

# Quality of antenatal and childbirth care in selected rural health facilities in Burkina Faso, Ghana and Tanzania: similar finding

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## Abstract

**OBJECTIVES** To measure pre-intervention quality of routine antenatal and childbirth care in rural districts of Burkina Faso, Ghana and Tanzania and to identify shortcomings.

**METHODS** In each country, we selected two adjoining rural districts. Within each district, we randomly sampled 6 primary healthcare facilities. Quality of care was assessed through health facility surveys, direct observation of antenatal and childbirth care, exit interviews and review of patient records.

**RESULTS** By and large, quality of antenatal and childbirth care in the six districts was satisfactory, but we did identify some critical gaps common to the study sites in all three countries. Counselling and health education practices are poor; laboratory investigations are often not performed; examination and monitoring of mother and newborn during childbirth are inadequate; partographs are not used. Equipment required to provide assisted vaginal deliveries (vacuum extractor or forceps) was absent in all surveyed facilities.

**CONCLUSION** Quality of care in the three study sites can be improved with the available human resources and without major investments. This improvement could reduce maternal and neonatal mortality and morbidity.

**keywords** quality of care, maternal and newborn health, childbirth, antenatal care, sub-Saharan Africa, emergency obstetric care, haemorrhage, pre-eclampsia / eclampsia, obstructed labour

## Introduction

Maternal and neonatal mortality and morbidity remain unacceptably high in sub-Saharan Africa (UNICEF, WHO, World Bank & United Nation Population Division 2011; WHO, UNICEF, UNFPA & World Bank 2012). Although, during recent years, there has been a decline in mortality, this decline is too small to achieve by 2015 the targets of Millennium Development Goals (MDGs) four and five on reduction of child and maternal mortality (UNICEF, WHO, World Bank & United Nation Population Division 2011; WHO, UNICEF, UNFPA & World Bank 2012). In 2011, worldwide maternal mortality was estimated at 273,500 deaths; under-5 mortality was estimated at 7.2 million deaths of which 2.2 million were early neonatal deaths (Lozano *et al.* 2011). Although sub-Saharan Africa is home to

only 13% of the world population (Population Reference Bureau (PRB) 2011) and 19% of the global under-5 population (UNICEF 2012), an estimated 52% of all maternal deaths and 49% of all under-5 deaths occur in this region (Lozano *et al.* 2011).

Interventions and strategies to reduce maternal and newborn mortality and morbidity are known (Campbell & Graham 2006; Freedman *et al.* 2007; Bhutta *et al.* 2008; Nyamtema *et al.* 2011; The Partnership for Maternal, Newborn & Child Health 2011). They include among others access to skilled maternity care, prophylactic administration of uterotonics, active management of third-stage labour and counselling on danger signs during pregnancy. But implementation of these interventions and strategies is not a guarantee for improved health outcomes. Quality of care is key to ensure adequate case management and to encourage use of the services

(Hulton *et al.* 2000; Miller *et al.* 2003; van den Broek & Graham 2009).

Quality of care is not easy to define or to measure. Whilst there is no universally accepted definition of ‘quality care’, it is widely acknowledged that it embraces multiple levels, from patient to health system and health policies, and multiple dimensions, including safety as well as efficiency. In the literature, different definitions of quality of care and frameworks to assess quality of care are described (Bruce 1990; Donabedian 1997; Campbell *et al.* 2000; Hulton *et al.* 2000). Quality assessment frameworks emphasise that quality encompasses the quality of care provided as well as the users’ experience of care received (Campbell *et al.* 2000; Hulton *et al.* 2000) and that when assessing the quality of care, differences between effectiveness of interpersonal care (referring to patient-centeredness of care) and effectiveness of clinical/technical care (including technical professional care, availability of resources and counselling practice) are important (Campbell *et al.* 2000).

QUALMAT is an intervention research project aiming to improve maternal and newborn health by improving the quality of care provided at primary healthcare (PHC) facilities. The project is conducted in selected facilities in Burkina Faso, Ghana and Tanzania. All three countries are poor sub-Saharan African nations with high maternal and neonatal mortality (maternal mortality ratio of 354, 328 and 418 per 100,000 live births, and neonatal mortality rate of 39, 25 and 24 per 1,000 live births, respectively, for Burkina Faso, Ghana and Tanzania) (Lozano *et al.* 2011). At present, none of the three countries shows enough progress in reducing maternal and child mortality to achieve the targets of MDGs four and five by 2015 (Lozano *et al.* 2011). The QUALMAT project addresses at provider level the existing gap between ‘knowing what to do’ and ‘doing what you know’. Two kinds of interventions are planned: (i) performance-based incentives to increase health workers’ motivation and (ii) computer-assisted clinical decision support, which will help providers to comply with established standards of care. Success of the QUALMAT intervention is measured by a quality-of-care assessment comparing intervention and non-intervention PHC facilities and care before and after the intervention.

In this study, we describe the baseline assessment. Our objective was to measure overall quality of routine antenatal and childbirth care and to identify areas for improvement. In addition, we focused on detection, prevention and management at PHC level of three important obstetric complications: haemorrhage, hypertensive disorders (pre-eclampsia/eclampsia) and obstructed labour (Khan *et al.* 2006; Ronsmans & Graham 2006).

## Methods

### Study setting

The study took place in PHC facilities in Burkina Faso, Ghana and Tanzania. In each country, two neighbouring rural districts, one intervention district and one non-intervention district, were identified. In each district, 6 PHC facilities were randomly selected. Only PHC facilities providing antenatal care (ANC) consultations, and childbirth services were eligible for selection. Selection of districts was based on being typical for the country and being comparable in terms of medical infrastructure, equipment and staffing, corresponding to national norms. An important criterion for selecting the districts was the availability of emergency obstetric care services. The selected districts have no more than one small town (population <30,000), and most of their populations are subsistence farmers.

Quality was assessed in all selected facilities. Locations and names of the countries and districts are provided in Figure 1. Table 1 provides some general demographic and maternal health-related indicators at the district level.

### Assessment of quality of care

As standard for good quality of care, we used the WHO guidelines on antenatal and childbirth care (WHO, UNFPA, UNICEF & World Bank 2006; WHO, World Bank, UNICEF & UNFPA 2010). In this baseline assessment, we employed four sets of tools to measure quality of care: (i) health facility surveys, (ii) direct observation studies, (iii) satisfaction surveys (exit interviews) and (iv) document reviews of patients records and maternal and child health (MCH) registers at the health facilities and districts. Tool 1 records availability of material resources, tools 2 and 4 measure quality of actual care provided, and tool 3 explores women’s satisfaction with care received (Delvaux *et al.* 2008; Hulton *et al.* 2000; Pitchforth *et al.* 2010; Birungi & Onyanga-Ouma 2006).

For each study tool, we developed structured checklists or questionnaires and defined a scale of quality measurement. Separate quality scores for antenatal care and for childbirth care were calculated for each tool and for each study site. Variables were regrouped into topic groups based on WHO guidelines (WHO, UNFPA, UNICEF & World Bank 2006; WHO, World Bank, UNICEF & UNFPA 2010) and taking into account the different dimensions of care (interpersonal and technical performance and continuity of care) (Campbell *et al.* 2000). For the health facility survey and the observation study, each single variable received a score of ‘1’ if the

**Figure 1** Study countries and districts.**Table 1** District demographic and maternal health-related indicators

Country and districts	Population*	Total fertility rate†	Percentage pregnant women receiving ANC from a skilled provider†‡	Percentage pregnant women delivered by a skilled provider†‡
<i>Burkina Faso</i>				
Nouna health district	305,351	6.8	93.6	65.2
Solenzo health district	288,107			
<i>Ghana</i>				
Builsa district	83,174	4.1	95.7	46.7
Kassena-Nankana district	165,258			
<i>Tanzania</i>				
Lindi rural district	244,256	4.4	99.6	52.1
Mtwara rural district	227,134		99.0	59.5

\*Data from the respective maternal and child health district registers, 2010.

†Data for the regions in which the districts are located from the respective country demographic and health surveys (Ghana Statistical Service (GSS), Ghana Health Service (GHS) & ICF Macro 2009b; Institut National de la Statistique et de la Démographie (INSD) et ICF International 2012; National Bureau of Statistics (NBS) [Tanzania] & ICF Macro 2011).

‡Skilled provider includes medical doctor/officer, assistant medical officer, clinical officer, assistant clinical officer, nurse, midwife, auxiliary nurse and auxiliary midwife.

commodity was available and in good working condition, or if the activity was observed and performed according to accepted standards of care, and a score of '0' if this was not the case (Boller *et al.* 2003; Wahlstrom *et al.* 2003; Birungi & Onyanga-Ouma 2006; Eriksen *et al.* 2007). For the satisfaction survey, a 5-

point Likert scale with scores ranging from '+2' meaning 'very satisfied' to '-2' meaning 'very unsatisfied' was used and factor-analysis performed. (Haddad *et al.* 1998; Baltussen *et al.* 2002; van Duong *et al.* 2004; Al Tehewy *et al.* 2009). For the health facility survey, the observation study and the satisfaction survey of each

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variable, each topic group and for the tool as a whole, the arithmetic mean for the total of the selected study facilities in each country was used as a pre-intervention quality score. For the document reviews, variables were assessed individually and scores were given for these individual variables without calculating group scores. For a detailed description of all study tools, we refer to the Annex.

In addition to the scores above, reflecting the overall quality of routine ANC and childbirth care, a score reflecting availability of the signal functions identifying basic emergency obstetric care (BEmOC) services (WHO, UNFPA, UNICEF & AMDD 2009) was calculated and a list combining variables from different tools reflecting the quality of care related to haemorrhage, hypertensive disorders and obstructed labour at PHC facilities was compiled. For each of these variables, individual quality scores were calculated.

**Sample size**

To enable us to demonstrate statistically significant changes in quality of care pre- and post-intervention and between intervention and non-intervention health facilities, we aimed at observing at each PHC facility at least 35 ANC consultations and childbirths, reviewing at least 35 ANC and childbirth patient records and interviewing at least 63 women after receiving ANC consultation and 63 women after childbirth.

**Data collection and analysis**

Data collection took place between June and November 2010 and was performed by certified health workers

(nurses and midwives without links to the assessed facilities) who had undergone a 5-day training. In each facility, data collection started on a randomly selected day and continued until the pre-defined sample size was achieved. Interviews were conducted in the local language. Data collection took about one month per facility. To ensure objectivity, data collectors moved to another facility every two weeks. Data were double-entered in Epi Info v. 3.5.1 and analysed in Stata/IC 11.2.

**Ethics**

Written informed consent was obtained from all women and healthcare providers before enrolment in the study. To guarantee confidentiality, study tools did not include patient identifiers. Ethical clearance was granted by: (i) the Ethics Committee of the Centre de Recherche en Santé de Nouna for Burkina Faso; (ii) the Institutional Review Board of the Navrongo Health Research Centre for Ghana; (iii) the Muhimbili University of Health and Allied Science Review Committee for Tanzania; (iv) the Ethics Committee of the Medical Faculty, University of Heidelberg, Germany, and (v) by the Ethics Committee of the University of Ghent.

**Results****General characteristics of women and PHC facilities**

Characteristics of health facilities and women involved in the different study tools are given in Table 2 and 3. General characteristics were quite similar between the study sites, apart from the smaller catchment area population and, consequently, fewer ANC consultations and

**Table 2** General characteristics of the research primary healthcare facilities

Research PHC facilities	Kind of facility	Catchment area population <i>n</i> – median (range)	Number of healthcare professionals* <i>n</i> – median (range)	Number of ANC consultations in 2009 <i>n</i> – median (range)	Number of deliveries in 2009 <i>n</i> – median (range)
12 Primary healthcare facilities in Burkina Faso	All public	11,039 (3,463–41,346)	5 (3–20)	1,549 (455–3,693)	330 (104–773)
12 primary healthcare facilities in Ghana	10 public, 2 private non-for-profit (faith based)	13,975 (2,083–20,444)	8.5 (2–14)	1,417 (269–5,077)	145 (64–337)
12 primary healthcare facilities in Tanzania	11 public, 1 private non-for-profit (faith based)	7,994 (3,551–16,773)	6 (2–13)	508 (138–1,325)	101 (50–246)

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

\*Healthcare professionals include medical doctor/officer, assistant medical officer, clinical officer, assistant clinical officer, nurse/midwife and auxiliary nurse/midwife.

**Table 3** : General characteristics of women per study tool

Study tool	Women characteristic	Research sites		
		12 PHC facilities in Burkina Faso	12 PHC facilities in Ghana	12 PHC facilities in Tanzania
<b>ANC study tools</b>				
<i>Observation study</i>	Age, median (range), years	24 (14–55)	26 (15–50)	26 (15–49)
	Gestation age at time of consultation, median (range), weeks	28 (6–45)	28 (4–41)	24 (8–40)
<i>Satisfaction survey</i>	Number of ANC visit, median	2	3	2
	Women with 2 or more ANC visits,%	61%	76%	62%
	Age, median (range), years	24 (15–44)	25 (14–55)	26 (14–46)
	Gestation age at time of consultation, median (range), weeks	28 (5–42)	26 (5–39)	20 (3–40)
	Number of ANC visit, median	2	3	2
	Women with 2 or more ANC visits,%	73%	80%	66%
	Number of pregnancies (including present pregnancy), median (range)	3 (1–15)	3 (1–8)	3 (1–10)
	<i>Education level</i>			
Women who never attended school,%	81%	48%	46%	
Women who completed primary school,%	12%	32%	44%	
<i>Review of patient ANC records</i>	Age, median (range), years	24 (14–45)	26 (11–50)	26 (15–45)
<b>Childbirth study tools</b>				
<i>Satisfaction survey</i>	Age, median (range), years	25 (13–47)	25 (14–48)	26 (14–47)
	Number of deliveries (including present delivery), median (range)	3 (1–13)	2 (1–10)	3 (1–18)
<i>Review of patient childbirth records</i>	<i>Education level</i>			
	Women that never attended school,%	81%	45%	42%
	Women that completed primary school,%	12%	35%	44%
<i>Review of patient childbirth records</i>	Age, median (range), years	23 (14–40)	26 (11–50)	26 (14–50)

No general information was collected for the childbirth observation study as this was a non-participatory, silent observation. General information on the mother included in this study was collected during ANC consultation, and this information is not again collected by the health worker at the time of the delivery.

childbirths in the facilities in Tanzania and the lower educational level of women in Burkina Faso.

Within the study sites, we found no statistically significant differences in quality of care between prospective intervention and non-intervention facilities. As we focus in this study on overall quality of care in three study areas, these findings are not discussed here.

### Quality of routine ANC care

Quality scores obtained were reasonably high and fairly consistent between study sites (Table 4). Overall scores (expressed on a 0–1 scale and expressed for all research facilities together per country) ranged from 0.75 to 0.81 for the health facility survey, from 0.82 and 0.88 for the observation study and from 0.59 to 0.78 for the records review. In the satisfaction surveys (expressed on a scale ranging from –2 to +2), overall scores ranged from +0.17 to +0.78.

Looking in greater detail at the results of the different study tools, we found that some technical performance aspects scored poorly, especially counselling and laboratory examination. History taking is also rather weak. Counselling about danger signs such as fever, vaginal bleeding, swelling of face and/or legs and convulsions, and instructing women what to do if such signs occur was particularly deficient. This was reflected in findings of the observation study as well as of the satisfaction survey. At all three study sites, urine is rarely tested for protein and glucose. HIV testing scored well in Ghana and Tanzania but poorly in Burkina Faso because no test kits were available there.

Overall health facility survey scores were high, which means that most key supplies and commodities were available. Yet, vacuum aspiration equipment was available in two health facilities only. The study site in Burkina Faso scored worse than the other countries on availability of essential drugs, vaccines and laboratory

**Table 4** Results of quality of antenatal care assessment in selected primary healthcare facilities in three sub-Saharan African countries, 2010

Study tool	Topic group	Quality scores		
		PHC facilities in Burkina Faso	PHC facilities in Ghana	PHC facilities in Tanzania
<i>ANC health facility survey</i>		<i>Minimum: 0.00–maximum: 1.00</i>		
	<i>Number of health facilities, n</i>	12	12	11
	Availability of infrastructure	0.83	0.81	0.79
	Availability of essential equipment	0.83	0.81	0.82
	Availability of essential drugs and vaccines	0.69	0.76	0.80
	Availability of laboratory supplies	0.67	0.83	0.82
	Total ANC health facility survey quality score	0.75	0.80	0.81
<i>ANC observation study</i>		<i>Minimum: 0.00–maximum: 1.00</i>		
	<i>Number of women observed, n</i>	412	420	418
	Technical performance	0.60	0.59	0.68
	History taking	0.69	0.64	0.72
	Clinical examination	0.97	0.89	0.87
	Laboratory examination	0.38	0.43	0.35
	Preventive measures	0.91	0.89	0.86
	Counselling	0.33	0.44	0.50
	Management and treatment	0.33	0.27	0.78
	Interpersonal performance	0.94	0.97	0.97
	Continuity of care	0.91	0.98	0.98
	Total ANC observation quality score	0.82	0.84	0.88
<i>ANC satisfaction survey</i>		<i>Minimum: –2.00–maximum: 2.00</i>		
	<i>Number of women interviewed, n</i>	644	710	611
	Technical, professional and interpersonal performance and organization of services	1.14	1.28	1.00
	Client–provider interaction	0.69	0.80	–0.79
	Providing information on pregnancy-related issues	–0.34	0.57	0.85
	Counselling on danger signs	–0.82	0.49	0.28
	Total ANC satisfaction survey quality score	0.17	0.78	0.34
<i>Review of patient ANC records</i>		<i>Minimum: 0.00–maximum: 1.00</i>		
	<i>Number of ANC cards reviewed, n</i>	420	417	403
	Laboratory examination	0.51	0.65	0.61
	Preventive measures	0.68	0.77	0.67
	HIV counselling	0.48	0.90	0.99
	Total ANC patient record review quality score	0.59	0.78	0.76

supplies. This was due to stock-outs of magnesium sulphate, antiretroviral drugs and erratic availability of HIV test kits. Non-availability of antiretroviral drugs was also observed in half of the study health facilities in Ghana.

Providing preventive measures scored high in the observation study but lower in the document review. This lower score is due to inadequate provision of malaria prophylaxis, impregnated bed nets and deworming treatment, which were not part of the observation study, which covered only the provision of iron, folic acid and tetanus toxoid vaccination.

Items with high scores at all three study sites were interpersonal performance, continuity of care and performance of clinical examination. Interpersonal performance

reflects patient-centeredness of care and includes variables such as friendliness, privacy and respect shown by the health facility staff towards the client. Continuity of care reflects intrafacility continuity of care.

In Tanzania, the 'client–provider interaction', which assessed the women's opportunities to ask questions and express their concerns, was perceived as very poor. In Burkina Faso and Ghana, women perceived this interaction as satisfactory.

#### Quality of routine childbirth care

Childbirth quality scores were reasonably high and fairly consistent between sites. Overall scores (expressed on a



**Table 5** Results of quality of childbirth care assessment in selected primary healthcare facilities in three sub-Saharan African countries, 2010

Study tool	Topic group	Quality scores		
		PHC facilities in Burkina Faso	PHC facilities in Ghana	PHC facilities in Tanzania
<i>Childbirth health facility survey</i>	<i>Number of health facilities, n</i>	<i>Minimum: 0.00–maximum: 1.00</i>		
	Availability of infrastructure	12	12	11
	Availability of essential equipment	0.88	0.85	0.84
	Availability of essential drugs	0.67	0.74	0.73
	Availability of essential drugs	0.59	0.69	0.74
	Total childbirth health facility survey quality score	0.71	0.76	0.77
<i>Childbirth observation study</i>	<i>Number of women observed, n</i>	<i>Minimum: 0.00–maximum: 1.00</i>		
	Technical performance	133	164	254
	History taking	0.58	0.64	0.65
	Clinical examination on admission	0.53	0.44	0.72
	Monitoring mother	0.65	0.67	0.64
	Monitoring newborn	0.72	0.59	0.30
	Care and examination mother	0.29	0.42	0.65
	Care and examination newborn	0.48	0.58	0.50
	Delivery newborn	0.59	0.78	0.71
	Delivery placenta	0.82	0.89	0.88
	Counselling	0.70	0.88	0.84
	Interpersonal performance	0.43	0.54	0.56
	Recording	0.81	0.83	0.81
	Total childbirth observation quality score	0.64	0.75	0.47
<i>Childbirth satisfaction survey</i>	<i>Number of women interviewed, n</i>	<i>Minimum: –2.00–maximum: 2.00</i>		
	Technical, professional and interpersonal performance and organization of services	682	708	503
	Client–provider interaction	1.02	1.32	0.67
	Health worker's availability	0.76	0.88	–1.31
	Counselling/health education	1.75	1.53	1.42
	Total childbirth satisfaction survey quality score	–0.21	0.71	–0.59
		0.83	1.11	0.05

0–1 scale) ranged from 0.71 to 0.77 for the health facility survey and from 0.64 to 0.74 for the observation study. In the satisfaction surveys (expressed on a scale ranging from –2 to +2), overall scores ranged from +0.05 to +1.11 (Table 5). The score for availability of BEmOC signal functions (WHO, UNFPA, UNICEF & AMDD 2009) (Table 6) ranged from 0.63 to 0.71 (expressed on a 0–1 scale). Although scores are relatively high, none of the study facilities performed assisted vaginal delivery (in the past 3 months), meaning none of the facilities provided BEmOC services. The absence in all facilities of a vacuum extractor or a forceps supports this finding.

Technical performance scores were poor. The main deficiencies were as follows: inadequate counselling, and poor examination, monitoring and care of mother and newborn. Although some aspects of the technical performance, such as the clinical examination and attention

and care given to mother and newborn, received high scores in the satisfaction survey, they received low scores in the observation study. Post-partum counselling, provided before discharge, scored low in both the observation study and the satisfaction survey, due to insufficient attention to danger signs and family planning. A major deficiency in all study facilities was checking emergency signs when women were admitted for delivery. In Ghana and in Tanzania, we observed poor monitoring of the mother for emergency signs throughout labour and after delivery. Monitoring of the newborn, which includes assessing breathing and warmth, scored poorly in the study facilities in Burkina Faso and Ghana.

In Tanzania the 'client–provider interaction' was perceived as very poor in the study site while it was perceived as satisfactory in Burkina Faso and Ghana. Items that scored high in all three study sites were interpersonal

**Table 6** Results of availability of BEmOC signal functions assessment in selected primary healthcare facilities in three sub-Saharan African countries, 2010

Research sites	Availability of BEmOC signal functions (been performed in the past 3 months) score		
	PHC facilities in Burkina Faso	PHC facilities in Ghana	PHC facilities in Tanzania
<i>Signal functions for BEmOC</i>			
Administer parenteral antibiotics	1.00	1.00	1.00
Administer uterotonic (e.g. parenteral oxytocin)	1.00	1.00	0.73
Administer parenteral anticonvulsants for pre-eclampsia and eclampsia (e.g. magnesium sulphate)	1.00*	0.92	1.00
Manual removal of placenta	0.92	0.83	0.82
Removal of retained products (e.g. manual vacuum aspiration, dilatation and curettage)	0.00	0.00	0.73
Perform assisted vaginal delivery (e.g. vacuum extraction)	0.00	0.00	0.00
Total availability of BEmOC signal functions score	0.65	0.63	0.71

\*In none of the assessed health facilities in Burkina Faso, magnesium sulphate was available; however, all had diazepam in stock.

performance and delivery of the newborn and the placenta.

#### Quality of care of specific obstetric complications

For quality of detection, prevention and, if applicable, management of haemorrhage, hypertensive disorders and obstructed labour, a list with quality scores of individual variables from different tools was generated and the quality assessed by reviewing these individual variable scores.

The main deficiencies related to detection and prevention of haemorrhage were inadequate counselling on what to do in case of vaginal bleeding, inadequate assessment of vaginal bleeding and failure to palpate the uterus after delivery. In study facilities in Burkina Faso and Ghana, almost all women do receive oxytocin or another uterotonic drug after delivery; in facilities in Tanzania, this is not the case (Table 7).

In management of hypertensive disorders (pre-eclampsia/eclampsia), we notice that checking blood pressure is performed well during ANC but not during childbirth. Counselling practice is poor. Less than half of the clients had their urine tested for protein during the ANC consultation. Study facilities in Burkina Faso have no magnesium sulphate to treat pre-eclampsia/eclampsia (Table 8).

Concerning prevention of obstructed labour, we observed that correct partograph use was rare in all study sites (68% of the women included in the observation study arrived at the health facility during the first stage of labour, 32% during the second stage). Assisted vaginal delivery by vacuum extraction or forceps was not provided in any of the study facilities (Table 9).

As timely referral is important in antenatal and childbirth care at PHC level, several variables assessing the referral system were included in the assessment tools. Outcomes are rather poor in the selected facilities in Burkina Faso and Ghana, where free referral transport is available in, respectively, nine and five of the 12 assessed facilities and where we recorded fewer than 7% referrals during ANC and fewer than 3% during childbirth. At the study facilities in Tanzania, we recorded 17% referrals during ANC and 16% during childbirth. Free referral transport was available in 10 of the 11 facilities.

#### Discussion

This study identified some critical gaps in the quality of antenatal and childbirth care, as a result of which the study sites in Burkina Faso, Ghana and Tanzania fail to achieve the international standards to which they all have subscribed. Findings are remarkably similar between study sites and may therefore be applicable to similar environments. Our multi-method approach enabled us to assess the quality of ANC and childbirth care in a comprehensive and unique way.

#### Quality of routine ANC and childbirth care

Quality of technical performance for both antenatal and childbirth care is inadequate at all study sites, mostly because of non-adherence to guidelines (Baker *et al.* 2012). Health education and counselling during ANC consultation and immediately after childbirth are poorly performed. These problems are not unique to this study



**Table 7** Quality of haemorrhage prevention and detection

Study tool	Variables part of the quality assessment of haemorrhage management	Quality scores		
		PHC facilities in Burkina Faso	PHC facilities in Ghana	PHC facilities in Tanzania
<i>Childbirth health facility survey</i> <i>ANC observation study</i>	Availability of oxytocin	<i>Minimum: 0.00–maximum: 1.00</i>		
		1.00	1.00	0.64
	<i>History taking</i>	<i>Minimum: 0.00–maximum: 1.00</i>		
	Asked about vaginal bleeding	0.29	0.13	0.22
<i>Childbirth observation study</i>	<i>Counselling on</i>			
	Vaginal bleeding	0.52	0.61	0.57
	<i>History taking</i>	<i>Minimum: 0.00–maximum: 1.00</i>		
	Asked about vaginal bleeding	0.39	0.20	0.51
	<i>Delivery newborn</i>			
	Administer oxytocin after childbirth	0.91	0.99	0.79
	<i>Monitoring mother</i>			
	Check uterine retraction during third stage of labour	0.71	0.78	0.48
	Check uterine retraction during first hour after childbirth	0.59	0.61	0.27
	Check uterine retraction from first hour after childbirth until discharge	0.47	0.45	0.15
	<i>Care and examination mother</i>			
	Assess vaginal bleeding throughout third stage of labour and immediately afterwards	0.72	0.88	0.91
	Assess vaginal bleeding during first hour after childbirth	0.46	0.72	0.67
Assess vaginal bleeding from first hour after childbirth until discharge	0.56	0.62	0.58	
<i>ANC satisfaction survey</i>	<i>Counselling on</i>	<i>Minimum: –2.00–maximum: 2.00</i>		
	Vaginal bleeding	–0.17	0.70	0.87
<i>Review of patient childbirth record cards</i>	Proportion of women who received parenteral oxytocin (%)	<i>Percentage</i> 85%	96%	73%
<i>Review of data from MCH registers at health facility level (2009)</i>	Proportion of women who received parenteral oxytocin (%)	<i>Percentage</i> 99%	100%	Not available

and have been reported in earlier studies from sub-Saharan Africa (Pembe *et al.* 2009, 2010; Jennings *et al.* 2010; Nikiema *et al.* 2010; Sarker *et al.* 2010; Magoma *et al.* 2011). In particular, counselling on how to recognise danger signs of unpredictable obstetric complications during pregnancy and post-partum and what to do if these occur are crucial in reducing maternal mortality. Inadequate laboratory investigations during ANC consultation, and inadequate examination, care and monitoring of mother and newborn during childbirth have also been reported earlier (Nikiema *et al.* 2010; Sarker *et al.* 2010;

Rawlins *et al.* 2011), and stress that need for improvements remains. Life-threatening conditions in mother and newborn may thus fail to be identified and managed in time.

Findings from the different study tools were generally in line with each other; for example, counselling was poorly perceived by women, confirming observation study findings; poor observed laboratory examination was supported by findings from the health facility survey and document review. Nevertheless, this was not always the case; as clinical examination during childbirth of

**Table 8** Quality of hypertensive disorders: prevention, detection and management

Study tool	Variables part of the quality assessment of hypertensive disorders management	Quality scores		
		PHC facilities in Burkina Faso	PHC facilities in Ghana	PHC facilities in Tanzania
ANC		<i>Minimum: 0.00–maximum: 1.00</i>		
<i>health facility survey</i>	Availability of sphygmomanometer	1.00	1.00	1.00
	Availability of urine protein tests	0.75	0.67	0.64
	Availability of magnesium sulphate	0.00	0.83	0.91
	Availability of calcium gluconate	0.00	0.00	0.00
ANC		<i>Minimum: 0.00–maximum: 1.00</i>		
<i>observation study</i>	<i>Clinical examination</i>			
	Check blood pressure	1.00	1.00	0.95
	<i>Laboratory examination</i>			
	Check proteinuria during first visit	0.54	0.42	0.25
	Check proteinuria during subsequent visits	0.27	0.12	0.11
	<i>Counselling on</i>			
	Abdominal pain	0.70	0.60	0.54
	Swelling of fingers, face and/or legs	0.12	0.56	0.48
	Convulsions	0.14	0.39	0.35
	Severe headaches with blurred vision	0.43	0.55	0.49
	Severe abdominal pain	0.67	0.56	0.54
Childbirth		<i>Minimum: 0.00–maximum: 1.00</i>		
<i>observation study</i>	<i>Clinical examination on admission</i>			
	Check blood pressure	0.87	0.77	0.60
	<i>Monitoring mother</i>			
	Check blood pressure during first stage of labour; none active labour	0.75	0.73	0.41
	Check blood pressure during first stage of labour; active labour	0.78	0.65	0.39
ANC satisfaction		<i>Minimum: –2.00–maximum: 2.00</i>		
<i>survey</i>	<i>Counselling on</i>			
	Swelling of fingers, face and/or legs	–1.24	0.72	0.41
	Headache and blurred vision	–0.80	0.90	0.38
	Convulsions	–1.57	–0.16	–0.14
	Severe abdominal pain	0.10	0.91	0.41
Review of patient		<i>Minimum: 0.00–maximum: 1.00</i>		
ANC record cards	<i>Laboratory examination</i>			
	Check proteinuria	0.53	0.40	0.23

mother and newborn was observed to be poor, women perceive the examination they and their babies received as satisfactory.

#### Quality of care for obstetric complications

Haemorrhage is the most common single cause of maternal mortality in the 3 study countries, accounting for 30% of maternal deaths in Burkina Faso (MoH 2006), 24% in Ghana (Ghana Statistical Service (GSS), Ghana Health Service (GHS), & Macro International 2009a) and 28% in Tanzania (MoHSW 2008). Yet, counselling on vaginal bleeding was poorly performed in all three study sites, and post-partum monitoring for uterine

contraction and vaginal blood loss often not performed. In Burkina Faso and Ghana, most women received oxytocin or another uterotonic drug, although in Tanzania uterotonic drugs were unavailable in a substantial proportion of facilities. Again, there is a potential to reduce maternal mortality through improving implementation of basic quality-of-care standards.

Hypertensive disorders cause 9% of maternal deaths in Africa (Khan *et al.* 2006; UNICEF 2008). Early detection and treatment are key in prevention. The two key screening elements are (i) counselling and asking about danger signs for hypertensive disorders and (ii) checking blood pressure (Urassa *et al.* 2003; WHO, UNFPA, UNICEF & World Bank 2006). Both are easy to perform, but were

**Table 9** Quality of obstructed labour prevention, detection and management

Study tool	Variables part of the quality assessment of obstructed labour management	Quality scores		
		PHC facilities in Burkina Faso	PHC facilities in Ghana	PHC facilities in Tanzania
<i>Childbirth health facility survey and survey of BEmOC services</i>	Availability of partograph	1.00	1.00	0.73
	Vaginal-assisted delivery provided	0.00	0.00	0.00
<i>Childbirth observation study</i>		<i>Minimum: 0.00–maximum: 1.00</i>		
	Partograph correctly used	0.59	0.74	0.44
<i>Review of patient childbirth record cards</i>		<i>Percentage</i>		
	Proportion of deliveries with correctly completed partograph (%)	59%	41%	17%

poorly implemented in our study sites. Fewer than half of women were screened for proteinuria, another element in early detection of pre-eclampsia. Again, there are similar findings from studies in other sub-Saharan countries (Jennings *et al.* 2010), with respect to screening for proteinuria (Boller *et al.* 2003; Urassa *et al.* 2003; Sarker *et al.* 2010) and checking of blood pressure during childbirth (Delvaux *et al.* 2007).

Obstructive labour accounts for 10% of maternal deaths in Burkina Faso (MoH 2006), 4% in Ghana (Ghana Statistical Service (GSS), Ghana Health Service (GHS), & Macro International 2009a) and 11% in Tanzania (MoHSW 2008). Proper partograph use can be an effective tool for monitoring labour and detecting problems before it is too late. We observed that in all study sites, use of the partograph was grossly inadequate, a finding also seen in other studies (Bosse *et al.* 2002; Fawole *et al.* 2008). Moreover, none of the study facilities had the ability to provide assisted vaginal delivery, which means that none of the study sites meet the required BEmOC standards (WHO, UNFPA, UNICEF & AMDD 2009). The absence of one or more of the six BEmOC signal functions in PHC facilities providing childbirth is also described in several other studies from sub-Saharan Africa (Olsen *et al.* 2005; Pearson & Shoo 2005; Paxton *et al.* 2006; Leigh *et al.* 2008; Kongnyuy *et al.* 2009; Ziraba *et al.* 2009; Gabrysch *et al.* 2011). Assisted vaginal delivery and removal of retained products were the two items most frequently lacking in our study.

#### Limitations of this study

The study has some limitations. First, the non-participatory observations may have influenced the performance of health workers in a positive direction, the so-called Hawthorne effect. However, the effect of the presence of

an observer is short-lived (10–15 observations) (Leonard & Masatu 2006). Secondly, exit interviews are susceptible to the tendency for respondents to answer questions favourably (Haddad *et al.* 1998; Baltussen *et al.* 2002). Third, the study was conducted in two rural districts in each country; quality of antenatal and childbirth care provided in the facilities in these districts might differ from other rural districts and from urban areas. Fourth, due to the design of the QUALMAT project, the study was only conducted in PHC facilities, which hampers getting an overview of the overall quality of ANC and childbirth care because the quality of services provided at referral facility/hospital level is not included in this study. Fifth, because participation at exit interviews and observation studies was voluntary, it might have resulted in selection bias.

#### Conclusion

We identified some critical gaps that are by no means unique to the three study sites. A 2008 statement by UNICEF on global maternal mortality already alluded to this:

*‘There is no mystery about why most of these women are dying. They are dying because they have no access or limited access to health care, or because the quality of care is poor. They die due to haemorrhage, sepsis, hypertensive disorders, unsafe abortion and prolonged or obstructed labour – complications that can often be effectively treated in a health system that provides skilled personnel, facilities to handle emergencies when they occur, and post-partum care’ (UNICEF 2008).*

We believe in the potential to improve quality within the constraints of human resources available and without major capital investments. What is needed is (i) the guaranteed availability of inexpensive key supplies and

commodities to enable health workers to provide essential services and (ii) a supportive environment to enable health workers to know what to do and to motivate them to do what they know. This implies bridging the 'know-do gap', the objective of the QUALMAT project.

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