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EFFECT OF DELIVERY CARE USER FEE EXEMPTION POLICY ON INSTITUTIONAL MATERNAL DEATHS IN THE CENTRAL AND VOLTA REGIONS OF GHANA

*W.K BOSU^{1,2}, JACQUELINE S BELL³, MARGARET ARMAR-KLEMESU¹, and JANET ANSONG TORNUI¹

¹Impact, Noguchi Memorial Institute for Medical Research, University of Ghana, Legon, ²Disease Control Unit, Ghana Health Service, PO Box KB 493, Korle Bu, Accra, ³Impact, University of Aberdeen, Health Sciences Building, Foresterhill Campus, Aberdeen, UK AB25 2ZD

SUMMARY

Background: To improve access to skilled attendance at delivery and thereby reduce maternal mortality, the Government of Ghana introduced a policy exempting all women attending health facilities from paying delivery care fees.

Objective: To examine the effect of the exemption policy on delivery-related maternal mortality.

Methods: Maternal deaths in 9 and 12 hospitals in the Central Region (CR) and the Volta Region (VR) respectively were analysed. The study covered a period of 11 and 12 months before and after the introduction of the policy between 2004 and 2006. Maternal deaths were identified by screening registers and clinical notes of all deaths in women aged 15-49 years in all units of the hospitals. These deaths were further screened for those related to delivery. The total births in the study period were also obtained in order to calculate maternal mortality ratios (MMR).

Results: A total of 1220 (78.8%) clinical notes of 1549 registered female deaths were retrieved. A total of 334 (21.6%) maternal deaths were identified. The delivery-related MMR decreased from 445 to 381 per 100,000 total births in the CR and from 648 to 391 per 100,000 total births in the VR following the implementation of the policy. The changes in the 2 regions were not statistically significant ($p=0.458$) and ($p=0.052$) respectively. No significant changes in mean age of delivery-related deaths, duration of admission and causes of deaths before and after the policy in both regions.

Conclusion: The delivery-related institutional maternal mortality did not appear to have been significantly affected after about one year of implementation of the policy.

Keywords: Exemption policy, maternal death, institutional maternal deaths, Central Region, Volta Region, Ghana.

INTRODUCTION

In late 2003, the Government of Ghana introduced a policy exempting women in the four poorest regions of the country (the three northern regions and the Central Region) attending public and private health facilities from paying user fees for delivery care. An amount of about USD 2 million was voted for this purpose. The 'fee-free' delivery policy aimed to improve levels of skilled attendance at birth and thereby reduce maternal morbidity and mortality. In 2005, the policy was extended to the remaining six regions of the country¹. As part of a multi-component study evaluating this policy, we investigated the effect of the policy on institutional maternal mortality in two regions.

The objectives of the study were to measure any effect of the intervention on hospital maternal mortality ratios (MMRs) for all maternal deaths, and focus, in particular, on delivery-related deaths, as these should be most influenced by the policy. Reported figures from the Central Region demonstrate a significant reduction in total institutional MMR from 2001 through to 2004^{2,3}. We anticipated, this trend could reverse if increasing numbers of complicated cases referred from lower level facilities or reported directly to the district hospitals in response to the free delivery care policy. We also analysed the change in the distribution of causes of the maternal death over the study period.

METHODS

Description of Study Sites

The Central Region (CR) is one of the ten regions in Ghana. It has an estimated population of 1.73 million, of which about 63% is rural. The region is divided into 13 administrative districts and has a total of 193 health facilities of which 77 are pub-

* Author for correspondence
billy.bosu@hru-ghs.org

lic-owned. Besides the three northern regions, the region has the highest levels of poverty in Ghana. Childhood mortality rates have traditionally been among the highest in Ghana although the situation has been improving steadily since 1993. For more than ten years, over 60% of deliveries in the CR have taken place at home and less than 40% of all deliveries have been attended by a skilled professional.⁴ Institutional maternal mortality ratio (MMR) in the CR was the highest in Ghana over the period from 1998 to 2000, peaking in 1998 at 656 per 100,000 live births. However, it declined sharply over a 5-year period to about the lowest level in the country. In 2004, there were 71 maternal deaths and 55,406 live births yielding an institutional MMR of 128 per 100,000 live births.

The Volta Region (VR) has an estimated population of 1.76 million, and a rural population of about 70%. It has 15 districts and a total of 288 health institutions out of which 70% are public-owned. Out of the total, 24 are hospitals. As in the Central Region, the majority of deliveries (55%) in the Volta Region take place outside of health facilities; 45% of deliveries are attended by a health professional⁴. Institutional MMR in the VR was 262 per 100,000 live births in 2004, and remained the same at 256 per 100,000 live births in 2005^{5,6}. In absolute terms, the number of maternal deaths increased from 71 in 2004 to 75 in 2005.

The study sites were public and mission-owned hospitals in Central and Volta regions reporting more than 10 annual deaths to women aged 15-49 years. There were nine such facilities in CR and 12 such facilities in VR. A before-and-after intervention study design was used. In CR, the 12-month period from January to December 2003 was taken as the pre-exemption and the equivalent period in 2004 as the post-exemption period. In VR, since the study was completed before the end of April 2006, the 11-month period from May 2004 to March 2005 was determined as the pre-exemption period and the equivalent period from May 2005 to March 2006 as post-exemption period.

Data collection

Ethical approval was obtained from the Noguchi Memorial Institute for Medical Research (NMIMR). Permission to undertake the study was obtained from the regional and district health authorities in the two regions. Data were collected by teams of field workers and supervisors, com-

prising senior nurses with training in midwifery, under the overall supervision of the researchers.

Previous work by Immpact in Central Region, using the Rapid Ascertainment Process for Institutional Deaths (RAPID) method, has shown that at least 35% of maternal deaths in hospitals are missed from routine reports⁷. RAPID, an improved method developed by Immpact for collecting data on institutional maternal deaths, involved actively looking for maternal deaths by reviewing registers and selected case notes for all deaths among women aged 15-49 years. Based on these findings we decided to maximise the quality of the data by using RAPID again to scrutinise records and identify as many maternal deaths as possible.

Hence, in each study hospital, all sources of information on deaths to women aged 15-49 years were systematically screened. These included the 'admissions and discharges' (A&D) registers in the female ward, maternity ward, outpatient department, theatre, emergency room, isolation ward, intensive care unit and the mortuary. The name of each patient, her age, hospital identification numbers, date of admission, date of death and cause of death were extracted from these sources onto a register review form.

Using identifiers obtained from the registers, the clinical notes of these patients were then retrieved from the Biostatistics Department of the hospital. Relevant clinical details on the symptoms, signs, diagnostic investigations, treatment and stated cause of death were extracted on to another clinical form. Where the inpatient number was unavailable, or the case notes could not be retrieved or were incomplete, the nurses report book was also examined for any clinical details on the inpatient deaths. Maternal deaths whose case notes were not retrieved were still included in the study if the diagnosis was evident from the register review. Maternal deaths were further screened to identify those that were delivery-related and therefore qualified for exemption from the payment of delivery-related user fees.

Outcome definitions

Delivery-related deaths are the sub-group of maternal deaths that are most likely to be affected by the intervention. It will be important to look at these separately to avoid the dilution of any effect. But it will also be important to monitor any changes in all maternal deaths to ascertain whether the increased caseload and emphasis on delivery care has a detrimental effect on these ratios.

Maternal death was defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes.⁸

Deaths occurring during labour and selected deaths in the post-partum period were considered delivery-related. Based partly on the findings from key informant interviews on the implementation of the exemption policy in a separate component study⁹, we included deaths occurring up to 10 days after delivery, and deaths which occur in hospitals following home deliveries within the 10-day period due to direct obstetric causes as delivery-related deaths. Post-abortion deaths and women dying while pregnant, regardless of cause were not regarded as delivery-related deaths.

tals in the two regions. Of these registered deaths, 1220 (78.8%) clinical notes were retrieved. After screening, a total of 334 (27.4%) maternal deaths were identified. Twenty-seven maternal deaths were identified from registers only because their case notes could not be located. A total of 198 maternal deaths occurred over the 24-month study period in the CR; 136 maternal deaths occurred over the 22-month study period in the VR.

Total Maternal Mortality Ratio

The total number of institutional deliveries in the CR increased by 33.6% from 9,439 in the pre-exemption period to 12,615 in the post-exemption period (Table 1). At the same time, the institutional MMR declined from 953 deaths per 100,000 births in the pre-exemption period to 856 per 100,000 births in the post-exemption period in the CR; the difference was not statistically significant ($p=0.45$).

Table 1 Institutional delivery-related deaths and maternal mortality ratio by phase of implementation of exemption scheme in the Central and Volta Regions

Region	Maternal Deaths			Total Deliveries			MMR/100,000 total births		
	Pre-intervention	Post-intervention	Total	Pre-intervention	Post-intervention	Total	Pre-intervention	Post-intervention	Total
Total maternal deaths									
Central	90	108	198	9439	12615	22054	953.5	856.1	897.8
Volta	80	56	136	5558	6146	11704	1439.4	911.2	1162.0
Delivery-related deaths									
Central	42	48	90	9439	12615	22054	445.0	380.5	408.1
Volta	36	24	60	5558	6146	11704	647.7	390.5	512.6

Data analysis

Data were captured with Epi Info version 6.03¹⁰ and analysed with SPSS 13.0¹¹. The institutional maternal mortality ratio based on total deaths and delivery-related deaths in the pre- and post-intervention periods in facilities within each region were compared. Denominator information comprised total births from the study hospitals reported over the same period as the maternal deaths. Proportions were compared using chi-squared statistical tests and means were compared using the Student t-test, with the level of significance set at 5%.

RESULTS

Review of Registers and Retrieval of Clinical Notes

Overall, 1549 registered female deaths were identified from the various registers in the study hospi-

tal in the VR, the number of institutional deliveries increased by 10.6% from 5,558 in the 11 months before implementation of the exemption policy to 6,146 in the same period following implementation. The institutional MMR in the VR significantly reduced by 36.7% from 1,439 per 100,000 births in the pre-exemption period to 911 per 100,000 births in the post-exemption period ($p=0.008$).

Delivery-Related Maternal Mortality Ratio

When analyses were restricted to delivery-related deaths, the institutional MMR in both the CR and VR also declined after the introduction of the exemption policy. In the CR, the delivery-related MMR decreased from 445 per 100,000 total births

to 381 per 100,000 births following the implementation of the exemption policy (Table 1). In the VR, the change was from 648 per 100,000 total births to 391 per 100,000 total births. The change in the CR was not statistically significant ($p=0.458$) while that in the VR was of borderline significance ($p=0.052$).

Table 2 Duration of admission of institutional delivery-related deaths by phase of implementation of exemption scheme in the Central and Volta Regions

Duration	Pre-exemption (%)	Post-exemption (%)	Total n (%)	P value
Central Region				
up to 1 day	29(69.0)	32(66.7)	61(67.8)	0.49
2-7 days	8 (19.0)	13(27.1)	21(23.3)	
> 7 days	5 (11.9)	3 (6.3)	8 (8.9)	
Total	42 (100)	48(100)	90(100)	
Volta Region				
up to 1 day	23(63.9)	15(62.5)	38(63.3)	0.83
2 - 7 days	7 (19.4)	6 (25.0)	13(21.7)	
> 7 days	6 (16.7)	3 (12.5)	9 (15.0)	
Total	36(100)	24(100)	60(100)	

Duration of admission prior to delivery-related deaths and Maternal Age

Two potential confounders of the relationship between the exemption policy and the level of maternal death – severity of illness and age - were examined. The duration of admission was used as a proxy for the severity of the maternal condition prior to death. It was assumed that the most severe cases died after a shorter period of admission than the less severe cases. Approximately two-thirds of the delivery-related maternal deaths in each region occurred within one day of admission. In the CR, the proportion of delivery-related deaths occurring within 24 hours of admission declined slightly between the exemption and post-exemption periods, but the proportion dying in the first week increased (Table 2). In the VR a similar pattern was observed. There appeared to be a shift to a period of two to seven days on admission before deaths occurred. None of these differences were statistically significant

The mean age of patients dying of delivery-related causes in each region did not differ statistically between the pre-exemption and post-exemption

periods. For the CR the pre-exemption mean age was 29.5 years and the post-exemption mean age 30.1 years ($p= 0.71$). The values for the VR were 30.9 years and 30.5 years respectively ($p= 0.83$)

Causes of delivery related deaths

The most common causes of deaths were severe anaemia, post-partum haemorrhage, eclampsia, obstructed labour, puerperal sepsis and malaria. No clear pattern in the causes of deaths was observed between the pre-exemption and post-exemption periods in each region. In the CR, there appeared to be more cases of eclampsia and obstructed labour in the post-exemption phase. Many patients died from multiple causes of deaths. Common non-delivery-related causes of deaths included eclampsia, abortions, ectopic pregnancy, malaria in pregnancy, HIV, liver diseases, pneumonia and heart failure.

DISCUSSION

The study demonstrated a non-statistically significant decline in delivery-related deaths in both regions following the implementation of the exemption policy. While it is not possible to attribute causality, this finding appears to refute the assumption that the free delivery care would lead to increased hospital MMRs, at least, in the short term. Two possible mechanisms could have mediated such an increase. First, it may be expected that the removal of delivery user fees would attract more severely ill women who previously sought care or died outside of public health facilities. Secondly, the quality of delivery-related care could have suffered as a result of increased workload or reduced staff morale, particularly as the implementation of the exemption policy was not accompanied by a commensurate increase in human, material and financial resources.

We found no evidence that the severity of delivery-related obstetric conditions (using the lengths of admission prior to death as a proxy) was significantly different before and after the exemption. In contrast, interventions to improve access to care at the Juaben Teaching Health Centre in the Ashanti Region of Ghana for example, led to a three-fold increase among women with complications seeking care and a 67% drop in referrals for treatment.¹²

The increase in uptake of delivery care observed in this study is supported by data from routine reports and a community survey. Routine reports from the CR suggest that institutional deliveries increased by up to 111% between 2002 and 2004 following

the introduction of the exemption policy.³ In a concurrent household survey by Immpact, it was found that the proportion of deliveries conducted in health facilities in the CR increased from 51.7% to 63.6% while that in the VR increased from 45.6% to 50.6% after the implementation of fee exemption, but the increase was not statistically significant in VR.¹³ Also consistent with our findings, an analysis of administrative data showed a 28% increase in health facility deliveries following the abolition of user fees in Uganda¹⁴.

Besides the increase in utilisation, the effect of the exemption on workload was directly assessed through health worker interviews and clinical record review in other component Immpact studies. On average, public sector midwives reported that they had to work for an extra seven to seventeen hours per week to cope with the additional workload of 8 deliveries per week¹⁵. Record review showed that the average daily number of pregnant women with hypertensive disease, haemorrhage and those undergoing Caesarean delivery increased from 3.2 to 4.2 in hospitals in the CR and from 1.6 to 2.5 in the VR¹⁶.

The apparent lack of negative effect on institutional MMR may be related to operational or methodological reasons. Operationally, it is possible that some health facilities were operating below capacity and so could easily accommodate the resulting increased workload following the exemption, particularly where the increase in workload was small. On the other hand, health workers may have worked above their capacity to contain the increased workload. Many health workers in the two regions averred a motivation to ensure successful delivery outcomes despite the increased work demands following the exemption¹⁵. This reported motivation contrasts with the situation in Uganda following the abolition of maternal user fees where staff morale suffered as a result of a 47% increase in average workload and the loss of the fee revenue that had been used to supplement staff salaries.¹⁷ Similarly, in South Africa, health workers perceived little value in their raised levels of workload and stress resulting from a 'fee-free' policy for maternal and child care as they were largely due to increased attendance by persons with self-limiting illness¹⁸.

Thus, the suggested fall in hospital MMRs may be explained by a workforce able to cope with the increase in workload, allowing quality of care to be maintained and no measurable decline in the clinical condition of women on admission. Indeed

by removing user fees, maternal outcomes would be expected to improve if this empowered women to report earlier to hospitals than they did before the exemption.

Methodologically, the design of the current study was unable to isolate the effects of the exemption policy on institutional MMR. Administrative reports showed that there was already a downward trend in institutional MMR in the Central and Volta Regions prior to the introduction of the policy, although such reports could have been affected by under-reporting. It was not possible to control for certain confounders (e.g. parity, gestational age, quality of clinical interventions) as these had not been routinely recorded in enough cases. However, the distributions of the two confounders examined (maternal age on admission and duration of admission preceding death) did not differ significantly between the pre-exemption and post-exemption period in each region. The distribution of the causes of death also appeared to be similar between the study phases.

Another methodological limitation is that the intervention period was judged at a regional level. Other component studies have shown that the period and intensity of the implementation of the exemption policy was different between districts, leading to a possible misclassification of exposure, and the dilution of any effect¹⁹.

The study design had other limitations which were probably constant across the study periods (i.e. unrelated to the exemption), and so not likely to affect the direction of the change in MMR in each region. The period of evaluation was short, resulting in relatively small numbers of deaths for inclusion in calculations and subsequent lack of statistical power to detect change. In the absence of detailed information to set definite criteria, the classification of delivery-related deaths was somewhat subjective, which may have led to misclassification and some dilution of any effect. Finally, although the denominator used in the calculation of MMRs was total births, rather than live births (and so has the effect of reducing the MMR values), this will not affect the comparisons. Despite these limitations, the before-and-after design is a useful method to assess the effect of the policy of user fee exemptions, especially where baseline data are collected before or at the time of the introduction of the intervention^{14,18}.

In order to achieve the best impact of 'fee-free' policy on maternal outcomes, supplementary

measures such as strengthening other components of the health system (e.g. logistics, personnel, funding), assuring equity, improving monitoring systems and improving geographical access are needed²⁰. The impact of the exemption policy in Ghana is hindered by its restriction to only delivery-related obstetric cases. Since the majority of maternal deaths in our study were not delivery-related, other exemption mechanisms such as health insurance may be needed for maximum coverage.

CONCLUSIONS

We conclude that the introduction of exemption from payment of delivery user fees has not been associated with a worsening of institutional MMR. Indeed, it may have contributed to a slight decline in the MMR. It would be pertinent to further monitor and evaluate the effect of the exemption policy on maternal morbidity and mortality.

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