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Published in:
Midwifery

DOI:
[10.1016/j.midw.2011.10.009](https://doi.org/10.1016/j.midw.2011.10.009)

2011

[Link to publication](#)

Citation for published version (APA):
Danerek, M., Marsal, K., Cuttini, M., Lingman, G., Nilstun, T., & Dykes, A.-K. (2011). Attitudes of Swedish midwives towards management of extremely preterm labour and birth. *Midwifery*.
<https://doi.org/10.1016/j.midw.2011.10.009>

Total number of authors:
6

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ATTITUDES OF SWEDISH MIDWIVES TOWARDS MANAGEMENT OF EXTREMELY PRETERM LABOUR AND BIRTH

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Introduction

Preterm labour and birth are two of the most important issues in perinatal care. Advances in perinatal technology have increased the survival rate among very preterm infants. Active perinatal management has been shown to be associated with decreased neonatal morbidity and mortality for infants born at very early gestational weeks (GW) both in national (EXPRESS group, 2009) and regional studies made in Sweden (Serenius et al., 2004a, 2004b, 2004c).

Concerning **short-term** consequences for those infants born extremely preterm, the EPIBEL study from Belgium (Vanhaesebrouck et al., 2004) investigated mortality and morbidity at discharge from the hospital of a large population-based cohort of infants who were born at ≤ 26 weeks' gestation. The overall survival rate of live born ($n=322$) infants was 54%. Of the infants who were alive at the age of 7 days, 82% survived until discharge. Among the 175 survivors, 63% had adverse outcomes at the time of discharge, i.e. serious neuromorbidity, chronic lung disease or retinopathy). For the admitted infants with a gestation period of <26 weeks, $<15\%$ (21 of 158) were discharged free from serious neonatal morbidity.

In the Swedish study made by the EXPRESS Group (2009), 70% ($n=1011$) of infants (at < 27 gestational weeks) were live-born. The overall perinatal mortality was 45%. The overall survival rate, at 1 year of age, for infants born alive was 70% ($n=497$). Of the infants who survived, 34% had retinopathy of prematurity, 25% severe bronchopulmonary dysplasia. At the time for discharged from hospital 45% of the infants were without major neonatal morbidity. The percentages of surviving infants increased with each gestational week; i.e. 20% at 22 weeks to 63% at 26 weeks.

Concerning **long-term** consequences, a total-population study of all extremely preterm children in the United Kingdom and Ireland was performed by Samara et al., EPICure study group, (2008) with the aim of testing whether extremely preterm children have more pervasive behavior problems than their classroom peers. This testing took place 6 years after birth and showed that hyperactivity 30.6% (n=200) and conduct problems 12.5%, could be accounted for by cognitive deficiency. For children born at the limit of viability, pervasive behavior problems were more frequent than had been previously reported for larger preterm populations (ibid). It has also been shown that extremely preterm children have a continuum of poor respiratory health over their first 6 years (Hennessy et al., 2008, EPICure study group).

The definition of preterm birth is when an infant is born < 37 GW, very preterm birth < GW 32 and extremely preterm birth < GW 28 (Lagercrantz et al., 2008). In Sweden, the prevalence of preterm births < GW 33 was 1.1% in 2007 and of preterm births < GW 37 was 5.4 % (The Swedish National Board of Health and Welfare, 2008). The very preterm (< GW 32) birth rate in 10 European countries, was on average, 9.9 per 1000 total live births and ranged from 7.7 to 13.1 per 1000 (Zeitlin et al., 2008). The preterm birth rate (< GW 37) in the USA in 2006 was 12.8% and for very preterm birth (< GW 32) it was 2.04% (Martin et al., 2008).

Because of the short and long term consequences for the child questions arise concerning the important issues of attitudes and management of preterm birth. The active management of very preterm labour and birth involves optimising perinatal outcome utilising diagnostic and therapeutic modalities (Chervenak & McCullough, 2008) such as administering tocolytics and steroids, performing cesarean sections (CS), monitoring foetal heart rate with cardiotocography (CTG) and transferring the pregnant woman before birth to a level III hospital with a Neonatal Intensive Care Unit (NICU) (Serenius et al., 2004a, 2004b, 2004c; Högberg et al., 2006; EXPRESS group, 2009). Since the early 1990s the policy of the care of preterm labour and birth < GW 28 in Sweden has

been based on active perinatal management and centralisation to regional hospitals with NICU, i.e. to the seven university hospitals (Finnström et al., 1997; Finnström et al., 2006; Serenius et al., 2004a; EXPRESS group, 2009). Non-active management implies that the above mentioned modalities are not used. The non-active management might be recommended in the extreme preterm period if there is a very high probability that the infant will not survive, will have severe morbidity, or if the parents request non-active management (Chervenak & McCullough, 2008).

Information, in cases of threatened preterm birth, should be given to the parents by the professionals so that the parents are able to make an informed choice (Sharp, 1998; Danerek et al., 2005; Danerek & Dykes, 2008; Kavanaugh et al., 2005; Chan et al., 2006). The obstetrician and the midwife have the obligation to inform the parents about the prognosis and treatment based on scientifically based information and proven experience. According to the Swedish National Board of Health and Welfare (2006), midwives have an obligation to update the care with all new evidence based information. To minimise their doubts, parents wished to receive complete and honest information and concrete evidence of a poor prognosis for their infant (McHaffie, Lyon and Hume, 2001). Fathers to preterm infants particularly, wished to receive straight forward information concerning the prognosis and treatment for their baby (Danerek & Dykes, 2008). Swedish midwives have expressed how very important it is that the midwife listens actively to the woman and takes her seriously when a critical situation arises. (Danerek & Dykes, 2001). Decision-making often follows clinical guidelines, but in the case of preterm labour and birth these are not always sufficient and decisions are then made on an individual basis (Garel et al., 2002; Garel et al., 2004; Danerek et al., 2005; Pignotti & Donzelli, 2008).

Decision-making concerning very preterm and still more, extremely preterm labour and birth can place a strain on all those involved, which was noted in interviews with parents (Jackson et al., 2003; Danerek & Dykes, 2008) and obstetricians in Sweden (Danerek, Udén & Dykes, 2005). The

majority of parents wish to be active in decision making on behalf of their infant (McHaffie Lyon and Hume, 2001; McHaffie, Laing, Parker, and McMillan, 2001; Danerek et al, 2005).

The attitudes of obstetrical staff in relation to the management of extremely preterm infants (GW 21-26), was investigated in the UK by Chan et al., (2006). Their findings were compared with the views of neonatal staff and it was shown that the neonatal staff were more likely to recommend interventions at an earlier GA than the obstetrical staff. In France, interviews with 30 midwives highlighted that the midwives were very worried about the long-term consequences for preterm infants (Garel et al., 2004). Concerning parental involvement in decision-making, midwives felt that parents were not involved as much as they ought to be.

There are very few studies with focus only on the attitudes of midwives in relation to very preterm labour and birth. However, several studies have investigated the attitudes of other professionals with the same focus (De Leeuw et al., 2000; Streiner et al., 2001; Kavanaugh et al., 2005; Chan et al., 2006; Peerzada et al., 2006). The aim of this study was to ascertain the attitudes of Swedish midwives towards management of very/extremely preterm labour and birth and to compare the attitudes of midwives working at university hospitals with those at general hospitals.

Method

A quantitative method with standardised and structured anonymous questionnaires was used.

Design

The design of the study was cross-sectional, descriptive and comparative.

Setting and participants

All midwives working on delivery wards at 16 maternity units in Sweden, that are associated with a NICU, were invited to participate in the study and 259 midwives from 13 units took part. Of these 123 midwives worked at six university hospitals, i.e. level III hospitals and 136 worked at seven general hospitals, i.e. level II hospitals.

Data collection

Data collection for the SWEMID study (Ethical decision-making during pregnancy and birth: midwives' perspectives in Sweden) took place between March 2007 and June 2008. To describe the self-reported attitudes of midwives concerning management of preterm labour and birth at GW 21 - 28, an anonymous and structured questionnaire was used. After permission was obtained from the heads of the maternity units, the study material was sent to the units. The local co-ordinator of the study distributed the questionnaires to the midwives. A local coordinator was recruited by each of heads at the maternity units and the responsible local coordinator distributed the questionnaires to the midwives at the units using each midwives' personal mailbox. The deadline for completion was set as Sept 2007, however, for administrative reasons it had to be extended until June 2008. Completed questionnaires were returned in sealed envelopes to the local coordinator who in turn sent them to the head coordinator of the SWEMID study (MD) (Figure 1). Each responsible coordinator was required to ensure that this deadline was met. The midwives were recruited from the same Swedish units that participated in the EUROBS study: (Development of Perinatal Technology and Ethical Decision-making during Pregnancy and Birth; the attitudes of obstetricians from eight European countries) (Cuttini et al., 2006; Habiba et al., 2006). The heads of three units refused to give their consent, due either to reorganisation, a heavy workload or shortage of time.

Insert Figure 1 here

The questionnaire

The questionnaire in the SWEMID-project was the same as the questionnaire used in the EUROBS project (Cuttini et al., 2006; Habiba et al., 2006). This questionnaire was developed in English, translated into Swedish and then back-translated into English (ibid). According to Habiba et al., 2006, a pilot study was performed to assess readability and suitability. The EUROBS questionnaire consisted of six parts and comprised of 54 questions. The questionnaire used in the SWEMID-project was adapted to the context of midwives and included the same six original parts with a reduced number of questions, in total 32, out of the original 54. Questions that were only for obstetricians were removed. Two obstetricians, two midwives and one ethicist evaluated the SWEMID questionnaire for content validity. Six midwives examined the questionnaire using face validity (Polit & Beck, 2006) and this evaluation led to a few minor changes to clarify the questions.

The attitudes were investigated by giving a short case report about preterm birth at GW 21 – 28, when the parents wished for either active or non-active management: “Pregnant woman with spontaneous preterm labour, singleton pregnancy, the foetus in cephalic presentation, normal foetal growth and absence of malformations. What is the lowest GA (in completed GW) at which you think the following should be performed: Steroid prophylaxis to stimulate lung maturation, CTG monitoring, CS for preterm labour only, CS for acute foetal distress, information to the neonatologist before birth, and admission to NICU.” Furthermore, questions about what information should be given to the parents when the threat of very preterm birth occurred and questions regarding the involvement of the neonatologists were also included.

Statistical analysis

Socio-demographic data were analysed for frequencies with descriptive statistics. For all nominal data the Chi²-test was used. The Mann-Whitney U-test was carried out to compare the two

subgroups of midwives (general hospitals vs. university hospitals) with regard to the number of their own children. The p-value <0.05 was considered statistically significant. For all analyses SPSS 14.0 (SPSS Inc., Chicago, Ill) was used.

Approval by a Regional Research Ethics committee was not required, as, according to Swedish law, anonymous questionnaires are excluded from being assessed by a Research Ethics Committee (EPL, 2003; MFR, 2003; SOU, 2005). The World Medical Association's Declaration of Helsinki was taken into consideration when performing this study (WMA, 2008).

Findings

Thirteen of the 16 units approached accepted to take part in the SWEMID study, which gave a response rate of 81 % for the units. In total, 513 questionnaires were distributed and 259 returned (51 %). The majority of midwives (74 %) were older than 40 years (Table 1). Most of them were married or co-habitant and had two or three biological children. Religious affiliation was mostly protestant or none. Religion was to various degrees important in the life of many midwives who felt affiliation; although for 29% religion was not at all important. There was a significant difference between the two subgroups, the midwives at general hospitals having more own children ($p=0.004$).

The midwives participating in this study (87%), were currently working at a delivery ward. Some also had other tasks, such as taking care of women with a fear of birth, or working on postnatal wards or at ultrasound units. Seventy four point five percent of the midwives had long working experience (6-40 years) of working at a delivery ward. Work experience related to preterm birth was not required. More than half of the midwives (53%) were working part-time. There was a significant difference between the two subgroups, for the variable "hospital working appointment": more midwives working at general hospitals worked full-time ($p<0.001$) (Table 1).

Insert Table 1 here

Attitudes of midwives

The GA at which the midwives would consider starting treatment/procedures or giving information, varied. Below, is presented the most frequently proposed GA. When preterm labour occurs at GW 21 - 28 and the parents wish there to be active management, the midwives felt that the lowest GA for steroid-prophylaxis was GW 23. In relation to the lowest GA to start CTG monitoring, the midwives would agree to start at GW 25 (Table 2). In relation to CS due to preterm labour only, the midwives felt that this was indicated from GW 25. Caesarean section due to acute foetal distress was considered to be indicated at GW 25. Concerning when information to the neonatologists before preterm birth should be given, the midwives felt that it should be done at GW 23 and the point at which to suggest admission to NICU at the same GW (Figure 2a and 2b). There was a significant difference between the two subgroups, when the parents wished for active management, concerning steroid prophylaxis, CTG monitoring, and information to the neonatologists. Midwives at university hospitals were more likely to start steroid prophylaxis at an earlier GA than midwives at general hospitals ($p=0.025$). There were more midwives at university hospitals than at general hospitals who would agree to start CTG monitoring at GW 25 or earlier ($p=0.001$) (Tables 2a). Midwives at general hospitals thought that information to the neonatologists before preterm birth should be given later on in the pregnancy when compared to midwives at university hospitals did ($p=0.040$) (Figure 2a).

Generally, when non-active management was the parents wish, the midwives would agree to start interventions at a later GA than they would in active management. Midwives at university hospitals were more likely to agree to administrate steroid prophylaxis ($p=0.001$) and to start CTG monitoring (<0.001) at an earlier GA than midwives at general hospitals (Table 2b).

Insert Table 2a and 2b, Figure 2a and 2b here.

The attitudes of all midwives in relation to what information should be given to the parents regularly were: Based on the present condition and the well-being of the infant - 98.8%, then on

anticipated mode of birth - 96.4%, on the infant's prognosis in general terms - 89.2%, on transfer to NICU 96.3%, and on the type of treatment the infant will receive after birth - 92%. When parents enquired, midwives at general hospitals ($p=0.008$) were more often in favour of only informing the parents about the type of treatment the infant would receive at birth than midwives at university hospitals. Other information that should be given regularly but to a lesser extent or only when asked for, was information related to the infants estimated birth weight, the estimated possibility of survival in percent, and on the possibility to refrain from resuscitation, but only when the gestational age was < 25 weeks. A significant difference ($p=0.001$) was found between the subgroups, for the variable "estimated risk for disability (in percent)". The midwives at university hospitals were more willing to disclose the risk of handicap in percent than were the midwives at general hospitals, who would mostly do so mostly if requested. In 34.6% of answers regarding the midwives' attitudes towards the lowest GA for the statement "to tell the parents that the possibility for the baby to survive is 50%," the stated limit was at GW 24. The lowest GA for the statement "the risk for serious disability among those who survive is approximately 10%" was GW 24 in 27.3%. Most midwives at both university hospitals (97.4%) and general hospitals, 86.5%, believed that the obstetricians at their hospital involved the neonatologists on a regular basis. However, more midwives at general hospitals (13.5%) than midwives at university hospitals thought the neonatologists were "not always regularly" or "not at all" involved. (2.6%) ($p=0.013$). The majority of midwives (75%) felt that the neonatologists were as active as they wished them to be.

Discussion

Methodological consideration

The unit response rate was 81% and the individual response rate of midwives 51%, the latter at the lower limit of what is considered acceptable (Altman, 1991). However, as discussed before (Danerek et al., 2011), we might have underestimated the response rate of midwives by not having full reports from the local coordinators concerning the number of questionnaires actually distributed

The proportion of missing answers for the questions concerning “Management of preterm labour and birth” were between 3.1% - 6.9%, except for the statement “perform CS due to preterm labour only”, 15.1% - 16.2%. The proportion of missing answers for the questions about “information to the parents when the threat of very preterm labour and birth occur” varied from 3.5% to 5.8%. Two statements concerning “Possibility for the baby’s survival” and the “risk of disability” had more missing answers, 28.6% respectively 32%. In the open comments some midwives expressed the opinion that, in these two statements it was the responsibility of the neonatologists to inform the woman. Missing answers were not included in the analyses.

Concerning reliability, Test-retest was not performed in this study as parts of the questionnaire had been used successfully in previous studies (Cuttini et al., 2006; Habiba et al., 2006). The questionnaire consisted of different parts. Internal consistency, for the different parts was tested separately. Chron-Bach’s alpha for the questions concerning “Preterm labour and birth”, was 0.94 and for the questions related to “Information to the parents “, the result was 0.56 (Polit & Beck, 2006).

The study participants had experience of working at delivery wards at general hospitals as well as at university hospitals and they were from different geographical areas in Sweden, from north to south, which supports the validity of our data. There might be some limitation to the possibility for generalising of our findings due to a lower response rate from a few of the maternity units. However, the fact that we found a significant difference between the hospital subgroups indicates that we have a sufficient sample size.

Discussion of the findings

Midwives in Sweden would initiate antenatal steroids at GW 23, which is in line with evidence based care. In the EXPRESS study, antenatal steroid prophylaxis was given to 85% - 95% of the women with imminent birth before GW 23 - 27 and the steroids have significantly increased the

survival rate ([EXPRESS group, 2009). Of 707 live-born infants, 591 were given antenatal steroid prophylaxis and only 24% died within one year, compared to infants not given antenatal steroid prophylaxis, where the result was 65% (n=85). Midwives in Sweden, especially midwives at university hospitals, would agree to start steroid treatment at an earlier GA than UK midwives, according to Chan et al., (2006). The British midwives felt that the use of antenatal steroids was indicated from GW 24-26.

In our study the participating midwives felt that a CS might be performed at GW 25 when preterm labour was the only indication. It has been argued that CS at very preterm GA is associated with frequent maternal complications (Nielsen & Hokegard, 1984). However, Högberg et al., (2006) However our study could not confirm that finding. The midwives participating in our study thought that CS for foetal distress was indicated at GW 25. Chan et al, (2006) found similar results as midwives in their study replied that CS for foetal reasons should be performed earliest at GW 25 - 26. In the EXPRESS study (2009) 50% of the 707 live-born infants, were born by CS but this was found not to be associated with increased survival.

Information to the parents before birth and suggestion of admission to NICU, should, according to the participating midwives, be given at GW 23. It has been shown that transfer to a hospital with NICU, i.e. to a level III hospital, is of significant benefit for the infant (EXPRESS group, 2009). Access to the full resources of obstetric and neonatal intensive care was shown to decrease the mortality rate among infants born > GW 23 and < 1000 g (Finnström et al., 1997). It was also shown that the referral system for high-risk pregnancies is efficient (Finnström et al., 1997; Finnström et al., 2006). This entails that the foetus or newborn will be transferred from a general hospital to a university hospital, preferably *in utero* or after birth (Finnström et al., 1997; Finnström et al., 2006; Serenius et al., 2004a; EXPRESS group, 2009). Consequently, Swedish midwives

working at general hospitals and university hospitals, respectively, will therefore have different experience of managing very preterm birth.

Professional experience of taking care of labour/birth in very low gestational age cases seemed to make midwives at university hospitals more positive to interventions at an earlier GA than midwives at general hospitals proposed. Midwives at general hospitals manage the initial care of the women, and then the women are usually transferred to a university hospital. The women may return to the general hospital, after birth, for postnatal care if it is their “local” hospital, which makes it important that the midwives at general hospitals have the ability to inform the women concerning the risks and benefits of treatment related to very preterm labour and birth. Although midwives in Sweden have the same basic education and clinical training in the midwifery programme and also access to the same information and new research results about very preterm labour and birth, the working experience they gain from different hospitals seems to make a difference. Practical experience and theoretical knowledge strengthen the midwives and help them to recognise situations that need fast decisions and also how to act upon them. This was narrated by midwives in the study by Danerek and Dykes, (2001).

Midwives were likely to impart information of facts and the consequences of management of preterm birth and thereby to involve the parents in the decision-making process. To inform the parents before decision-making is one of the tasks of the midwife together with the obstetrician. The final medical decision of management is the responsibility of the obstetrician. The midwife is usually an advocate for the woman and her partner, and she tries to achieve what is in the parents’ best interest (Sharp, 1998). McHaffie, Laing et al, (2001) noted that doctors, nurses and parents believed that parents should be involved in treatment limitation decisions on behalf of their infants. The majority of parents wish to be the final arbiters, whilst many doctors and nurses consider the ultimate responsibility to be too great for families to carry alone, (ibid). Although, medical

decision-making is the role of the obstetricians and even if they involve the parents to take part they cannot allow the parents to decide alone in decisive situations, it is their medical responsibility to make the final decision and when doing so lessen the feelings of guilt in the parents (Danerek et al, 2005). The obstetricians have an ongoing dialogue with the midwife involved in the current case and with the parents, the purpose of which is to achieve a decision acceptable for the all parties involved (ibid).

Parents' perception of decisions, concerning the life support of their extremely preterm infant (< 25 GW), was that they could recall the information given before birth (Kavanaugh et al., 2005). This included information related to medical matters, such as morbidity and mortality, but also more practical questions like breast feeding. Most of the parents believed that their baby would survive (Chan et al., 2006). As each case of very preterm birth is unique, it is necessary to take the parents' wishes into account and let them participate in the decision-making process (Garel et al., 2002; Jackson et al., 2003; Garel et al., 2004; Danerek et al., 2005; Danerek & Dykes, 2008; Pignotti & Donzelli, 2008). Both parents often want to take part in the decisions concerning the care of the mother and their infant (Jackson et al., 2003; Danerek & Dykes, 2008). Fathers wanted honest and consistent information about what was going on, and both parents felt it important to minimise the number of professionals giving advice and information (Kavanaugh et al., 2005; Danerek & Dykes, 2008). If they were given adequate information they felt confident about the decision they made. Counselling was shown to increase the woman's understanding of the information concerning her preterm infant (Kaempf et al., 2009). Midwives, in the study by Garel et al., (2004) felt that parents were not adequately informed and were not always listened to. They thought the parents were not involved in the decision-making process concerning the care as much as the midwives thought they should be. The consequences for the family, of preterm birth were not sufficiently considered, which the midwives found to be a major problem.

Guidelines should be seen as a framework for professionals and the parents during the decision-making process in the critical situation of the threat of very preterm labour and birth (Pignotti & Donzelli, 2008). A review of 15 documents (guidelines) for perinatal care in connection with extreme preterm birth from various industrialised countries, six European countries, Australia, Canada and the USA, showed that there were many differences between the countries. It was shown that there was a general agreement that at \leq GW 22 the foetus/neonate could not survive and 22 GW was considered to be the cut-off point for human viability. Most of the countries offered compassionate care at this point. At GW 23-24 interventions were recommended on an individual basis and according to the wishes of the parents, as these GW were considered to be a “grey zone”. Antenatal steroids were recommended from GW 25 as well as prenatal transfer and CS for the wellbeing of the foetus. Resuscitation was offered if no fatal anomalies were found. The attitudes of the midwives in our study were mostly congruent with the guidelines in Pignotti and Donzelli’s (2008) study, except for steroid prophylaxis and transfer to NICU where Swedish midwives would agree to start at an earlier GA. The differences between the countries could be partly due to how GW is assessed in the different countries. In Sweden, GA is usually assessed by ultrasound foetometry at 16-18 GW, which is more exact than the last menstrual period (Serenius et al., 2004a; EXPRESS group, 2009). The GA can differ with plus/minus two weeks based on the last menstrual period, whereas foetometry gives a GA plus/minus seven days.

Conclusions

Our study showed that midwives working at university hospitals i.e. level III hospitals developed a more positive attitude towards the initiation of interventions at an earlier GA when compared to midwives without such experience. The midwives in this study gave regular information to the parents, although to a lesser extent when concerning the estimated survival probability of the infant given in percent, the estimated probability of handicap given in percent, and the possibility of withholding resuscitation if GA is < 25 GW. The midwives in this study, who worked at university

hospitals, were more willing to disclose information on these issues, to the parents. More communication and exchange of knowledge between general hospitals (level II hospitals) and university hospitals (level III hospitals) might benefit the management of very preterm labour and birth. Guidelines for management of very preterm labour and birth can be a framework and a help in the decision-making process for all professionals. Inter-professional meetings and/or workshops concerning these issues, including discussions of ethical problems, should be encouraged and implicated as they might be of benefit to the professionals and their patients. Further research could be the follow up of an intervention study, including workshops using authentic cases and with obstetrical and neonatal staff discussing ethical problems.

Competing interest

The authors declare that they have no competing interest.

Authors' contributions

MD, KM, GL, TN, AKD designed and planned the study. MD collected the data. MD carried out the statistical analysis, and interpreted and discussed the results with AKD and KM. MD drafted the manuscript. MD, AKD, KM, GL and TN reviewed various versions of the manuscript. MC designed the original EUROBS questionnaire, collected and processed the data on Swedish obstetricians, and she revised the manuscript. All authors read and approved the final version of the manuscript.

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LEGENDS

Figure 1. Flow chart of the data collection for SWEMID-project.

Figure 2a. Attitudes among 259 midwives towards the gestational age when information should be given to the neonatologist before very preterm birth in a situation when parents express a wish of active management.

Figure 2b. Attitudes among 259 midwives towards the lowest gestational age when to suggest admission to neonatal intensive care unit in a situation of imminent very preterm birth and parents not wishing active management (non-active management).

Table 1. Socio-demographic and professional characteristics of the responding midwives (SWEMID study).

	All midwives n =259 n (%)	Midwives at general hospitals (GH) n =136 n (%)	Midwives at university hospitals (UH) n =123 n (%)	Significance of difference between GH and UH P-value*
Gender - male - female	3 (1.2) 252 (98.8)	2 (1.5) 134 (98.5)	1 (0.8) 118 (99.2)	641
Age (years) - <30 - 30-39 - 40-49 - >50	5 (2.0) 54 (21.3) 77 (30.4) 117 (46.2)	3 (2.2) 25 (18.5) 44 (32.6) 63 (46.7)	2 (1.7) 29 (24.6) 33 (28.0) 54 (45.8)	
Married/co-habitant - yes - no	205 (80.7) 49 (19.3)	112 (83.0) 23 (17.0)	93 (78.2) 26 (21.8)	398
Number of own children - 0 - 1 - 2 - 3 - 4 - 5	35 (14.7) 21 (8.8) 81 (34.0) 66 (27.7) 26 (10.9) 9 (3.8)	13 (10.2) 10 (7.8) 42 (32.8) 38 (29.7) 19 (14.8) 6 (4.7)	22 (20.0) 11 (10.0) 39 (35.5) 28 (25.5) 7 (6.4) 3 (2.7)	0.004**
Religious affiliation - none - protestant - other	78 (31.1) 156 (62.2) 17 (6.8)	36 (26.9) 91 (67.9) 7 (5.2)	42 (35.9) 65 (55.6) 10 (8.6)	178
Importance of religion - very important - rather important - less important - not at all important	56 (22.4) 39 (15.6) 82 (32.8) 73 (29.2)	36 (26.9) 17 (12.7) 48 (35.8) 33 (24.6)	20 (17.2) 22 (19.0) 34 (29.3) 40 (34.5)	71
Professional position - head of ward - delivery ward - other	4 (1.6) 216 (85.7) 32 (12.7)	4 (3.0) 113 (84.3) 17 (12.7)	0 103 (87.3) 15 (12.7)	191
Hospital appointment - full-time - part-time -other	115 (45.1) 136 (53.3) 4 (1.6)	76 (56.3) 59 (43.7) 0	39 (32.5) 77 (64.2) 4 (3.3)	< 0.001

Routine delivery room practice (years)				486
- 0-1				
- 2-5	29 (12.1)	13 (10.3)	16 (14.0)	
- 6-40	30 (12.5)	14 (11.1)	16 (14.0)	
	181 (75.4)	99 (78.6)	82 (71.9)	

*Pearson Chi²-test

** Mann Whitney U-test

Table 2a. Attitudes of midwives at general hospitals (GH) and university hospitals (UH) regarding the lowest gestational age for steroid prophylaxis and CTG monitoring when the parents wish active management.

Based on a clinical case.*

Active management	Steroid-prophylaxis			P-value**	CTG monitoring			P-value**
t	25				1			
Completed gestational weeks	All midwives n(%)	GH midwives n(%)	UH midwives n(%)		All midwives n(%)	GH midwives n(%)	UH midwives n(%)	
21	12(4.8)	4(3.0)	8(6.8)		1(0.4)	1(0.8)	0	
22	36(14.4)	12(9.0)	24(20.5)		9(3.6)	4(3.0)	5(4.2)	
23	104(41.6)	57(42.9)	47(40.2)		46(18.3)	26(19.5)	20(16.9)	
24	53(21.2)	28(21.1)	25(21.4)		50(19.9)	24(18.0)	26(22.0)	
25	24(9.6)	14(10.5)	10(8.5)		68(27.1)	23(17.3)	45(38.1)	
26	13(5.2)	12(9.0)	1(0.9)		38(15.1)	25(18.8)	13(11.0)	
27	4(1.6)	3(2.3)	1(0.9)		13(5.2)	11(8.3)	2(1.7)	
28	4(1.6)	3(2.3)	1(0.9)		26(10.4)	19(14.3)	7(5.9)	
Total	250 [§]	133	117		251 ^{§§}	133	118	

* Case: Pregnant woman with spontaneous preterm labour, singleton pregnancy, the fetus in cephalic presentation, normal fetal growth and absence of malformations

** Chi²-test between the GH and UH subgroups; [§] 9 answers missing; ^{§§} 8 answers missing

Table 2b. Attitudes of midwives at general hospitals (GH) and university hospitals (UH) regarding the lowest gestational age for steroid prophylaxis and CTG monitoring when the parents do not wish active management.

Based on a clinical case.*

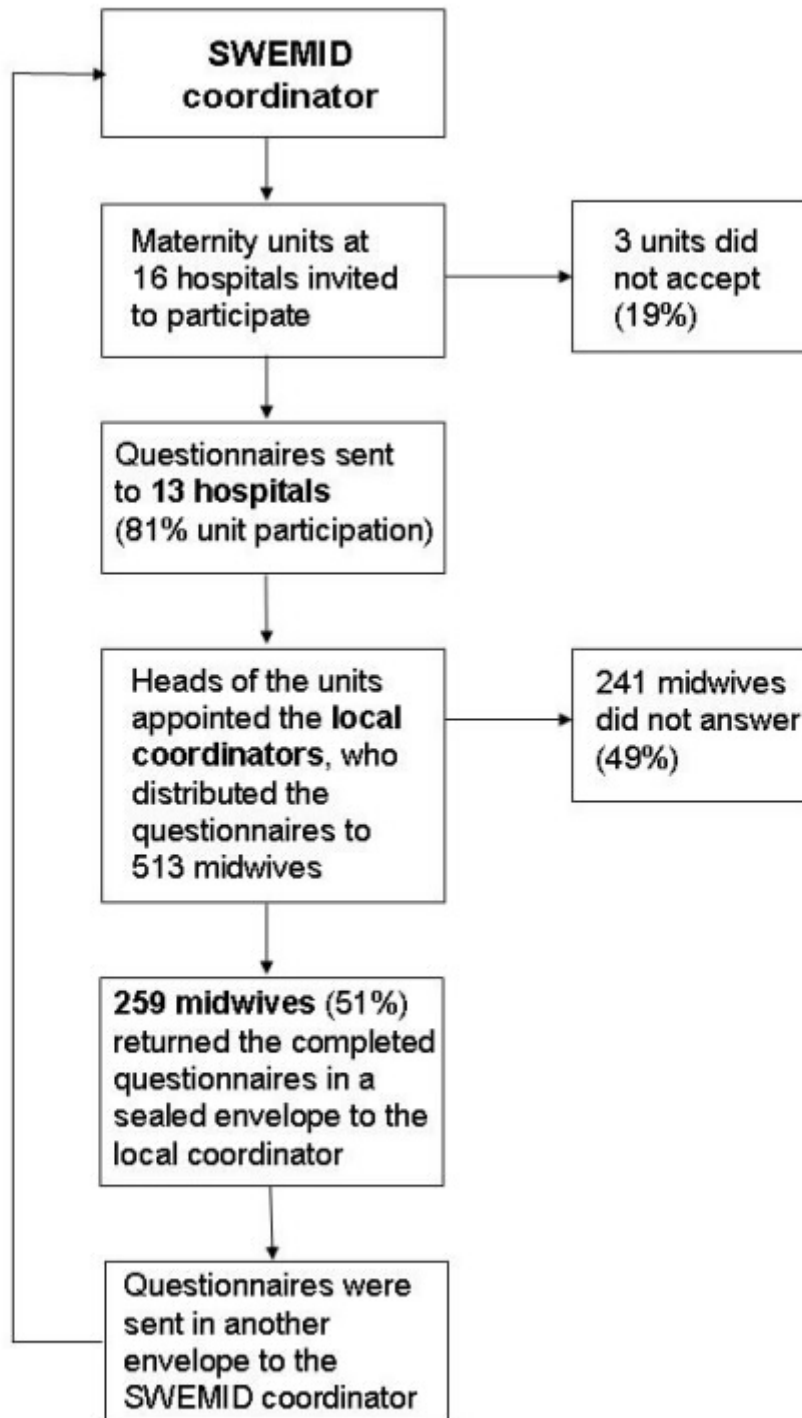
Non-active management	Steroid-prophylaxis			P-value**	CTG monitoring			P-value**
t	1				<0.001			
Completed gestational weeks	All midwives n(%)	GH midwives n(%)	UH midwives n(%)		All midwives n(%)	GH midwives n(%)	UH midwives n(%)	
21	8(3.2)	2(1.5)	6(5.2)		3(1.2)	2(1.5)	1(0.9)	
22	26(10.5)	8(6.1)	18(15.5)		3(1.2)	1(0.8)	2(1.7)	
23	79(31.9)	41(31.1)	38(32.8)		27(11.0)	13(9.9)	14(12.2)	
24	62(25.0)	32(24.2)	30(25.9)		45(18.3)	19(14.5)	26(22.6)	
25	25(10.1)	12(9.1)	13(11.2)		64(26.0)	22(16.8)	42(36.5)	

26	15(6.0)	12(9.1)	3(2.6)	44(17.9)	27(20.6)	17(14.8)
27	12(4.8)	9(6.8)	3(2.6)	17(6.9)	15(11.5)	2(1.7)
28	21(8.5)	16(12.1)	5(4.3)	43(17.5)	32(24.4)	11(9.6)
Total	248 [§]	132	116	246 ^{§§}	131	115

* Case: Pregnant woman with spontaneous preterm labour, singleton pregnancy, the fetus in cephalic presentation, normal fetal growth and absence of malformations

** Chi²-test between the GH and UH subgroups; [§] 11 answers missing; ^{§§} 13 answers missing

Figure 1. Flow chart of the data collection for SWEMID-project.



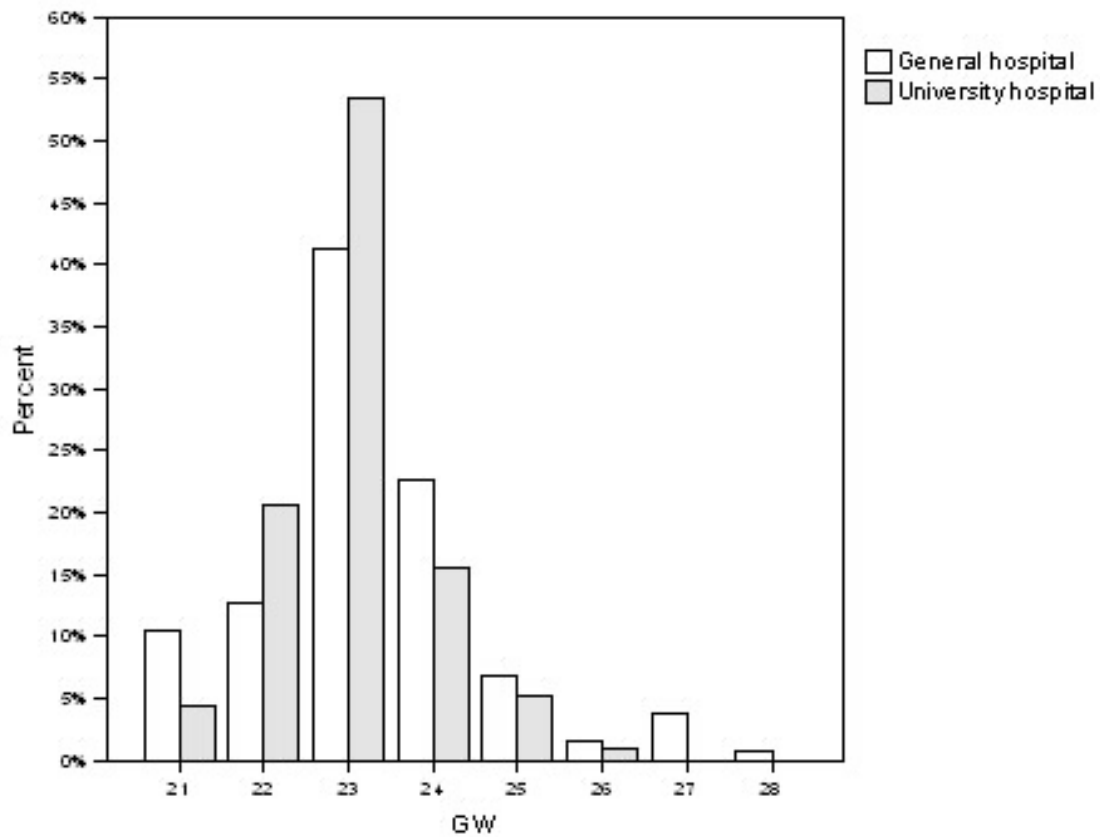


Figure 2a. Attitudes among 249 midwives towards the gestational age when information should be given to the neonatologists before very preterm birth in a situation when parents express a wish of active management.

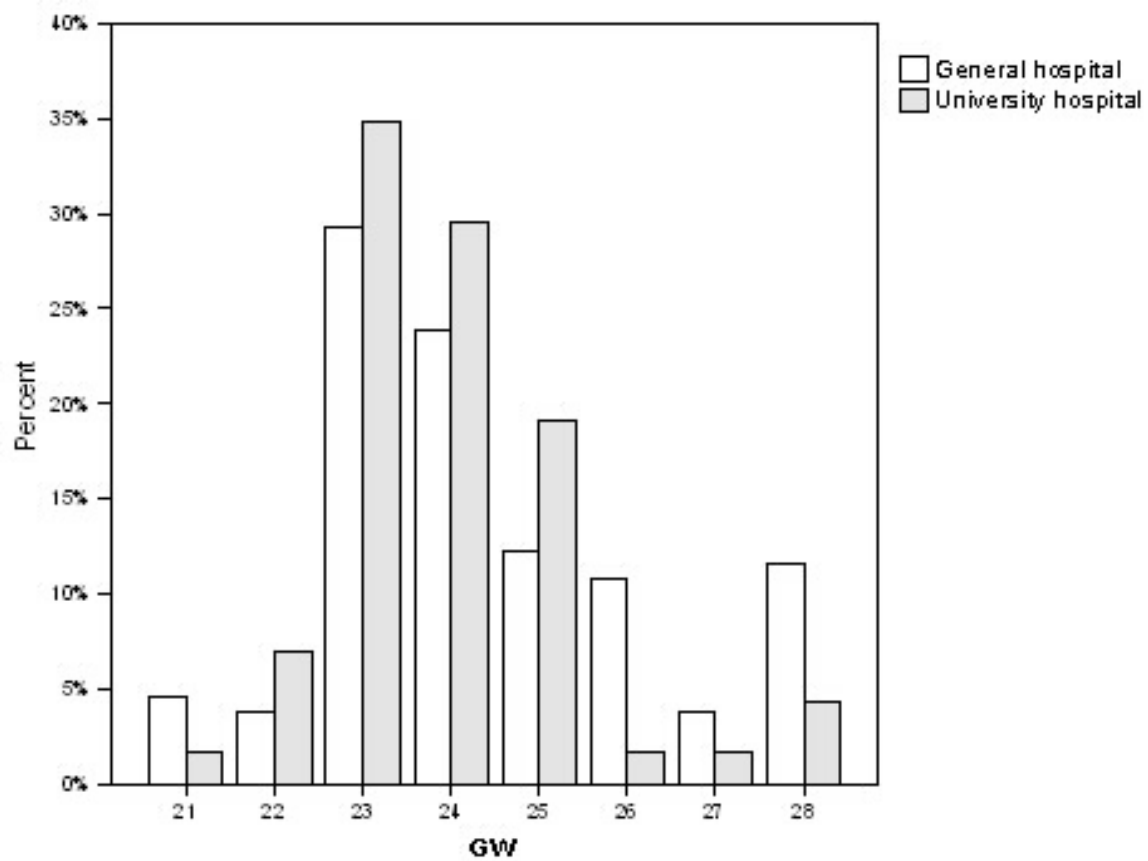


Figure 2b. Attitudes among 245 midwives towards the lowest gestational age when to suggest admission to neonatal intensive care unit in a situation imminent very preterm birth and parents not wishing active management (non-active management).