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## SPECIAL ARTICLE

# Timeliness of care for eclampsia and pre-eclampsia in Benin, Ecuador, and Jamaica

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### KEYWORDS

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Eclampsia;  
Pre-eclampsia

### Abstract

**Objective:** Cases meeting diagnostic criteria for severe pre-eclampsia or eclampsia were reviewed in three countries to determine timeliness and effectiveness of care. **Method:** Cases were retrospectively selected from 11 emergency obstetric care facilities and medical records reviewed by trained obstetricians. **Result:** Of 91 cases (Benin, 28; Ecuador, 25; Jamaica, 38), 74% were correctly treated with anticonvulsant and 77% with antihypertensive therapy. The median interval to treat eclampsia (anticonvulsant, 28 min; antihypertensive, 77 min) was shorter than for severe pre-eclampsia (anticonvulsant, 45 min; antihypertensive, 85 min). Two in three cases (65%) received anticonvulsant but only 41% received antihypertensive therapy within 60 min of diagnosis. While 74% of eclamptics had been delivered within 12 h, only 39% of severe pre-eclamptics were delivered within 24 h. **Conclusion:** Timeliness can be studied in developing countries. Its objective measurement is a first step towards improving this component of care. © 2007 International Federation of Gynecology and Obstetrics. Published by Elsevier Ireland Ltd. All rights reserved.

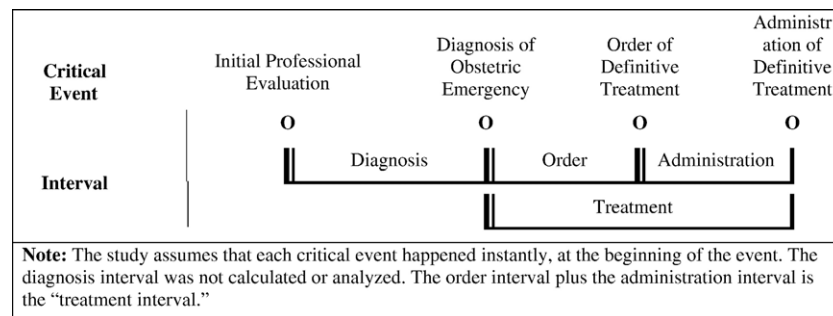
## 1. Introduction

Timeliness or the degree to which care is provided at the most beneficial or necessary time [1] is a key component of quality health care [2,3] along with effectiveness, patient safety and patient centeredness. Timeliness [4] includes (1) access to the care system, (2) getting to care and (3) timeliness within and across episodes of care [5]. In obstetric emergencies,

maternal or fetal survival is at stake, making timeliness a critical component of the quality of care.

Timeliness of safe motherhood care was epitomized by the three-delays model [6]. Significant reasons for in-hospital delays during obstetric emergencies in developing countries included time of arrival (time of day, day of week), fees, patient cost of drugs or supplies, missed or incorrect diagnosis, lack of personnel, facility delays (electricity failure, overcrowding), and lack of equipment, drugs or supplies [7–11]. Few studies however define or report time intervals for care in obstetric emergencies. An observational study in Benin of near miss cases reported that 54% and 57% of women with hypertension received anticonvulsant or antihypertensive treatment within 60 min of decision to treat [12].

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**Figure 1** Overall framework: timeliness of care for obstetric emergencies: critical events and attendant intervals.

Criterion-based audits have successfully evaluated practice in developing countries and may be used to monitor and evaluate services, guide quality improvement, and even accredit services [13–17]. For eclampsia and severe pre-eclampsia, benchmarks were set to measure timeliness. For example, start IV magnesium sulfate and antihypertensive treatment within 1 h of admission, with delivery started within 12 h [16], and antihypertensive therapy within 20 min of diagnosis [14]. To assess timeliness of care for obstetric emergencies, more norm-referenced and criterion-referenced measures of timely care must be developed [18].

This study aimed to improve the understanding and measurement of timeliness of care for obstetric emergencies in developing countries. The conceptual framework (see Fig. 1) defined terms and developed indicators to monitor hospital delays in care. While undertaken for the five leading causes of maternal mortality [19], this paper presents the overall framework, definitions, measures, and their application to eclampsia and severe pre-eclampsia in three countries.

## 2. Methods

Fig. 1 illustrates the four critical events (defined below) in order of their occurrence along the care continuum, with names of the intervals between those events.

**Initial professional evaluation:** Time when the first evaluation by an obstetric professional (midwife or physician) started. An initial assessment of vital signs or history by auxiliary staff (triage) was not considered a professional examination.

**Diagnosis of an obstetric emergency:** Time when a diagnosis of the obstetric emergency was first recorded in the patient's record at study facility. If the obstetric emergency began before arrival it was assumed the diagnosis was made at the initial professional evaluation.

**Order of definitive treatment for the emergency:** Time recorded in patient record ordering the definitive treatment for specific emergency, e.g., one definitive treatment for eclampsia was MgSO<sub>4</sub>, so data collectors noted the time MgSO<sub>4</sub> was ordered.

**Administration of definitive treatment:** Time recorded in patient record for the start of the administration of the definitive treatment.

Intervals between critical events were measured in minutes. One interval ended when the next began. As Fig. 1 shows, the four critical events define three intervals, each denoted by the critical event that ends the interval (diagnosis, order, administration). The "treatment" interval spanned the interval from diagnosis to administration of a definitive treatment, equaling

the sum of the order and administration intervals. Intervals were calculated only if the beginning and ending event times were both noted.

### 2.1. Case definitions

**Eclampsia:** Generalized fits in a pregnant patient without previous history of epilepsy [17].

**Severe pre-eclampsia:** Diastolic blood pressure at least 110 mm Hg or more after 20 weeks of gestation and proteinuria at 3+ or more [20].

### 2.2. Definitive treatments

WHO IMPAC standards [20] were used to delineate definitive treatment for eclampsia and severe pre-eclampsia:

Eclampsia:

- Administer anticonvulsant (magnesium sulfate (generic) or diazepam (generic) if former not available)

**Table 1** Effectiveness of care for severe pre-eclampsia and eclampsia, all countries

|                                                                                        | N  | Yes (%) <sup>a</sup> | No | Missing | N/A             |
|----------------------------------------------------------------------------------------|----|----------------------|----|---------|-----------------|
| <b>Was anticonvulsant<sup>b</sup> given?</b>                                           |    |                      |    |         |                 |
| Severe pre-eclampsia                                                                   | 49 | 32 (65%)             | 10 | 7       | 0               |
| Eclampsia                                                                              | 42 | 35 (83%)             | 3  | 4       | 0               |
| All                                                                                    | 91 | 67 (74%)             | 13 | 11      | 0               |
| <b>Was antihypertensive<sup>c</sup> given?</b>                                         |    |                      |    |         |                 |
| Severe pre-eclampsia                                                                   | 49 | 35 (71%)             | 6  | 8       | 0               |
| Eclampsia                                                                              | 42 | 35 (83%)             | 3  | 4       | 0               |
| All                                                                                    | 91 | 70 (77%)             | 9  | 12      | 0               |
| <b>Was delivery within 24 h for severe pre-eclampsia or within 12 h for eclampsia?</b> |    |                      |    |         |                 |
| Severe pre-eclampsia                                                                   | 49 | 18 (39%)             | 24 | 4       | 3               |
| Eclampsia                                                                              | 42 | 25 (74%)             | 6  | 3       | 8               |
| All                                                                                    | 91 | 43 (54%)             | 30 | 7       | 11 <sup>d</sup> |

<sup>a</sup> Yes / (Yes + No + Missing).

<sup>b</sup> Mag Sulfate in Jamaica and Ecuador; Diazepam in Benin.

<sup>c</sup> Hydralazine in Jamaica and Ecuador; clonidine or nifedipine in Benin.

<sup>d</sup> Excluded from the denominator were 8 cases diagnosed after delivery, 1 case who expired before delivery and 2 cases where delivery time was unclear.

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