'Maternal Intensive Care': a systematic literature review

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Abstract

Objective: The objective of this systematic literature review is to review current scientific knowledge on the definition of and the indications for maternal-obstetric intensive care (MIC).

Methods: We conducted a extensive search in OVID MEDLINE, EMBASE, COCHRANE, CINHAL and CEBAM using the keywords: maternal-obstetric intensive care, subacute care, intermediate care, postacute care, critical care, sub intensive care, progressive patient care, postnatal care, perinatal care, obstetric nursing, neonatology, pregnancy, maternal mortality/morbidity and pregnancy complication. A total of 180 articles and one guideline were identified and supplemented by a hand search. After title, abstract and full text evaluation, the articles and guideline were subjected to critical appraisal.

Results: Out of 180 potentially relevant articles, we identified 44 eligible articles of which 14 relevant MIC-articles of relatively good quality were selected. The concept ‘maternal intensive care’ was not found elsewhere, “high-dependency care” and “obstetrical intermediate care” appeared to be best comparable to what is understood as a MIC-service in Belgium. This thorough literature search resulted in a limited amount of scientific literature, with most studies retrospective observational tertiary centre based. No clear definition and admission criteria for maternal intensive care were found.

Conclusion: This systematic literature review revealed that 1) there is no standard definition of maternal intensive care and 2) that admission criteria to a MIC unit differ widely. Further research is needed to create an evidence-based triage system to help clinicians attribute women to the appropriate level of care and thus stimulate an efficient utilization of maternal-obstetric intensive care services.

Key words: maternal-obstetric intensive care, intermediate care, high risk obstetric service/unit, maternal mortality/morbidity, pregnancy complication.

Introduction

In Belgium, the Maternal Intensive Care (MIC) concept was introduced by law in 1996. The Royal Decree (RD) of Augustus 20th 1996 defines Maternal Intensive Care as follows:

“The MIC-service is recognized as a division of the maternity department. This division is dedicated to the intensive observation of high-risk pregnancies. The division also admits in its P* function, patients with a pregnancy at high risk for neonatal observation at a Neonatal Intensive Care (NIC) service and patients who will need highly specialized postpartum care.” The P* function is mandatory constituted by a MIC-service and a NIC (Neonatal Intensive Care) service; the MIC-service will serve as a referral centre for a group of hospitals totaling a minimum of 5000 deliveries per year”.

However, the Royal Decree has not precisely defined the statute, the purposes, nor the function and terms of reference of a MIC-service. What is intensive observation? What are the indications for which a baby potentially needs neonatal intensive care? How are high-risk pregnancies defined? When does a patient need highly specialised post partum care?

Hence, the indications during pregnancy, delivery, or post-partum leading to an admission in a MIC-service are not specified. This legal frame with
regard to maternal intensive care seems not sufficient to guide the daily obstetrical practice.

In this article, we conducted a systematic literature review in an effort to resolve the vagueness related to the definition and admission criteria for optimal maternal intensive care, based on the current scientific knowledge and evidence.

Sources and study selection

This systematic literature review was based on a extensive search in the electronic databases OVID MEDLINE, EMBASE, COCHRANE and CINHAL. The CEBAM database was accessed to review the relevant (clinical) guidelines on the topic.

The limits were set on English, Dutch or French publications from January 1997 to December 2007. The searches were systematically updated during the writing process, the last update took place July 15th, 2009. Following keywords and combinations of these keywords were used: maternal/obstetric intensive care, subacute care, intermediate care, postacute care, critical care, sub intensive care, progressive patient care, postnatal care, perinatal care, obstetrical nursing, neonatology, pregnancy, maternal mortality/morbidity and pregnancy complication.

We started our literature search in OVID MEDLINE and applied the same search strategy in EMBASE, COCHRANE and CINHAL. The different steps followed were: enter MeSH terms/keywords in selected databases, title and abstract evaluation (selection criteria below), full text evaluation, critical appraisal and selection of articles. The detailed flow chart from the search strategy used for the different databases is presented in Figure 1. Several articles were found through the snowball method (hand search). During full text evaluation, one article of high relevance written by Zeeman (2006), was retrieved by hand search. This systematic literature review evaluated 30 articles about obstetric intermediate and intensive care, hence we retrieved and evaluated all studies selected by Zeeman. The studies of fairly good quality were included in our selection. The selection criteria used for the title and abstract evaluation were:

- No comments and case reports;
- No specific ‘intensive care’ research: articles that only describe research on mechanical ventilation, multiple organ support, invasive monitoring and artificial life support were excluded;
- No specific ‘neonatologic’ research: articles describing research on science in medically caring for the newborn were excluded (for example research about growth retardation and very low birth weight); and
- No ‘infertility’ research: articles on specific research on infertility were excluded (for example ovarian hyperstimulation syndrome).

The critical appraisal of the selected articles (after full text evaluation) was based on “The checklist for observational studies” from the Agency for Healthcare Research and Quality (West et al., 2002). Two individual researchers (ASVP and HV) performed separately the assessment of the selected studies and attributed a level of evidence based on the above mentioned checklist. Evidence level 3 is non-experimental descriptive research with a good design: comparative research, correlation studies, case-serie. Level 4 are reports of expert groups, expert opinions, clinical experience of respected authorities. A detailed overview of the selected articles (evidence table) is available in the annexes.

As stated above, relevant guidelines on definitions and admission criteria were also retrieved through CEBAM (this is the Belgian branch of the Cochrane collaboration and has a portal site that gathers up to date evidence based search engines). The following search engines were systematically explored in the Dutch-language databases: CBO, Nederlands Huisartsengeneesk, Richtlijnen Kenniscentrum (KCE), NVOG, RIZIV richtlijnen and WVVH Donus Medica. Furthermore, Anglo-Saxon guidelines search engines (Guideline Finder UK, National Guideline Clearinghouse, New Zealand Guidelines Group, RCOG, ACOG, Tripdatabase, Sumsearch, Prodigy Guidelines and WHO) were searched with keywords: maternal/obstetric intensive care, subacute care, intermediate care, postacute care, critical care, sub intensive care, progressive patient care, postnatal care, perinatal care, obstetrical nursing, neonatology, pregnancy, maternal mortality/morbidity and pregnancy complication. We identified 4 potential relevant guidelines and explored everything related to high-risk, complication and problem. Similar selection criteria as in the above literature search were used and critical appraisal was done by means of the Appraisal of Guidelines Research and Evaluation instrument (The AGREE collaboration, 2001).

Results

The search in OVID MEDLINE, EMBASE, COCHRANE and CINHAL retrieved 180 potentially relevant articles. Based on title and abstract evaluation, 136 articles were excluded, 44 articles were eligible for more detailed evaluation. After full text evaluation another 30 were excluded and 14 studies were submitted to critical appraisal. The quality of all 14 studies were evaluated as fairly good and therefore included in the systematic review (Table I, Fig. 1).
The search for guidelines resulted in two types of guidelines, general (low risk) maternity care guidelines and guidelines on a specific topic of complicated peripartal care e.g. diabetes and pregnancy, cardio-vascular problems during pregnancy, etc.Only one guideline (Duodecim, 2006) was selected because it specified management/treatment of pregnant women with heart and vascular diseases (hypertension, heart disease), thrombotic complications, metabolic disorders (diabetes, hypothyroidism, hyperthyroidism, obesity), neurological diseases (epilepsy, migraine, disturbances of cerebral circulation), renal diseases, rheumatic disorders, psychiatric problems, bronchial asthma and cancer. Unfortunately no recommendations were made about the appropriate level of care for each type of pathology.

We found no specific guidelines concerning overall maternal/obstetrical intensive/intermediate care, we did find some general guidelines concerning admission and discharge from general intensive care and high dependency/intermediate care units (Nasrway et al., 1998). Within these general admission and discharge criteria nothing was specifically mentioned for pregnancy and childbirth. The search for guidelines resulted in the selection of only one guideline.
An important finding of this systematic literature review is that there is hardly any literature on maternal intensive care. This thorough literature search did not reveal any publication that contributes to a sizeable extent on how qualitative maternal intensive care should be defined and what the admission criteria for a MIC-service should be. Most articles on the subject are literature reviews, no Cochrane reviews and only very few systematic reviews, no randomized controlled trials and controlled clinical trials were found. The majority of the selected articles were retrospective observational tertiary centre based studies, with levels of evidence between 3 and 4. These studies explored the individual tertiary settings and findings can not be generalized because of the limited number of patients and the randomly selected criteria for admission.

The results of our literature review are described below in three separate sections: terminology, definition of maternal intensive care and admission criteria for a MIC-service.

**Terminology**

**Graded Care**

Health care organisations around the globe need to cope with a rising demand for care. (evidence based)
unit. These studies explored the individual tertiary settings and findings can not be generalized because of the limited number of patients and the randomly selected criteria for admission. Nearly all evidence regarding maternal intensive care was indirect evidence through ICU literature. Few articles studied investigated the functioning of MIC-services and the organisational aspects of the associated hospital ward in depth (Biswas et al., 2005; Hazelgrove et al., 2001; Ryan et al., 2000).

Admission criteria for maternal intensive care

Similar to the lack of a consensus definition for maternal intensive care, an evidence-based model of admission criteria for a MIC-service doesn’t exist (Zeeman, 2006). In the underneath listing we present a summary of the most important admission criteria internationally widely used (Afessa et al., 2001; Baskett and Sternadel, 1998; Brewley and Creighton, 1997; Biswas et al., 2005; Farkas and Watson, 1996; Fowler, 2005; Hazelgrove et al., 2001; Heimonen et al., 2002; Keizer et al., 2006; Lee, 2004; Mirghani et al., 2004; Neto, 2006; Okafor and Aniebu, 2004; Panchal and Harris, 2000; Ryan et al., 2000; Schatz, 2003; Wheatley et al., 1997; Zeeman et al., 2003; Zeeman, 2006).

(Pre) eclampsia and haemorrhage are the two commonest mentioned reasons for admission within the reviewed literature. The underneath list of complications is a brief synthesis and is not exhaustive.

**Direct obstetrical complications**: pre-eclampsia, HELLP, severe haemorrhage, trombo-embolic disorders, sepsis, placental abruption/paevia, inevitable premature labour (before 32 weeks), premature rupture of the membranes (before 32 weeks), intra uterine growth retardation (on vascular basis), congenital malformation wherefore early treatment is recommended and multiple pregnancy (more than 2 neonates or threatening premature birth before 34 weeks).

**Indirect obstetrical complications**: Cardiac and vascular disease (e.g. hypertension, thyrotoxicosis, plasmapheresis, anaemia, ...), pulmonary disease (e.g. asthma or pneumonia, ...), neurological disease, gastro-intestinal disease (e.g. diabetes mellitus, cholecystitis, pancreatitis, appendicitis, peritonitis, ...), endocrine disease (e.g. thyrotoxicois, ...), infectious and parasitical disease, drug dependence, intoxication, trauma, and psychiatric disease.

The available literature and guidelines did not provide clear evidence-based criteria to tackle the question which level of maternal morbidity should ideally be treated at which level of care.

**Discussion / Conclusion**

An important result from our systematic literature review was that we were not able to find any literature which mentioned or referred to the concept “maternal intensive care”. Concepts as “high-dependency care” and “obstetrical intermediate care” appeared to be best comparable to the typical Belgian MIC-service. MIC-services provide a level of care in between standard and intensive care. Therefore we propose to use the less confusing concept ‘Maternal Intermediate Care (MIC)’ to refer to what is now understood as ‘Maternal Intensive Care’.

The results of this systematic literature review on maternal intensive care provided a very diverse, but very limited amount of scientific literature. A reasonable amount of articles/studies was found about specific aspects of intensive or critical obstetric care. Few articles studied, investigated the functioning of maternal intensive care and the organisational aspects of the associated hospital ward in depth.

Similar to the lack of evidence on the maternal intensive care definition, little information was found on the admission criteria for maternal intensive care. Pre-eclampsia and haemorrhage were the most two common disorders wherefore admission at a maternal intensive care unit was deemed necessary. We did not find any article or guideline that could contribute to a sizeable extent to tackle the question which level of maternal/fetal pathology should be treated at which level of care. Most guidelines focused on normal pregnancy care or on the appropriate care for a specific pregnancy or not-pregnancy related disease.

This systematic literature review revealed a great lack of literature and evidence about definitions and admission criteria for maternal intensive care. Further research is needed to create an evidence-based basis for an efficient utilization of maternal intensive care services. A clear triage-system for maternal morbidity could help clinicians to attribute women to the appropriate level of care. Reorganising the Belgian health care system into 3 distinct levels of care (standard care, intermediate care and intensive care) with clear-cut guidelines and referral pathways could benefit the quality of maternity services.

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References


