International Journal of Gynecology and Obstetrics 114 (2011) 23–28

Contents lists available at ScienceDirect

International Journal of Gynecology and Obstetrics

journal homepage: www.elsevier.com/locate/ijgo

CLINICAL ARTICLE

Obstetric quality assurance to reduce maternal and fetal mortality in Kano and Kaduna State hospitals in Nigeria

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ARTICLE INFO

Article history:
Received 14 December 2010
Received in revised form 11 February 2011
Accepted 24 March 2011

Keywords:
Maternal mortality ratio
Millennium Development Goal 5
Obstetrics
Quality Assurance

ABSTRACT

Objective: To achieve Millennium Development Goals 4 and 5 in Nigeria, a quality assurance project in obstetrics in 10 hospitals in northern Nigeria was established to improve maternal and fetal outcome. *Methods:* The project commenced in January 2008 with assessment and improvement of the structure of the 10 hospitals. Continuous maternal and fetal data collection and analysis were conducted from 2008 to 2009 by means of a maternity record book and structured monthly summary form. The quality of hospital infrastructure and equipment was also assessed. *Results:* The mean maternal mortality ratio (MMR) was reduced from 1790 per 100 000 births in the first half of 2008 to 940 per 100 000 births in the second half of 2009. The average fetal mortality ratio (FMR) decreased slightly from 84.9 to 83.5 per 1000 births. There was an inversely proportional relationship between the total number of deliveries in a hospital and MMR and FMR. There was a close correlation between the MMR and the equipment status and hygiene conditions of the hospitals. *Conclusion:* Continuous monitoring of quality assurance in maternity units raised the awareness of the quality of obstetric performance and improved the quality of care provided, thereby improving MMR.

1. Introduction

Maternal and perinatal mortality is a significant measure of a sufficient obstetric service. Since 1990, both maternal and perinatal mortality have decreased in all European countries, the United States, and Canada to approximately 0.5%–0.6% [1]. At present, maternal and perinatal mortality in Europe is the lowest worldwide, raising the question of which measures have been introduced in the maternal and perinatal healthcare service to achieve this low figure [2,3].

The development of new methods of surveillance of the mother and the fetus before and during labor, in parallel with a move from home deliveries to hospital deliveries and payment for birth costs by insurance companies, has had a major impact on maternal and perinatal mortality. An additional impact has been the introduction of quality assurance in obstetric services for all hospitals [4].

The picture is very different in low-income countries [5]. According to statistics of the WHO [6] and USAID [7], maternal and perinatal mortality remain high in African countries [6]. Ways to improve the quality of care have been outlined by van den Broek and Graham [8], and Dumont et al. [9].

In Nigeria, prenatal attendance is approximately 58%, only 35% of women deliver in health facilities, and most women deliver at home without a skilled attendant [10]. Up to 22% are delivered by traditional birth attendants, and only 42% receive postnatal checkup after delivery [10]. It is therefore not surprising that the National Demographic Health Service (NDHS) of Nigeria has recorded a maternal mortality ratio (MMR) of 545 per 100 000 live births [10], although this figure varies tremendously. The average MMR estimated by WHO, UNICEF, UNFPA, and the World Bank is 820, with a range of 460 to 1500. The NDHS also recorded an infant mortality rate of 75 per 1000 live births and an under-5-years mortality rate of 157 per 1000 live births. The quality of care provided by most maternity centers in Nigeria is poor; as a result, utilization of the services is still insufficient despite the provision of free maternity care in some states.

Against this background and as part of the Millennium Development Goals 4 and 5, Rotary International, supported by the German Federal Ministry of Economic Cooperation and Development in collaboration with the governments of Kano and Kaduna States, introduced a project of quality assurance in obstetric services in 10 hospitals located in northern Nigeria, where MMR is reported to be extremely high [10].

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0020-7292/$ – see front matter
doi:10.1016/j.ijgo.2011.02.005

The basic principles of quality assurance in a hospital are based on 3 parameters: "quality of infrastructure," "quality of process," and "quality of outcome." All 3 parameters are interdependent and closely related. Quality of infrastructure comprises the conditions of the hospital building, including water supply, power supply, hygiene conditions, number of staff, and equipment available. Quality of process is predominantly dependent on a sufficient infrastructure, but also on trained, skilled, and experienced health personnel. By contrast, quality of outcome is dependent on both the quality of infrastructure and the quality of process and can be evaluated by continuous data monitoring. The circle of quality is a continuous and interrelated process and has an inherent ability to lead to a spiral improvement of the system (Fig. 1).

The aim of the present study was to assess the 2-year results of an ongoing total quality assurance project in 10 Nigerian hospitals in a rural setting, and their impact on the MMR and fetal mortality ratio (FMR) in these hospitals from 2008 to 2009.

2. Materials and methods

Ten rural hospitals in the northern states of Kano and Kaduna (5 from each) were selected in agreement with, and on the proposals of, government officials for the present project of quality assurance. The hospitals participated under the supervision of the Aminu Kano Teaching Hospital (AKTH), Kano and Ahmadu Bello University Teaching Hospital (ABUTH), Zaria. To guarantee confidentiality, each hospital received a coded number by which they could identify themselves but not the other hospitals. This is an important instrument of benchmarking in order to improve the results and encourage honest criticism.

For uniform data collection, a maternity record book was developed and tested in 2007 and used by all hospitals. It records 16 obstetric values, such as age of patient, parity, gestational age, mode of delivery, complications at delivery and/or postpartum, birth weight, and Apgar score of baby. These data are routinely collected for all deliveries by midwives in the participating hospitals. For the quality assurance project, a monthly form was completed that summarized the obstetric data for the month, such as total prenatal clinic attendance, total deliveries, total cesarean deliveries, total cases of eclampsia, and total maternal and fetal deaths. The monthly summary forms were checked, monitored, and collected monthly by the chief midwife.

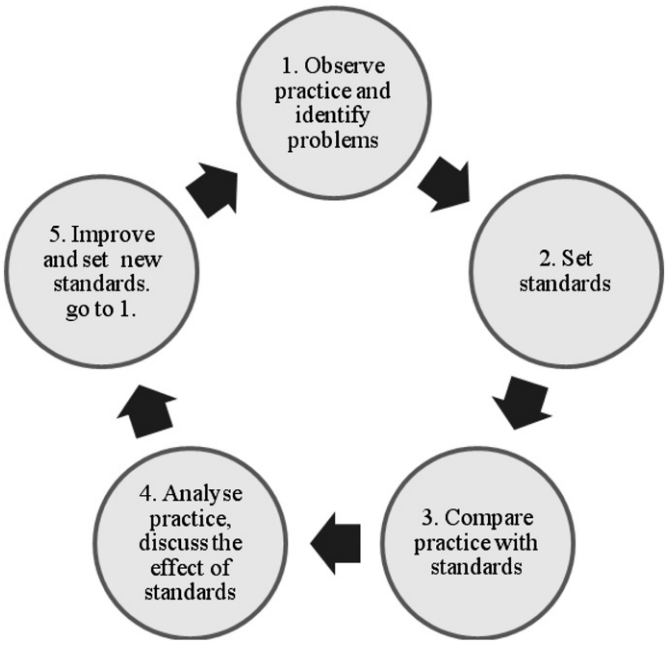

Fig. 1. Circle of quality assurance, demonstrating a cycle of continuous improvement via the introduction of standards, collection of data, and discussion of results.

Local standards for infrastructure status (IS) and hygiene status (HS) were not available. Most of the hospitals were in a dreadful condition that was hard to evaluate. As a result, the quality of the infrastructure of the 10 hospitals was evaluated via a structured questionnaire (Table 1). For each hospital, score criteria for the "general status of the infrastructure/equipment" and score criteria for "hygiene conditions" were used. Each of 5 areas (units)—operating theater, delivery room, neonatal unit, delivery ward/prenatal clinic, and general conditions of the hospital—was scored by 2 investigators by evaluating different criteria within each area from 1 (excellent, best result) to 6 (very poor, worst result).

For the operating theater unit, 12 criteria were evaluated for both IS and HS; for the delivery room unit, 8 criteria were evaluated for both IS and HS; for the neonatal unit unit, 3 criteria were evaluated for both IS and HS; for the delivery ward and prenatal clinic unit, 7 criteria were evaluated for both IS and HS; and, for the general hospital condition unit, 7 criteria were evaluated for both IS and HS. This provided a simple method for defining the impression of the facility in numbers.

According to the points given for each unit, the total score for general infrastructure/equipment ranged from a minimum of 5 points to a maximum of 30 points, for hygiene conditions from 5 to 30 points, and in total from 10 (best result) to 60 (worst result) points. The

Table 1
Evaluation criteria for infrastructure and hygiene conditions in the 10 study hospitals.

Score criteria for infrastructure/equipment	Score criteria for hygiene
Operating theater	
Anesthesia apparatus	Condition of floor
Operating table	Cleanliness of sink
Resuscitation equipment	Cleanliness of apparatus
Instruments for operations	Dust distribution
Intubation set	Blood-stained equipment
Suction machine	Cleanliness of resuscitation equipment
Anti-shock garments	Filled suction machines
Oxygen availability	Sterilizing condition
Bag valve mask	Blood-stained walls
Cesarean section set	Availability of operating shoes
Theater lamp	Unorganized storage of material
Sterilizer	Cleanliness of record books
Delivery room	
Delivery beds	Dust distribution
Delivery instruments	Blood-stained delivery beds
Specula	Rusted instruments
Vacuum extractor	Rusted delivery beds
Episiotomy set	Conditions of bowls for sterilizing
Delivery set	Conditions of mattresses
Baby scale	Hand disinfection
Gloves	Resuscitation units for newborns
Neonatal unit	
Incubator	Dust distribution
Instruments for intubation/resuscitation	Rusted instruments
Baby scale	Conditions of mattresses
Delivery ward/prenatal clinic	
Number of beds	Conditions of beds
Drip system	Dust-stained mattresses
Mosquito nets	Condition of floor
Maternity record book	Availability of mosquito nets
Ultrasound scanning room	Cleanliness of ultrasound probes
Mother scales	Dust-stained instruments
Sphygmomanometer	Dust-stained windows
General conditions	
Water supply, bore hole	Sink hygiene
Electricity (power supply)	Toilet hygiene
Window form and good seal	Cobwebs
Generator	Gloves
Refrigerator	Aprons
Magnesium sulfate	Masks
Blood bank availability	Storage of files