and focusing on fetal activity. This is the only situation in which we know that maternal perception and objective measures of FM are strongly correlated with objective measures of fetal activity. Outside such a setting, both the actual frequency of movements as well as the mother's ability to perceive them are influenced by factors such as maternal position [13], activity and exercise [14], anxiety [15], stress [16], blood sugar [17], smoking [18], placenta localization [10], and obesity [19]. Parity has not been found to affect maternal perception of FM in the third trimester [10], but multiparous might be able to perceive FM earlier in pregnancy than primiparous [20]. There are significant diurnal variations in normal fetal activity, which changes gradually with gestation [10,20].

Among the attempts to define DFM, a variety of methods of FM counting with different alarm limits have been published [1,6,7]. Among these, the rule of "ten movements within 2 hours" [21]. This is the only definition of DFM based on focused maternal counting which has been both developed and tested as a screening tool in a total population, and currently the definition of DFM recommended by the American Academy of Pediatrics and the American College of Obstetricians and Gynecologists if maternal movement counting is performed [22]. Other definitions of DFM have mostly been based on counting through both rest and activity and have little evidence in support of their association with actual fetal activity. The most important clinical understanding of DFM is still the mother's own perception of a decrease [1,23-26].

There are no universally accepted guidelines for the management of DFM [7,12]. Although several studies have presented guidelines including non-stress test (NST), ultrasound examination and Doppler [2,3,5,7,22,27], most of these recommendations are based on limited evidence, as we have reviewed elsewhere [7,12].

We intended to examine two cohorts of women with DFM before and during a quality improvement intervention by implementing guidelines for management of DFM and uniform information on fetal activity to women.

Methods

Women with singleton pregnancies of at least 28 weeks gestation or more who reported a concern for DFM (either by spontaneous reporting or upon questioning), were registered prospectively for quality-assurance purposes at 14 delivery units in eastern Norway and the city of Bergen. The registrations were a part of the international collaboration, Fetal Movement Intervention Assessment (Femina) [2]. Recurrent visits for DFM in already registered pregnancies were excluded as we intended to report the number of women newly reporting DFM. Data from women with a stillborn infant were obtained separately, to ensure completeness of mortality data, but stillbirths not initially identified by DFM were subsequently excluded, as were pregnancies with a gestational age under 28 weeks and multiple pregnancies (figure 1). To ensure unbiased registrations for quality-assurance of clinical practice at the individual hospital, maternal consent was not sought. The study was approved by The Regional Committees for Medical Research Ethics and Personal Data Act and advised by The Norwegian Data Inspectorate.

Data collection

The registration period included 7 months of baseline observation followed by 17 months of intervention: from April 1, 2005 to March 31, 2007. In Norway, almost all pregnant women attend the antenatal program which is free of charge and covered by the public health-care services. The Norwegian antenatal care program is following contemporary guidelines composed by the National Institute of Clinical Excellence [28]. The community midwives and general practitioners are in charge of the antenatal program, and without the possibility to perform an NST or ultrasound examinations locally, they usually refer the concerned mothers to the nearby hospital with a maternity ward. Hence, the pregnant women in Norway typically contact maternity wards directly with any acute concerns for DFM. There are no private delivery wards in Norway. Women fulfilling the inclusion criteria were registered prospectively by the caregiver at the time the woman presented to the hospital. Pregnancy outcome were collected independently after delivery from the medical files by study coordinator at each hospital. Data were anonymized and submitted to the study-coordinating centre. DFM was defined as any woman presenting with

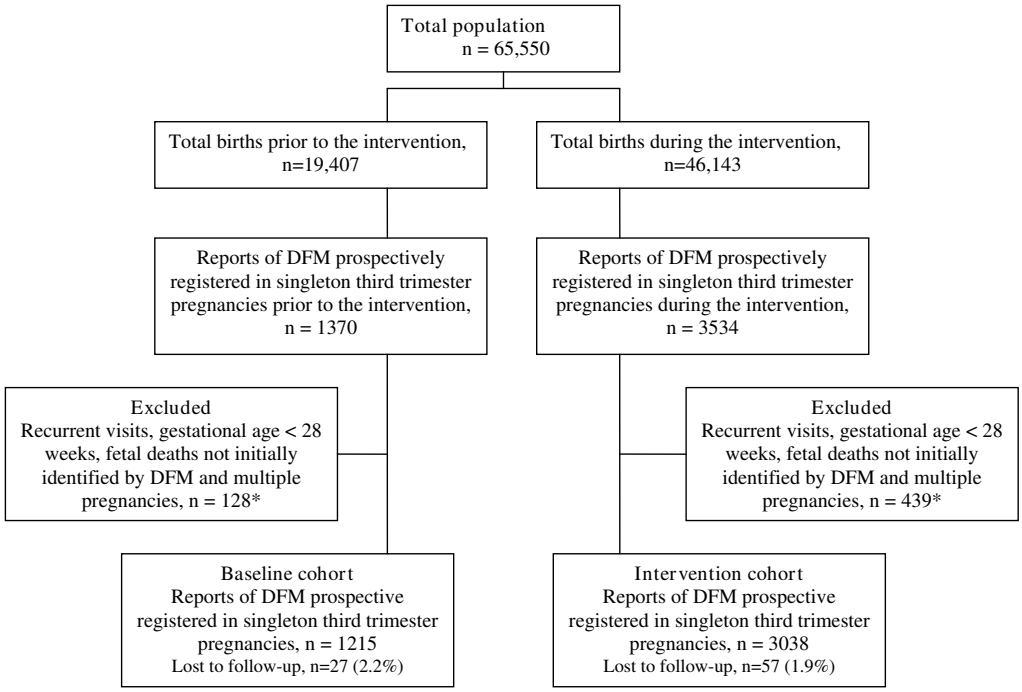

Figure 1
Trial profile. Trial profile of total births and reports of decreased fetal movements before and during the intervention *All deaths, irrespective of how they were initially identified, were included in analyses of mortality in the total population.

concerns for DFM, irrespective of whether this was based on her subjective opinion or it emerged during an antenatal visit for other reasons. In addition to the registrations by our study protocol, the numbers of births and stillbirths from our population were obtained from the Medical Birth Registry in Norway to assess overall trends in stillbirth, for the most updated period available: April 2005 to December 2006.

Guideline development

Our observations of pregnancies with DFM prior to the intervention identified significant differences in management between hospitals – none had provided the women with written information – and there were indications of co-variation between management and pregnancy outcomes [2]. Almost all hospitals would perform an NST, about half performed an ultrasound scanning, and some carried out an umbilical artery Doppler examinations [2]. The risk of adverse outcomes increased with the severity (perceived absence of DFM) and duration of DFM. Undesirable behavior was frequent, with one-third of the women did not present before an absence of FM was perceived: one-quarter of these women waited for more that 24 hours [2]. An initial survey of all 55 birth clinics in Norway found a wide range of definitions of DFM used to inform women, varying from three kicks per hour to an absence of more than 24 hours [29]. Among the fourteen participating clinics, the women received a wide range of advice in terms of normal frequency of FM: varying from 25 kicks per hour to 3 kicks per 24 hours [30].

With this in mind, a systematic review of all currently published literature was undertaken to determine the optimal management for women with DFM. A group of experts together with Chairs of midwifery and obstetrics of all participating hospitals developed a best- practice- and consensus-based approach to the best-practice management of DFM and the information provided to pregnant women. In our own quality assessment of care prior to the intervention, NST and ultrasound examination were

found to be the most useful tools for fetal surveillance in DFM, while an umbilical artery Doppler examination failed to add significant information among 3014 cases of DFM. Ultrasound scanning was, by comparison, the most important tool, being the source of information in 86.2% of cases where abnormalities were detected [12]. In brief, our implemented guidelines recommended: a standard clinical evaluation for all women reporting DFM, an NST, and an ultrasound scan to quantify FM, amniotic fluid volume, and fetal anatomy and growth. A mother presenting with a concern of DFM was to be examined within two 2 hours if absence of FM was suspected, otherwise within 12 hours (guidelines published in detail) [12].

Information for women

We developed a brochure of information that aimed to increase maternal awareness and vigilance to significant decreases in fetal activity, and to aid health-promoting behavior. This was provided as a part of the routine information given to women at the standard ultrasound assessment at 17–19 weeks of pregnancy (to which 98% of the population adhere). In addition to Norwegian, the brochure was available in Somali, Urdu, English, Turkish, and Arabic. The brochure included certain "rules of thumb" about fetal activity (additional files 1, 2, 3, 4, 5 and 6). The primary indicator of DFM was defined as her perception of a major and lasting reduction in the normal activity of her baby. In some situations the woman was advised to contact health-professionals for further examinations: 1) never to wait to the next day if the baby did not kick one day or, 2) if the baby kicked less and less in the course of a day/days, or 3) if she felt less than ten FM in 2 hours at a time of the day when the baby was usually active, and she perceived this as a reduction. As a guide to help the women to identify DFM, an invitation to use a kick chart was included. The informational brochure on FM for the mothers and new guidelines for health-care professionals were implemented in November 2005 in all hospitals included in the Femina trial.

End points

The main outcome measures were all antepartum, intrapartum and neonatal death in the delivery room (i.e., the death occurred immediately after completion of delivery) from 28 completed weeks of gestation in women who were previously registered as having one or more episodes of DFM. As there was only one neonatal death, all deaths are called "stillbirths" in the following. The number of births and third trimester stillbirths (singleton and multiples) in the Norwegian population from the years 1999–2004 ranges between 56,374 to 59,927 births, and 2.9/1000 to 3.9/1000 stillbirths, respectively. However, as an additional 0.2/1000 to 0.4/1000 of stillbirths during the same period are registered as of unknown gestational age, this may be underestimates [31]. Secondary outcomes for women with DFM were: severe neonatal depression, defined as Apgar score of < 3 at 5 minutes postpartum; symptoms of multisystem organ failure and pH < 7 in the umbilical artery or fetal capillary scalp, if obtained; preterm birth ($28^{+} - 36^{6}$ weeks); FGR (< 10th percentile of birthweight adjusted for gender and mother's height, weight, parity, and ethnicity) [32]; fetal heart rate tracings judged clinically as nonreassuring and leading to intervention in labor; oligohydramnios defined as an amniotic fluid index of < 5 cm or at < 2.5th percentile; polyhydramnios defined as an amniotic fluid index of > 25 cm or at > 97.5th percentile; investigations undertaken for reduced FM; and examinations of DFM resulting in immediate admission for induction of labor or caesarean section. Outcomes related to maternal behavior were: the number of women waiting more than 24 hours with an absence of FM or more than 48 hours with a decrease of FM before contacting health-care professionals.

Statistical analysis

All statistical analysis were performed with SPSS version 15.0. (SPSS Chicago, IL, USA) using cross tabulations, with χ^2 tests and logistic regressions to find crude (unadjusted) and adjusted odds ratios (OR) with 95% confidence intervals (CI). The level of statistical significance was set at $p < 0.05$. In the multivariate analysis, all outcomes were adjusted for potential confounding factors – such as maternal age, body mass index (BMI), smoking habits, parity, and ethnicity – due to prior knowledge of their impact on pregnancy outcomes and health-promoting behavior.

Results

Number of cases included in the baseline and intervention cohorts are described in figure 1.

The number of women presenting with DFM remained unchanged during intervention at 6.3% versus 6.6% (OR 1.05; 95% CI 0.98–1.12, $p = 0.19$), respectively. The rate of unplanned repeat visits for DFM was consistently very low, but increased from 0.3% to 0.5%, $p = 0.002$.

The stillbirth rates among women with DFM were reduced by almost 50% (OR 0.51; 95% CI 0.32–0.81, $p = 0.004$)) from 4.2% (n = 50) to 2.4% (n = 73) during the intervention. Stillbirth rates among women in the entire cohort were reduced by one third from 3.0/1000 to 2.0/1000 (OR 0.67; 95% CI 0.48–0.93, $p = 0.02$). Independent data from the Medical Birth Registry in Norway, confirmed that the stillbirth rate in our total cohort of births was comparable to the rest of Norway in the baseline observation (OR 1.06; 95% CI 0.70–1.65, $p = 0.73$), and significantly lower during the intervention period (OR 0.64; 95% CI 0.47–0.87, $p = 0.005$). The intervention was followed prospectively with statistical process control charts

which indicated a significant change in mortality after 7 months of intervention (arrow in figure 2), and no month during the intervention with a mortality exceeding the pre-intervention mean (figure 2). There was no increase in secondary outcomes such as preterm births, FGR, severe neonatal depression or transfers to neonatal care among women with DFM during the intervention period (table 1).

Among those with DFM, fewer women with a perceived absence of FM waited more than 24 hours, or a perceived decrease for more than 48 hours, before contacting health-care professionals during the intervention. There were no changes over time in the population in potential confounding factors as maternal age, BMI, smoking habits, parity or ethnicity (table 2).

At consultations for DFM the use of ultrasound increased while there were no differences in frequency of umbilical artery Doppler examinations. The complete detection rate of FGR following consultations for DFM and subsequent follow up was not captured, only diagnoses set at the initial consultation. This detection rate rose by 83% from 2.4% to 4.4%, p = 0.020 in term (> 36 weeks) pregnan-

Table 1: Outcomes of the quality improvement intervention, N = 4253

			Univariate*			Multivariate*		
	Baseline % (n)	**Intervention % (n)**	**Crude OR**	**95% CI**	**P Value**	**Adjusted OR†**	**95% CI**	**P Value**
MATERNAL BEHAVIOR IN DFM								
Consultation rate of DFM	6.3 (1215)	6.6 (3038)	1.05	0.98–1.12	0.19	Not available		
Time to contact > 24 hours in absent fetal movements	24 (99)	18 (201)	0.70	0.53–0.92	0.01	0.73	0.53–1.00	0.05
Time to contact ≥ 48 hours in DFM	54 (415)	49 (897)	0.83	0.70–0.98	0.03	0.73	0.60–0.90	0.002
EXAMINATIONS AT CONSULTATION FOR DFM								
Used CTG	96 (1155)	98 (2929)	1.67	1.16–2.41	0.006	1.46	0.92–2.30	0.11
Used ultrasound	86 (1040)	94 (2764)	2.50	2.02–3.12	< 0.001	2.64	2.02–3.45	< 0.001
Used Doppler	44 (532)	47 (1415)	1.15	1.00–1.30	0.04	1.12	0.96–1.33	0.20
CONSEQUENCES OF THE EXAMINATION FOR DFM								
No follow up	63 (716)	69 (1980)	1.34	1.16–1.55	< 0.001	1.36	1.14–1.61	< 0.001
Admissions	14 (158)	11 (300)	0.73	0.59–0.90	0.003	0.71	0.55–0.91	0.006
Admissions for induction	7.0 (80)	4.9 (141)	0.69	0.52–0.92	0.01	0.68	0–49–0.96	0.03
Admissions for emergency section	1.8 (21)	1.2 (35)	0.66	0.38–1.14	0.14	0.73	0.40–1.59	0.43
PREGNANCY OUTCOMES								
Non-reassuring heart rate tracings in labor (DFM)	11 (130)	14 (398)	1.27	1.03–1.57	0.03	1.23	0.96–1.57	0.11
Severe neonatal depression (DFM)	1.7 (19)	1.1 (30)	0.64	0.39–1.03	0.07	0.55	0.29–1.04	0.07
Admitted to neonatal care (DFM)	4.4 (52)	4.5 (131)	1.02	0.73–1.41	0.91	1.02	0.69–1.52	0.92
Preterm births 28°-36⁶weeks (DFM)	12 (145)	10 (169)	0.79	0.62–1.00	0.05	0.79	0.60–1.05	0.10
FGR < 10 percent (DFM)	14 (168)	13.5 (391)	0.93	0.77–1.13	0.48	0.97	0.77–1.23	0.82
Stillbirths (DFM)	4.2 (50)	2.4 (73)	0.58	0.41–0.84	0.004	0.51	0.32–0.81	0.004
Normally formed stillbirths (DFM)	3.9 (46)	2.2 (65)	0.57	0.39–0.83	0.004	0.50	0.31–0.81	0.005
Stillbirths (rate in total population)	3.0/1000	2.0/1000	0.67	0.48–0.93	0.02	Not available		
Normally formed stillbirths (rate in total population)	2.8/1000	1.8/1000	0.60	0.42–0.85	0.004	Not available		

* Univariate and multivariate logistic regression showing crude (unadjusted) and adjusted odds ratios (OR) with their 95% confidence intervals (CI).
† OR adjusted for maternal weight, age, parity, smoking habits and ethnicity (considered as potential confounding factors). DFM: cases of decreased fetal movements.

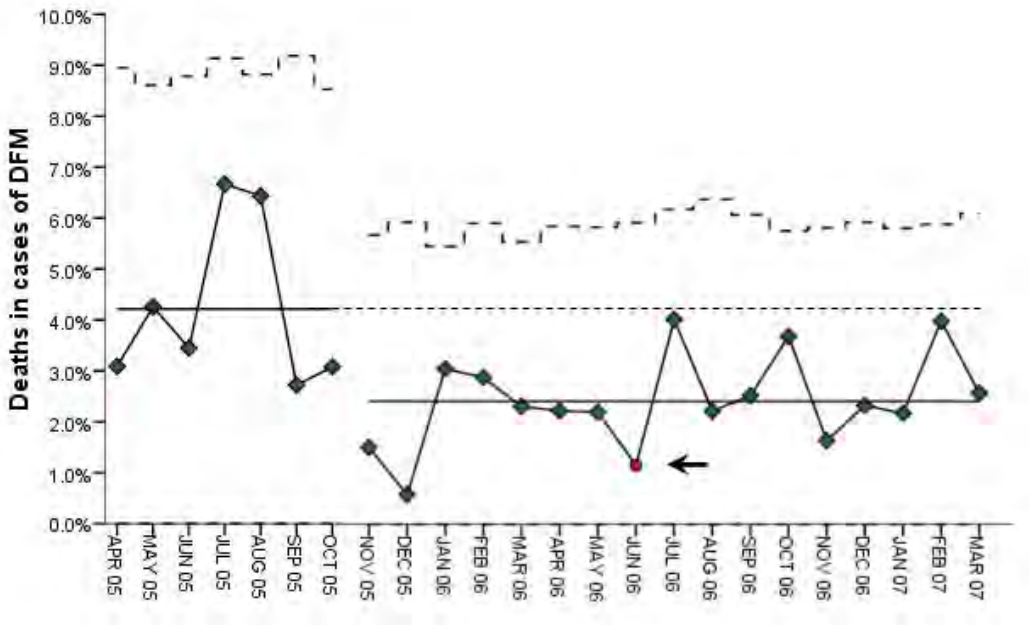

Figure 2
Stillbirth rates in pregnancies presenting decreased fetal movements. Statistical process control chart presenting the monthly stillbirth rates and means during the baseline quality assessment period and the intervention period. The arrow indicates the time (seventh month of intervention) at which a significant change was documented during the intervention.

cies, and remained unchanged in the preterm (4.5% versus 4.0%, p = 0.604). The use of additional follow up consultations and admissions for induction as a consequence of the initial consultation for DFM was reduced and the number of emergency caesarean sections remained unchanged (table 1). No difference was seen in any other pre-specified secondary outcomes (data not shown).

Discussion

We found that our interventions combining improved guidelines for management of DFM to health professionals and uniform information on fetal activity to expecting women improved the quality of care and was associated with a reduction of stillbirth rates in our population.

With a large prospective population-based cohort, a low "loss to follow-up" rate, a design with low risk of recruitment bias by outcome, ability to correct for anticipated confounders, large effects on hard outcomes, and confirmation of effects from independent data sources, the assessment of our intervention appear robust. Our quality assessment was conducted as a multi-intervention bundle that aimed to improve the in-hospital management of DFM, including clinical examination, the use of NST and ultrasound, recommended time-lines for health-care professionals, and excluding the use of Doppler. It included general information about fetal activity, recommendations for maternal care-seeking, several rules of thumb for recognizing DFM, and an FM chart as a supportive tool. It also included awareness among health-care professionals, since all obstetricians, general practitioners, community midwives, and others contributing to antenatal care in our population were informed in writing about the ongoing intervention. The exact effect size can only be estimated in randomized trials, which may be challenging and of moderate value unless each individual component of the bundle is tested in a separate trial [1,25]. Implementing only parts of the bundle as a response to the findings of our initial quality-assurance data was not an option in our high-resource setting with a highly educated population. It was considered unacceptable to inform women about DFM without securing professional management of DFM according to the consensus of best practice, and equally unacceptable to perform quality assurance of management of DFM without informing the women to the best of

Table 2: Descriptive characteristics: women with DFM before and during the intervention

Characteristics	Women with DFM before the intervention* n = 1215 n (%)†	Women with DFM during the intervention* n = 3038 n (%)†	*P*‡
Age, y mean (SD)	29.6 (4.9)	29.6 (5.1)	0.625
BMI, kg/m^2			
> 25	386 (36)	1014 (37)	0.474
Smoking habits			
Smoking	104 (8.8)	259 (8.9)	0.924
Maternal age			
> 35	196 (16.3)	528 (17.6)	0.324
Primiparity	559 (51)	1414 (52)	0.490
Parity			
Para 0	559 (51)	1414 (52)	0.601
Para 1	372 (34)	878 (33)	
Para 2+	163 (15)	409 (15)	
Country of origin			
Non-western	221 (20)	510 (18)	0.198

* Data are reported as n (%) unless otherwise noted.
† Denominators vary due to missing values
‡ Chi square tests for the difference between proportions within women with DFM before and during the intervention

our knowledge about their important role in identifying and reporting DFM.

A much-debated issue is whether women should receive uniform information about FM, and whether this should include formal fetal movement counting (FMC) [25]. This is a method used by the mother to quantify FM, and the source of quantitative definitions of DFM, also called "alarm limits". Two main groups of counting methods exist, using either a "fixed time" or "fixed number" approach. The "Daily Movement Count" [33] reflects 12 hours of maternal FMC through an entire day (i.e., "fixed time"). This method was later modified to shorter and repeated periods of counting [1]. The "Count to ten" or "Cardiff" method uses the time it takes to perceive ten movements (i.e., "fixed number") [34]. The latter method is the most user-friendly, since a shorter time is needed to perform counting for normal pregnancies. This method has also been shown to have the highest compliance and acceptance rates [6,35,36]. While three controlled trials (one randomized) of FMC counting versus no counting has suggested benefit in preventing stillbirths [21,37-39], a large cluster multicentred cluster-randomized controlled trial reported by Grant, Valentin, Elbourne & Alexander in 1989 failed to demonstrate the same benefit using a "Kick Chart" for all pregnancies versus only for risk pregnancies [40]. This is the most referred-to and influential publication on maternal counting, and as such is often cited as evidence against FMC [1,28,41]. However, this trial had several of limitations [1,6]. Of greatest importance is the issue of contamination between the groups through the use of "within-hospital" clusters. The problem of contamination is compounded by the use of Kick Charts for control-group women on the basis of clinical discretion as a part of the trial design. While no difference was shown in the stillbirth rate across the study groups, the overall late-gestation stillbirth rate fell during the study period from 4/1000 to 2.8/1000 [40].

The lowered overall stillbirth rates seen in the observational cohorts and during the cluster-randomized trial might, however, be attributable equally to increased awareness and vigilance, as to the actual FMC methods and alarm limits. Indeed, the cluster-randomized trial used extreme limits (ten movements in 10 hours for two days or no movements for one full day) and based their "count to ten" method on the mother's perception through the day, and not on focused counting while lying down. Thus, the women needed 162 minutes to count ten movements versus the average of 20 minutes reported in focused counting [20,21,42]. Despite the extreme nature of such limits, they are still widely used [43]. There is no evidence that formal FMC with their fixed alarm limits are superior to maternal common sense, no evidence to support the introduction of such counting in any total population, and no rationale to perform trials using the existing alarm limits of FMC [25]. Better tools to identify the pregnancy at risk by assessing FM patterns are needed, and they will have to be individually adjusted to identify change, not fixed levels, to reflect what pregnant women are actually reporting. However, the routine of daily FMC in the third trimester could provide additional vigilance in the individual pregnancy, and help the expectant mother to identify significant changes. Our information highlighted the importance of the woman's subjective perception of a significant and sustained reduction in FM as the primary indicator of DFM, and a cause to seek professional help. We suggested daily FMC only as a tool to aid

monitor FM, and guided the woman with "ten FM within 2 hours" as a secondary rule of thumb in situations where she felt in doubt.

The goal of antepartum fetal surveillance is to exclude imminent fetal jeopardy, identify risk pregnancies and aid in the prevention of adverse outcomes [27]. Controlled trials of management of DFM are lacking [7,12]. While the behaviour of health-care professionals related to the time of referral or examination remained unchanged during the intervention, the use of ultrasound changed. This was in accordance with the consensus-based guidelines of our study [12] indicating that NST and ultrasound examination were the most useful tools for fetal surveillance in DFM, and consistent with the evidence for antepartum testing in other risk pregnancies [12,44-46]

A weakness of the assessment of the intervention is that there are no codes for visits due to consultations for DFM in the electronic medical files of the Norwegian hospital system. Thus, no validation of the completeness of registrations of cases of DFM was possible with the anonymous of files used. Bias may have been introduced through the health professionals' inclusion of cases either by registration fatigue over time or increased enthusiasm by the general awareness caused by the intervention. This would, however, not affect the results on stillbirth rates in the total population, and not the outcomes among cases with DFM. Only a systematically skewed registration towards more or less severe cases of DFM would affect these results, and our design separating inclusion from outcome registration would counteract such effects. An additional weakness of the intervention is that we do not have the overall caesarean section and induction rate in the total population. However, it is unlikely that there would be any increase in the total population as the caesarean section rate following consultations for DFM remained unchanged and the induction rate was reduced. Clinical quality interventions in a population are based on the existing imperfections found by prior data collections of quality indicators, as we have demonstrated in our community. The results may thus not be directly transferable to other populations. Yet, reports from a variety of locations suggest that significant variability in the management of DFM and of information given to expecting women is a wide-spread quality issue in obstetric care [2,5,12,29].

There may be concerns that such a quality improvement intervention would increase interventions and iatrogenic injuries. This was not observed in our population. There was no increase in consultations for DFM, and, while no formal cost analysis was performed, it is likely that the added cost of ultrasound was compensated by reduced use of admissions for induction and repeated follow up consultations. Increased confidence in the adequacy of the management plan could have contributed to this change in behavior among health-care professionals.

Conclusion

Improved quality of management of DFM and uniform information to improve the value of the existing "self-screening" of fetal activity was associated with a reduction in stillbirth rates in our population. For further improvements, new and individually adjusted definitions of DFM are needed, as well as randomized controlled trials to determine the optimal management and information to pregnant women with DFM. Further research is required to identify optimal methods for detecting important reductions in FM if DFM is to be an effective screening tool for adverse pregnancy outcomes.

Abbreviations

BMI: Body mass index; DFM: Decreased fetal movements; FGR: Fetal growth restriction; FM: Fetal movements; FMC: Fetal Movement Counting; NST: Non-stress test.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

JVHT: Design of the study, collection, analysis and the interpretation of data, writing and finalizing the manuscript. ES: Design of the study, collection, analysis and the interpretation of data and revising the manuscript. BSP: Design of the study, the interpretation of data and revising the manuscript. PEB: Design of the study, the interpretation of data and revising the manuscript. VF: Design of the study, the interpretation of data and revising the manuscript. RF: Design of the study, the interpretation of data and revising the manuscript. JFF: Design of the study, collection, analysis and the interpretation of data, writing and revising the manuscript. All authors have approved the final version of the manuscript.

Additional material

Additional file 1

Kicks Count. *Kicks Count brochure, Norwegian version. A brochure of information aiming to increase maternal awareness and vigilance to significant decreases in fetal activity, and to aid health promoting behavior. The brochure was provided as a part of the routine information given to women at the standard ultrasound assessment at 17–19 weeks in Norway as a part of the quality improvement intervention.*

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Additional file 2

Kicks Count. *Kicks Count brochure, English version. A brochure of information aiming to increase maternal awareness and vigilance to significant decreases in fetal activity, and to aid health promoting behavior. The brochure was provided as a part of the routine information given to women at the standard ultrasound assessment at 17–19 weeks in Norway as a part of the quality improvement intervention.*
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Additional file 3

Kicks Count. *Kicks Count brochure, Arabic version. A brochure of information aiming to increase maternal awareness and vigilance to significant decreases in fetal activity, and to aid health promoting behavior. The brochure was provided as a part of the routine information given to women at the standard ultrasound assessment at 17–19 weeks in Norway as a part of the quality improvement intervention.*
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Additional file 4

Kicks Count. *Kicks Count brochure, Turkish version. A brochure of information aiming to increase maternal awareness and vigilance to significant decreases in fetal activity, and to aid health promoting behavior. The brochure was provided as a part of the routine information given to women at the standard ultrasound assessment at 17–19 weeks in Norway as a part of the quality improvement intervention.*
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Additional file 5

Kicks Count. *Kicks Count brochure, Somali version. A brochure of information aiming to increase maternal awareness and vigilance to significant decreases in fetal activity, and to aid health promoting behavior. The brochure was provided as a part of the routine information given to women at the standard ultrasound assessment at 17–19 weeks in Norway as a part of the quality improvement intervention.*
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Additional file 6

Kicks Count. *Kicks Count brochure, Urdu version. A brochure of information aiming to increase maternal awareness and vigilance to significant decreases in fetal activity, and to aid health promoting behavior. The brochure was provided as a part of the routine information given to women at the standard ultrasound assessment at 17–19 weeks in Norway as a part of the quality improvement intervention.*
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[http://www.biomedcentral.com/content/supplementary/1471-2393-9-32-S6.pdf]

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CORRECTION Open Access

Correction: Reduction of late stillbirth with the introduction of fetal movement information and guidelines - a clinical quality improvement

Julie Victoria Holm Tveit[1,2], Eli Saastad[2,3], Babill Stray-Pedersen[1], Per E Børdahl[4,5], Vicki Flenady[6], Ruth Fretts[7], J Frederik Frøen[2*]

Abstract

We have performed a full cross-validation of this clinical Femina data collection against the routinely collected data of the Medical Birth Registry of Norway to validate the estimates of reduced mortality in the total population. The original estimate of fewer deaths during the intervention with OR 0.7 remains virtually unchanged for the original data collection.

The validation procedures revealed inaccuracies in data from the Medical Birth Registry of Norway for a partial comparison with mortality outside the study area, and we here correct this comparison. We present new, corrected and cross-validated data. Despite comparability issues, the most robust and cross-validated estimates confirm similar estimates of reduced mortality during the quality improvement intervention.

Introduction: Comparison with registry data

This article is based on the clinical Femina data collection - independent of the Medical Birth Registry of Norway (MBRN). However, a partial comparison with the population outside the cohort was included, using MBRN data [1].

In accordance with the study protocol of 2005, we aimed to compare our Femina data with MBRN data for the full cohort for an independent validation of stillbirth rates in the total population. The complete data set for Norway for 2007, needed for this final comparison, was released by the MBRN on December 13, 2009. Upon receipt of these complete data we found discrepancies with the data our project had previously received from the MBRN and published [1]. The MBRN performed an inquiry into the two data deliveries, and on February, 17, 2010, the MBRN issued a public report which confirmed that the previous data delivery to our project was inaccurate.

We deeply regret this, and wish to correct the original article accordingly and provide new and validated data.

Correction

From the section Data collection, the following sentence describes the data found to be inaccurate, and should be discarded: "*In addition to the registrations by our study protocol, the numbers of births and stillbirths from our population were obtained from the Medical Birth Registry in Norway to assess overall trends in stillbirth, for the most updated period available: April 2005 to December 2006.*"

From the third paragraph of the Results section, the following sentence is based on the inaccurate data, and should be discarded: "*Independent data from the Medical Birth Registry in Norway, confirmed that the stillbirth rate in our total cohort of births was comparable to the rest of Norway in the baseline observation (OR 1.06; 95% CI 0.70-1.65, p = 0.73), and significantly lower during the intervention period (OR 0.64; 95% CI 0.47-0.87, p = 0.005).*"

Limitations in comparisons of Femina data and MBRN data

There was a dual capture of deaths in the Femina study. Primarily, deaths were registered retrospectively by clinical study site coordinators (midwife or obstetrician) reporting births, deaths and causes of death monthly

* Correspondence: frederik.froen@fhi.no
[2]Norwegian Institute of Public Health, Division of Epidemiology, Oslo, Norway
Full list of author information is available at the end of the article

from the clinical logs and hospital records. All hospitals provided monthly reports. In addition, women presenting with a complaint of decreased fetal movements were captured prospectively, prior to the registration of outcome [1].

Notification of all births to the MBRN is compulsory in Norway. However, missed or erroneous key variables leading to missing capture of cases may occur in any registry.

Femina and MBRN data differ in some aspects. 1) Femina did not register cases born after ≥ 28 weeks if death occurred prior to 28 weeks. Time of intrauterine death is not reported to the MBRN. 2) In Femina the clinicians reported the best estimate of gestational age (combining clinical assessment, last menstrual period, ultrasound screening and autopsies). The MBRN is based on the LMP and ultrasound alone. 3) Femina included immediate neonatal deaths in the delivery room, which would by definition not be captured as a stillbirth in the MBRN.

In their report of February 17, 2010, the MBRN find that gestational age alone is insufficient to track third trimester stillbirths due to missing data on gestation. For comparisons with the Femina data they therefore report cases of ≥ 28 weeks of gestation and a birth weight ≥ 1000 grams, or one of these criterions if the other is missing (Cat. 28). The MBRN also reports that the completeness of stillbirth reports increase with gestation; this is also our experience. With the existing limitations for comparisons at the limits around 28 weeks and 1000 grams, the MBRN suggest to report cases of ≥ 32 weeks and 1500 grams (Cat. 32) to minimize bias in comparisons. We agree that this improves comparability, and probably represent the most robust data for comparing the point estimates (odds ratios), despite having less statistical power due to smaller groups and thus wider confidence intervals.

New data from the MBRN and cross-validation with Femina data

We found some discrepancies between the MBRN and Femina in the number of deaths registered. Prior to intervention, the MBRN registered 47 deaths in Cat. 28, while Femina registered significantly more cases, altogether 56. During the intervention, both registered 92. Due to the concerns this raised, the Norwegian Institute of Public Health (NIPH), owners of both the Femina and MBRN data, combined Femina and MBRN registrations on day and hospital of birth, birth weight and gestational age to compare case by case. The probability of identical details for all four variables in separate cases is negligible in our setting - e.g. two deaths on the same day in the same delivery unit only occurred once in our two-year study, and their gestation and weight differed. Cases on which both registries agreed were deemed to be validated by each other.

In total, there were 33 unique Cat. 28 cases only found in one of the datasets. The hospitals in question were requested to re-confirm these cases to the NIPH. Two duplicates in the Femina material were found by this procedure: The dual prospective and retrospective capture of stillbirths in Femina, described above, lead to two stillbirths being reported twice from different hospitals. The two duplicate reports did not mention that the stillbirth had occurred in another hospital, and slight differences in the details reported made them go unrecognized.

A cross-validated dataset may be the most robust estimate available, compensating for underreporting to both datasets by including all deaths registered in any of the two. Validation identified 46 deaths prior to vs. 78 during intervention in Cat. 32, and 55 deaths vs. 102 in Cat. 28.

Overall, for stillbirths ≥ 28 weeks/1000 grams, 10% were not found in the MBRN, and 7% were not found in Femina. For the MBRN, this does not exclude the possibility that they had been reported in some form, but neither gestation nor birth weight identified them as deaths in any of these categories.

Analyses of the cross-validated data, Femina data and MBRN data

Removing the two duplicates from the Femina data provides an essentially identical estimate of the original significant association with lower mortality in the total population with OR 0.7 (table 1). In the subset Cat. 32 the estimates of OR 0.7 is found to be identical in both the Femina data, the MBRN data, as well as in the cross-validated data combining Femina and MBRN, and the widened confidence interval a natural consequence of the smaller subset from the total material. In the cross-validated data the mortality rates are 2.4/1000 prior to vs. 1.7/1000 during intervention.

In the subset Cat. 28 we find support for the expectations, discussed above, that the clearest differences in data collection and reporting, are found in the lowest gestational ages. With Cat. 32 estimates being identical in all three datasets, the one fifth of deaths occurring between 28 and 32 weeks account for the discrepancies. During the intervention, reporting of these early deaths to Femina remained unchanged (increased by 9%, 7 vs. 18 cases among 19035 vs. 44967 births) while reporting to the MBRN increased by 80% (4 vs. 17 cases). As a result, the MBRN finds an estimate of OR 0.8 where Femina finds OR 0.7 in Cat. 28.

For analyses of mortality rates outside our study area, only MBRN data is available. In Cat. 32 these indicate more deaths in the Femina area than in the rest of

Table 1 Odds ratios (OR) and 95% confidence intervals (CI) for all comparisons of mortality associated with the intervention period, both within the Femina cohort (actual study), outside the study area (trends unrelated to study), and between the study area and the rest of Norway, stratified by the data sources available for the comparison

Comparison	*Femina area: Intervention period vs. pre-intervention period*		*Rest of Norway: Intervention period vs. pre-intervention period*		*Femina area vs. rest of Norway prior to intervention period*		*Femina area vs. rest of Norway during intervention period*	
Group & data source	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Original comparison								
Femina data	0.69	0.50 - 0.96	-	-	-	-	-	-
MBRN data	-	-	-	-	-	-	-	-
Cross-validated data	-	-	-	-	-	-	-	-
≥ 32 weeks or 1500 g								
Femina data	0.74	0.50 - 1.08	-	-	-	-	-	-
MBRN data	0.71	0.48 - 1.05	1.11	0.71 - 1.73	1.16	0.71 - 1.88	0.74	0.53 - 1.04
Cross-validated data	0.72	0.50 - 1.03	-	-	-	-	-	-
≥ 28 weeks or 1000 g								
Femina data	0.72	0.52 - 1.01	-	-	-	-	-	-
MBRN data	0.83	0.58 - 1.18	1.07	0.72 - 1.59	1.05	0.68 - 1.63	0.82	0.61 - 1.10
Cross-validated data	0.79	0.57 - 1.09	-	-	-	-	-	-

Norway prior to intervention with OR 1.2, while this is reversed during intervention to OR 0.7 (table 1). As noted above, the intervention in the Femina area was associated with OR 0.7 while in the rest of Norway there was an increased number of deaths with OR 1.1 in this period. In Cat. 28, again, the estimate in the MBRN is OR 0.8 rather than 0.7.

Conclusion: Support of original estimates, but more studies needed

The validation of MBRN and Femina data show that neither had optimal robustness - 10% and 7% of deaths were not identified, respectively. Thorough validation using independent data collections was needed to identify two duplicates. Yet, the reproduction of identical estimates of OR 0.7 among deaths in Cat. 32 in Femina data, MBRN data and cross-validated data, lend significant support to the validity of the study's original data collection and results. The discrepancy produced by including deaths between 28 and 32 weeks questions whether there was truly more deaths in this group during the intervention (as the MBRN data may suggest), or whether the rate was unaffected and discrepancy is due to data collection/comparability issues (as the comparison of Femina and MBRN data may suggest). In an intervention increasing stillbirth awareness among health professionals, an increased proportion of early gestation deaths being reported to the MBRN is not surprising. In a prolonged quality improvement project like ours, "registration fatigue" would not be surprising either.

In taking all possible comparisons into account, we find odds ratios of 0.69, 0.71, 0.72, 0.72, 0.74, 0.74, 0.79, 0.82 and 0.83, mostly at borderline significance levels. It therefore seems prudent to estimate an association between the intervention and mortality in the range of OR 0.7 - 0.8. The precise effect of optimal information to pregnant women about decreased fetal movements, and the optimal management of complaints for decreased fetal movements, remains to be identified in randomized controlled trials.

We have reviewed the commentaries in light of our findings. The MBRN data were not directly questioned by Dr. Salvesen, however, he did compare with the MBRN and found reasons for concern over numbers that apparently demonstrated the opposite of the actual results of the study [2]. Dr. Salvesen should be commended for his interest in the study and for acting on such concerns. The published data indicated that a comparison based solely on gestational age in the MBRN was valid and helpful, which is regrettable.

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Author details

[1]Division of Obstetrics and Gynecology, and Centre for Perinatal Research, Rikshospitalet University Hospital, University of Oslo, Medical Faculty, Norway. [2]Norwegian Institute of Public Health, Division of Epidemiology, Oslo, Norway. [3]Akershus University College, and University of Oslo, Medical faculty, Norway. [4]Department of Obstetrics and Gynecology, Haukeland University Hospital, Bergen, Norway. [5]Institute for Clinical Medicine, Section for

Gynaecology and Obstetrics, University of Bergen. [6]Department of Obstetrics and Gynecology, University of Queensland, Mater Mothers' Hospital, South Brisbane, Australia. [7]Brigham and Women's Hospital, Division of Maternal-Fetal Medicine, Harvard Medical School, Boston, MA.

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PAPER IV

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BMC Research Notes

RESEARCH ARTICLE Open Access

Implementation of uniform information on fetal movement in a Norwegian population reduced delayed reporting of decreased fetal movement and stillbirths in primiparous women - a clinical quality improvement

Eli Saastad[1,2,4*], Julie Victoria Holm Tveit[3,4], Vicki Flenady[5], Babill Stray-Pedersen[3,4], Ruth C Fretts[6], Per E Børdahl[7], J Frederik Frøen[1]

Abstract

Background: Delayed maternal reporting of decreased fetal movement (DFM) is associated with adverse pregnancy outcomes. Inconsistent information on fetal activity to women during the antenatal period may result in delayed reporting of DFM. We aimed to evaluate an intervention of implementation of uniform information on fetal activity to women during the antenatal period.

Methods: In a prospective before-and-after study, singleton women presenting DFM in the third trimester across 14 hospitals in Norway were registered. Outcome measures were maternal behavior regarding reporting of DFM, concerns and stillbirth. In addition, cross-sectional studies of all women giving birth were undertaken to assess maternal concerns about fetal activity, and population-based data were obtained from the Medical Birth Registry Norway.

Results: Pre- and post-intervention cohorts included 19 407 and 46 143 births with 1 215 and 3 038 women with DFM respectively. Among primiparous women with DFM, a reduction in delayed reporting of DFM (≥48 hrs) OR 0.61 (95% CI 0.47-0.81) and stillbirths OR 0.36 (95% CI 0.19-0.69) was shown in the post-intervention period. No difference was shown in rates of consultations for DFM or maternal concerns. Stillbirth rates and maternal behavior among women who were of non-Western origin, smokers, overweight or >34 years old were unchanged.

Conclusions: Uniform information on fetal activity provided to pregnant women was associated with a reduction in the number of primiparous women who delayed reporting of DFM and a reduction of the stillbirth rates for primiparous women reporting DFM. The information did not appear to increase maternal concerns or rate of consultation. Due to different imperfections in different clinical settings, further studies in other populations replicating these findings are required.

Background

Women presenting with decreased fetal movement (DFM) are at increased risk of fetal growth restriction, stillbirth, preterm birth and emergency caesarean section [1-5]. Excessive delay in maternal reporting of DFM is associated with perinatal deaths [5,6]. There is no agreement on any quantitative limit between "normal" versus "abnormal" fetal activity [7,8], due to normal variation among healthy fetuses [9] and variation in maternal ability to perceive fetal activity [10]. The only definition of DFM based on focused counting data in a total population, is the rule of "10 fetal movements within two hours", which subsequently has been tested as a screening tool [7,11]. Fetal movement counting (FMC) is a method used by the mother to quantify her

* Correspondence: eli.saastad@fhi.no
[1]Norwegian Institute of Public Health, Division of Epidemiology, Oslo, Norway

baby's movements. Various methods with different alarm limits have been published; discussed elsewhere [7,8]. FMC is not promoted as a universal screening tool for fetal wellbeing [4], but has been recommended in high-risk pregnancies [12,13].

The most important clinical screening tool for DFM for identifying high-risk pregnancies is the women's own perception of a decrease [8,14-16]; i.e. her perception of a *change*, not the crossing of a given limit. Existing guidelines for antenatal care in the United Kingdom, the US and Norway recommend that a distinct reduction of fetal movement should be reported and lead to further investigation [17-20]. In our Norwegian setting nearly 100% of all pregnant women attend the public antenatal care program provided by community midwives and general practitioners. Pregnant women with a concern of DFM usually contact maternity wards directly. Four to fifteen percent of women present to the hospital in late pregnancy with the primary complaint of reduced or absent fetal movements [8,21,22].

The current study was a part of the ongoing, interdisciplinary collaborative effort related to DFM: Fetal Movement Intervention Assessment (Femina), aiming to survey clinical management and initiate quality improvement efforts in Australia & New Zealand [23], the US [24], the United Kingdom [15] and Norway. The information pamphlet provided to expectant mothers by Norwegian health authorities, instructs women to contact a midwife or a physician "if the baby has become very calm, if they feel less movements - a few or no movements from the fetus" [18,20]. In Norway, significant variation has been shown in maternal recall of information received about fetal movement [10]. Further, women who waited >24 hours with reduced or absent movement before contacting healthcare have been shown to be at increased risk for adverse outcomes [22]. Maternal recall of having received information about fetal movement was associated with more frequent concerns, without improving pregnancy outcomes [10].

Variation in clinical practice, as reflected in patient information, may represent increased risk [25]. Quality assurance efforts aimed at health providers (through clinical guidelines) and pregnant women (through uniform information) were implemented in order to increase identification of high-risk pregnancies for optimal observation and treatment. This paper reports the effects of providing uniform information about fetal activity on maternal awareness, behavior, concerns and pregnancy outcomes when DFM was perceived by the mothers. We hypothesised that providing this information would reduce the number of women who delayed reporting DFM to their healthcare provider, in the total population or by the subgroups defined by maternal age [5,26], body mass index (BMI) [5,27], smoking habits [5,28], and maternal country of origin [29]. We also hypothesised that the intervention was associated with improved pregnancy outcomes, overall and/or by the subgroups. The guidelines for health care providers and effects on clinical management are presented elsewhere [30].

Methods

The intervention - information on fetal activity and monitoring

Due to limited high level evidence, the brochure of information was developed using a consensus-based approach; by a systematic literature review, and consultation with leading academics in midwifery and obstetrics across all participating hospitals and a group of pregnant women. The brochure, which included a fetal movement chart (a kick chart), was provided at the ultrasound screening assessment in gestational week 17-19, which 98% of the women attend. The brochure covered information on: expected normal fetal activity [31]; differences in perception according to different fetal movements [31], maternal position [32], the inter- and intraindividual variation between fetuses [9], maternal weight [27], and smoking [33]; interpretation of variation of fetal activity; instructions on how to use the kick chart; and when to contact health professionals if experiencing DFM [11].

Women were informed that their subjective assessment of a decrease in fetal activity was the most important marker of DFM - taking priority over any formal DFM alarm limits [8]. They were instructed not to wait until the next day if they perceived complete absence of fetal activity or if they felt a significant and sustained decrease. If in doubt, as a "thumb rule", they were advised in accordance with the most validated definition for focused counting [11,34]: that a healthy baby very rarely has less than 10 movement in the course of two hours when it usually is active [35]. The brochure was available in Norwegian (Additional file 1), English (Additional file 2), Urdu (Additional file 3), Somali (Additional file 4), Turkish (Additional file 5) and Arabic (Additional file 6). The kick chart was suggested as a supportive tool for women who wished to use it. A modified "count-to-ten" chart [11,36] was chosen, as this has the highest compliance and acceptance rates [4,37,38]. Use of a kick chart is exemplified in additional file 7.

To assist in the clinicians' implementation of this brochure, written information and newsletters were distributed to participating hospitals and regular meetings between clinicians and the study staff were arranged.

Data collection

Fourteen hospitals across both urban and rural districts, with a total of approximately 33, 000 births annually,

were included in the before-and-after study. Two different data collection methods were used pre- and post-intervention: 1) Prospective data collection for women presenting with DFM (DFM population), and 2) Cross-sectional studies (Cross-sectional population):

1) Prospective data collection for all women with singleton pregnancies of ≥28 weeks of gestation presenting at the hospital with a concern of DFM was undertaken by the caregiver without maternal consent and forwarded as anonymous data to the study coordinating centre. Data were collected on maternal demographic characteristics, delay in reporting DFM, clinical management of DFM and pregnancy outcome. Following baseline data collection over a seven month period from April to October 2005, post-intervention data were collected for the 16 month period from November 2005 to March 2007.
2) Cross-sectional studies were performed; pre-intervention (June 2005) and post-intervention (February 2007). Women who birthed at one of the participating hospitals completed a survey anonymously prior to hospital discharge. Further description of this data collection is presented elsewhere [10]. The sample size for the cross-sectional studies was weighted according to number of births in the respective hospitals during the study period.

In addition, population-based data were obtained from the Medical Birth Registry Norway [39] for the purpose of comparisons of the covariates in the study populations versus the total population deliveries in the area. The studies were approved by The Regional Committees for Medical Research Ethics and The Norwegian Data Inspectorate.

Outcome measures

Primary outcome measure

The primary outcome measure was *maternal behavior* in relation to reporting perceived absence or decreased fetal movement to the health provider; defined as the rate of women waiting ≥25 hours with absent fetal movement or ≥48 hours with DFM [6,16,29,40,41].

Secondary outcome measures

- *Maternal awareness*: maternal self-report of attention paid to fetal activity.
- *Maternal concerns*: maternal self-report of the frequency of concerns about DFM; dichotomized into being concerned "twice or more" versus "once or never".
- *Receiving information*: maternal self-report of receiving information about fetal activity.
- *DFM consultation*: a consultation at the hospital because of maternal perception of DFM.
- *Pregnancy outcome* for women with DFM was stillbirth; and, for the cross-sectional population; small for gestational (SGA) <10th centile (customized) [42] and emergency cesarean section.
- *Counting group*: proportion of women reporting using a kick chart more than once per week.

Effectiveness in distribution of information and maternal internalization of information were assessed by combining cross-sectional data with the stillbirth rate at hospital levels. As a proxy for effectiveness in distribution, we compared the hospital specific percentage of women reporting receipt of the written information from the cross-sectional surveys with the stillbirth rate in the DFM population. As a proxy for internalization of the information, the percentage for women reporting having used the kick chart twice a week or more was compared with the stillbirth rate in the DFM population.

Analyses

Statistical analyses were performed in SPSS 14.0.1 (SPSS Inc., Chicago, IL). Crude and adjusted odds ratios (ORs) with 95% confidence intervals (CIs) were estimated, and variables with associations with a $p < 0.20$ in univariate analyses were included in the multivariate models [43]. Chi square tests were used for estimating differences between proportions of categorical variables. A p-value <0.05 was considered statistically significant. Bonferroni corrections were performed in the multiple comparisons. Subgroup analyses were undertaken according to: maternal age [5,26], body mass index (BMI) [5,27], smoking habits [5,28], and maternal country of origin [29] and according to subgroups of Western and non-Western origin (due to higher rates of stillbirths among non-Western women in our community) [29]. Western mothers were defined as women with origin in Western Europe, North America and Oceania. For women with more than one episode of reporting DFM, only the first episode was included in the analyses.

Results

Overview data collection is presented in Figure 1. Baseline characteristics of the populations are described in Table 1. The respondents in the cross-sectional studies were representative for the pregnant population in their area during the study period in regard to age, parity and smoking habits (data from the Medical Birth Registry Norway, not shown).

Information and maternal awareness of fetal activity

Data from the cross-sectional studies showed that one in four women did not recall receiving information about normal expected fetal activity by their health provider, both pre- and post-intervention. Recall of

Table 1 Descriptive characteristics: DFM and Cross-sectional populations

	DFM* N = 4 253			Cross-sectional* N = 1 431		
Characteristics	**Pre-intervention n = 1 215 n (%)†**	**Post-intervention n = 3 038 n (%)†**	***P*‡**	**Pre-intervention n = 692 n (%)†**	**Post-intervention n = 739 n (%)†**	***P*‡**
Age, y mean (SD)	29.6 (4.9)	29.7 (5.2)	0.625	30.2 (4.9)	30.1 (5.1)	0.849
<20	23 (1.9)	59 (2.0)		9 (1.3)	10 (1.4)	
20-24	182 (15.1)	454 (15.1)		70 (10.3)	101 (13.7)	
25-29	388 (32.3)	933 (31.1)		231 (34.0)	208 (28.1)	
30-34	413 (34.4)	1 031 (34.3)		237 (34.9)	273 (36.9)	
35+	196 (16.3)	527 (17.5)		133 (19.6)	147 (19.9)	
Parity						
Para 0	559 (51.1)	1 414 (52.4)	0.490	287 (43.1)	300 (41.4)	0.197
Para 1	372 (34.0)	878 (32.5)		221 (33.2)	283 (39.0)	
Para 2+	163 (14.9)	409 (15.2)		158 (23.7)	142 (19.5)	
BMI, kg/m^2	24.7 (5.1)	24.5 (5.0)	0.547	24.4 (4.4)	23.6 (4.2)	<0.001
<20	143 (13.3)	383 (14.2)		74 (11.0)	113 (15.6)	
20-24	547 (50.8)	1325 (49.0)		378 (56.2)	412 (56.9)	
25-29	244 (22.7)	638 (23.6)		147 (21.8)	137 (18.9)	
30+	91 (8.5)	249 (9.2)		74 (11.0)	21 (8.6)	
Smoking habits						
Smoking	104 (8.8)	259 (8.9)	0.924	50 (7.4)	48 (6.4)	0.483
Country of origin						
Non-Western	178 (14.7)	406 (13.4)	0.271	39 (5.7)	29 (3.6)	0.064

* Data are reported as n(%) unless otherwise noted.
† Denominators vary due to missing values
‡ Chi square tests for the difference between proportions within women with DFM and the cross-sectional population respectively

receiving information was associated with higher awareness of fetal activity, both pre-intervention (OR 2.0, 95% CI 1.2-3.3) and post-intervention (OR 1.8, 95% CI 1.0-3.1, p = 0.043). Pre-intervention, recall of receiving information was associated with more frequent maternal concern (OR 1.7, 95% CI 1.2-2.4); while this association was not longer present post-intervention (OR 1.3, 95% CI 0.9-1.9).

Maternal recall of information about limits for normality was more homogeneous in the intervention period, e.g. 22% recalled having seen the thumb rule (10 kicks in two hours) at baseline measurement, versus 42% in the intervention period (p = 0.022). Pre-intervention, low maternal awareness to fetal activity was associated with an increased risk of having an SGA baby; [10] this association was not observed in the post-intervention period (OR 1.3, 95% CI 0.6-2.9).

Maternal behavior and pregnancy outcomes

Among women with DFM, the stillbirth rate was lower in post-intervention period; 4.2% versus 2.4% (Tveit et al, submitted 2009). The reduction in stillbirth was isolated to primiparous women only. Primiparous women also reported DFM earlier than all other women included (Table 2). In the total population, the mean gestational age at the time of reporting DFM was two days lower during the post-intervention period; 36^6 versus 36^4 weeks, p = 0.006.

In the post-intervention group, overweight women in the cross-sectional populations described higher awareness of fetal activity (Table 3). No behavior changes were observed among overweight women if they perceived DFM (Table 2).

Pre-intervention, smoking mothers in the cross-sectional population recalled less receipt of information about fetal activity than non-smokers, OR 0.5 (95% CI 0.3-0.9). This association was not present in post-intervention, OR 0.6 (95% CI 0.3-1.2). No changes in maternal behavior were observed among smoking women perceiving DFM (Table 2).

Non-Western women in the cross-sectional study post-intervention, remained the only risk group reporting both less receipt of information (adjusted OR 0.4, 95% CI 0.2-0.8) and low awareness of fetal activity (Table 3). Among the non-Western women who perceived DFM, the intervention showed no changes in maternal behavior, frequency of concerns or outcomes (Table 2).

The hospital-specific percentage of women reporting having received written information (proxy for

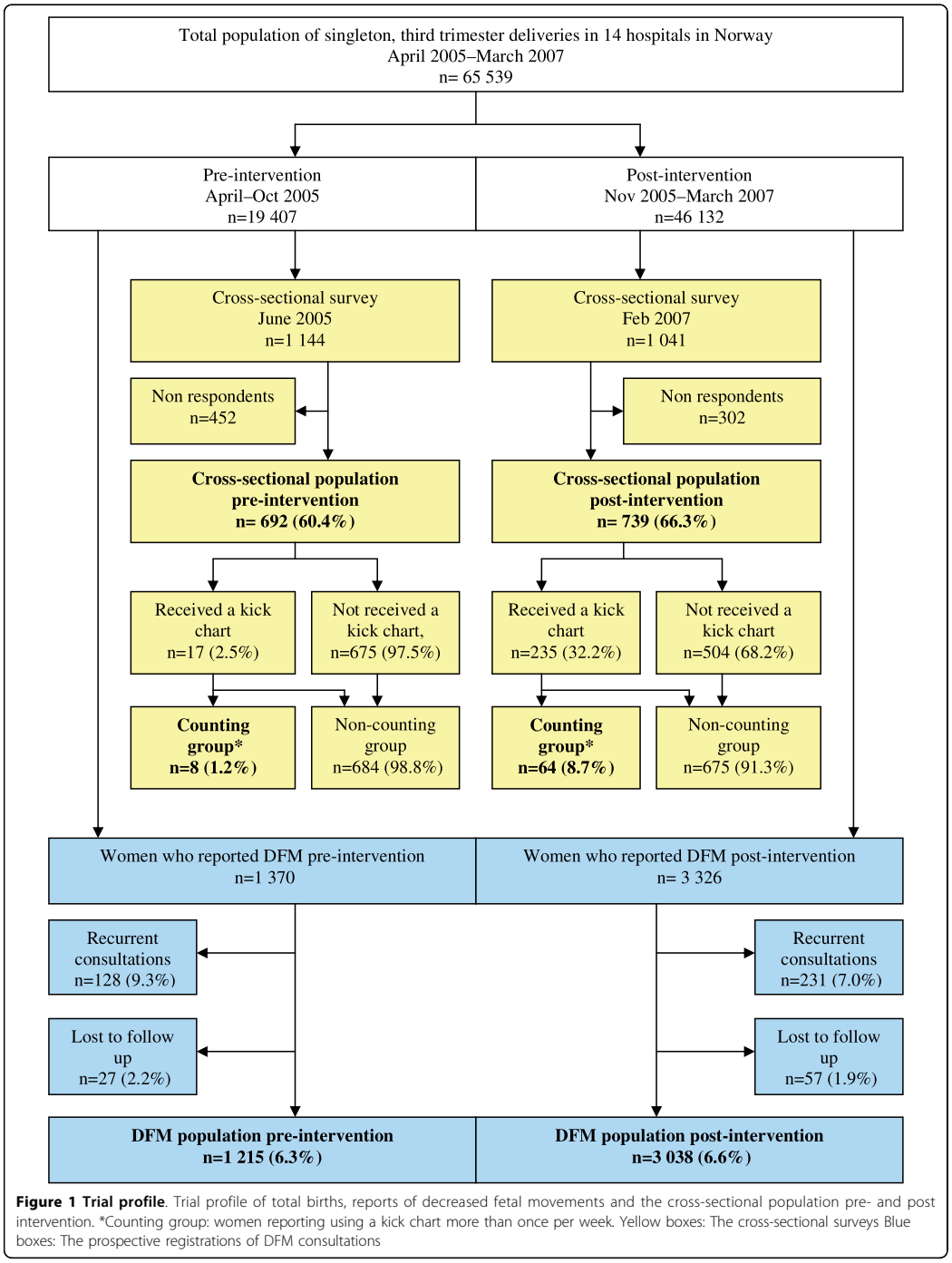

Figure 1 Trial profile. Trial profile of total births, reports of decreased fetal movements and the cross-sectional population pre- and post intervention. *Counting group: women reporting using a kick chart more than once per week. Yellow boxes: The cross-sectional surveys Blue boxes: The prospective registrations of DFM consultations

Table 2 DFM population: Effects of intervention on maternal behavior and stillbirth rates, stratified by subgroups

	Overall N = 4 253		Stratified by subgroups n (%)									
	Pre-intervention n = 1 215 n (%)	Post-intervention n = 3 038 n (%)	Primiparous n = 1 973 (52.0)	P-value	≥ 35 years n = 724 (17.2)	P-value	Overweight n = 1 400 (36.8)	P-value	Smokers n = 363 (8.9)	P-value	Non-Western n = 583 (13.7)	P-value
Consultation			Adj OR (95% CI)[§]									
By own initiative	363 (32.1)	656 (30.8)	1.22 (0.95-1.57)	0.117	1.43 (0.99-2.08)	0.652	1.10 (0.81-1.50)	0.524	0.87 (0.47-1.62)	0.657	0.88 (0.54-1.46)	0.631
At the delivery unit	661 (54.9)	1, 716 (57.4)	**1.35** (1.09-1.67)	0.007	1.01 (0.76-1.34)	0.057	1.24 (0.96-1.60)	0.106	0.82 (0.47-1.44)	0.493	1.06 (0.68-1.67)	0.786
During night (6 pm-8 am)	317 (27.7)	846 (29.9)	**1.39** (1.09-1.77)	0.007	1.31 (0.83-2.07)	0.258	1.41 (1.05-1.89)	0.023	1.78 (0.99-3.21)	0.055	1.08 (0.65-1.80)	0.775
In weekends	258 (21.2)	607 (20.0)	1.04 (0.80-1.35)	0.758	0.84 (0.65-1.69)	0.855	1.28 (0.94-1.76)	0.121	0.51 (0.27-0.96)	0.037	0.88 (0.50-1.52)	0.634
DFM ≥ 48 hrs	415 (53.6)	897 (48.9)	**0.61** (0.47-0.81)	<0.001	0.82 (0.51-1.32)	0.414	1.12 (0.81-1.54)	0.507	1.47 (0.74-2.91)	0.274	0.54 (0.29-0.99)	0.045
Absent FM ≥ 25 hrs	99 (23.9)	201 (18.0)	0.72 (0.47-1.09)	0.117	1.00 (0.43-2.32)	0.996	0.90 (0.55-1.47)	0.668	0.60 (0.22-1.61)	0.309	0.64 (0.29-1.43)	0.274
Fetal deaths	50(4.2)	73 (2.4)	**0.36** (0.19-0.69)	0.002	0.92 (0.35-2.44)	0.902	0.60 (0.30-1.20)	0.151	1.48 (0.40-5.53)	0.559	0.99 (0.25-4.02)	0.993

[†] Univariate logistic regression analyses with 95% CI, at baseline is the reference category
[§] Multivariate logistic regression analyses with 95% CI, adjusting for the covariates (parity, maternal age, BMI, smoking habits, maternal origin)
Denominators vary due to missing values. Bold numbers indicate significant values after Bonferroni correction for multiple comparisons

distribution) was negatively associated with mortality rates - the more information, the lower mortality (β = 0.974, p = 0.031). This was done to assess the effect of the distribution of information and maternal internalization of it on the number of stillbirths.

Maternal concerns - as reported by women in the cross-sectional studies

Mothers in the post-intervention period did not report concerns or have a DFM consultation more frequently (Table 4). Overweight women were the only subgroup reporting increased concerns; however, this was not significant after Bonferroni correction (Table 4). When concerned, the mothers more often related their concern to the fetal activity level earlier in the actual pregnancy (44% vs. 51%, p = 0.011). More often, the concerned mothers assessed their perception of DFM *not* being normal for their baby and that their concern was a true reason for being concerned (28% vs. 33%, p = 0.022). Being concerned was associated with being examined at hospital both pre-intervention (OR 4.9, 95% CI 3.0-7.8) and post-intervention (OR 5.8, 95% CI 3.7-9.2).

Fetal movement counting in the intervention group

In the post-intervention group, 235 (32%) reported using a kick chart, as opposed to 8 (1%) pre-intervention. Post-intervention, 64 (9%) of women used a kick chart more than once per week (*counting group*); versus 8 (1%) pre-intervention. Primiparous women were more likely than multiparous women to use a kick chart more than once per week (OR 2.3, 95% CI 1.3-4.2). No non-Western mothers used a kick chart.

Maternal experiences with use of a kick chart in the intervention period are presented in Table 5, illustrating the benefits of maternal receipt of receiving information on *how* and *why* to use the kick chart. The use of a kick chart was not associated with increased maternal concerns about DFM (32% in the *non-counting group* vs. 42% in the *counting group*, p = 0.090). Use of a kick chart was associated with a reduced risk of having a DFM consultation, 18% vs. 9% (p = 0.045). One of ten babies was SGA in both groups. Eleven (7%) of the *non-counting group* had an emergency caesarean section, as opposed to one (2%) in the *counting group* (p = 0.047).

Table 3 Cross-sectional population: Low maternal awareness of fetal activity and maternal characteristics (N = 1431)*

	Pre-intervention, n = 692			Post-intervention, n = 739		
	Low maternal awareness† n = 78 (11.7%)			Low maternal awareness† n = 62 (8.9%)		
Maternal characteristics	Values n (%)	Crude OR (95% CI)	Adj OR (95% CI)	Values n (%)	Crude OR (95% CI)	Adj OR (95% CI)
Primiparous (reference: multiparous)	287 (43.1)	**0.57**(0.34-0.96) p = 0.032	0.87 (0.58-1.30) p = 0.494	300 (41.4)	0.98 (0.57-1.67) p = 0.930	Not included
Age ≥ 35 yrs (reference: <35 years old)	133 (19.6)	**2.67**(1.61-4.45) p < 0.001	**1.64**(1.06-2.54) p = 0.026	147 (19.9)	1.38 (0.76-2.51) p = 0.290	1.34 (0.74-2.52) p = 0.316
BMI >25 kg/m^2 (reference: BMI ≤ 25 kg/m^2)	221 (32.8)	1.38 (0.84-2.27) p = 0.208	0.77 (0.50-1.18) p = 0.226	158 (27.5)	0.53 (0.27-1.04) p = 0.063	**0.43**(0.21-0.89) p = 0.024
Smokers (reference: non-smokers)	50 (7.4)	0.67 (0.24-2.00) p = 0.503	Not included	48 (6.4)	0.74 (0.22-2.46) p = 0.622	Not included
Non-Western origin (reference: Western origin)	39 (5.7)	**2.54**(1.11-5.83) p = 0.023	1.79 (0.83-3.83) p = 0.226	29 (3.6)	**3.50**(1.34-9.08) p = 0.006	**3.34**(1.27-8.78) p = 0.015

* Detailed results from the baseline population are presented elsewhere [10].
† Univariate and multivariate logistic regression analyses with 95% CI for the associations between the analyzed groups. Denominators vary due to missing values. Bold numbers indicate significant values.

The hospital-specific percentage of women reporting having used the kick chart more than once per week or more (proxy for internalization) was negatively associated with mortality (β = 0.922, p = 0.005). This does not reflect the effect of kick counting on an individual level, as there are no data to support this, only the benefit of effective information.

Discussion

In this prospective before-and-after study, primiparous women were shown to have the greatest behavioral change in reporting DFM and were the only risk group with a reduction in stillbirth. This may be associated with the experience of transition to the motherhood role of first-time mothers. With no previous experiences, pregnancy represents a major adjustment period, strongly influenced by information seeking and trying to adopt best health practices and changes in lifestyle [44].

While the effect of printed educational materials as guidelines for health care providers is associated with some improvement in process of care [45], the addition of additional interventions such as outreach education and audit and feedback may enhance this effect [46]. In this study, implementation of standardized information for women across participating hospitals was achieved through a multifaceted intervention including clinical practice recommendations, outreach education and audit and feedback. Standardized written information improved maternal self-screening of significance for

Table 4 Cross-sectional population: Effects of intervention on maternal awareness, concern and maternal behavior (N = 1431)

	Overall N = 1 431				Stratified by subgroups post-intervention, n = 739 n (%)*				
	Pre-intervention n = 692 n (%)*	Post-intervention n = 715 n (%)*	Crude OR (95% CI)†	Adjusted OR (95% CI)§	Primiparous n = 587 (57.8)	≥ 35 years n = 280 (19.7)	Overweight n = 421 (30.1)	Smokers n = 97 (6.9)	Non-Western n = 67 (4.7)
					Adj OR (95% CI)§				
Low awareness	78 (11.7)	62 (8.9)	0.72 (0.50-1.02) p = 0.060	0.84 (0.57-1.24) p = 0.356	1.19 (0.63-2.26) p = 0.585	0.49 (0.24-1.00) p = 0.050	0.44 (0.20-1.00) p = 0.051	0.74 (0.15-3.68) p = 0.712	1.10 (0.23-5.27) p = 0.909
Concerned	341 (50.7)	417 (57.9)	1.15 (0.93-1.42) p = 0.210	1.20 (0.96-1.50) p = 0.114	0.95 (0.68-1.34) p = 0.783	1.32 (0.80-2.19) p = 0.273	1.54 (1.03-2.31) p = 0.037	0.98 (0.42-2.34) p = 0.969	3.21 (1.04-9.93) p = 0.043
DFM consultation	98 (14.2)	122 (16.4)	1.18 (0.88-1.57) p = 0.263	1.32 (0.97-1.78) p = 0.075	1.38 (0.88-2.17) p = 0.163	1.10 (0.54-2.21) p = 0.801	1.06 (0.93-2.63) p = 0.092	1.32 (0.46-3.80) p = 0.613	0.42 (0.10-1.82) p = 0.245

* Denominators vary due to missing values.
† Univariate regression analyses with 95% CI for the associations between the analyzed groups.
§ Multivariate logistic regression analyses with 95% CI, adjusting for the covariates (parity, maternal age, BMI, smoking habits, maternal origin).

Table 5 Cross-sectional population post-intervention: Experiences with use of a kick chart (N = 235)*

Maternal experiences with use of a kick cart	n (%)	Recalled receipt of information about HOW to use the kick chart n = 119 (63.3%) OR (95% CI)†	P value	Recalled receipt of information about WHY use the kick chart n = 121 (66.5%) OR (95% CI) †	P value
Kick counting was time-consuming	97 (41.3)	0.3 (0.1-0.7)	0.003	0.4 (0.2-0.9)	0.039
Kick counting stimulated to "get to know" the baby	71 (30.2)	2.2 (0.9-5.4)	0.099	1.7 (0.7-4.3)	0.251
Appreciated the visual presentation of the fetal activity	74 (31.5)	3.3 (1.3-8.4)	0.011	1.9 (0.7-4.9)	0.189
Kick counting induced too much focus on fetal activity	47 (20.0)	1.2 (0.5-3.0)	0.568	0.8 (0.4-1.9)	0.727

* Denominators vary due to missing values.
† Univariate regression analyses with 95% CI for the associations between the analyzed groups. Reference groups: women who did not recall receipt of information about *how* to and *why* use of a kick chart respectively.

decrease in or absence of fetal movement. This may have contributed to the decreased stillbirth rate among primiparous women. The importance of recognizing DFM for pregnancy outcomes is indisputable [2,4,22], and identification of risk is one of the main goals for antenatal care [47]. Women were advised to contact their health care provider for concerns about DFM regardless of reaching in any specific fetal movement rate threshold. The advice on focused counting and the suggested "alarm limits" [7,11] when women were in doubt about the presence of DFM in addition to the advice about their perceptions may have contributed to a reduction in excessive delay in reporting DFM.

A similar proportion (75%) of women recalled having received information in the baseline and the intervention. Thus, this provides support to the effectiveness of the information to improve maternal self-screening of DFM which was more explicit than the previous information [18] and emphasized maternal assessment of fetal activity according to the activity pattern for her *own* child [9]. This was reflected in the mothers' reasoning for concern in the post-intervention. Women in the post-implementation period reported concerns related to the activity level earlier in the pregnancy more often and were more confident that their perception of DFM was the true reason for being concerned.

Overweight mothers - higher awareness, more concerns, but not improved pregnancy outcomes

Being overweight increases the risk of not perceiving DFM (Tveit et al, submitted 2009). However, it is unknown whether reduced perception of fetal movements among overweight women is due to higher risk of a true decrease in fetal movement or to a lower ability to perceive fetal activity [27]. In the post-intervention period, overweight women described higher awareness of fetal activity, they more frequently reported concerns of DFM and presented at the hospital during the night more frequently. However, no difference was shown in the excessive delay in reporting of decreased or absent fetal movement or in the stillbirth rate among these mothers.

Mothers of non-Western origin - less access to information

In the non-Western population the intervention was not associated with changes in maternal behavior or the stillbirth rates. Non-Western women had three times increased risk of low awareness of fetal activity when compared to the Western mothers, and were shown to have the lowest rates of receiving the information about expected fetal activity, in spite of available information brochures in the most common foreign languages in the area. This may be due to the presentation of the information not adequately meeting their needs or to cultural differences in risk orientation [48]. Communication problems between non-Western women and health care providers have been identified as a risk factor for adverse pregnancy outcomes [29,48]. This confirms the need for a greater focus on providing culturally appropriate information which is written at an appropriate level to ensure comprehensive uptake particularly for those women at increased risk [49].

The population non-Western women in our study were mainly from low-income countries and a wide variation in cultures was represented. Minority or marginalized women in a high-income country do not appear to display a "healthism" approach to their lives [50]; normative assumptions in antenatal guidelines do not apply. This may be in part due to a lack of trust in caregivers among minority women in Western countries [50,51], the authoritative source often are their husband [51] or their mother [52], instead of the health care services. While printed educational materials are widely used to improve knowledge, awareness and attitudes, especially in developed countries, other methods for information

and education may be needed for cultural minority groups. The impact of life style choices and compliance to recommendations from health providers may be higher if role models and authoritative sources, such as the husband and/or mother, are involved in the antenatal care. Further research is needed on appropriate methods to change health seeking behavior in pregnancy, including DFM, for non-Western women in our setting.

Fetal movement counting associated with well-being and safety

While the majority of women chose not to use a kick chart, its use was associated with less maternal concerns, as well as a reduced risk of being examined in hospital because of DFM. Satisfaction with the information about the rationale for fetal monitoring and the technique of recording were associated with more frequent use of a kick chart and increased the mothers' assessment that a kick chart was important and useful. Effective communication specific for each woman's need and encouragement by a consistent healthcare professional have been identified as the key factor for high compliance for use of a kick chart [6,31,53].

Many health professionals do not to recommend a FMC in their low-risk patients because they fear it will cause increased maternal concern and anxiety [54], as well as increased unnecessary consultations and/or interventions [7,55]. The current study was not a study to evaluate the use of kick chart per se. Nevertheless, it is important to notice that use of a kick chart was not associated with increased concerns or more frequent consultations in the hospital. It seemed to be "safe" with regard to maternal well-being and use of health resources. We have no evidence that FMC with specific alarm limits are preferable or superior to subjective maternal opinion. However, previous reports also indicate that the use of a kick chart does not cause anxiety or other adverse psychological effects [54,56,57]. Further research is needed, both in low- and high-risk populations [4,12].

Methodological considerations

The true effect of such an intervention may be better estimated using a randomized trial methodology. However, in a quality improvement setting like ours, a before-and-after study design was chosen. There are potential problems in using RCT to test the effect of information within the same population due to the likelihood of contamination. While the before-and-after study design may overestimate the true effect, the prospective nature of this study may limit this effect. Additional methodological considerations are presented in the article from the other part of the quality improvement, the clinical management of DFM pregnancies [30]. Potential recall bias and the validity of the cross-sectional questionnaire have been discussed elsewhere [10].

While these findings are encouraging, caution in its interpretation is warranted due to limitations of the design employed in this quality improvement project; the implemented solutions were based on the local existing imperfections found by prior data collections of quality indicators. The results may thus not be directly transferable to other populations. Yet, reports from a variety of locations suggest that significant variability in the information given to expecting women is a wide-spread quality issue in obstetric care [15,22,23,58].

Conclusions

Uniform information about fetal activity provided to pregnant women was associated with a reduction in the number of primiparous women who delayed reporting of DFM and reduced stillbirth rates for primiparous women reporting DFM. The information did not appear to increase maternal concerns or frequency of consultations. While these findings are encouraging, caution in its interpretation is warranted due to limitations of the design employed in this quality improvement project; the implemented solutions were based on the local issues identified by prior quality assurance studies. Further studies replicating these findings are required. A clearer definition of DFM is needed.

Additional file 1: Kick Count. Kicks Count brochure, Norwegian version. A brochure of information aiming to increase maternal awareness and vigilance to significant decreases in fetal activity, and to aid health promoting behavior. The brochure was provided as a part of the routine information given to women at the standard ultrasound assessment at 17-19 weeks in Norway as a part of the quality improvement intervention.
Click here for file
[http://www.biomedcentral.com/content/supplementary/1756-0500-3-2-S1.PDF]

Additional file 2: Kick Count. Kicks Count brochure, English version. A brochure of information aiming to increase maternal awareness and vigilance to significant decreases in fetal activity, and to aid health promoting behavior. The brochure was provided as a part of the routine information given to women at the standard ultrasound assessment at 17-19 weeks in Norway as a part of the quality improvement intervention.
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Additional file 3: Kick Count. Kicks Count brochure, Urdu version. A brochure of information aiming to increase maternal awareness and vigilance to significant decreases in fetal activity, and to aid health promoting behavior. The brochure was provided as a part of the routine information given to women at the standard ultrasound assessment at 17-19 weeks in Norway as a part of the quality improvement intervention.
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Additional file 4: Kick Count. Kicks Count brochure, Somali version. A brochure of information aiming to increase maternal awareness and vigilance to significant decreases in fetal activity, and to aid health promoting behavior. The brochure was provided as a part of the routine information given to women at the standard ultrasound assessment at 17-19 weeks in Norway as a part of the quality improvement intervention.
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Additional file 5: Kick Count. Kicks Count brochure, Turkish version. A brochure of information aiming to increase maternal awareness and vigilance to significant decreases in fetal activity, and to aid health promoting behavior. The brochure was provided as a part of the routine information given to women at the standard ultrasound assessment at 17-19 weeks in Norway as a part of the quality improvement intervention.
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[http://www.biomedcentral.com/content/supplementary/1756-0500-3-2-S5.PDF]

Additional file 6: Kick Count. Kicks Count brochure, Arabic version. A brochure of information aiming to increase maternal awareness and vigilance to significant decreases in fetal activity, and to aid health promoting behavior. The brochure was provided as a part of the routine information given to women at the standard ultrasound assessment at 17-19 weeks in Norway as a part of the quality improvement intervention.
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[http://www.biomedcentral.com/content/supplementary/1756-0500-3-2-S6.PDF]

Additional file 7: Example of use of a kick chart. An example of a kick chart used by a women participating in the study
Click here for file
[http://www.biomedcentral.com/content/supplementary/1756-0500-3-2-S7.PDF]

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Author details
[1]Norwegian Institute of Public Health, Division of Epidemiology, Oslo, Norway. [2]Akershus University College, Lillestrøm, Norway. [3]Department of Obstetrics and Gynecology, Centre for Perinatal Research, Rikshospitalet University Hospital, Oslo, Norway. [4]University of Oslo, Medical faculty, Norway. [5]Department of Obstetrics and Gynecology, University of Queensland, Mater Mothers' Hospital, South Brisbane, Australia. [6]Brigham and Women's Hospital, Division of Maternal-Fetal Medicine, Harvard Medical School, Boston, MA and Harvard Medical Associates, Wellesley, MA, USA. [7]Institutes for Clinical Medicine, Section for Gynecology and Obstetrics, and University of Bergen, Norway.

Authors' contributions
ES: Design of the study, data collection, analysis, interpretation of data, writing and finalizing the manuscript. JVHT: Design of the study, data collection, interpretation of data and revising the manuscript. VF: Design of the study, interpretation of data, writing and revising the manuscript. BSP: Design of the study, interpretation of data and revising the manuscript. PEB: Design of the study. RF: Design of the study, interpretation of data and revising the manuscript. JFF: Design of the study, analysis, interpretation of data, writing and revising the manuscript.
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