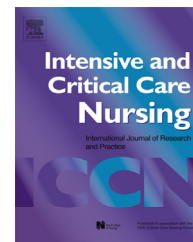




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ORIGINAL ARTICLE

Obstetric admissions to ICUs in Finland: A multicentre study



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Accepted 16 March 2016

KEYWORDS

Adverse event;
Interventions;
Obstetric patient;
Outcome;
Severity of illness

Summary In this study, the objective was to describe and analyse reasons for obstetric admissions to the ICU, severity of illness, level and types of interventions, adverse events and patient outcomes. In a retrospective database study, we identified 291 obstetric patients during pregnancy and puerperium from four Finnish university hospitals. Most were admitted in the post-partum period and hypertensive disorders were the main indications for admissions, followed by obstetric haemorrhage. The median length of stay was 21 hours. The most common intervention was blood transfusion and mechanical ventilation was required in nearly one fifth of the patients. Three patients had a prolonged stay and nine had re-admissions. One maternal death was recorded. This study found that severity of illness and organ failure scores describe the obstetric patient as having a good probability of recovery and a short length of stay. However, the obstetric patients reason for admission and their type of delivery were associated with both the severity of illness scores and level of intervention required. Those admitted for non-obstetric reasons and having had a vaginal delivery demonstrated higher severity of illness scores, organ failure scores, and levels of intervention when compared to those admitted for obstetric reasons or those who had delivered by caesarean section. In conclusion, care of these patients can be improved by understanding the severity of illness scores, common ICU interventions and patient outcomes.

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<http://dx.doi.org/10.1016/j.iccn.2016.03.002>

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Implications for Clinical Practice

- With the low number of obstetric patients admitted to ICU, a register-based study provides a large study population and long observation period.
- Care of obstetric patients can be improved by understanding the severity of illness scores, common ICU interventions and patient outcomes.

Introduction

In developed countries, maternal mortality is low ([World Health Organisation, 2014](#)) but sometimes complications associated with pregnancy and childbirth require intensive care. Previous studies have shown that the most frequent reasons for intensive care unit (ICU) admission during pregnancy or post-partum are: hypertensive disorders, obstetric haemorrhage ([Crozier and Wallace, 2011](#); [Pollock et al., 2010](#); [Wanderer et al., 2013](#)), non-obstetric sepsis ([Zwart et al., 2010](#)), respiratory failure ([Selo-Ojeme et al., 2005](#)) and cardiac problems ([Mirghani et al., 2004](#)). Although obstetric admissions to ICU are infrequent ([Pollock et al., 2010](#)), care of these patients can be improved by understanding the severity of illness scores, common ICU interventions and patient outcomes.

Register-based studies are an appropriate method to search unfrequented phenomena from all admissions and collect data from retrospectively. Routinely recorded databases (as a source of secondary data) can provide a large study population of obstetric patients and a long retrospective observational period ([Motheral et al., 2003](#)). In addition considering the low frequency of obstetric intensive care admissions register-based studies are a justifiable method, because small samples might yield random outcomes ([Räisänen et al., 2013](#); [Sund et al., 2013](#)).

In this study, the objective was to retrospectively describe and analyse reasons for obstetric admissions to the ICU, severity of illness, level and types of interventions, adverse events and patient outcomes.

Methods

Study design

The study used a retrospective audit design. Data were retrospectively collected from the clinical information systems of four university hospitals in Finland between 2007 and 2011.

Data from all obstetric patients aged 18–50 admitted to intensive care during pregnancy and post-partum (up to 42 days) were included in the study.

Data collection

Patients were identified using the APACHE III diagnosis-group, which is compulsory information for all ICU admitted patients in Finland. All women aged 18–50 in the APACHE III diagnosis category “other gynaecological disease” were

considered. The total number of patients identified in the four hospitals was 328, of which 291 were accepted for final inclusion in the study ([Fig. 1](#)).

For data collection, three clinical information systems (CIS) were used: Intensium (Finnish Intensive Care Quality Consortium), Clinisoft and Miranda. All ICUs participating in this study use these clinical information systems to record patient data. Each unit identified contact people who collected defined variables from the clinical information systems, using a research strategy provided by the researchers. Data obtained from these information systems was based on the patient’s social security number. Five variables required manual searches by the contact people in each unit, and included parity, ante or post-partum treatment, gestational age, type of delivery and the need for embolisation. One nominated contact person integrated all of the data and recorded it into the study register.

Obstetric patient data collected over the five-year period included: (1) maternal demographics from the Miranda information system, (2) intensive care severity of illness scores, Therapeutic Intervention Scoring System 76 (TISS-76) scores and intensive care complications from Intensium information system and (3) the type of ICU interventions required, length of stay (LOS), prolonged stay (defined as ≥ 144 hours) and patient outcome obtained from the Clinisoft information system (see [Fig. 1](#)).

Data analysis

The reasons leading to intensive care treatment were re-categorised as obstetric and non-obstetric by using ICD-10 diagnosis codes. Obstetric reasons included: hypertensive disorder, obstetric haemorrhage and pregnancy or delivery related complications. Hypertensive complications included pre-eclampsia, eclampsia and hypertension. Obstetric haemorrhage included ante, intra or postpartum haemorrhage. Pregnancy or delivery related complications included diagnoses associated with uterine function such as rupture, uterine atony, placental abruption or placenta praevia and types of delivery related complications. Non-obstetric reasons were categorised as heart diseases, respiratory failure, infection, liver or kidney dysfunction and miscellaneous. Types of delivery were categorised as vaginal delivery, planned section, planned immediate section and emergency section. In the Clinisoft information system, complications in intensive care treatment were categorised as listed above.

The retrieved data was inserted into a Microsoft Excel spreadsheet and exported to SPSS 20.0 software for descriptive and statistical analysis. Categorical data were analysed using frequency counts and percentages and continuous

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