



Obstetric early warning score in Scandinavia. A survey of midwives' use of systematic monitoring in parturients



Catrine Carlstein, MD^a, Elin Helland, MD^b, Kim Wildgaard, MD, PhD^{c,d,*}

^a Department of Obstetrics and Gynaecology, Næstved Hospital, Denmark

^b Department of Obstetrics and Gynaecology, Levanger sykehus, Helse Nord-Trøndelag HF, Norway

^c Department of Anaesthesiology, Næstved Hospital, Ringstedgade 61, 4700 Næstved, Denmark

^d Department of Anaesthesiology, Herlev Hospital, Denmark

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ABSTRACT

Objective: systematic monitoring has recently been implemented widely in non-obstetric departments. In the UK, Early Warning Score (EWS) systems specifically designed for the obstetric population (OEWS) are used. No information on the use of OEWS in Scandinavia has been reported. Consequently, we wanted to investigate the use of vital signs and attitude towards systematic monitoring of parturients in Denmark, Norway and Sweden. **Design:** electronic questionnaires sent to heads of midwifery. The heads of midwifery referred two clinically active midwives. All in-hospital obstetric departments in Scandinavia were invited to participate.

Findings: heads of midwifery from 76 departments (68%), and 125 clinical midwives (82%) responded. Ten per cent of midwives reported use of OEWS. Reported implementation barriers to OEWS included lack of evidence and suspected impact on the parturient due to frequent interruptions.

fifty-four per cent of clinical midwives reported a systolic blood pressure threshold of 90–139 mmHg, while 33% reported a threshold of > 160 mmHg. Ninety-three per cent stated a low threshold for maternal heart rate < 60 bpm whereas 10% reported an upper threshold heart rate ≥ 150 bpm. Forty-seven per cent reported call for assistance thresholds for maternal heart rate at 60–110 bpm.

Key conclusions: OEWS is not implemented in Scandinavian obstetric departments and reported thresholds of vital signs varied considerably. Major barriers for implementation in Scandinavia include midwives' concern of interruptions for the parturient and increased workload, and unclear benefit from use of OEWS. Local departments should provide midwives with unambiguous thresholds for vital signs in parturients either through local guidelines or via OEWS.

Introduction

Early Warning Score (EWS) is a simple scoring system using core physiological parameters such as blood pressure, heart rate, respiratory rate and temperature to identify patients in deterioration demanding extra attention. The different parameters generate a sum-score that may, depending on the total score or score of a single parameter, trigger an action ('track-and-trigger' system) such as escalated monitoring or call for assistance. Use of EWS is expected to improve communication between nursing staff and doctors, and reduce morbidity and mortality by early identification and treatment of patients at risk (Gardner-Thorpe et al., 2006).

From 1900–1980, maternal mortality has decreased significantly in Scandinavia, as well as in other high-income countries. However, since the beginning of the 1980s, despite medical progression, maternal mortality

rates have remained stationary and are now slightly increasing in Europe (Högberg et al., 1994). Cardiorespiratory arrests and deaths are rare; in Scandinavia, the maternal mortality rate is 4–6/100,000 maternities (United Nations Statistical Commission, 2016). The recent increase in obstetric morbidity is likely explained by a rise in age and increased obesity in the pregnant population. In western countries, for every one death there are nine cases of severe morbidity (Mackintosh et al., 2014). Most common causes such as haemorrhage, thromboembolic disease, infections and preeclampsia/eclampsia are to a large degree reversible if detected and intervened early. Haemorrhage can be limited with early onset medical and surgical intervention, infection can be treated with antibiotics and thrombosis with anticoagulants. Furthermore, risk of eclampsia can be reduced with antihypertensive medication and/or induction of labour if there are signs of preeclampsia. One method for early recognition of these patients may be use of obstetric EWS (Swanton et al., 2009).

* Corresponding author.

E-mail address: wildgaard@kejsersnit.com (K. Wildgaard).

Obstetrics pose a unique challenge when introducing systematic monitoring based on vital parameters such as in obstetric early warning scores (OEWS) systems. Parturients are not typical hospital patients. Giving birth is not a pathologic condition per se. Differentiating women on a trajectory of increased risk for morbidity and mortality from healthy individuals with altered physiological parameters is particularly challenging in obstetrics, as physiological parameters may vary considerably due to severe pain and increased physical workload during labour (Carle et al., 2013).

In the UK, nationwide reports have recommended the use of a Modified Early Obstetric Warning Score (MEOWS) since 2007 (Knight et al., 2014; Lewis and Royal College of Obstetricians and Gynaecologists (Great Britain), 2007). Australia, USA and Ireland also recommend nationwide implementation of OEWS (Australian Commission on Safety and Quality in Health Care, 2010; Institute of Obstetricians and Gynaecologists, Royal College of Physicians of Ireland and Directorate of Clinical Strategy and Programmes, Health Service Executive, 2013; Joint Commission, 2010). In Scandinavia, there is no such recommendation and no information on use of EWS or other systematic assessments in obstetrics has so far been reported. Consequently, we wanted to investigate the use of systematic assessment of vital signs in obstetrics (OEWS) in Scandinavia.

In Scandinavia, midwives are the primary caretakers for pregnant and labouring women. A normal pregnancy never needs involve a doctor. Midwives are thus responsible for registration and intervention of vital signs including alerting colleagues or physicians when vital signs are alarming. Therefore, we set out to assess midwives' systematic use of vital signs during birth, using an electronic questionnaire.

Knowledge from our study will serve as a status on the current use of systematic monitoring of vital signs in parturients in Scandinavia. Thus, our study is to inspire decision makers and health care providers considering implementation of systematic monitoring of women in labour.

Methods

Ethical approval was not required since the study used a questionnaire of health care providers and did not include any medical or personal information. The Danish Data Protection Agency approved electronic registration of data (REG-132–2014) and all data were stored according to their guidelines. The Norwegian and Swedish Data Protection Agencies waived registration referring to registration in Denmark as sufficient.

All departments offering obstetric services are registered by the National Boards of Health in Denmark, Norway and Sweden respectively and can be identified through publicly available data. Non-hospital obstetric departments were excluded.

Questionnaire design

Questionnaires were developed for heads of midwifery and clinically active midwives using an online survey tool (Limesurvey, 2014) and consisted of two parts. A brief explanation text about the concept of OEWS introduced the questionnaire. The first part of the questionnaire regarded use of and attitude towards systematic monitoring and OEWS including perceived barriers to implementation of OEWS. Heads of midwifery were also asked to provide e-mail addresses of two clinically active midwives from their department to answer both parts of the questionnaire. The first part concerning attitude was based on previous studies on OEWS (Bick et al., 2014; Isaacs et al., 2014; Swanton et al., 2009). Both heads of midwifery and the clinical midwives received the questionnaire on attitude towards OEWS.

The second part of the questionnaire inquired clinically active midwives as to what maternal vital signs were registered during birth. Furthermore, midwives were asked to state the actual high and low

thresholds of maternal vital signs that would trigger a call for assistance (blood pressure, maternal heart rate, temperature, respiratory rate, oxygen saturation and level of consciousness).

Questions were translated from English (Bick et al., 2014; Isaacs et al., 2014; Swanton et al., 2009) and were, along with possible answer options, tested using cognitive interviews of seven midwives. Cognitive testing was performed using open-ended questions to assess a) the midwives understanding of the questions and b) the completeness of the answering possibilities. After minor changes according to first-line testing, two midwives from another department validated the questionnaire. Finally, native speaking medical professionals translated the questionnaire from Danish to Norwegian and Swedish.

The questionnaires contained multiple choice as well as free-text answer options. All questions were mandatory but included a 'no answer' alternative. Replies on thresholds for vital signs could be any numerical value.

First e-mail contact was attempted on September 30th, 2015. After three e-mail reminders, telephone contact to non-responders was attempted. The study closed for inclusion on 25th January 2016.

Supplementary data associated with this article can be found in the online version at URL to be inserted.

Data analysis

All replies were handled confidentially and individual answers could not be identified as the key to the electronic survey was encrypted. Statistical analysis was performed using IBM SPSS version 23. As it was a descriptive study no advanced statistical methods were used.

Individually reported thresholds for vital signs are presented for maternal heart rate and blood pressure as scatter diagrams but all thresholds are also presented as part of the New Obstetric Early Warning Score (Carle et al., 2013). This in order to allow clinical interpretation of reported maternal thresholds in an OEWS context.

Findings

Heads of midwifery in all 112 obstetric departments in Denmark, Norway and Sweden were contacted. Seventy-six questionnaires (response rate 68%) from heads of midwifery provided e-mail addresses for 152 clinically active midwives, of which 125 responded (82%) (Table 1).

The majority of responding departments ($n = 42$, 55%) had between 300 and 1999 births per year, Fig. 1.

Heads of midwifery

Of the 76 responding heads of midwifery, 16 (21%) reported use of a systematic monitoring system in their department. Of these, eight (11%) stated that there was local documentation of OEWS preventing morbidity/mortality.

Table 1
Obstetric Early Warning Score in Scandinavia 2015. Invites and responses per country.

	Denmark	Norway	Sweden	Total
Obstetric departments in Scandinavia	22	45	45	112
Heads of midwifery responders	21	30	25	76
Heads of midwifery participation	95%	67%	56%	68%
Midwives contacted (Heads of midwifery × 2)	42	60	50	152
Midwife responders	40	40	45	125
Midwife participation	96%	67%	90%	82%

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