

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/266401089>

# Socio-economic differences in cost of pregnancy-related health services in the peri-urban Accra, Ghana

Article in *Journal of Public Health* · October 2014

DOI: 10.1093/pubmed/fdu072 · Source: PubMed

CITATIONS

3

READS

171

5 authors, including:



**Moses Aikins**

University of Ghana

142 PUBLICATIONS 5,155 CITATIONS

[SEE PROFILE](#)



**Richmond Aryeetey**

University of Ghana

218 PUBLICATIONS 2,973 CITATIONS

[SEE PROFILE](#)



**Phyllis Dako-Gyeke**

University of Ghana

77 PUBLICATIONS 1,188 CITATIONS

[SEE PROFILE](#)



**Philip Adongo**

University of Ghana

112 PUBLICATIONS 3,747 CITATIONS

[SEE PROFILE](#)

# Socio-economic differences in cost of pregnancy-related health services in the peri-urban Accra, Ghana

M. Aikins, R. Aryeetey, P. Dako-Gyeke, P.B. Adongo, L. McGough

School of Public Health, College of Health Sciences, University of Ghana, PO Box LG13, Legon, Accra, Ghana

Address correspondence to M. Aikins, E-mail: mksaikins@ug.edu.gh

## ABSTRACT

**Background** Financial and physical barriers are known to limit access to maternal health services in developing countries. These limitations are often compounded by the low socio-economic status of women. This study examined socio-economic differences in health services cost incurred by pregnant women.

**Methods** A cross-sectional cost survey of 300 women who had delivered a live birth in the last 12 months was undertaken.

**Results** Majority of the women were aged between 20 and 39 years. About 63% of the women claimed they were registrants of the National Health Insurance Scheme (NHIS). However, only 64% of them provided valid NHIS identification cards. There were relatively more insured women in the rich quintiles (44%) compared with insured women in the poor quintiles (33%). Generally, women who were in the rich quintile incurred the highest average medical and non-medical costs, spent the highest time prior to service provision and lost the highest average incomes.

**Conclusions** Women socio-economic differences play a critical role in access to health services. We recommend that awareness campaigns on the NHIS must be intensified. The Ghana Health Services through its Community-based Health Planning Service should carefully structure its home visits to cover education on pregnancy-related health services.

**Keywords** economics, health services, public health

## Introduction

Cost studies on reproductive health have generally focused on components of reproductive health care,<sup>1</sup> cost estimation of a reproductive health unit and demand for its services,<sup>2</sup> changes in cost of women's health services and efficiency,<sup>3</sup> costing of hospital maternity services,<sup>4</sup> determination of appropriate prices for reproductive health services<sup>5</sup> and effect of user fees on maternity services.<sup>6</sup> Other cost studies on antenatal services have looked at costs incurred by poor- and high-risk pregnant women,<sup>7</sup> prenatal care cost,<sup>8</sup> estimation of the costs of prenatal, delivery-related and post-partum health care,<sup>9</sup> quality and access to antenatal care<sup>10</sup> and cost of antenatal examinations and interventions.<sup>11</sup> Invariably, most of the cost studies on pregnancy have focused on the ability and willingness to pay for services,<sup>12</sup> estimated resource use and costs associated with routine obstetric ultrasound and follow-up tests,<sup>13</sup> estimated government spending on unintended pregnancies<sup>14</sup> and the cost of pregnancy and puerperium-related care.<sup>15</sup>

However, there are relatively few studies on the cost of maternal health services in Ghana. These studies have mainly focused on evaluation of free government maternal health policy,<sup>16,17</sup> estimation of cost recovery levels of reproductive health services,<sup>18</sup> economic factors affecting choice for antenatal care<sup>19</sup> and factors influencing utilization of antenatal and maternal health-care services.<sup>20,21</sup> There is therefore a paucity of data on pregnancy-related health-seeking behaviour and its associated cost.

The 2008 Demographic and Health Survey reported that although 95% of Ghanaian women seek care from a skilled

M. Aikins, Associate Professor

R. Aryeetey, Senior Lecturer

P. Dako-Gyeke, Lecturer

P.B. Adongo, Associate Professor

L. McGough, Lecturer

provider during pregnancy, only about half of them accessed antenatal care during the first trimester when appropriate care is critical.<sup>22</sup> In addition, one-fifth of pregnant women did not make four or more antenatal visits as recommended by WHO. At delivery, ~40% of women did not have access to delivery services provided by an adequately resourced health facility or a skilled provider. Physical and financial barriers are known to inhibit utilization of health services across the country, a situation often compounded by the relatively low socio-economic status of women.

In its efforts to reduce financial barriers and also help curb maternal and perinatal mortality, the Government of Ghana introduced delivery fee exemptions for pregnant women in September 2003 in the four most deprived regions of the country, namely Upper West, Upper East, Northern and Central regions. In April 2005, this exemption was extended to cover the whole country.<sup>23–26</sup> Services covered by the exemption policy include normal deliveries, assisted deliveries including Caesarean operation and management of medical and surgical complications arising out of deliveries, including the repair of vesico-vaginal and recto-vaginal fistulae.<sup>23</sup> The policy covered delivery services provided in public, private and faith-based health facilities.<sup>27</sup> This policy was sponsored through the debt relief fund under the Highly Indebted Poor Countries initiative. This was gradually phased out and was replaced by health insurance in 2008.<sup>26</sup>

The Millennium Development Goal 5 is to improve maternal health, especially in poor and high fertility countries where women have an elevated risk of dying during childbirth.<sup>28</sup> In Ghana, for every 100 000 live births, an estimated 580 women die in pregnancy and childbirth each year.<sup>29</sup> Maternal deaths are often attributed to haemorrhage, sepsis and hypertensive complications resulting from sub-optimal access to skilled routine and emergency care. Generally, these conditions are seen as outcomes of social, economic and political factors.

## Objective

This study examined socio-economic differences in cost incurred for accessing health services by women who have just delivered live birth in the Ga East district of Ghana.

## Methods

We carried out this study in the Ga East district located in the north-eastern part of the Greater Accra region, Ghana. The district has four sub-districts, out of which Taifa-Kwabanya and Madina sub-districts were purposively selected for this study. Taifa-Kwabanya was selected because it is a developing

community with limited number of public-managed health facilities, and limited access to health care, including pregnancy and delivery care. Residents in this area seek care from central Accra, and facilities in neighbouring communities such as Pokuase, Nsawam and Amasaman. Madina, on the other hand, is more urbanized with better access to social services including health-care facilities and public transportation. Most of the public health facilities in the Ga East district are located in the Madina sub-district. Thus, it served as a good comparison for Taifa-Kwabanya sub-district.

The district is a mix of urban, peri-urban and rural communities, although mainly urbanized. The estimated population was 294 121, has a growth rate of 4.5% and is 76% urban. The 2008 Annual Health Report showed supervised delivery (31.8%) and antenatal clinic attendance (69.2%)<sup>30</sup> in the district were below national averages, therefore making Ga East an important site for this study.

A cross-sectional study design and the survey method were used for data collection. The 300 women included in the survey had delivered a live birth in the last 12 months. Data were collected between November 2011 and April 2012. We collected data on care-seeking patterns and associated cost. Expected pregnancies in the district were ~11 765 and supervised delivery was 31.8%.<sup>30</sup> The study sample was thus estimated to be large enough to detect a 20% variation in supervised delivery. Therefore, 300 mothers were required to achieve 80% power at 5% two-sided level of significance. To select respondents for the survey, each selected sub-district was subdivided into clusters. Eligible women in the clusters were selected through systematic sampling of every other house beginning from a randomly selected house from the community map.

Face-to-face interviews were conducted by trained field staff, who administered the questionnaires. The questionnaire had three main sections: (i) a household roster describing household and demographic characteristics including household assets; (ii) a care-seeking tool describing women's care-seeking behaviour, places where care was sought, barriers and access to care services and (iii) a Standard Patient Cost Questionnaire which documented women's pathways to care seeking and the costs of seeking health care during pregnancy and delivery.

Service providers were classified into modern health facilities, traditional health/herbalist, spiritualist/prayer camp, drug shops and also self-medication. The health insurance status of the women was ascertained by confirming a woman's possession of a valid National Health Insurance card. The expenditure centres at the point of service delivery were consultation, medication, donation/gifts, transportation, food and other services. The associated costs incurred were estimated in terms of total and average costs. Indirect costs

were also classified into time spent at health facility, number of work days lost seeking care and income lost while seeking care for both the pregnant woman and her accompanying household member or helper.

We used principal component as the main statistical technique to classify relative wealth from households' ownership of selected assets. The wealth index placed individual households on a continuous scale of relative wealth. We then categorized the women into quintile groups (i.e. poorest, poor, middle, rich and richest). Finally, we converted all the costs into their US dollar equivalent using the Bank of Ghana Interbank Exchange rate average equivalent for 2012. Microsoft Excel programme was used for the estimations and drawing of graphs.

Ethical approval for this study was obtained from the Institutional Review Board of the Noguchi Memorial Institute for Medical Research, University of Ghana, Legon, Accra. Also, the researchers obtained written permission from the Municipal Director of Health Services, Ga East, Accra. In addition, verbal consent was received from all respondents after explaining the purpose of the study and their right to withdraw their participation at any time.

## Results

### Demographic characteristics of respondents

Table 1 shows that in both Taifa-Kwabanya and Madina, 45% of women surveyed resided in households with four to five persons. Majority of the women (95%) were aged between 20 and 39 years, with a mean age of  $29.1 \pm 5.4$  years. Also, majority of the women (79.9%) had completed at least Junior High School and ~44% were engaged in trading and 29% in artisanal occupations, such as hairdressing and dressmaking. Most women identified themselves as Christians (82.7%) and were either married or living with a partner in a cohabiting relationship (94.4%).

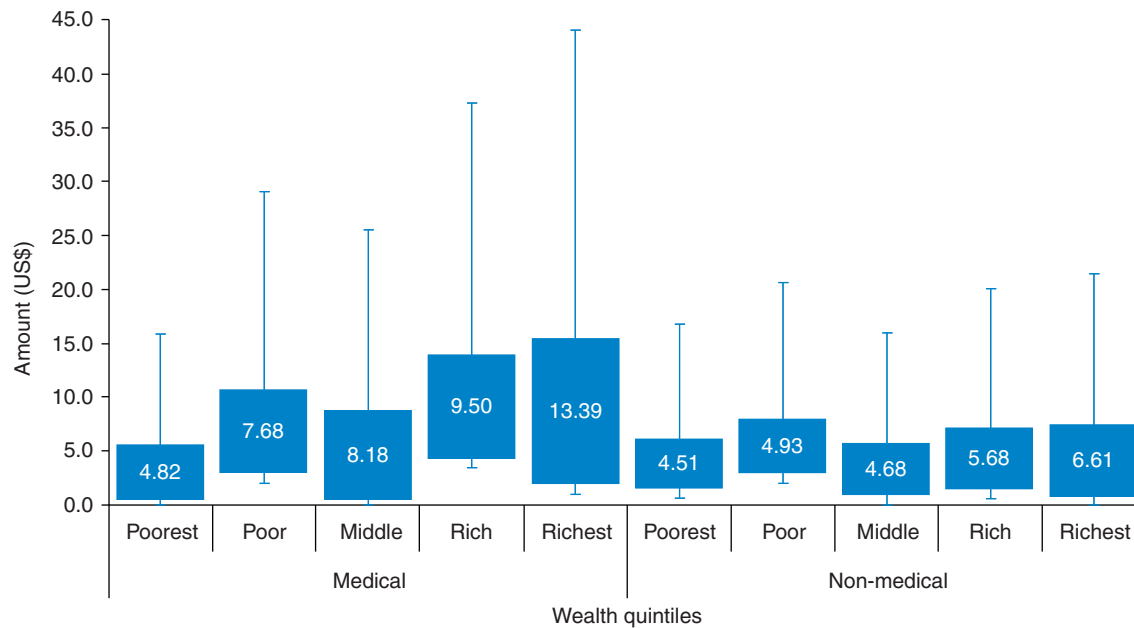
### Direct cost of pregnancy-related health services

About 63% of the women were registrants of the NHIS, but only 64% of them provided valid NHIS identification cards. There were relatively more insured women in the rich quintiles (44%) compared with insured women in the poor quintiles (33%). However, there was no significant difference between the groups ( $P = 0.1$ ). Thus, women in the rich quintiles are seemingly more financially protected than those in the poor quintiles. During pregnancy, women incurred various types of out-of-pocket expenditures (i.e. medical and non-medical) at points of service delivery. These costs were for consultation, medication, donation/gifts, transportation, food and other services. Figure 1 shows the average medical and non-medical

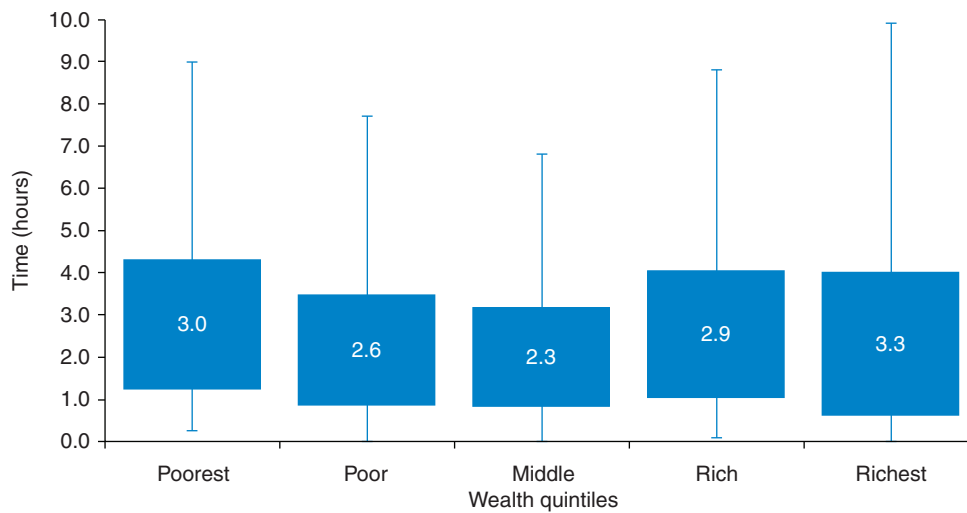
**Table 1** Background characteristics of study participants ( $n = 300$ )

Characteristics	Taifa-Kwabanya, n (%)	Madina, n (%)	Total, n (%)
<b>Household size</b>			
2–3	61 (33.9)	36 (30.0)	97 (32.3)
4–5	83 (46.1)	52 (43.3)	135 (45.0)
>5	36 (20.0)	32 (26.7)	68 (22.7)
<b>Age groups</b>			
<20 years	5 (2.8)	2 (1.7)	7 (2.3)
20–29 years	103 (57.2)	54 (45.0)	157 (52.3)
30–39 years	66 (36.7)	61 (59.0)	127 (42.3)
40–49 years	6 (3.3)	3 (2.5)	9 (3.0)
<b>Education completed</b>			
None	13 (7.2)	14 (11.9)	27 (9.1)
Primary	20 (11.1)	13 (11.0)	33 (11.1)
JHS/middle	97 (53.9)	48 (40.7)	145 (48.7)
Secondary	32 (17.8)	31 (26.3)	63 (21.1)
Post-secondary	18 (10.0)	12 (10.2)	30 (10.1)
<b>Current occupation</b>			
Unemployed	36 (20.0)	15 (12.7)	51 (17.0)
Trading	87 (48.3)	44 (36.7)	131 (43.7)
Artisan	43 (23.9)	43 (35.8)	86 (28.7)
Other	14 (7.8)	18 (15.0)	32 (10.7)
<b>Religion</b>			
Christian	167 (92.8)	81 (67.5)	248 (82.7)
Muslim	8 (4.4)	36 (30.0)	44 (14.7)
Other	5 (2.8)	3 (2.5)	8 (2.7)
<b>Marital status</b>			
Single	9 (5.0)	8 (6.7)	17 (5.7)
Married	101 (56.1)	90 (75.0)	191 (63.7)
Cohabiting	70 (38.9)	22 (18.3)	92 (30.7)
Total	180 (100)	120 (100)	300 (100)

costs by wealth quintiles with standard deviations. For medical costs, the richest quintile incurred the highest average cost of US\$ 13.39 and the poorest incurred the lowest cost of US\$ 4.82. A similar pattern was observed for non-medical costs: where the richest quintile recorded highest average cost (US\$6.61) and the poorest had the lowest average cost (US\$4.51). Further analyses by provider type show that the total cost incurred at the health facilities was US\$ 13 896.86, of which medication accounted for 40%, transportation 27%, food 18% and consultation 16%. Similarly, the total cost incurred at the traditional healer/herbalist was US\$ 899.19, of which transportation accounted for 44%, medication 38%, food 11%, consultation 4% and other services 3%. The total cost incurred at the spiritualist/prayer camp was US\$ 369.67, of which transportation accounted for 30%, other services 26%, donations 25%, consultation 11% and food 8%. Self-medication was also estimated at US\$ 133.23 with a mean of US\$ 5.79.



**Fig. 1** Average medical and non-medical costs by wealth quintiles (US\$).



**Fig. 2** Average waiting time prior to service provision (hours).

## Indirect cost of pregnancy-related health services

### Waiting time prior to service provision

Figure 2 shows that richest women on average spent the highest time (3.3 h), whilst the middle group had the lowest time (2.3 h). Also, differences were found in the average time spent prior to service provision at the health facility (2.1 h), traditional healer/herbalist (3.1 h) and the spiritualist/prayer camp (2.3 h).

### Estimated income lost for seeking health care

Figure 3 shows that the rich lost the highest average income (US\$ 28.17) and the poorest lost the lowest income (US\$

10.96). Women who sought services at health facilities lost the highest average income (US\$ 36.61) compared with those who utilized services offered by the traditional healer/herbalist (US\$ 35.73) and the spiritualist/prayer camp, where no income losses were reported (see Fig. 4).

## Discussion

### Main findings of this study

This was a cross-sectional study which examined cost associated with pregnancy-related health-care services in the Ga East district of Ghana. Majority of the women were between

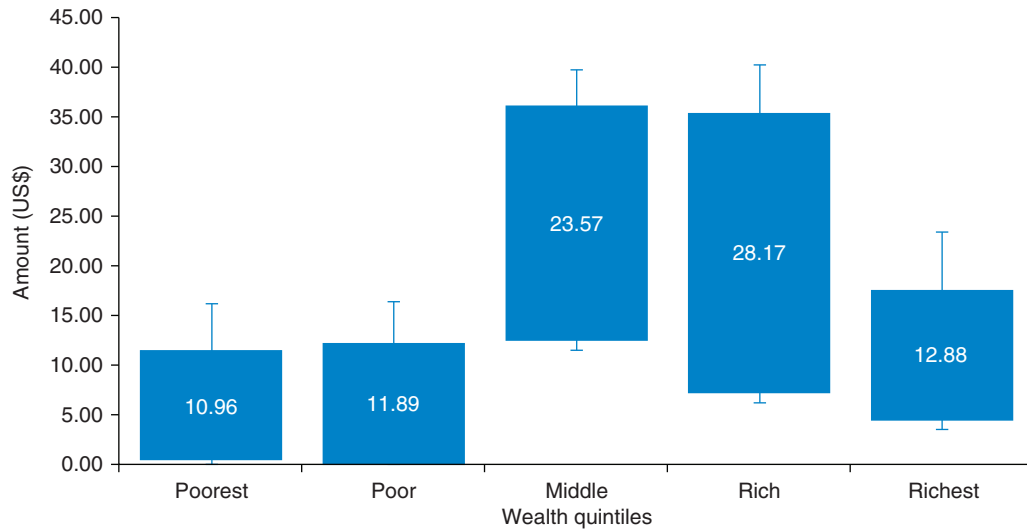


Fig. 3 Average income lost for seeking health-care services (US\$).

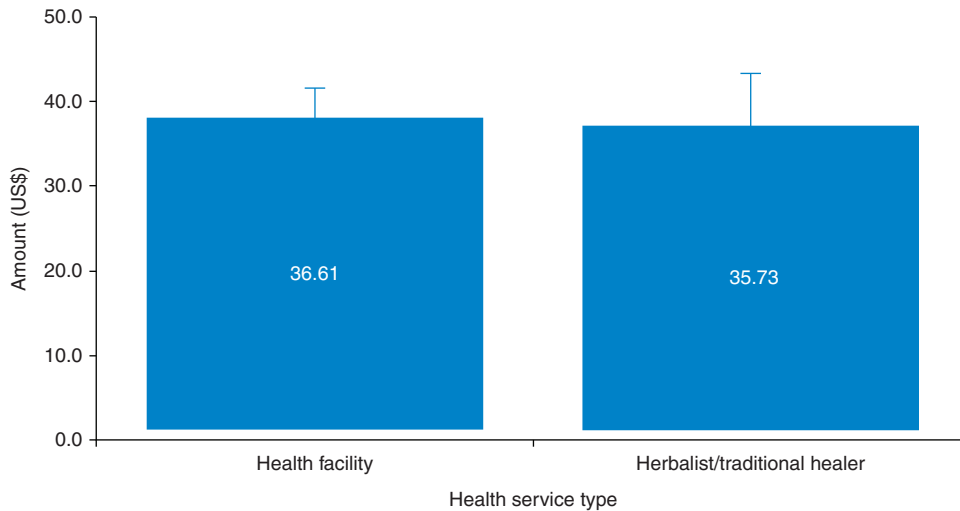


Fig. 4 Average income lost by type of health-care services (US\$).

ages 20 and 39 years, had completed at least Junior High School, identified themselves as Christians and were either married or living with a partner in a cohabiting relationship. About 63% of the women were registrants of the NHIS, out of which 64% provided valid NHIS identification cards. Unfortunately, the study results show that women in the poor quintiles are relatively less protected financially, compared with their rich counterparts. This shows that NHIS alone cannot offer financial protection for the poor and vulnerable women. There is therefore the need to explore other viable income-generating ventures for women to improve their livelihood. The richest quintile incurred the highest average medical cost of US\$ 13.39 and the poorest incurred the lowest cost of US\$ 4.82. This may be due to the fact that women who were within the rich and richest quintiles could

afford the cost of health services, especially, the modern health facility services compared with women who were within the poor and poorest quintiles. A similar pattern was observed for non-medical costs. The total health service cost incurred at the health facilities was the highest and the lowest was self-medication. Furthermore, the richest women on average spent the highest time of 3.3 h prior to service provision. The average time spent for services at the traditional healer/herbalist was the highest (3.1 h). Generally, the rich and middle quintiles lost the highest average incomes, whilst women who sought health-care services at health facilities lost the highest average income of US\$ 36.61. Similarities in income lost by women who were within the poorest (US\$ 10.96) and richest (US\$ 12.88) quintiles may be attributed to under-reporting among those in the richest quintile. This may

also be due to the fact that the selected assets used to estimate wealth quintiles were not discriminatory enough to provide clear distinctions between quintiles. This implies that conclusions drawn on utilization of health services and health-care-seeking behaviour by socio-economic status of women from this study must be done with some caution. Access has been previously reported by a population-based survey in Ghana, which identified financial and physical access as major problems why women do not seek antenatal care or deliver at health facilities.<sup>29</sup> However, studies on use of pregnancy-related health services and socio-economic status of women can hardly be found in the current literature.

### What is already known on this topic?

Financial barriers are known to limit utilization of health services. However in the case of reproductive health, most cost studies have focused on general reproductive health services<sup>2,3,5</sup> and maternal health services.<sup>4,6</sup>

In the case of pregnancy-related cost studies, the antenatal services costs range from the risk status of pregnancy,<sup>7</sup> prenatal care,<sup>8,9</sup> quality and access to antenatal care<sup>10</sup> and to antenatal examinations and interventions.<sup>11</sup> Whilst the remaining pregnancy cost data are mostly in the areas of the ability and willingness to pay for services,<sup>12</sup> resource use and costs associated with routine obstetric ultrasound and follow-up tests,<sup>13</sup> government spending on unintended pregnancies,<sup>14</sup> and the cost of pregnancy and puerperium-related care.<sup>15</sup> Nonetheless, there is generally little cost data on direct and indirect costs of pregnancy-related health services categorized by socio-economic status.

### What this study adds

This study provides data on socio-economic differences in health service cost incurred by pregnant women. The main focus of this study was direct and indirect costs of pregnancy-related health services. The direct cost provides data on the out-of-pocket expenditure on medical and non-medical services according to socio-economic statuses, whilst the indirect costs cover waiting time prior to service provision and income lost for seeking health care. Such cost data may bring out the cost burden confronting women of different socio-economic statuses when seeking health care.

### Limitation of this study

This is a cross-sectional study which provides a snapshot of differences in cost by the identified socio-economic groups. Longitudinal studies would have provided a more consistent cumulative data. A larger sample size in terms of coverage of all the sub-districts in the Ga East district would have improved the representativeness and made generalization of

these findings in the district more meaningful. Lastly, self-reporting, especially the information on out-of-pocket expenditures and household ownership of assets, may not be accurate due to recall bias and exaggeration. However, cross-sectional studies have vital roles to play in research. This study has provided data on the cost description and the characteristics associated with it (i.e. socio-economic status) which is useful for planning future services. The rigorous data collection approach used and the ethical issues considered validate the results obtained from this study.

### Conclusions

Women socio-economic differences play a critical role in access to health services. We recommend that awareness campaigns on the NHIS must be intensified. Also eligible women must be encouraged to enrol. The Ghana Health Services through its Community-based Health Planning Service must carefully structure its home visits to cover education on pregnancy-related health services.

### Acknowledgements

We would like to thank the University of Ghana Research Fund provided through the University of Ghana's Office of Research, Innovation and Development (ORID). Finally, we are grateful to our women respondents, care providers and health care managers of the Madina and Taifa facilities.

### References

- Mitchell MD, Littlefield J, Gutter S. Costing of reproductive health services. *Int Fam Plann Perspect* 1999;**25**(Suppl.):17–21, 29.
- Bratt JH, Valdez A, Molina R *et al.* Setting prices for reproductive health services in a public hospital in Guatemala. [https://usaid.gov/pdf\\_docs/PNACL862.pdf](https://usaid.gov/pdf_docs/PNACL862.pdf) (13 March 2014, date last accessed).
- Angeles G, Gaete R, Stewart JF. Cost and efficiency of reproductive health service provision at the facility level in Paraguay. <https://www.cpc.unc.edu/measure/publications/wp-02-45> (13 March 2014, date last accessed).
- Borghji J, Bastus S, Belizan M *et al.* Costs of publicly provided maternity services in Rosario, Argentina. *Salud Publica de Mexico* 2003;**45**:27–34.
- Munguti N, Mokuu M, Homan R *et al.* Cost analysis of reproductive health services in PCEA Chogoria Hospital, Kenya. [http://www.populationcouncil.net/pdfs/frontiers/FR\\_FinalReports/kenya\\_chogoria.pdf](http://www.populationcouncil.net/pdfs/frontiers/FR_FinalReports/kenya_chogoria.pdf) (13 March 2014, date last accessed).
- Pearson L, Gandhi M, Admasu K *et al.* User fees and maternity services in Ethiopia. *Int J Gynecol Obstet* 2011;**115**:310–5.
- Stringer M. Personal costs associated with high-risk prenatal care attendance. *J Health Care Poor Underserved* 1998;**9**:222–35.
- Gesse T, Golembeski S, Potter JL. Cost analysis of prenatal care using the activity-based costing model: a pilot study. *J Perinat Educ* 1999;**8**:20–7.

- 9 Thomson Healthcare. The healthcare costs of having a baby. [http://www.marchofdimes.com/downloads/The\\_Healthcare\\_Costs\\_of\\_Having\\_a\\_Baby.pdf](http://www.marchofdimes.com/downloads/The_Healthcare_Costs_of_Having_a_Baby.pdf) (13 March 2014, date last accessed).
- 10 Hoxha I, Bajraktari I, Kotori V. Antenatal care in Kosovo quality and access. [http://www.unicef.org/kosovo/Kujdesi\\_Antenatal\\_-\\_Anglisht\(per\\_Web\)02.pdf](http://www.unicef.org/kosovo/Kujdesi_Antenatal_-_Anglisht(per_Web)02.pdf) (13 March 2014, date last accessed).
- 11 Banta D. What is the Efficacy/effectiveness of antenatal care and the financial and organisational implications? <http://www.euro.who.int/Document/E82996.pdf> (13 March 2014, date last accessed).
- 12 Schuler RS, Bates LM, Islam K. Paying for reproductive health services in Bangladesh: intersections between cost, quality and culture. *Health Policy Plann* 2002;**17**:273–80.
- 13 Henderson J, Bricker L, Roberts T *et al*. British National Health Service's and women's costs of antenatal ultrasound screening and follow-up tests. *Ultrasound Obstet Gynecol* 2002;**20**:154–62.
- 14 Thomas A, Monea E. The public cost of pregnancy. [http://www.brookings.edu/~media/Files/rc/papers/2011/03\\_pregnancy\\_public\\_cost\\_monea\\_thomas/03\\_pregnancy\\_public\\_cost\\_monea\\_thomas.pdf](http://www.brookings.edu/~media/Files/rc/papers/2011/03_pregnancy_public_cost_monea_thomas/03_pregnancy_public_cost_monea_thomas.pdf) (13 March 2014, date last accessed).
- 15 Sarowar MG, Medin E, Gazi R *et al*. Calculation of costs of pregnancy and puerperium related care: experience from a hospital in a low-income country. *J Health Popul Nutr* 2010;**28**(3):264–72.
- 16 IMMPACT Project: implementation of free delivery policy in Ghana. [http://www.immpactinternational.org/uploads/files/Ghana\\_Implementation\\_of\\_Free\\_Delivery\\_Policy\\_in\\_Ghana\\_2005.pdf](http://www.immpactinternational.org/uploads/files/Ghana_Implementation_of_Free_Delivery_Policy_in_Ghana_2005.pdf) (13 March 2014, date last accessed).
- 17 Odame EA. Costing of free maternal health services under the National Health Insurance Scheme in Osu-Klottey Sub-Metro. MPH thesis. University of Ghana, Health Policy Planning and Management Department, 2009.
- 18 Boateng J, Surnye H, Mensah A *et al*. Cost of reproductive health services provided by four CHAG hospitals. [http://www.popcouncil.org/pdfs/frontiers/FR\\_FinalReports/ghana\\_CHAG.pdf](http://www.popcouncil.org/pdfs/frontiers/FR_FinalReports/ghana_CHAG.pdf) (13 March 2014, date last accessed).
- 19 Overbosch GB, Nsowah-Nuamah NNN, van den Boom GJM *et al*. Determinants of antenatal care use in Ghana. *J Afr Econ* 2006;**13**:277–301.
- 20 Agboolah AR. Utilization of antenatal care services in Atwima Nwabiagya District. MPH thesis. Kwame Nkrumah University of Science and Technology, Department of Community Health (SMS). 2009.
- 21 Arthur E. Wealth and antenatal care use: implications for maternal health care utilisation in Ghana. *Health Econ Rev* 2012;**2**:14.
- 22 Ghana Statistical Service (GSS), Ghana Health Service (GHS), and ICF Macro. Ghana Demographic and Health Survey 2008. GSS, GHS and ICF Macro 2009.
- 23 Ministry of Health. *Guidelines for Implementing the Exemption Policy on Maternal Deliveries*. Accra: Ministry of Health, Accra, 2004.
- 24 Bosu WK, Bell JS, Armar-Klemesu M *et al*. Effect of delivery care user fee exemption policy on institutional maternal deaths in the Central and Volta Regions of Ghana. *Ghana Med J* 2007;**41**(3):118–24.
- 25 Witter S, Arhinful DK, Kusi A *et al*. The experience of Ghana in implementing a user fee exemption policy to provide free delivery care. *Reprod Health Matters* 2007;**15**(30):61–71.
- 26 Witter S, Adjei S, Armar-Klemesu M *et al*. Providing free maternal health care: ten lessons from an evaluation of the national delivery exemption policy in Ghana. *Global Health Action* 2009. doi:10.3402/gha.v2i0.1881.
- 27 Ofori-Adjei D. Ghana's free delivery care policy. *Ghana Med J* 2007;**41**(3):94–5.
- 28 United Nations. United Nations Millennium Declaration, 55/2. Resolution adopted by the General Assembly 2000. <http://www.un.org/millennium/declaration/ares552e.htm> (20 November 2013, date last accessed).
- 29 Ghana Statistical Service. Ghana Maternal Health Survey 2007. Ghana Health Service: Macro International Inc., 2009, xvii. [http://pdf.usaid.gov/pdf\\_docs/PNADO492.pdf](http://pdf.usaid.gov/pdf_docs/PNADO492.pdf) (20 November 2013, date last accessed).
- 30 Ghana Health Services. Ga East District Annual Report, 2008.