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Mobile ultrasound scan services increases skilled delivery in rural health facilities: Lessons from a pilot public- private partnership model in rural Ghana

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Abstract:

Background: Skilled delivery at birth has been a major challenge facing developing countries. Other options aimed at increasing skilled delivery and reducing maternal mortality such as having access to ultrasound imaging still remains unexplored and absent in many rural healthcare facilities in developing regions. Aim: To evaluate the impact on skilled delivery in two rural facilities in Ghana following the introduction of a pilot mobile obstetric ultrasound program to assess the feasibility of a public- private partnership model towards improving maternal health in rural areas. Methods: Registers at the Buipe and Zabrama health centres were reviewed to determine baseline data on utilization of maternal health services in general and deliveries specifically for midyear of 2008 to 2010. Review of midyear data for 2011 after initiation of the pilot program was also carried out to enable comparison. Results: About 15 outreach visits were organized resulting in a total of 835 obstetric ultrasound scans were performed within the period. There was a significant ($p<0.0001$) increase in skilled delivery in both facilities after the program. The registration of pregnant women with the national health insurance scheme at the end of the program in Buipe had increased from 155 to 222 (43%) whiles that in Zambrama had increased from 32 to 423 (1222%). Conclusion: This study shows that public- private driven initiatives such as this, do not only have the potential of increasing skilled or facility delivery, but can go a long way towards improving maternal health care in general.

Key words: Buipe; Facility Delivery; Ghana; Mobile Ultrasound; Zambrama,

Introduction

Utilization of maternal health services is critical in attaining the Millennium Development Goal 5 [1-2]. In Ghana although antenatal care attendance has been found to be almost universal, the number of births attended to by skilled personnel still continue to remain low especially in rural areas of the country [3-4].

Although various initiatives including the implementation of the community-based health planning and services (CHPS) concept [5] and the free maternal health policy [6] have been introduced to improve access to maternal health services in Ghana, these have only led to marginal increases in antenatal care attendance and skilled delivery coverage [3].

Other options aimed at increasing skilled delivery and reducing maternal mortality such as having access to ultrasound imaging still remains unexplored and absent in many rural healthcare facilities in developing regions [7] contrary to the WHO statement that ultrasound is cost effective, safe and should be available worldwide to assist the clinician in the diagnostic process [8].

We therefore evaluate the impact on skilled delivery in two rural facilities in Ghana following the introduction of a pilot mobile (outreach) obstetric ultrasound program to assess the feasibility of a public-private partnership model towards improving maternal health in rural areas. The effect of the program on registration of pregnant women with the national health insurance scheme in order to fulfill the free maternal health care program was also evaluated.

Materials and Methods

Study area and Population

This program was carried out in Buipe and Zambrama, both rural downs in the Northern and Brong Ahafo regions of Ghana respectively from March to June 2011. Rural pregnant women on scheduled antenatal care clinic visits were involved in this program.

Program Design/Description

A local private diagnostic centre located at Kintampo in the middle belt of Ghana after haven attained accreditation from the National Health Insurance Authority to offer diagnostic services to its clients, went into an agreement with some public institutions comprising of the Kintampo Municipal Mutual Health Insurance Scheme, Buipe health centre and Zambrama rural clinic to render obstetric outreach ultrasound scan services to these health facilities.

Outreach ultrasound scan services were offered to rural pregnant women at any gestational age on scheduled antenatal care clinic days at both centres using a portable ultrasound scan unit. An electric generator was used as the source of power in Zabrama which does not have electricity and occasionally in Buipe during power outreaches. The outreach team comprised of two trained sonographers (a clinician inclusive) and a record clerk. The outreach team provided the ultrasound scan unit with its associated consumables whiles the health facilities provided the needed room, examination couch, tables and chairs needed.

During each outreach visit, women with identified obstetric complications were educated by both the outreach team and the attendant midwife. An appropriate facilitative referral process was also embarked on by the clinician of the team.

After each outreach visit, duplicate report forms are reviewed by the clinician and a summary report which contains the number of ultrasound scans performed, the complications identified and the health insurance status of the women is prepared with a copy submitted to the health centre concerned.

For the diagnostic centre to be reimbursed by the health insurance scheme, request forms will have to be filled by the attending midwife during clinic visit days after which scans are then performed. Completed claim forms are subsequently submitted to the health insurance scheme on a monthly basis for reimbursement.

Data collection and Analysis

Registers at the two health centres were reviewed to determine baseline data on utilization of maternal health services in general and deliveries specifically for mid year of 2008 to 2010 before the pilot program. Data for mid year of 2011 after initiation of the pilot program was also collected. All data collected were double-entered initially into Microsoft Access to ensure consistency and reduce the occurrence of missing values and then transferred to STATA 11 for analysis.

Ethical considerations

Permission for this outreach program was sought from the Kintampo Mutual Health Insurance Scheme, the District Health Management Teams of Central Gonja and Pru Districts and the heads of Buipe health centre and Zambrama rural clinic.

Results

In all 15 outreach visits were organized from March to June 2011, 10 of them to the Buipe Health Centre and 5 to the Zabrama Rural Clinic. A total of 835 obstetric ultrasound scans were performed within the period. The mean age of the pregnant women was 27 years with a minimum and maximum age of 14 and 46 years respectively.

Table 1: Number of deliveries with their percentage changes in the first and second quarters of 2008-2011

Deliveries per quarter	**Buipe**				**Zambrama**			
	2008	2009	2010	2011	2008	2009	2010	2011
First quarter	38	41	48	61	42	51	58	56
Second quarter	42	37	50	81	44	60	67	106
Percentage change	**10.5**	**-9.8**	**4.2**	**32.8**	**4.8**	**17.6**	**15.5**	**89.3**

Despite the insignificant increase in the number of antenatal care attendance between 2010 and 2011 in both facilities, there was a very significant ($p<0.0001$) increase in facility delivery (table 2) within the same period after a two- sample test of proportion.

Table 2: Comparative difference in percentage change of deliveries at facilities per first and second quarters of 2008-2011

Facility	**Buipe**			**Zambrama**		
Years	2008 and 2009	2009 and 2010	2010 and 2011	2008 and 2009	2009 and 2010	2010 and 2011
Difference in percentage change	0.7	5.6	28.6	12.8	2.1	73.8
P value	0.8842	0.1394	<0.0001	0.0061	0.6643	<0.0001
95% confidence interval	(-8.7 10.1)	(-2.1 13.3)	(19.9 37.3)	(21.2 44.0)	(-7.4 11.6)	(65.9 81.7)

Antenatal care

The number of pregnant women registering for antenatal care services by midyear at the Buipe health centre was 752 for 2010 and 818 for 2011 whiles that at Zambrama rural clinic was 543 and 475 for 2010 and 2011respectively.

Health facility deliveries

The number of deliveries in the first and second quarters together with the percentage changes between each quarter from 2008 to the end of the program at 2011 is shown in table1.

Registration with insurance scheme

The registration of pregnant women with the national health insurance scheme at the end of the program in Buipe had increased from 155 to 222 (43%) whiles that in Zambrama had increased from 32 to 423 (1222%).

Discussion

There was only a marginal increase in antenatal care attendance in Buipe by midyear 2011 as compared to 2010 whiles there was actually a reduction in attendance within the same period in Zambrama. These findings were consistent with the Ghana Demographic and Health Survey of 2008 [3] and inconsistent with findings of a rural and remote aboriginal community of Australia where there was a 90% increase in antenatal care attendance following the implementation of an antenatal outreach program [9]. However if this program was designed specifically targeting improvement of antenatal care attendance, then the impact might have been different.

The general increase in facility delivery from 2008 to 2011 may just be an indication of the positive impact of the pragmatic measures of the CHPS concept [5] and the free maternal health policy [6] put in place to reduce maternal mortality.

Just four months after this pilot model, the impact of the program was already beginning to be felt during a comparative midyear evaluation. The high percentage increase in facility delivery between the second and first quarters of 2011 compared to the previous year's especially in Zambrama rural clinic which is more remote goes to emphasize the significant impact of this outreach program. This significant increase in facility delivery was due mainly to the fact that danger signs and complications were picked up

early in pregnancy and women were encouraged to deliver at the facilities instead of delivering at home. The facilitative referral process and offering of specialized care by the clinician of the outreach team have also contributed to this significant increase. This finding also suggest that programs such as this, if integrated into the free delivery care policy in Ghana can be equally beneficial to the poor contrary to findings from an evaluation carried out by Initiative for Maternal Mortality Programme Assessment (Immpact) to look at the effects of the free delivery policy on utilization and quality of delivery services, delivery outcomes and the economic consequences for households [10].

The high percentage rise in registration with the national health insurance scheme was because the few who had registered initially encouraged their fellow pregnant women who did not have faith in the current existing health system to register to be able to enjoy the benefits of this program. This is particularly encouraging as it opens yet another option for improving the registration of pregnant women with the national health insurance scheme towards achieving the free maternal health policy.

Limitations of study

This study was carried out using just two rural health facilities and within a short period of time (only four months) making annual comparisons difficult. A complete year of intervention might give a better picture of this model than the findings in this study show.

Conclusion

Public- private driven initiatives such as this program do not only have the potential of increasing skilled or facility delivery, but can go a long way towards improving maternal health care in general and hence attaining the Millennium Development Goal 5.
We recommend that the ministry of health together with its stake holders involved in maternal health adapt and scale up this pilot program into a district-wide one to further assess its impact on maternal and neonatal health services in rural communities.

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