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## REVIEW ARTICLE

## A literature review of quantitative indicators to measure the quality of labor and delivery care

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## ABSTRACT

**Background:** Strengthening measurement of the quality of labor and delivery (L&D) care in low-resource countries requires an understanding of existing approaches. **Objectives:** To identify quantitative indicators of L&D care quality and assess gaps in indicators. **Search strategy:** PubMed, CINAHL Plus, and Embase databases were searched for research published in English between January 1, 1990, and October 31, 2013, using structured terms. **Selection criteria:** Studies describing indicators for L&D care quality assessment were included. Those whose abstracts contained inclusion criteria underwent full-text review. **Data collection and analysis:** Study characteristics, including indicator selection and data sources, were extracted via a standard spreadsheet. **Main results:** The structured search identified 1224 studies. After abstract and full-text review, 477 were included in the analysis. Most studies selected indicators by using literature review, clinical guidelines, or expert panels. Few indicators were empirically validated; most studies relied on medical record review to measure indicators. **Conclusions:** Many quantitative indicators have been used to measure L&D care quality, but few have been validated beyond expert opinion. There has been limited use of clinical observation in quality assessment of care processes. The findings suggest the need for validated, efficient consensus indicators of the quality of L&D care processes, particularly in low-resource countries.

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## 1. Introduction

Although the rate of maternal death has decreased globally, many low-resource countries will not achieve the Millennium Development Goal (MDG) 5 to reduce maternal mortality [1–3]. Similarly, despite reductions in the past two decades, 2 million intrapartum stillbirths and intrapartum-event-related early neonatal deaths occur each year [4].

Skilled birth attendance rate—a commonly used measure of progress toward reducing maternal mortality—is included in the list of MDG 5 indicators [1]. Although the rates of facility delivery and skilled birth attendance are increasing in many low-resource countries, service contacts are not informative about the quality of labor and delivery (L&D) services, including essential newborn care (ENC) [5,6]. The content and quality of care (QoC) are crucial in ensuring the provision of interventions that either reduce the incidence of intrapartum and postpartum complications or respond to these complications [6–8].

Thaddeus and Maine's widely used “three-delays” framework of maternal mortality [9] explicitly links QoC to the first and third delay, and proposes that perceptions of quality could be more important than access and distance in the decision to seek care. Empirical research

suggests that poor QoC could underlie persistently high maternal mortality despite increasing facility delivery [10,11]. Studies indicate that perceptions of poor QoC lead to both a low demand for facility-based L&D services and a bypassing of close-by facilities for more distant ones [12].

Despite the evident importance of L&D care quality in reducing mortality and morbidity, questions remain about how to define and measure this construct. Many definitions of QoC have been proposed, including the WHO description of quality as encompassing effective, efficient, accessible, acceptable, patient-centered, equitable, and safe services [13]. However, these comprehensive definitions need refinement to enable an assessment of L&D care. The Donabedian QoC framework is useful in conceptualizing L&D care assessment, identifying three components of quality—namely, structure, process, and outcomes [14].

The present review had three aims. The first was to identify, describe, and classify in accordance with the components of the Donabedian QoC framework, quantitative indicators that have been proposed or applied to assess the quality of facility-based L&D care, including during the intrapartum and immediate postpartum period, and ENC. The second was to describe how quality indicators were selected and the data collection approaches used to evaluate these indicators. Finally, the review sought to identify gaps in QoC indicators used currently that should be addressed through future research in low-resource countries.

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## 2. Materials and methods

In a systematic review, the PubMed, Embase, and CINAHL Plus databases were searched to identify research on quantitative indicators of L&D care quality published in English between January 1, 1990, and October 31, 2013. The search terms combined the following words and phrases: “maternal,” “obstetric,” “newborn,” “L&D,” “QoC,” “performance,” “measure,” “indicator,” “process indicators,” “assessment,” and “standards.”

Journal articles identified through the searches were retained for full-text review when the citation or abstract suggested that the study contained a description of proposed or applied indicators of facility-based L&D care quality. Although the present review was motivated by concerns related to care in low-resource countries, articles were included from all countries under the presumption that many aspects of QoC are independent of context.

Articles were excluded after citation or abstract review if they referred solely to community practices or home delivery, prenatal care, care after the immediate postpartum period, and prevention of mother-to-child HIV transmission without reference to other aspects of L&D care. Dissertations, conference proceedings, and books were excluded.

Articles meeting the criteria received full-text review. Additional exclusion criteria were applied during full-text review to ensure a focus on the aims of the present review (Box 1).

Full-text review and abstraction of information from articles was conducted with a structured spreadsheet template in Microsoft Excel 12.0 (Microsoft Corporation, Redmond, WA, USA). The assessed article characteristics included study country or region, methods used to select and validate indicators, indicator data sources, inclusion of newborn care or maternal or newborn complications, and distribution across the components of the Donabedian framework [14].

The present review sought to represent the investigators' descriptions of QoC indicators. For example, among the widely used UN process indicators for emergency obstetric and newborn obstetric care (EmONC), only facility-based case fatality rate is classified as a QoC indicator; other UN process indicators are described as measures of availability, access, and utilization [15]. In the present review, therefore, studies applying only the UN process indicators were categorized as using a single or sentinel QoC indicator, although it is possible to interpret service availability indicators as measures of structural quality [14].

The review was conducted in adherence with PRISMA guidelines [16].

## 3. Results

Fig. 1 summarizes the article search and selection process. Application of the structured search terms across three databases identified 1224 unique articles. After abstract and full-text review, 477 articles were included in the present analysis (Supplementary Material S1).

Table 1 summarizes key characteristics of articles included in the review, specifically geographic focus, indicator selection processes, data collection approach, inclusion of Donabedian QoC framework components, number and/or type of indicators (single/sentinel, composite, or multiple), inclusion of newborn care, and inclusion of complication care. Among the 477 articles included, studies were evenly split between high-income countries (HICs) and low- and middle-income countries (LMICs). Despite considerable overlap in the indicators proposed for HIC and LMIC settings, few studies described the indicators that they used as global or suitable for use across both HICs and LMICs. Overall, 170 (35.6%) articles used literature review in indicator selection and 147 (30.8%) referred to existing tools to identify indicators. All or some of the UN EmONC process indicators were used in 74 LMIC studies; these articles generally did not describe additional indicator selection processes. Several studies that applied UN process indicators without including the case fatality rate indicator were not included in the review.

### Box 1

Exclusion criteria applied during full-text review.

Articles were not included in analysis if they exclusively described:

- A set of quality indicators without at least some illustrative examples of specific indicators
- Access to and availability of maternal and neonatal health services
- Adverse event reviews to identify substandard care without specification of QoC indicators or criteria (e.g. non-criteria-based clinical audit)
- Assessment of health systems capacity or service quality without a focus on intrapartum and immediate postpartum or neonatal care
- Care for induced abortion, ectopic pregnancy, or obstetric fistula
- Clinical guidelines or competence standards without explicit reference to their use as quality indicators
- Data sources and systems for QoC assessment without discussion or endorsement of specific quality indicators
- Extra-medical services (e.g. transportation and/or communication systems)
- Evidence for clinical procedures (e.g. active management of the third stage of labor or partogram) without endorsing specific indicators for quality in performing these procedures
- Indicators that were inappropriate, not feasible, or not meaningful for assessing QoC
- Indicators selected owing to their role in malpractice claims or healthcare costs
- Labor induction, pain management, or anesthesia without reference to overall labor and delivery care
- Maternal or newborn mortality levels without explicit identification of quality indicators
- Patterns of current clinical practices (e.g. cesarean rate, uterotonic administration, or partogram use) without explicit discussion of QoC
- Process or feasibility of quality assurance or improvement techniques (e.g. clinical audit) without discussion of specific indicators to measure quality
- Qualitative data collection or qualitative exploration of QoC without prespecified quality indicators
- Rates of obstetric complications, near misses, or severe morbidities without explicit identification of them as quality indicators

Abbreviation: QoC, quality of care.

Many articles referred to clinical guidelines, professional association recommendations, and government policies in indicator selection. Several studies seemed to convert clinical guidelines into a set of indicators, particularly to assess management of complications. Numerous studies described the use of expert opinion ranging from informal staff committees to formal Delphi processes to select quality indicators. Some of these described providing experts with an explicit set of criteria for the selection process (e.g. availability in existing clinical data sources).

Indicator selection commonly involved two stages. The first was a review of published literature, clinical guidelines, and/or existing QoC tools. The second was a critical analysis of information gleaned through desk review by a panel of experts, such as public health leaders, clinicians, or other health-system representatives. Few articles described including service users during the process of indicator selection (Table 1). Some selected quality indicators through empirical validation, such as examining the association of potential indicators with clinical outcomes or the correlation between performance of potential indicators and associated constructs. In general, studies conducting such validation applied literature review or expert opinion to identify the pool of potential quality indicators.

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