Compliance with focused antenatal care services: do health workers in rural Burkina Faso, Uganda and Tanzania perform all ANC procedures?

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Abstract

OBJECTIVE   To assess health workers' compliance with the procedures set in the focused antenatal care (ANC) guidelines in rural Uganda, Tanzania and Burkina Faso; to compare the compliance within and among the three study sites; and to appraise the logistic and supply of the respective health facilities (HF).

METHODS   The cross-sectional study was conducted in the rural HF in three African countries. This descriptive observational study took place in HF in Nouna, Burkina Faso (5), Iganga, Uganda (6) and Rufiji, Tanzania (7). In total, 788 ANC sessions and service provisions were observed, the duration of each ANC service provision was calculated, and the infrastructures of the respective HF were assessed.

RESULTS   Health workers in all HF performed most of the procedures but also omitted certain practices stipulated in the focused ANC guidelines. There was a substantial variation in provision of ANC services among HF within and among the country sites. The findings also revealed that the duration of first visits was <15 min and health workers spent even less time in subsequent visits in all three sites. Reagents for laboratory tests and drugs as outlined in the focus ANC guidelines were often out of stock in most facilities.

CONCLUSION   Health workers in all three country sites failed to perform all procedures stipulated in the focused ANC guideline; this could not be always explained by the lack of supplies. It is crucial to point out the necessity of the core procedures of ANC repeatedly.

keywords focused antenatal care, health system, health worker, performance, rural, Africa

Introduction

Despite a recent decline in maternal mortality ratio (MMR), sub-Saharan Africa (SSA) still has the highest MMR among developing regions (Hogan *et al.* 2010; WHO 2010). Haemorrhage, puerperal sepsis and hypertensive disorders cause the majority of the maternal deaths in SSA (Khan *et al.* 2006). Early identification of hypertensive disorder, anaemia and malaria is crucial because often these illnesses worsen during pregnancy and are associated with a greater risk of maternal death (Steer 2000; Brabin *et al.* 2001; Steer *et al.* 2004; Duley 2009).

Peer-reviewed literature and global public health practice agree on the fact that antenatal care (ANC) has the capacity to reach large segments of the pregnant population and that certain interventions can detect, treat and prevent conditions that could result in maternal mortality and morbidity (McDonagh 1996; Bloom *et al.* 1999; Carroli *et al.* 2001). ANC provides an opportunity to promote readiness for unpredictable obstetric complications and birth preparedness, to detect and treat bacteriuria, syphilis and pre-eclampsia, and to distribute preventive medicines such as anti malarial drugs, iron and folic acid tablets (Walsh *et al.* 1990; Pandit 1992; McDonagh 1996; Bloom *et al.* 1999; Carroli *et al.* 2001; Campbell & Graham 2006; Pembe *et al.* 2009).

However, scepticism regarding the effectiveness of ANC has been directed towards the many visits and the need to perform all procedures prescribed for routine visits (Carroli *et al.* 2001). Based on the evidence from a multicentre

randomized controlled trial (Villar *et al.* 1998), the World Health Organization (WHO) recommends the implementation of a focused ANC platform that consists of four ANC visits and a well-defined set of activities proven to be beneficial for maternal and neonatal health (WHO 2001). While the international community is optimistic about the potential of focused ANC to ensure better maternal health outcomes, not much information is available on whether health workers actually carry out all ANC procedures as outlined in the guidelines in routine settings.

This study aimed to fill the gap in knowledge by assessing health workers' compliance with the procedures set in the focused ANC guidelines in rural Uganda, Tanzania and Burkina Faso.

Methods

The study was a part of a large collaborative research project ARVMAC, Effects of Antiretrovirals for HIV on African Health Systems, Maternal and Child health (ARVMAC; http://www.arvmac.eu) in three African countries: Burkina Faso, Uganda and Tanzania. Burkina Faso, Uganda and Tanzania adopted the focused ANC policy in 2003.

This cross-sectional, health facility–based quantitative study was conducted in three health districts with a Health and Demographic Surveillance System in place: Nouna District in Burkina Faso, Iganga District in Uganda and Rufiji District in Tanzania. Nouna is a rural district located in North-Western Burkina Faso about 300 km from the capital Ouagadougou. At the time of the study, maternal care in the district was offered by 25 first-line facilities, *Centres de Santé et de Promotion Sociale* (CSPS) – 24 located in rural areas and one in Nouna town. The district hospital is a referral facility and does not offer routine ANC.

Located in Eastern Uganda, Iganga is about 115 km from the capital Kampala. The study area is served by 114 public HF, which, in line with national policy, are categorized into five groups: Health Centre (HC) I, II, III, IV and Hospitals. ANC services are provided in all facilities, except HC I.

Rufiji District is situated about 178 km south of Dar es Salaam. ANC care is provided in three hospitals (one mission hospital, one private hospital and one government hospital), five government HCs and 48 government dispensaries.

Systematic observation using a pre-defined check list was used to assess health workers' compliance with focused ANC procedures and infrastructure of the HF. The facilities where the observations took place were purposely selected to represent the different levels of HF: five in Nouna (CSPS); six in Iganga (one hospital, two HC IV, two

HC III and one HC II); and seven in Rufiji (one government hospital, one mission hospital, two HC and three dispensaries). A total of 788 ANC sessions (347 in Nouna, 284 in Iganga and 157 in Rufiji) were observed. Owing to logistic problems, the data collected in Rufiji were limited to 157. The information on pregnancy and ANC services received during current visit was collected on all ANC attendants (788) through direct observations. Information on previous visits was collected from ANC cards. In all three countries, almost all women (>95%) brought their ANC card. The duration of ANC services was calculated, and the infrastructure assessment was conducted.

The pre-defined check list for ANC session observation and infrastructure assessment was developed on the basis of the WHO and the national ANC guidelines of Burkina Faso, Uganda and Tanzania. The same check list was used in all three countries as the core contents of the ANC visit were similar. In addition, an overall observation of ANC service organization was conducted. The components of ANC services were categorized into four groups: (i) Provision of Information; (ii) Clinical Examinations; (iii) Laboratory Testing (collected sample, referred to the laboratory); and (iv) Distribution of Drugs (Table 1). The original set of checklists was developed in English for

Table 1 Important components of focused antenatal care (FANC) service

ANC services	Standard based on 4 visits
Information provision	
Danger signs in pregnancy	Inform every visit
Immunisation information	Inform (at least) once
Nutrition information	Inform every visit
STI information	Inform every visit
PMTCT information	Inform (at least) once
Information on delivery	Inform once
Drugs distribution	
Iron/Folate	Administer every visit
Malaria prophylaxis	Administer two times
Clinical examination	
Weight	Check every visit
Blood pressure	Check every visit
Anaemia	Check every visit
Oedema	Check every visit
Uterine (Fundal) height	Check every visit
Foetal heart sound	Check >16w GA
Laboratory services	
Haemoglobin	Check every visit
Urine for albumin	Check every visit
Urine for glucose	Check every visit
Syphilis	Check once
HIV	Check once
Blood group	Check once
Malaria	Check twice

ANC, antenatal care.

Tanzania and Uganda, and translated into French for Burkina Faso. All tools were pilot tested in the respective countries in health facilities (HF) not selected for the study.

Data collection took place in 2008 using similar procedures in all three study sites. Research assistants (RA) with a medical background (medicine or nursing) were recruited locally and trained by the research team to observe the ANC consultations and report the relevant information on the check list. RAs introduced themselves to the ANC provider on duty and obtained verbal consent to conduct the non-participating observations. At the start of the ANC session, the health worker introduced the RA to the pregnant woman and explained the reason for his/her presence during the consultation. During each ANC session, the RA acquired verbal consent from the pregnant woman and noted the health worker's performed activities on the checklist and collected additionally required information from the woman's ANC cards. RAs attended the collective educational sessions held at the HF to record what topics were covered. In addition to observing the consultation, the RA also noted the time (in min) spent on ANC activities. The ANC service had several parts: (i) registration, (ii) history taking and (iii) examination, testing, counselling and education. As the respective time of each step of service provision (excluding waiting time) was separately measured with a stopwatch, the total time of the visit was calculated as the sum of the different steps observed. Time was recorded differently in the three study sites. In Tanzania, the duration of the consultation was already pre-categorized into three groups: (i) <15 min; (ii) 15–30 min; and (iii) >30 min. Thus, meaningful comparisons were only possible between Burkina Faso and Uganda. The check list for infrastructure assessment was used to collect the information on current availability of equipment, reagents and drugs.

The data collected during the course of the observations, the time spent on each consultation, and the information from the ANC cards were entered in a Microsoft Excel (2007) roster. Later, the data were transferred to SAS 9.0 (SAS Institute Inc., Cary, NC, USA) for analytical purposes. Descriptive analysis was conducted to identify the proportion of tasks completed by the health workers and the time spent on ANC sessions including arithmetic mean, minimum and maximum. The services with maximum variations among health facilitates were selected for comparison.

Results

Organization of ANC service provision

In all study sites, ANC clinics usually opened on weekdays in the morning and were led by trained midwives. In general, a health worker started ANC service with a group education session focusing on different topics such as breast feeding, HIV testing and family planning. After the group session, each woman attended an individual ANC session to receive individual services, but there was a considerable time lag between these two sessions depending on staff availability. Across the three countries, the group education session was sometimes only offered on specific week days instead of every day. The activities for each ANC session included a detailed health inspection and assessment of pregnant women through history taking, examination, laboratory tests (when indicated) and drug dispensing. The topic covered in the general education forum was not repeated during the individual session. Depending on the site, the services mentioned earlier were performed by several health workers (two in Nouna to nine in Iganga). This variation constrained the cross-comparison among the health workers.

Infrastructure assessment

Several HF in all three countries were deficient in supplies and drugs. Iron tablets and urine strips for glucose and albumin were missing (Table 2).

Characteristics of the ANC attendants

The majority of ANC attendants were multigravida; primigravida comprised 28% in both Rufiji and Iganga and 20% in Nouna. Thirty-five per cent women came for their first ANC visit during the first trimester in Nouna; 20% in Iganga; and 19% in Rufiji. The proportion of first visits during the last trimester was higher in Iganga (23%) than in Nouna (13%) and Rufiji (14%).

ANC performances

In all three study sites, health workers did not comply with all procedures set out in the four service categories: (i) Provision of Information; (ii) Clinical Examinations; (iii) Laboratory Testing; and (iv) Distribution of Drugs. The only two clinical procedures performed consistently in all three study sites were listening to foetal heart sound and examination of uterine height. In Nouna, because of the unavailability of a foetal scope in three HF, health workers listened to the heart sound with a stethoscope.

There were variations in performing specific service among study sites. During their current visit, only 7% and 2% women received information on danger signs in Iganga and Nouna, respectively, compared with 67% in Rufiji. Women who were in their third trimester but visited clinics for the first time were not provided any information on

Table 2 Number of health facilities (HF) with equipment and supplies for FANC

Supplies	Nouna±	Iganga±	Rufiji±
Equipment			
Weighing scale (adult)	5/6	6/6	7/7
Sphygmomanometer*	4/6	4/6	6/7
Stethoscope	5/6	5/6	7/7
Foetal scope	2/6	6/6	7/7
Facility			
Laboratory facility	5/6	4/6	6/7
Laboratory reagents			
Haemoglobin	0/5	3/4	5/6
Urine dip test for glucose	5/5	2/4	2/6
Urine dip test for albumin	5/5	2/4	2/6
HIV testing	5/5	4/6 + 1 outreach	6/6
Blood group	0/5	3/4	2/6
Syphilis	0/5	3/4	6/6
Malaria	0/5	4/4	6/6
Microscopic urine test	1/5	4/4	2/6
Drugs			
Fe-sulphate	6/6	3/6	4/7
Folic acid tablet	6/6	2/6	4/7
Antimalarial tablet	6/6	6/6	7/7
Antihelminthics	6/6	5/6	6/7
TT vaccine	6/6	4/6	7/7

±(Numerator = number of HF with equipment/supplies; Denominator = number of HF surveyed).
*Heidelberg research team donated one sphygmomanometer to the health facility in Nouna.

delivery. This ranged from 79% of women in Nouna and 24% in Iganga. Although the measurement of uterine height was similar in all three study sites, large differences were noticed in physical examination for anaemia in Nouna and for blood pressure measurement in Iganga. Testing for HIV (21%), blood group (0.9%) and syphilis (0.6%) was uncommon in Nouna, but testing urine for protein and sugar was routinely carried out (Table 3). While no women in their first trimester received anti-malarial prophylaxis in Nouna and Rufiji in their first trimester, 89% in Iganga did (data not shown).

Variation among HF within the country

There was also a variation in performing services amongst HF within the country (Figure 1). Health workers skipped certain procedures consistently in a few HF in each country.

Time assessment of ANC session

Health workers in Rufiji, Iganga and Nouna spent more than 30 min in only 36%, 5% and 16% of all first ANC

visits, respectively. Although average duration of the first visit was more than 15 min in all three country sites, it was shorter at subsequent visits (Table 4). The average time spent for each ANC session was 12 min in Iganga and 17 min in Nouna.

Discussion

This ANC assessment study in rural HF that offer routine ANC care showed that health workers performed most of the procedures but omitted certain practices stipulated in the ANC guidelines. The findings also revealed the considerable variation in provision of certain ANC services across the HF including lack of logistics and supplies in several facilities.

The variations included the following: (i) more women received danger signs information in Rufiji; (ii) anaemia was less frequently checked in Nouna; (iii) blood pressure was less regularly measured in Iganga; (iv) HIV testing was uncommon in Nouna; (v) microscopic examination of urine was rare in all sites, but urine testing for protein and sugar was common in Nouna; and (vi) duration of first visit was <15 min particularly in Iganga, and health workers spent even less time in subsequent visits in all three sites. Almost all women in the three countries carried their ANC cards, an indication of women's motivation to receive ANC service. Overall, information provision was weak in Nouna compared to Iganga and Rufiji. Not performing all procedures was common in three study sites. The only procedure practiced by all health workers across the countries was uterine height measurement. Health workers were reluctant to provide general educational information on PMTCT, delivery, or STI.

In spite of continuous debate (Bloom *et al.* 1999; Carroli *et al.* 2001; McDonagh 1996), the new approach to focused ANC with fewer visits and selective procedures has been recognized as an effective method to detect and treat complications and emphasize the quality of care rather than quantity (WHO 2001). The policies advocated by WHO are in place in all developing countries, but this study revealed that the procedures proven to be effective and integrated in the national guideline were not performed on all women. Until now many studies only addressed the quality assessment or validity of individual procedures (Urassa *et al.* 2002, 2003; von Both *et al.* 2006). The omission of certain procedures was also reported in earlier studies in Tanzania (Boller *et al.* 2003; Osungbade *et al.* 2008; Urassa *et al.*2002. This is noteworthy because the importance of assessing the coverage of ANC procedures cannot be understated.

Provision of information on danger signs in every visit is mandatory because although complications such as haem-

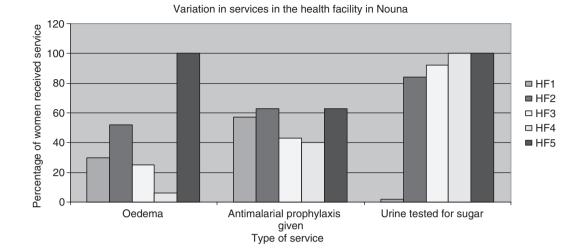**Table 3** Differences in service provision among three countries

Information provision	Nouna (%)	Iganga (%)	Rufiji (%)
STI information	30 (8)	63 (22)	59 (38)
Danger signs information	6 (2)	19 (7)	105 (67)
PMTCT information	71 (20)	171 (61)	48 (31)
Delivery information	48 (14)	194 (69)	120 (76)
Immunization information	50 (14)	24 (9)	75 (48)
Nutrition education	6 (2)	87 (31)	80 (51)
Drug distribution			
Anti malarial prophylaxis (at least once)	161 (46)	258 (92)	81 (52)
Iron tablet (current visit)	330 (95)	163 (58)	63 (40)
Clinical examination			
Anaemia (eye and/or hand)	2 (0.6)	226 (81)	81 (52)
Oedema (feet)	141 (41)	174 (62)	42 (27)
Measurement of weight	344 (99)	169 (60)	107 (68)
Measurement of blood pressure	331 (95)	151 (54)	148 (94)
Listening to foetal heart sound	265 (76)	266 (95)	132 (84)
Measurement of uterine height	338 (97)	270 (96)	156 (99)

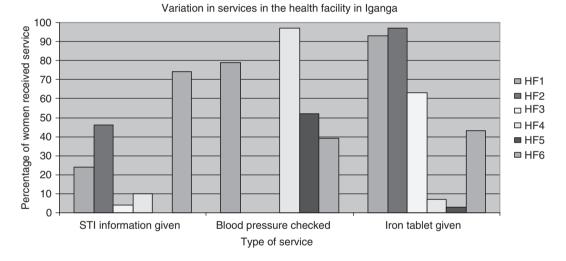| Laboratory testing	Done (%)	Ref (%)	Done (%)	Ref (%)	Done (%)	Ref (%)
HIV	75 (21)	0	233 (80)*	12 (4)	140 (89)	14 (9)
Blood group	3 (0.9)	29 (8)	0	0	24 (15)	16 (10)
Syphilis	2 (0.6)	30 (9)	17 (6)	0	138 (88)	17 (11)
Malaria	0	0	11 (4)	0	6 (4)	26 (17)
Haemoglobin	0	2 (0.6)	3 (1)	0	42 (27)	60 (38)
Microscopic examination of urine	0	0	4 (1)	0	24 (15)	29 (18)
Urine for protein	250 (72)	0	3 (1)	0	6 (3)	49 (31)
Urine for sugar	226 (65)	0	1 (0.4)	0	4 (3)	41 (26)

*One health facilities in Iganga does not have HIV rapid testing facility; all women were referred to nearest facility.

orrhage and puerperal sepsis cannot be predicted through ANC screening, women can be educated to recognize and act on symptoms that potentially lead to serious conditions (Bhatia & Cleland 1995; Pembe *et al.* 2009). Except in Tanzania, very few women were informed about danger signs. Women may hesitate to have delivery by skilled birth attendants as they have not received counselling on delivery preparation, one of the core strategies needed in the reduction of maternal and early neonatal death (Starrs 2007). Measuring blood pressure screens for hypertension, which is an early and detectable sign of toxaemia (Rosenberg & Twaddle 1990). Women with pre-eclampsia, one of the most common yet treatable complications, are at higher risk of severe maternal disease, preterm birth and small-for-gestational age babies. If untreated, it can lead to maternal and neonatal death (von Dadelszen *et al.* 2005). Similarly, not screening for treatable conditions like syphilis is common in other African countries. A survey of 22 SSA countries showed that on average, only 38% of women who attended ANCs were screened for syphilis (Gloyd *et al.* 2001). In addition to maternal morbidity, syphilis also has detrimental effects on foetal and infant

survivals (McDermott *et al.* 1993; Watson-Jones *et al.* 2005). Health workers also failed to carry out certain clinical examination, laboratory test, and distribute anti malarial prophylaxis, iron, and folic acid, which can have significant impact on the health of mother and foetus (Meda *et al.* 1999; Marchant *et al.* 2004; Miaffo *et al.* 2004; Idowu *et al.* 2005; Coetzee 2009). The above-mentioned interventions have been proven to effectively reduce serious mortality and morbidity (Carroli *et al.* 2001).

The selective performance could be explained by the lack of supplies found in the infrastructure assessment. The shortage of supplies was also found in other studies (Rooney 1992; Mwaniki *et al.* 2002; Osungbade *et al.* 2008; Sarker *et al.* 2010). Other barriers included health workers' lack of awareness regarding the importance of certain procedures (Schmid 2009) and shorter duration of ANC session (Mendoza *et al.* 2001; von Both *et al.* 2006). The duration of the first consultation of individual ANC session in this study was also often shorter than the 40-min approximation advocated by the new WHO ANC model. Studies from Gambia, Nepal, Tanzania and Zimbabwe
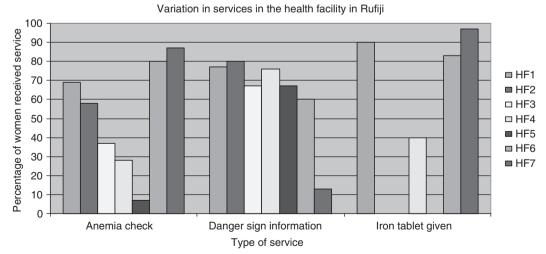
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Figure 1 Variation in service provisions in the health facilities (HF) in Nouna, Iganga, and Rufiji.

Table 4 Comparison of duration of ANC session according to the visit

ANC visit	<15 min (%)			15–30 min (%)			>30 min (%)		
	NOUNA	IGANGA	RUFIJI	NOUNA	IGANGA	RUFIJI	NOUNA	IGANGA	RUFIJI
1st	53 (36)	87 (67)	6 (12)	71 (48)	36 (28)	27 (52)	23 (16)	6 (5)	19 (36)
2nd	56 (60)	70 (77)	22 (71)	26 (28)	17 (19)	8 (26)	10 (11)	4 (4)	1 (3)
3rd	44 (63)	31 (89)	38 (70)	18 (26)	4 (11)	16 (30)	8 (11)	0	0
4th+	26 (79)	10 (100)	12 (60)	5 (19)	0	7 (35)	1 (2)	0	1 (5)
Total	180/342 (53)	198/268 (74)	78/157 (50)	120 (35)	57 (21)	58 (37)	48 (12)	10 (4)	20 (13)

ANC, antenatal care.

reported that <3 min were spent on individual counselling per consultation in antenatal clinics (von Both *et al.* 2006; Anya *et al.* 2008). Increasing consultation time would be a major constraint for high coverage, especially in settings with poor human resources. However, unlike many, the reason for not performing certain procedures in few HF could not be explained.

Certain limitations to our study must be acknowledged. First, the presence of an observer might have influenced the outcomes positively owing to indirect and direct actions. Secondly, the study only assessed the health workers' performance from a quantitative perspective, and therefore, the comprehensive of quality of services could not be measured. Finally, the study did not investigate the underlying reasons for not performing certain procedures.

In conclusion, assessment of the content of ANC can be an important process indicator for monitoring quality. In this study, health workers in all three country sites failed to perform many crucial procedures stipulated in the ANC guideline. This yields serious implications for women's health and may directly influence maternal mortality. The regular supply of materials and provision of supervision and refresher training for health workers should significantly improve the compliance of ANC services (Sarker *et al.* 2010). Furthermore, qualitative studies should be conducted to identify the underlying reasons for variation in performing services within the countries. The available evidence and the preceding discussion indicate that focused ANC is a great step forward, but the necessity of the core procedures collectively carried out during an antenatal visit needs to be revisited. The role of ANC is undeniable as it is one of the most widespread health services and coverage is often high. Given the expected benefits for maternal and perinatal health, revisiting the necessity of the core procedures will be a very worthwhile investment.

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