

Quality of antenatal and childbirth care in northern Ghana

E Duysburgh,^a A Williams,^b J Williams,^b S Loukanova,^c M Temmerman^{a,d}

^a International Centre for Reproductive Health (ICRH), Ghent University, Ghent, Belgium ^b Navrongo Health Research Centre, Navrongo, Ghana ^c Department of Public Health, University of Heidelberg, Heidelberg, Germany ^d Department of Reproductive Health and Research, World Health Organization, Geneva, Switzerland

Correspondence: Dr E Duysburgh, International Centre for Reproductive Health (ICRH), Ghent University, De Pintelaan 185, UZP114, 9000 Ghent, Belgium. Email els.duysburgh@ugent.be

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The QUALMAT research project aims to improve maternal and newborn health by improving the quality of antenatal and childbirth care provided in primary healthcare facilities. Within the frame of this project, a comprehensive quality assessment took place in selected health centres in northern Ghana. The results of this assessment showed that overall quality of routine antenatal and childbirth care was satisfactory, although some critical gaps were identified. Counselling and health education practices need

to be improved; laboratory investigations are often not performed; examination and monitoring of mother and newborn during childbirth are inadequate; partographs are often not used and poorly completed; and equipment to provide assisted vaginal deliveries was absent.

Keywords Antenatal care, childbirth, Ghana, maternal and newborn health, quality of care.

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Introduction

QUALMAT project description

QUALMAT (Quality of Maternal and Prenatal Care: Bridging the Know-do Gap) is an intervention research project aiming to improve maternal and newborn health by improving the quality of care provided at primary healthcare facilities through addressing, at provider level, the existing gap between 'knowing what to do' and 'doing what you know'. To address this, two kinds of interventions have been implemented: (1) performance-based incentives to increase health workers' motivation; and (2) a computer-assisted clinical decision support, which will help providers to comply with established standards of care. QUALMAT is a multi-country study implemented in Burkina Faso, Ghana and Tanzania. The project is funded by the European Union and runs from 2009 to 2014. Success of the QUALMAT intervention is measured by a quality of care assessment comparing quality of care provided by intervention and non-intervention primary healthcare facilities and before and after the interventions.

In this case study we describe the findings of the quality assessment conducted in Ghana at the start of the QUALMAT project. Our objective was to measure overall quality

of routine antenatal and childbirth care and to identify areas for improvement. In addition, the study also looked at the quality of lifesaving practices concerning the major causes of maternal and newborn death, being postpartum haemorrhage, hypertensive disorders in pregnancy (pre-eclampsia/eclampsia), infections/sepsis and obstructed labour. It also assessed the quality of other important maternal and newborn health issues such as malaria and tetanus prophylaxis and HIV/AIDS and syphilis screening and management.

Maternal and newborn health in Ghana

In Ghana, the maternal mortality ratio declined from 394 maternal deaths per 100 000 live births in 1990 to 328 in 2011. This corresponds to an annual rate of decline of 0.9%, far less than the 5.5% needed to reach the Millennium Development Goal 5 (MDG5) target to reduce the maternal mortality ratio by 75% between 1990 and 2015. The 2011 early neonatal mortality (0–6 days) rate was estimated at 20 deaths per 1000 live births, the late neonatal mortality rate (7–28 days) at 5 deaths per 1000 live births and the under-5 mortality rate was estimated at 62 per 1000 live births. The annual decline of under-5 mortality in Ghana between 1990 and 2011 was 3.2%, also less than the 4.4% decline needed to reach the MDG4 target, which aims

to reduce the mortality rate in children under 5 years old by two-thirds between 1990 and 2015.¹ Haemorrhage is the largest single cause of maternal death (24%) in Ghana. Sepsis and other, not classified, infections account for 22% combined, hypertensive disorders for 9% and obstructed labour for 4% of the maternal deaths.² In Upper East Region, the region where the QUALMAT study districts are located, 98% of pregnant women receive antenatal care (ANC) from a skilled provider and 47% of the deliveries are conducted by a skilled provider.²

Maternal health care is free of charge for all women in Ghana, also for those who are not enrolled in the National Health Insurance Scheme. The services provided free of charge include ANC, childbirth, caesarean section, management of emergency obstetric conditions, and postnatal care.²

Quality of care

Quality is not easy to measure or to define and although there is no universally accepted definition of 'quality care', it is widely acknowledged that it embraces multiple levels, from patient to health system, and multiple dimensions, including safety as well as efficiency.³ All quality assessment frameworks emphasise that quality includes the quality of the 'provision of care' and the quality of the 'users' experience of care' and that to assess the quality it is needed to assess 'structure' (the attribute of settings in which care occurs), 'process' (what is actually done in giving and receiving care) and 'outcome' (the effects of care on the health status of individuals and population) of provided care and services.⁴⁻⁷

Quality measurement of antenatal and childbirth care

This study took place in Kassena-Nankana (East and West) and Builsa Districts, located in the Upper East Region in

northern Ghana. In each district, six primary healthcare facilities with maternity units (called 'health centres' in the Ghanaian setting) were selected for this study. Quality was assessed in all selected facilities. Some general characteristics of these facilities are given in Table 1.

A detailed description of the study design and sample size was published in 2013 in *Tropical Medicine and International Health*.⁸ As described in this paper, World Health Organization guidelines on antenatal and child-birth care were used as the standard for good QoC^{9,10} and four sets of tools were employed to measure QoC: (1) health facility surveys, (2) direct observation studies, (3) satisfaction surveys (exit interviews) and (4) document reviews of patient records and maternal and child health registers at the health facilities and districts. Tool 1 records availability of material and human resources, tools 2 and 4 measure quality of actual care provided, and tool 3 explores women's satisfaction with care received.^{7,8,11-13}

For each study tool, we developed structured checklists or questionnaires and defined a scale of quality measurement. The way this quality measurement was performed is described in detail in the paper published in *Tropical Medicine and International Health*.⁸ In summary, for the health facility survey and the observation study, quality scores range from '1' if all commodities were available and in good working condition, or if all activities were observed and performed according to accepted standards, to '0' if this was not the case. For the satisfaction survey, scores range from '+2' meaning 'very satisfied' to '-2' meaning 'very unsatisfied'.

Data collection took place between June and September 2010. Apart from the exit interviews, all data collection was done by certified midwives. The interviews were conducted by fieldworkers with secondary school education.⁸ Data were double entered in EPI INFO v. 3.5.1 and analysed in STATA/IC 11.2. We used the Wilcoxon–Mann–Whitney test

Table 1. General characteristics of the research primary healthcare facilities

Research PHC facilities	Type of facility	Catchment area population	Number of healthcare professionals*	Number of ANC consultations in 2009	Number of deliveries in 2009
		Median (range)	Median (range)	Median (range)	Median (range)
Six health centres in Kassena-Nankana District	Five public, one private not-for-profit (faith based)	14 464 (8519–16 003)	10 (7–14)	1544 (828–5077)	158 (92–337)
Six health centres in Builsa District	Five public, one private not-for-profit (faith based)	11 368 (2083–20 444)	7 (2–12)	1182 (269–2220)	136 (64–257)

Source: Data collected during the health facility survey conducted in June 2010.

*Healthcare professionals include nurse, midwife and nursing assistant.

to identify statistically significant differences in quality of the routine antenatal and childbirth care between the two study districts. The *P*-values are given.

Ethics

Ethical clearance was granted by the Institutional Review Board of the Navrongo Health Research Centre, Ghana and by the Ethics Committee of the University of Ghent, Belgium.

Results

Weaknesses and strengths in quality of routine ANC and childbirth care

Quality scores obtained for routine antenatal and childbirth care were reasonably high (Tables 2 and 3) with total scores ranging from 0.72 to 0.80 for the health facility surveys, from 0.67 to 0.85 for the observation studies and from 0.75 to 1.13 in the satisfaction surveys. The scores are fairly consistent between the two study districts, with the only significant differences in QoC being for the childbirth health facility survey and the technical performance in the childbirth observation study.

Looking in more detail at the ANC quality scores, we found that in the observation study some technical performance aspects—laboratory examination, counselling and management and treatment—scored poorly. History taking was also rather weak. In the satisfaction survey, counselling was also least rewarded and laboratory examination scored low in the review of patient records as well. Items with high scores were interpersonal performance, continuity of care and performance of clinical examination. Interpersonal performance reflects patient-centredness of care and includes variables such as friendliness, privacy and respect shown by the health providers towards the client. Continuity of care reflects intra-facility continuity of care.

In the childbirth study, the observation study found poor technical performance scores with inadequate counselling and history taking, and poor examination, monitoring and care of mother and newborn. Quality scores for these aspects were better in Builsa district than in Kassena-Nankana district. Counselling and health education received the lowest scores in the childbirth satisfaction survey. Interpersonal performance and delivery of the newborn and the placenta scored high in the two districts.

Overall health facility survey scores were relatively high, indicating that most key supplies and commodities were available. Yet more detailed observation of the individual variables part of the different variable groups identified important gaps. We found that a vacuum extractor or obstetric forceps was unavailable (Table 6), meaning that none of the facilities had the ability to

provide assisted vaginal delivery and therefore none met the required standards for basic emergency obstetric care.¹⁴

This finding indicated the need to conduct a more detailed analysis of the individual variables, which we did by assessing the QoC for specific obstetric complications and maternal and newborn health issues.

Quality of care of specific obstetric complications and maternal and newborn health issues

Assessment results of the quality of detection, prevention and, if applicable, management of haemorrhage, hypertensive disorders, obstructed labour, HIV/AIDS and syphilis and the quality of malaria and tetanus prophylaxis are given below.

The direct observation study found that 99% of the women received oxytocin as prevention for postpartum haemorrhage. The results of the review of the patient records and health facility registers showed an oxytocin administration between 94% and 100%. Counselling on what to do in case of vaginal bleeding, assessment of vaginal bleeding and palpation of the uterus after delivery were well performed in Builsa district but inadequate in Kassena-Nankana district. History taking regarding vaginal bleeding was poor in both districts (Table 4).

In management of hypertensive disorders (pre-eclampsia/eclampsia), checking blood pressure was performed well during ANC. Checking blood pressure during childbirth and counselling practice were poor in Kassena-Nankana district but were performed much better in Builsa district. Proteinuria testing during the ANC consultation was inadequate in both districts. Two of the six health centres in Kassena-Nankana district had no magnesium sulphate to treat pre-eclampsia/eclampsia (Table 5).

Regarding prevention of obstructed labour, we observed that correct partograph use was insufficient in all study sites (65% of the women included in the observation study arrived at the health centres during the first stage of labour). Assisted vaginal delivery by vacuum extraction or forceps was not provided in any of the health centres (Table 6).

Malaria and tetanus prophylaxis were performed quite well in both districts (Tables 7 and 8). Anti-malarial drugs and tetanus toxoid were available in all health centres. Nevertheless, concerning malaria prophylaxis, use of impregnated bed-nets needs to be enhanced.

Quality score results for HIV/AIDS and syphilis screening are given in Tables 9 and 10. These results show that HIV screening was performed quite well, with almost all pregnant women receiving an HIV screening test, while syphilis screening was virtually non-existent, with very few women counselled and tested. Whereas HIV screening was performed well, prevention of mother-to-child

Table 2. Results of quality of antenatal care assessment in selected health centres in Kassena-Nankana and Builsa District, 2010

Study tool	Topic group	Quality scores		P-value
		Health centres in Kassena-Nankana District	Health centres in Builsa District	
ANC health facility survey		Minimum: 0.00–maximum: 1.00		
	Number of health facilities, <i>n</i>	6	6	
	Availability of infrastructure	0.72	0.89	
	Availability of essential equipment	0.78	0.83	
	Availability of essential drugs and vaccines	0.71	0.81	
	Availability of laboratory supplies	0.83	0.63	
	Total ANC health facility survey quality score	0.76	0.79	0.337
ANC observation study		Minimum: 0.00–maximum: 1.00		
	Number of women observed, <i>n</i>	210	210	
	Technical performance	0.54	0.63	0.055
	History taking	0.59	0.68	
	Clinical examination	0.85	0.94	
	Laboratory examination	0.50	0.31	
	Preventive measures	0.88	0.91	
	Counselling	0.30	0.58	
	Management and treatment	0.11	0.43	
	Interpersonal performance	0.96	0.98	0.211
Continuity of care	0.95	0.96	1	
Total ANC observation quality score	0.81	0.85	0.078	
ANC satisfaction survey		Minimum: –2.00–maximum: 2.00		
	Number of women interviewed, <i>n</i>	341	369	
	Technical professional and interpersonal performance and organisation of services	1.23	1.33	
	Client–provider interaction	0.86	0.74	
	Providing information on pregnancy-related issues	0.71	0.44	
	Total ANC satisfaction survey quality score	0.82	0.75	0.873
Review of patient ANC records		Minimum: 0.00–maximum: 1.00		
	Number of ANC cards reviewed, <i>n</i>	208	209	
	Laboratory examination	0.65	0.45	
	Preventive measures	0.77	0.77	
	HIV counselling	0.90	0.90	
	Total ANC patient record review quality score	0.79	0.71	0.109

transmission of HIV (PMTCT) management was weak. Only half of the health centres had anti-retroviral drugs available and none of the 19 of a total of 380 women (5%) found to be HIV-positive in patient records review received PMTCT treatment. However, as women found to be HIV-positive during an ANC consultation are referred to the anti-retroviral therapy clinic for further investigation and treatment it might be possible that they received PMTCT treatment in these clinics without this being reported in the patient's ANC record.

Discussion

The results described here highlight the main strengths and weaknesses in the quality of antenatal and childbirth care in the two study districts. Important gaps in quality that require urgent action were identified. During previous decades, much has been done to improve access to care. However, equally important as access to care is ensuring that the care provided is of internationally accepted quality standards. Yet this aspect remained, until recently, largely neglected.³ A main thread in this regard is that if the

Table 3. Results of quality of childbirth care assessment in selected health centres in Kassena-Nankana and Builsa District, 2010

Study tool	Topic group	Quality scores		P-value
		Health centres in Kassena-Nankana District	Health centres in Builsa District	
Childbirth health facility survey		Minimum: 0.00–maximum: 1.00		
	Number of health facilities, <i>n</i>	6	6	
	Availability of infrastructure	0.79	0.92	
	Availability of essential equipment	0.74	0.74	
	Availability of essential drugs	0.63	0.75	
	Total childbirth health facility survey quality score	0.72	0.80	0.044
Childbirth observation study		Minimum: 0.00–maximum: 1.00		
	Number of women observed, <i>n</i>	93	71	
	Technical performance	0.55	0.76	0.025
	History taking	0.33	0.60	
	Clinical examination on admission	0.61	0.75	
	Monitoring mother	0.45	0.77	
	Monitoring newborn	0.33	0.55	
	Care and examination mother	0.47	0.72	
	Care and examination newborn	0.76	0.80	
	Delivery newborn	0.84	0.95	
	Delivery placenta	0.81	0.98	
	Counselling	0.39	0.75	
	Interpersonal performance	0.76	0.91	0.078
Recording	0.71	0.80	0.522	
Total childbirth observation quality score	0.67	0.82	0.078	
Childbirth satisfaction survey		Minimum: –2.00–maximum: 2.00		
	Number of women interviewed, <i>n</i>	329	379	
	Technical professional and interpersonal performance and organisation of services	1.34	1.30	
	Client-provider interaction	0.97	0.80	
	Health worker's availability	1.44	1.60	
	Counselling/health education	0.77	0.66	
	Total childbirth satisfaction survey quality score	1.13	1.09	0.749

quality of provided care is poor, the population will lose its trust in the health system and, despite the efforts to enhance access, the utilisation rate of health services will decrease. As such, poor QoC and decreased utilisation of care will have negative impacts on maternal and newborn mortality and wellbeing.

Strength and weaknesses of the QUALMAT project quality measurement system

The quality assessment as conducted in the QUALMAT project is comprehensive, providing a wealth of information. This information enables us to find critical gaps in provided QoC and to take informed decisions and actions to improve the QoC. However, caution is needed when analysing and interpreting the quality assessment data. Using a scoring system composed of the results of several

variables may hide critical quality gaps. For example, as described earlier, although the overall quality score for the availability of essential equipment was high, this concealed the absence of equipment to conduct assisted vaginal deliveries, a key service needed to manage obstructed labour and to provide basic emergency obstetric care.¹⁴ Composite scores may also lack the information required to take needed action. For example, when finding low overall quality scores for 'laboratory examination' it may be that some tests are performed well, as was found to be the case in our study regarding HIV testing, while other testing was poorly performed, e.g. syphilis testing in our study.

Also important to consider is that this comprehensive quality analysis is too time and resource consuming to be used for routine QoC monitoring.

Table 4. Quality of haemorrhage prevention and detection

Study tool	Variables part of the quality assessment of haemorrhage management	Quality scores	
		Health centres in Kassena-Nankana District	Health centres in Builsa District
Childbirth health facility survey	Availability of oxytocin	Minimum: 0.00–maximum: 1.00 1.00	1.00
ANC observation study		Minimum: 0.00–maximum: 1.00	
	History taking		
	Asked about vaginal bleeding	0.06	0.20
	Counselling on		
	Vaginal bleeding	0.38	0.84
Childbirth observation study		Minimum: 0.00–maximum: 1.00	
	History taking		
	Asked about vaginal bleeding	0.08	0.35
	Delivery newborn		
	Administer oxytocin after childbirth	0.99	0.99
	Monitoring mother		
	Check uterine retraction during third stage of labour	0.66	0.95
	Check uterine retraction during first hour after childbirth	0.45	0.82
	Check uterine retraction from first hour after childbirth until discharge	0.26	0.70
	Care and examination mother		
	Assess vaginal bleeding throughout third stage of labour and immediately afterwards	0.79	1.00
	Assess vaginal bleeding during first hour after childbirth	0.65	0.82
	Assess vaginal bleeding from first hour after childbirth until discharge	0.47	0.82
ANC satisfaction survey		Minimum: –2.00–maximum: 2.00	
	Counselling on		
	Vaginal bleeding	0.56	0.82
Review of patient childbirth record cards	Proportion of women who received parenteral oxytocin	99	Percentage 94
Review of data from MCH registers at health facility level (2009)	Proportion of women who received parenteral oxytocin	100	Percentage 100

Conclusion

We identified critical gaps in the quality of antenatal and childbirth care provided at the study health centres. There is an urgent need to act on these gaps to guarantee that mothers and newborns that access care are receiving care of acceptable quality standards. This is needed to decrease maternal and newborn mortality and improve their wellbeing.

Disclosure of interests

The authors declare that they have no competing interests.

Contribution to authorship

ED designed, in cooperation with other QUALMAT researchers, the quality assessment protocol and tools. She coordinated the quality assessment data collection and analysis and contributed to the interpretation of the data. She prepared the draft of this paper and coordinated the writing of it. AW is the QUALMAT project worker responsible for quality assessment in Ghana. She participated in the design of the quality assessment protocols and tools. She trained the QUALMAT data collectors and supervised data collection in Ghana. She contributed to the interpretation of the data. AW has revised this paper and approved the submitted

Table 5. Quality of hypertensive disorders prevention, detection and management

Study tool	Variables part of the quality assessment of hypertensive disorders management	Quality scores	
		Health centres in Kassena-Nankana District	Health centres in Builsa District
ANC health facility survey		Minimum: 0.00–maximum: 1.00	
	Availability of sphygmomanometer	1.00	1.00
	Availability of urine protein tests	1.00	0.33
	Availability of magnesium sulphate	0.67	1.00
	Availability of calcium gluconate	0.00	0.00
ANC observation study		Minimum: 0.00–maximum: 1.00	
	Clinical examination		
	Check blood pressure	1.00	0.99
	Laboratory examination		
	Check proteinuria during first visit	0.65	0.19
	Check proteinuria during subsequent visits	0.18	0.02
	Counselling on		
	Abdominal pain	0.43	0.78
	Swelling of fingers, face and/or legs	0.42	0.71
	Convulsions	0.22	0.55
Severe headaches with blurred vision	0.34	0.77	
Severe abdominal pain	0.39	0.74	
Childbirth observation study		Minimum: 0.00–maximum: 1.00	
	Clinical examination on admission		
	Check blood pressure	0.65	0.94
	Monitoring mother		
	Check blood pressure during first stage of labour; none active labour	0.58	0.93
Check blood pressure during first stage of labour; active labour	0.43	0.92	
ANC satisfaction survey		Minimum: –2.00–maximum: 2.00	
	Counselling on		
	Swelling of fingers, face and/or legs	0.72	0.72
	Headache and blurred vision	0.91	0.89
	Convulsions	–0.47	0.13
Severe abdominal pain	1.00	0.82	
Review of patient ANC record cards		Minimum: 0.00–maximum: 1.00	
	Laboratory examination		
Check proteinuria	0.66	0.14	

Table 6. Quality of obstructed labour prevention, detection and management

Study tool	Variables part of the quality assessment of obstructed labour management	Quality scores	
		Health centres in Kassena-Nankana District	Health centres in Builsa District
Childbirth health facility survey		Minimum: 0.00–maximum: 1.00	
	Availability of partograph	1.00	1.00
	Availability of vacuum extractor (or forceps)	0.00	0.00
Childbirth observation study		Minimum: 0.00–maximum: 1.00	
	Partograph correctly used	0.66	0.85
Review of patient childbirth record cards		Percentage	
	Proportion of deliveries with correctly completed partograph	34	46

Table 7. Quality of malaria prophylaxis

Study tool	Variables part of the quality assessment of malaria prophylaxis	Quality scores	
		Health centres in Kassena-Nankana District	Health centres in Builsa District
ANC health facility survey	Availability of anti-malarial drugs	1.00	1.00
	Availability of insecticide treated bed-nets	0.50	0.83
ANC observation study		Minimum: 0.00–maximum: 1.00	
	Counselling on Bed-net use	0.45	0.59
Childbirth observation study		Minimum: 0.00–maximum: 1.00	
	Care newborn and mother Ensure newborn and mother use a bed-net at the health facility	0.63	0.74
	Counselling on Bed-net use	0.40	0.89
Review of patient ANC record cards		Minimum: –2.00–maximum: 2.00	
	Preventive measures Women received malaria prophylaxis	0.81	0.84
	Women received impregnated bed-net	0.20	0.29
Review of routinely collected data at district level (2009)	Proportion of women who received malaria prophylaxis	84	76

Table 8. Quality of tetanus prophylaxis

Study tool	Variables part of the quality assessment of tetanus prophylaxis	Quality scores	
		Health centres in Kassena-Nankana District	Health centres in Builsa District
ANC health facility survey	Availability of tetanus toxoid	1.00	1.00
		Minimum: 0.00–maximum: 1.00	
ANC observation study	History taking Check tetanus immunisation status	0.74	0.82
	Preventive measures Tetanus toxoid given if due	0.78	0.83
		Minimum: 0.00–maximum: 1.00	
Review of patient ANC record cards	Preventive measures Check tetanus immunisation status	0.95	0.96
	Proportion of women who needed tetanus immunisation and received it	93	97
		Percentage	

Table 9. Quality of HIV/AIDS prevention, detection and management

Study tool	Variables part of the quality assessment of HIV/AIDS prevention and management	Quality scores	
		Health centres in Kassena-Nankana District	Health centres in Builsa District
ANC health facility survey		Minimum: 0.00–maximum: 1.00	
	Availability of anti-retroviral drugs	0.50	0.50
	Availability of HIV screening test	1.00	1.00
ANC observation study		Minimum: 0.00–maximum: 1.00	
	Laboratory examination		
	HIV screening test done if not done before	0.80	0.81
	Counselling on		
	HIV	0.80	0.81
Review of patient ANC record cards		Minimum: 0.00–maximum: 1.00	
	HIV test offered	0.86	0.89
	HIV screening test done	0.89	0.90
Review of patient childbirth record cards		Percentage	
	Proportion of HIV positive women who received PMTCT	0	0
Review of data from MCH registers at health facility level (2009)		Percentage	
	Proportion women of who received a HIV test	82	71
Review of routinely collected data at district level (2009)		Percentage	
	Proportion women of who received a HIV test	86	78

Table 10. Quality of syphilis screening

Study tool	Variables part of the quality assessment of syphilis screening	Quality scores	
		Health centres in Kassena-Nankana District	Health centres in Builsa District
ANC health facility survey		Minimum: 0.00–maximum: 1.00	
	Availability of syphilis screening test	0.33	0.33
ANC observation study		Minimum: 0.00–maximum: 1.00	
	Laboratory examination		
	Syphilis screening test done if not done before	0.12	0.00
	Counselling on		
	Syphilis	0.08	0.02
Review of patient ANC record cards		Minimum: 0.00–maximum: 1.00	
	Laboratory examination		
	Syphilis test done	0.08	0.00
Review of data from MCH registers at health facility level (2009)		Percentage	
	Proportion of women who received a syphilis test	0	0
Review of data from MCH registers at health facility level (2009)		Percentage	
	Proportion of women who received a syphilis test	0	0

version. JW is the QUALMAT principal investigator for Ghana. He reviewed and gave his inputs to the quality assessment protocols and tools and contributed to the interpretation of the quality assessment data in Ghana. He reviewed and gave inputs to this paper and approved the submitted version. SL reviewed and gave her inputs to the quality assessment protocols and tools. She revised and gave inputs to this paper and approved the submitted version. MT has been involved in the design of the quality assessment protocol and tools. She gave inputs to and supported the paper writing and reviewed the final draft.

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