International Journal of Gynecology and Obstetrics 129 (2015) 165–168

Contents lists available at ScienceDirect

International Journal of Gynecology and Obstetrics

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

CLINICAL ARTICLE

Improving maternal and child health systems in Fiji through a perinatal mortality audit

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ARTICLE INFO

Article history:
Received 3 April 2014
Received in revised form 4 November 2014
Accepted 9 January 2015

Keywords:
Clinical audit
Health systems
Low-income countries
Maternal health
Millennium Development Goals
Newborn and child health
Perinatal mortality
Service improvement

ABSTRACT

Objective: To develop a standardized process of perinatal mortality audit (PMA) and improve the capacity of health workers to identify and correct factors underlying preventable deaths in Fiji. *Methods:* In a pilot study, clinicians and healthcare managers in obstetrics and pediatrics were trained to investigate stillbirths and neonatal deaths according to current guidelines. A pre-existing PMA datasheet was refined for use in Fiji and trialed in three divisional hospitals in 2011–12. Key informant interviews identified factors influencing PMA uptake. *Results:* Overall, 141 stillbirths and neonatal deaths were analyzed (57 from hospital A and 84 from hospital B; forms from hospital C excluded because incomplete/illegible). Between-site variations in mortality were recorded on the basis of the level of tertiary care available; 28 (49%) stillbirths were recorded in hospital A compared with 53 (63%) in hospital B. Substantial health system factors contributing to preventable deaths were identified, and included inadequate staffing, problems with medical equipment, and lack of clinical skills. Leadership, teamwork, communication, and having a standardized process were associated with uptake of PMA. *Conclusion:* The use of PMAs by health workers in Fiji and other Pacific island countries could potentially rectify gaps in maternal and neonatal service delivery.

1. Introduction

Global estimates suggest that approximately 3000 children aged younger than 5 years die every day from common, preventable, or treatable causes [1]. To address this issue, the United Nations Millennium Development Goals aim to reduce mortality within this age group by 2015 [2]. Improving the quality of newborn care and strengthening health systems, with an emphasis on stillbirths in low-resource settings, has been proposed as a viable approach to achieve this aim [3].

Fiji has already made appreciable advances in numerous indicators of health during the past decade. Nevertheless, a governmental review published in 2010 [4] showed that little progress had occurred in reducing childhood death rates during the same period. In Fiji, as in many low- and middle-income countries, perinatal mortality accounts for over half of all deaths recorded among children aged younger than 5 years [4].

The provision of appropriate health services (maternal, newborn, and pediatric care) can play a major part in the prevention of perinatal deaths [5]. Systematic assessment of clinical practice using perinatal mortality audits (PMAs) can drive improvements in quality of care through recommendation and implementation of measures to address deficiencies, which in turn might benefit maternal and neonatal health [6]. The use of PMAs also provides continuous information to policy makers and healthcare providers about health-status trends among mothers and their children [7].

Mortality measures are often poorly recorded in low-resource settings, including Pacific island countries such as Fiji, with little or no information available for many neonatal deaths [8–10]. Perinatal mortality also represents a great emotional, cultural, and social loss to families and so should be considered more than just a disease metric [3]. Requirements for adequate health programming include identification of attitudes and behaviors toward health care, clarification of potential weaknesses in health systems, and evaluation of the availability of infrastructure that will enable access to care. Nonetheless, consideration of these factors is often lacking in activities that aim to investigate mortality. The three delays model assesses three modifiable factors that influence perinatal health outcomes—delays in seeking care, in reaching care, and in receiving care—and is increasingly used in mortality audits [11]. The use of the six-stage PMA cycle is readily implemented in many low-income countries and its uptake and validity in low-resource settings is increasing [9,11–16].

Clinicians and health managers in Fiji endorsed the findings of the 2010 governmental review that had recommended active investigation

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http://dx.doi.org/10.1016/j.ijgo.2014.11.010
0020-7292/

of both perinatal deaths (stillbirths) and neonatal deaths, as well as the conduct of clinical quality improvement activities [4]. A key objective arising from this endorsement was to explore methods to improve and strengthen PMA processes with a view to developing a model for use in other Pacific island countries. Fiji was deemed an appropriate pilot site to bolster PMA in this geographic region because it is a middle-income country with a high proportion of births occurring in health facilities [17].

Consequently, the aims of the present study were to develop a PMA system with a standardized data collection sheet for classifying perinatal and neonatal deaths and to identify factors operating at a health-facility level that contributed to stillbirths and neonatal deaths. An additional aim was to detect facilitators and barriers to establishing PMA routinely in the three divisional hospitals in Fiji.

2. Materials and methods

In the present pilot study, an action research approach was used that enabled researchers from Australia and clinicians from Fiji to cooperatively investigate quality-improvement processes based around perinatal care, while concurrently fostering and managing change in clinical practice [18]. The present study comprised four phases: workshop and audit tool design; audit implementation and refining; key informant interviews; and data analysis. It was approved as a quality-improvement project by both the National Health Research Committee of the Fijian Ministry of Health and the Human Research Ethics Advisory of the University of New South Wales (Sydney, NSW, Australia). Written informed consent was gained from all participants before the present study began.

Two perinatal loss skills workshops were conducted by experts from Sydney (S.R.) and Fiji (R.G.) at Lautoka and Suva in Fiji, in September 2011. Each workshop was attended by approximately 20 participants, including doctors (obstetricians, pediatricians, public-health physicians, and trainees), nurses, social workers, and administrators. Participants were identified by the clinicians and health administrators from the three divisional hospitals in Fiji. During the workshops, an Australian confidential report on perinatal death datasheet was examined, and participants suggested how this document could be modified for use in Fiji.

A revised and simplified perinatal and neonatal mortality datasheet was created (Supplementary Material S1). Death was categorized using the Perinatal Society of Australia and New Zealand perinatal mortality classification sheet. Modifiable factors related to each death were classified according to the three delays model [11]. The datasheet was then provided to the three divisional hospitals in Fiji: hospital A (a tertiary hospital), hospital B, and hospital C [4]. Support for the establishment of PMA was also provided to each hospital in the form of technical support and consultation with the team in Sydney.

To accommodate the preferences of local clinicians, the datasheet was prospectively piloted in hospitals A and C from October 1, 2011, to March 31, 2012. Data were collected retrospectively at hospital B between January 1 and December 31, 2011. One clinician at each hospital entered the demographic information for each perinatal death onto the datasheet; however, information on modifiable factors was completed in discussion with a senior doctor.

At the end of the second phase, S.R. and A.I. visited all three hospitals and attended PMA meetings for both obstetric and pediatric wards. Field notes were taken and key informant interviews conducted with audit champions and team members to identify barriers and facilitators of PMA.

All usable information from the mortality datasheets was collated and analyzed using Excel (Microsoft, Redmond, WA, USA) and SPSS version 20 (IBM, Armonk, NY, USA). A χ^2 analysis was used to compare the hospitals; $P < 0.05$ was considered statistically significant. Any discrepancies in the data relating to modifiable factors were clarified in follow-up interviews; when appropriate, cases were reclassified and the possibility to have prevented the death assessed. The data for each of the three delays were analyzed thematically to identify relevant factors contributing to all deaths. Thematic content analysis [19] was used to evaluate data obtained from the key informant interviews and field notes. Findings were sent to the lead clinician at hospital A, as the head of the tertiary hospital Obstetrics Department, for input and for the purposes of triangulation.

3. Results

A complete dataset (legible forms for all perinatal deaths in the period of data collection) was obtained from hospital A only (n = 57); some demographic and other quantitative information was obtained from hospital B (n = 84). Although 12 datasheets were obtained from hospital C, these were excluded from the present analysis because they were incomplete and illegible.

The numbers of stillbirths and neonatal deaths reported by hospital A were similar, but hospital B recorded more stillbirths than neonatal deaths (Table 1). A birth weight of less than 2500 g was more common in hospital A (n = 42; 74%) than in hospital B (n = 41; 49%). Additionally, delivery before 37 weeks was more common in hospital A (n = 38; 67%) than in hospital B (n = 31; 37%). Information on the three delays from hospital A showed that at least one delay had been experienced in 47 (82%) cases. A delay in receiving care was the most cited factor (Table 1). Table 2 summarizes the factors that led to delays in accessing appropriate health care.

Analysis of the three delays data, key informant interviews, and fieldwork identified several key themes influencing uptake of PMA: preventability; building on existing audit processes; leadership, ownership, and teamwork; communication; and having a standardized process.

After excluding eight cases with incomplete information, 21 (43%) of the deaths in hospital A were deemed preventable, while 17 (35%)

Table 1
Characteristics recorded in the perinatal mortality audit performed at two hospitals in Fiji.[a]

Characteristic	Hospital A	Hospital B[b]	*P* value[c]
Total number of deaths	57	84	
Stage of death			0.099
Stillbirth	28 (49)	53 (63)	
Neonatal	29 (51)	31 (37)	
Causes of neonatal death			NA
Preterm delivery	11 (38)	–	
Infection	9 (31)	–	
Asphyxia	5 (17)	–	
Congenital abnormality	3 (10)	–	
Intrauterine growth restriction	1 (4)	–	
Birth weight, g[d]			0.005
<1000	14 (24)	16 (19)	
1000–1499	13 (23)	10 (12)	
1500–2499	15 (26)	15 (18)	
2500–3999	13 (23)	38 (45)	
>4000	2 (4)	3 (4)	
Gestational age at delivery, wk			0.001
<37	38 (67)	31 (37)	
>37	16 (28)	47 (56)	
Not known	3 (5)	6 (7)	
Delays			NA
None	10 (18)	–	
One	26 (46)	–	
Two	19 (33)	–	
Three	2 (3)	–	
Type of delay[e]			NA
Seeking care	29 (51)	–	
Reaching care	6 (11)	–	
Receiving care	35 (61)	–	

Abbreviation: NA, not applicable.
[a] Values given as number or number (percentage), unless indicated otherwise.
[b] Information about some characteristics not available for hospital B.
[c] Based on χ^2 calculations on differences between proportions.
[d] Birth weight was missing for two deaths at hospital B.
[e] More than one response was permissible.