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An assessment of the quality of antenatal care using Oakland's 4Ps and 3Cs in the Bamenda health district

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Abstract

Despite relatively high antenatal care (ANC) coverage in Cameroon, maternal and neonatal mortality remain high, suggesting that service quality rather than access alone may be the limiting factor. Oakland's Total Quality Management (TQM) framework of the 4Ps (People, Planning, Processes, Performance) and 3Cs (Culture, Communication, Commitment) provides a structured approach for assessing ANC quality. A descriptive cross-sectional study was conducted. Data was collected from February to May 2021 in 14 health facilities in the Bamenda Health District. These facilities were classified at faith-based or public some instances and according to the level of care they rendered at others. Data were collected through structured observation of 224 ANC consultations and interviews with 14 ANC providers and managers and 356 pregnant women. A checklist aligned with WHO recommendations and the TQM framework was used for the observation. Quantitative data were analyzed using SPSS ver 21.

People: Faith-based facilities had more qualified ANC providers, while public facilities relied more on nursing assistants. Supportive supervision was limited, with managers consistently present only 28.6% of the time.

Planning: Only 35.5% of facilities offered ANC services daily. Essential equipment and ANC guidelines were inconsistently available, and half of providers were unaware of the national guideline.

Processes: First ANC consultations were rarely provided on the day pregnancy was confirmed (25%). Higher-level facilities better implemented laboratory tests, supplementation, and screening, while mid-level facilities engaged husbands and communities more effectively.

Performance: Basic services such as registration, urine testing, and iron-folic acid supplementation were consistently delivered (>95%), but tuberculosis screening and arranged delivery transportation were inadequate.

Culture: Providers were courteous, collaborative, and maintained privacy, though space constraints occasionally caused breaches.

Communication: Women were informed of examination findings 94.6% of the time, but emergency response systems functioned promptly only 25% of the time.

Commitment: Providers demonstrated strong dedication, yet only 27% of women booked ANC in the first trimester, reflecting weak early client engagement.

Conclusion: ANC coverage in Bamenda Health District is undermined by inconsistent service quality across the 4Ps and 3Cs dimensions. Strengthening supervision, ensuring daily service availability, enforcing guideline use, and integrating horizontal service delivery models are critical to improving maternal and neonatal outcomes.

Keywords: Antenatal care quality, Cameroon, health service delivery, health systems improvement, maternal and neonatal health, supervision and guideline adherence, total quality management framework

Introduction

Most maternal deaths are preventable because solutions to manage pregnancy complications are well known [1]. Antenatal care (ANC) is defined as the medical care, supervision, and attention given to pregnant women and their fetuses—offers a platform for health promotion, disease prevention, screening, and early treatment [2, 3]. Initiated in the twentieth century to prevent or manage pregnancy complications [4], ANC includes micronutrient supplementation, hypertension management to prevent eclampsia, tetanus immunization, HIV testing and prevention of mother-to-child transmission, as well as malaria prophylaxis in endemic regions [5]. Its ultimate objective is to ensure healthy mothers and babies [2].

Despite its potential, ANC is often fragmented, dominated by vertical interventions, and of poor quality [6]. Care-seeking patterns vary widely, and many women initiate ANC late, leading to missed diagnoses and delayed referrals

for obstetric emergencies [7-10]. WHO emphasizes that implementing timely, evidence-based ANC can save lives while providing an opportunity to engage women, families, and communities at a critical stage of life [11, 12]. Moreover, ANC plays a role in managing concurrent conditions such as HIV and malaria, which account for about 25% of maternal deaths [13, 14].

Globally, 86% of pregnant women attend at least one ANC visit, but only 62% complete four visits, with lower coverage in high-mortality regions such as sub-Saharan Africa (52%) and South Asia (46%) [5]. In Cameroon, while 83% attend at least one visit and 59% complete four visits, only 35% initiate ANC during the first trimester [15]. In the North-West region, coverage is 97% for at least one visit and 83% for four or more visits, but only 33% attend in the first trimester [15].

Cameroon adopted the Focused ANC (FANC) approach in 2006 and later integrated the WHO 2016 recommendations[6]. Although FANC improved ANC coverage [16, 17], high maternal and neonatal mortality persists [12, 18]. Research indicates that coverage alone is insufficient—quality of care is critical [6]. Poor ANC quality, documented in multiple Cameroonian studies [19-21], may explain why improved coverage has not reduced adverse outcomes. Indeed, higher perinatal mortality rates have been reported with FANC [22], likely reflecting poor implementation rather than flaws in the model itself.

Improving ANC quality is particularly urgent in resource-constrained settings where out-of-pocket payments dominate healthcare financing [23]. Evidence suggests that women avoid ANC when experiences are negative, regardless of how many visits are recommended [12]. Thus, achieving positive outcomes requires not only adequate coverage but also continuous quality management to ensure a supportive environment for delivering services [3].

Against this backdrop, this study evaluates the quality of ANC in the Bamenda Health District using Oakland's 4Ps and 3Cs model of total quality management. The emphasis is on identifying gaps in service delivery and proposing strategies to strengthen quality rather than merely increasing contact frequency.

Materials and Methods

This study was carried out in the BHD in the North-West Region of Cameroon. The BHD is one of the 19 health districts in the NW Region of Cameroon. It lies within the High Western Plateau of Cameroon. It is an urban and semi-urban area with one main hospital (Bamenda Regional Hospital (BRH)) that functions as the referral hospital, and many public, lay private and faith-based health facilities. With about 337,036 inhabitants, it has 18 health areas and covers a total surface area of 560 square kilometers. The health areas include; Akumlam, Alabukam, Alakuma, Alamandom, Atuakom, Azire, Mankon, Mbachongwa, Mendankwe, Mulang, Ndzah, Nkwen Baptist, Nkwen Rural, Nkwen Urban, Ntambag, Ntamulung, Ntankah, and Ntasen health areas. The BHD is bounded to the North by the Bafut Health District, to the South by the Santa Health District, to the East by the Tubah Health District and to the West by the Mbengwi Health District.

A descriptive cross-sectional study was conducted in the Bamenda Health District (12 February-15 May 2021) involving health personnel providing ANC services. Thirteen lower-level health facilities (9 public, 4 faith-based) and the regional hospital were purposively sampled; five facilities were excluded due to insecurity and suspension of ANC services. Consecutive sampling recruited all ANC providers present, with lead providers interviewed on the recommended and practiced ANC approaches and related challenges. Event sampling was used to observe targeted behaviours, and data were collected using a checklist adapted from Ngxongo [6] and WHO [12] ANC guidelines, structured around Oakland's 4Ps and 3Cs model of Total Quality Management [24].

The data collection tool comprised three parts: identification information, a checklist of observed ANC components, and questions on recommended versus actual ANC approaches. A pilot was conducted in the Bambui Health District. Four trained nurse-research assistants used observation checklists over four ANC days per facility (≈2 weeks each, due to designated ANC days), covering all providers and women attending. In total, 224 consultations were observed across 14 facilities, with at least one first and one repeat visit per provider, generating 56 checklists. Additionally, 356 pregnant women were interviewed, and 14 key informant interviews with ANC unit heads were conducted. Data were analyzed using SPSS v21. Administrative, ethical, and facility-level approvals were obtained, and informed consent was secured from all participants.

Results

The presentation of results was guided by the TQM model using the 4Ps and 3Cs. Although discussed separately, these elements were often interrelated. Health facilities were further classified by level of care and ownership (faith-based vs. public).

People involved in ANC in the BHD

Our results show that, the number and cadre of personnel who provided ANC services varied from HF to HF. The table below presents the results for each HF type.

Table 1: ANC providers qualification

HF type	Number	Percentages
No RHN		
FBHF	6	54.5%
PHF	5	45.5%
Total	11	100%
BNS		
FBHF	1	100%
PHF	0	0%
Total	1	100%
MW		
FBHF	8	36.4%
PHF	14	63.6%
Total	22	100%
SRN		
FBHF	7	33.3%
PHF	14	66.7%
Total	21	100%
NA		
FBHF	0	0%
PHF	10	100%
Total	10	100%

A total of 65 ANC providers participated, with 22 (33.8%) from faith-based health facilities (FBHFs) and 43 (65.2%) from public health facilities (PHFs). FBHFs generally had more and better-qualified providers, while PHFs had 10 nursing assistants compared to none in FBHFs. Overall, 43 (66.1%) providers were midwives or state registered nurses.

Table 2: Availability of Mangers to Support Staff Activities

	Operational manager on site	
No	29	51.8
Yes	4	7.1
Yes always	16	28.6
Yes sometimes	7	12.5

It was observed that during 51.8% of the study period, no manager was available to support the activities of the staff. Only during 28.6% of the time was a manager always available to support the activities of the ANC providers.

Planning

Planning was assessed through operating days and times, service availability, resource use, and process mapping. Only 35.5% of facilities offered ANC services daily, including holidays, rising to 78.3% when weekends were excluded; 64.5% did not provide services on weekends or public holidays. In total, 10 facilities (71.4%) offered ANC only on scheduled days, while just 4 (28.6%) provided daily services. First and repeat visits were routinely scheduled on different days, and women who presented outside these schedules were often asked to return, meaning not all pregnant women were accepted for care.See table 3 below.

Table 3: Availability, Acessibility and Access to ANC services

Service available Monday to Friday	Frequency	Percentage
No	3	21.3
Yes	11	78.3
Weekend and public holidays		
No	9	64.5
Yes	5	35.5
Service Accessible daily		
No	10	71.4
Yes Always	4	28.6
All women accepted for ANC when they come		
Yes Always	53	94.6
Yes sometimes	3	5.4

The results we obtained when we used the levels of care are presented on the table below.

Table 4: Availability of services at levels of care

Evaluation Criteria	Response	HF level (n=56)							Chi-Squared	P value
		level 6	%	level 5	%	Level 3	%	Total		
Weekend and Pubic Holidays	NO	16	50.0%	14	70.0%	4	100.0%	34	4.85	0.09
	YES	16	50.0%	6	30.0%	0	0.0%	22		
All ANC equipment	No	8	25.0%	1	5.0%	0	0.0%	9	5.85	0.44
	Yes Always	23	71.9%	17	85.0%	4	100.0%	44		
	Yes sometimes	1	3.1%	2	10.0%	0	0.0%	3		
Clearly, defined process map	No	10	31.3%	12	60.0%	0	0.0%	22	9.03	0.06
	Yes Always	11	34.4%	3	15.0%	3	75.0%	17		
	Yes Sometimes	11	34.4%	5	25.0%	1	25.0%	17		

Weekend ANC services were available in all level 3 facilities, compared to 30% of level 5 and 50% of level 6 facilities, allowing some flexibility for working women. Working hours ranged from 6-12 hours, with half of facilities offering 8-hour days and only two extending to 12 hours.

Equipment availability did not differ significantly, though level 3 facilities had complete equipment 100% of the time versus 71.9% and 82.0% at levels 6 and 5. While all facilities had separate workstations for registration, examination, treatment, tests, counselling, and consultation, only 75% of level 3 facilities had a defined process map compared to 15% at level 5.

Processes involved in the implementation of quality ANC services

Administrative Processes

Administrative processes involved in the implementation of quality ANC services were assessed using the following parameters: i) first visit consultation provided on the day pregnancy was confirmed or the very first time the pregnant women presented at the HF, (ii) first visit consultation provided before transfer of those pregnant women who for some reason needed to attend ANC at another clinic, (iii) availability of ANC guidelines (iv) HF specific protocols on the management of pregnant women were used, and (v) availability of classifying forms.

Table 5: Processes for quality ANC services

Evaluation Criteria	Response	HF level (n=56)							Chi-Squared	P value
		level 6	%	level 5	%	Level 3	%	Total		
Availability of ANC guideline	No	4	12.5%	12	60.0%	4	100.0%	20	21.47	<0.01
	Yes Always	22	68.8%	8	40.0%	0	0.0%	30		
	Yes Sometimes	6	18.8%	0	0.0%	0	0.0%	6		
Use of checklist	No	6	18.8%	12	60.0%	4	100.0%	22	16.58	<0.01
	Yes Always	22	68.8%	8	40.0%	0	0.0%	30		
	Yes Sometimes	4	12.5%	0	0.0%	0	0.0%	4		
Classifying Form Available	No	28	87.5%	20	100.0%	4	100.0%	52	3.23	0.20
	Yes Always	4	12.5%	0	0.0%	0	0.0%	4		
First ANC on Diagnosed Date	No	4	12.5%	8	40.0%	0	0.0%	12	9.00	0.06
	Yes Always	9	28.1%	4	20.0%	0	0.0%	13		
	Yes Sometimes	19	59.4%	8	40.0%	4	100.0%	31		
HF Specific Protocol Used	No	3	9.4%	8	40.0%	0	0.0%	11	8.37	0.02
	Yes Always	29	90.6%	12	60.0%	4	100.0%	45		

As regards the administrative processes, there was a statistically significant difference (p value <0.01) with the availability of ANC guidelines. The guidelines were available at the level 6 HFs 68.8% of the time, and unavailable at the level 3 HF all the time. At the level 5 HFs, the guidelines were available 40% of the time.

Likewise, the checklists for first and subsequent visits were not used at the level 3 HF 100% of the time. The level 6 HFs excelled in the use of checklists (always using them (68.8%)). This finding was statistically significant (p value = <0.01).

Classifying forms were not available in all the HFs implying that they were not used in all the HFs. First ANC was only sometimes (66.5%) provided on the day pregnancy was diagnosed, with the level 5 HFs not doing so 40% of the time.

On the contrary, a statistically significant difference (p value =0.02) existed at various levels of care with HF specific protocols in the management of ANC problems. With the level 3 HF always implementing HF specific protocol (100% of the time) as opposed to level 6 and 5 HFs which implemented HF specific protocols 90.6% and 60.0% of the time respectively.

General ANC consultation processes

We looked at the following activities during ANC consultations i) if rapid appraisals were conducted in the waiting area, (ii) if priority was given to pregnant women requiring emergency services, and (iii) if the principle of "ask, look, listen and feel" was followed during consultations.

Table 6: Consultation Processes

Evaluation Criteria	Response	HF level (n=56)							Chi-Squared	P value
		level 6	%	level 5	%	Level 3	%	Total		
Emergency given priority	Yes Always	32	100.0%	20	100.0%	4	100.0%	56	0.00	1.00
Rapid Appraisal	No	20	62.5%	13	65.0%	2	50.0%	35	5.40	0.71
	Yes Always	1	3.1%	2	10.0%	0	0.0%	3		
	Yes Sometimes	11	34.4%	5	25.0%	2	50.0%	18		
Ask Look and Listen	Yes Always	31	96.9%	16	80.0%	4	100.0%	51	4.73	0.09
	Yes Sometimes	1	3.1%	4	20.0%	0	0.0%	5		

There was no statistically significant difference between the levels of care. However, rapid appraisal was not done 62.5% of the time. Emergencies were given priority all the time at all the levels of care. The 'Ask, look, listen and feel' method of assessment was used 98.2% of the time.

Performance of ANC Providers

An assessment was done regarding the guidelines used and whether the ANC providers followed the guidelines when carrying out procedures.

Table 7: ANC Guidelines being used for ANC and ANCP Knowledge of guidelines recommended for use at ANC

Evaluation Criteria	Response	HF level (n=56)							Chi-Squared	P value
		Level 6	%	Level 5	%	Level 3	%	Total		
Guidelines being used for ANC	New WHO	2	25.0%	0	0.0%	1	100.0%	3	32.33	<0.01
	FANC	2	25.0%	1	20.0%	0	0.0%	3		
	Traditional	4	50.0%	2	45.0%	0	0.0%	6		
	Health Institution Adapted Guideline	0	0.0%	1	15.0%	0	0.0%	1		
	Not aware	0	0.0%	1	20.0%	0	0.0%	1		
ANCP Knowledge of Guidelines recommended for use at ANC	New WHO	4	50.0%	0	0.0%	1	100.0%	5	35.8947	<0.01
	FANC	2	25.0%	0	0.0%	0	0.0%	2		
	Traditional	0	0.0%	1	20.0%	0	0.0%	1		
	Not aware	2	25.0%	4	80.0%	0	0.0%	6		

For the guideline used by the HFs, 1 (15.0%) out of the 14 HFs used an adapted guideline. 3(21.4%) of the HFs used the new WHO recommendations, while 3(21.4%) used FANC, and up to 6(42.9%) still used the traditional ANC guidelines. There was a HF where the ANCP interviewed was not aware of what was being used.

There was a significant relationship between level of care and the use of recommended guidelines, with 100% of service providers in level 3 health facility using the 2016 new WHO ANC guidelines. Meanwhile, 45% of level 5 HFs and 46.9% of level 6 health facilities continue to use the traditional ANC guidelines. T

As for knowledge of the current guideline recommended for use in Cameroon, 2(14.3%) of the respondents identified Focused Antenatal Care (FANC) as the guideline currently recommended for use in Cameroon, 5 (35.7%) cited the new WHO guidelines, 6 (42.9%) reported being unaware of the recommended guideline, and 1 (7.1%) indicated the traditional antenatal care approach.

There was also a significant relationship between the guideline recommended for care and the level of care with 100% of the ANCPs at level 3 having knowledge of the recommended guideline. 80% of ANCP at the second level of care were not aware of the guideline that is recommended for use in Cameroon.

The ANC providers did not follow guidelines 100% of the time when carrying out procedures at all the levels of care.

Commitment of ANCPs in providing ANC services and of PW to ANC

An assessment was done for both the ANC providers and the pregnant women to check how committed they were to ANC. Commitment of the ANC providers in providing ANC services was assessed by observing whether they spent most of their time attending to the pregnant women and actively working. Commitment of the PW to care was assessed by looking at the GA at first ANC.

At all levels of care ANCP were committed to providing care to the PW. This implies that no matter the level of the HF, PW were sure to meet a committed ANCP.

The results for PW's commitment to care are presented on the table below.

Table 9: Commitment of ANC providers

Evaluation Criteria	Response	HF level (n=56)							Chi-Squared	P value
		level 6	%	level 5	%	Level 3	%	Total		
Most time attending to PW	No	1	3.1%	0	0.0%	0	0.0%	1	8.04	0.09
	Yes always	23	71.9%	20	100.0%	4	100.0%	47		
	Yes sometimes	8	25.0%	0	0.0%	0	0.0%	8		

Communication in the HF

Communication in the HF was assessed by observing if the following were being done: i) clear directions and instructions given to pregnant women about HF procedures, ii) pregnant women informed about examination findings, iii) communication with referral institution, iv) EMRS responding to emergency calls within two hours, and v) plan of pregnancy management done in consultation with the pregnant women.

Clear directions and instructions given to pregnant women about clinic procedures

Table 10: Communication in the HF

Evaluation Criteria	Response	HF level (n=56)							Chi-Squared	P value
		level 6	%	level 5	%	Level 3	%	Total		
Clear Directions	No	1	3.1%	0	0.0%	0	0.0%	1	8.04	0.09
	Yes Always	23	71.9%	20	100.0%	4	100.0%	47		
	Yes Sometimes	8	25.0%	0	0.0%	0	0.0%	8		
Comm With Referral Institution	Yes always	28	87.5%	16	80.0%	4	100.0%	48	1.28	0.53
	Yes sometimes	4	12.5%	4	20.0%	0	0.0%	8		
Informed With Exams Findings	Yes always	29	90.6%	20	100.0%	4	100.0%	53	2.38	0.03
	Yes sometimes	3	9.4%	0	0.0%	0	0.0%	3		
Response of emergency call	Yes always	0	0.0%	5	25.0%	0	0.0%	5	9.88	0.01
	Yes sometimes	32	100.0%	15	75.0%	4	100.0%	51		
Plan of management done in consultation with the PW	No	8	25.0%	0	0.0%	0	0.0%	8	9.13	0.06
	Yes always	22	68.8%	20	100.0%	4	100.0%	46		
	Yes sometimes	2	6.3%	0	0.0%	0	0.0%	2		

It was observed that clear directions were given to the PW 85.7% of the time. Where this was not done it was mainly due to negligence and work load. The PW were informed about examination findings 94.6% of the time. When compared at the different levels of care, the results were significant (p value =.03) with the 5th and 3rd level of care informing the PW about examination findings all the time while at the 6th level it was done 90.6% of the time. Communication with the referral institution was possible 85.7% of the time. Challenges faced in communicating with the referral institution included poor network and workload. 14.3% of the time, the plan for the management of pregnancy was not done in collaboration with the PW.

Since it was not possible for us to observe response to emergencies during the study period, we interviewed the ANC providers about this service and we found out that emergencies were only handled sometimes 91.2% of the time. It was only 25% of the time that emergencies were

attended to promptly. This was only in the 5th level of care giving a statistically significant difference (p value = 01) between the 5th level of care and the 6th and 3rd levels of care.

Culture in the HF

Assessments were done during the observations and interviews to identify the type of culture that existed in the HF. Observations were made regarding i) whether the ANC providers were assisting each other when there was a need to do so, ii) professionalism and courteousness of ANCP towards each other, iii) follow-up ANC visits scheduled based on the PW's convenience, iv) satisfaction of the PW with the service, and v) maintenance of privacy during consultations and examinations.

Table 11: Culture that prevailed in the HF

Evaluation Criteria	Response	HF level (n=56)							Chi-Squared	P value
		level 6	%	level 5	%	Level 3	%	Total		
Approachable	Yes always	32	100.0%	20	100.0%	4	100.0%	56	0.00	1.00
Courteous	Yes always	32	100.0%	20	100.0%	4	100.0%	56	0.00	1.00
Professional assist each other	Yes always	32	100.0%	20	100.0%	4	100.0%	56	0.00	1.00
Professional between health personnel	Yes always	24	75.0%	20	100.0%	4	100.0%	48	7.00	0.03
	Yes sometimes	8	25.0%	0	0.0%	0	0.0%	8		
Professional	Yes always	31	96.9%	20	100.0%	4	100.0%	55	0.76	0.68
	Yes sometimes	1	3.1%	0	0.0%	0	0.0%	1		
Privacy	Yes always	28	87.5%	19	95.0%	2	50.0%	49	6.17	0.05
	Yes sometimes	4	12.5%	1	5.0%	2	50.0%	7		
Follow up visit	No	24	75.0%	15	75.0%	3	75.0%	42	0.00	1.00
	Yes sometimes	8	25.0%	5	25.0%	1	25.0%	14		

An excellent culture existed at the 3 levels of care. At all the levels ANCP were approachable, courteous and assisted each other were there was need to do so.

A significant difference (p value 0.03) was observed with the category of ANCP being professional and courteous among themselves. ANCPs at level 6 HFs were sometimes professional and courteous among themselves (25%). ANCPs at level 5 and 3 HFs were professional and courteous among themselves all the time. This implies that there was better collaboration among ANCPs at the 5th and 3rd levels of care than at the 6th level. Follow up visits were not planned at the PW's convenience 75.0% of the time at all the levels.

Discussion

Personnel in the HF

Among the ANCPs, 10(15.4%) were nursing assistants (NAs)**.** These findings could potentially influence the implementation of ANC services. Bradshaw [25], stated that coverage and quality of care depend on having sufficient personnel with the right skills in the right places and on training and sustaining adequate numbers of the right health care providers with relevant educational qualifications.

The reproductive health nurses and the midwives are more likely to be able to provide a higher standard of care than NAs because of the former's skills and knowledge. Therefore, the absence of this category of ANCP in some of the HF could have negative influences on the quality of ANC services rendered.

Manager in the HF

It was observed in most of the health facilities (50%) that, there were no managers to do supportive supervision during ANC sessions. Even in the HFs with managers, the mangers were only available on site 28.6% of the time. This is contrary to the recommendations made in the WHO guideline which stipulates that there should always be a manager on site to supervise ANCP activities [17]. Furthermore, Koblinsky and Matthew, emphasised the importance of the availability of a supervisor if implementation of policies are to be successful[26]. They also emphasized that good managers need to be able to ensure correct co-ordination and organization of services, including supply, training and communication, but most importantly, they should be available to support personnel.

4.2 Planning

For an effective ANC package to be delivered, competent health care providers in a functioning health system are needed with referral services and adequate supplies and laboratory support [6, 16]. All of these need to be planned and coordinated effectively [6, 16]. Bradshaw *et al*. emphasized this, stating that, coverage and quality of care depend on planning, and on the right actions being taken by the right people including the policy makers, managers, health care providers and the community [25].

Only 5(35.7%) out of the 14 HFs in our study offered ANC services throughout the week including public holidays**.** This practice limits access to healthcare services for working and school going pregnant women[6]. ANC services are supposed to be available throughout the week and for 24 hours a day.

It was observed that, not all of the HFs provided ANC services on a daily basis even when the HF was open. Instead, a specific day was set aside for ANC services. Provision of vertical programmes should be discouraged and a comprehensive package of services in every HF be encouraged to ensure availability and accessibility of services to the community every day of the week [27].

The practice of not having ANC services every day and all the time increased the risk of ANC non-attendance for working women and pregnant women who attend school [6].

Mathole *et al*., hold that, both trained staff and material resources are required in order for ANC to be effective and to meet standards [28]. In our study only the third level facility had equipment 100% of the time that were also accessible. Equipment forms the basis of health assessment

and the absence of this can lead to inadequate or wrong diagnoses and delayed treatments and/or pregnancy management.

It is important that a clearly defined process map be followed when services are not offered at one point. A clearly defined process map was followed only 30.9% of the time, with the third level HF always following it 75% of the time. In following a clearly defined process map, clients are sure to feel more relaxed as they will know how to move around the HF. There will also be increased chances of receiving complete service without getting lost in the system. This requires planning and organization of services [17, 29].

4.3 Processes involved in ANC services

Generally, the administrative processes were not well organised. Not performing these administrative processes has implications for the quality of ANC provided to the pregnant women[6]. Administrative processes form an important part of project management and should be included in the planning process in order to ensure that these are executed and monitored [6].

This study revealed that ANC was provided on the first day pregnancy was diagnosed only 25% of the time. This is contrary to what the ANC guidelines stipulate, where PW are supposed to be offered ANC services on the first day pregnancy is diagnosed [17]. According to Ngxongo, not providing the first ANC consultation on the day when the pregnancy was confirmed or at the very first clinic attendance, created missed opportunities and was also a cause for late ANC booking by some women [6]. Cameroon is one of the countries where late initiation of first ANC visit is predominant [9, 30]. Thus, every opportunity to get pregnant women to attend ANC early should not be missed.

In all the HFs classifying forms were not available. ANCPs were not conscious of its existence. Classifying forms are used to identify and distinguish women who are fit to follow basic ANC from those that are to receive specialized ANC. Doing this facilitates the planning of care for each PW, and therefore enhances individualized care. According to the WHO, the classifying form is recommended for use, during the first ANC visit to decide which women should follow the basic component of the WHO model and which women would require special care [17].

The provision of first visit consultations before transferring all pregnant women needed to attend ANC at another clinic was done 98% of the time in this study. This is recommended in order to limit missed opportunities [29]. It can therefore be deduced from the study that missed opportunities will be greatly reduced with this practice.

It was observed that, ANC guidelines were not used as a reference in providing care at all the levels of care. It is recommended that guidelines be used when carrying out ANC services. Although Cameroon is still to adapt a guideline that suits its specific context, it will be imperative for ANCPs to use the WHO's recommended guidelines while waiting. In some of the HFs the existence of these guidelines was known and available but were not being used. It was therefore difficult to assess performance of the ANCPs since there was no standard guiding principle to use. Although from our interviews with some of the ANCPs, we could deduce that some of the HFs were using the traditional approach to ANC and others were using the FANC or the WHO 2016 recommendations; this was not obvious from the women's ANC schedule. The scheduling of the ANC visits portrayed more of the traditional approach to ANC. However, according to the MoPH, in Cameroon, it is the WHO 2016 recommendations that are supposed to be implemented [31]. This study further assessed the knowledge of ANCPs on the guideline recommended for use in Cameroon, and found that 50% of the ANCPs thought it was the traditional approach. This could explain the differences in the guidelines that the various HFs adopted to provide care. It however remains a call for concern, because the guideline had been changed twice without the ANCP being aware. There is an urgent need for reliable means of communication at the various levels of the health care system.

The HF specific protocols on pregnancy management were used 80% of the time in the HFs. A statistically significant difference existed at various levels of care regarding the use of HF specific protocols in pregnancy management, with the level 3 HF always implementing specific protocol 100% of the time. It is recommended that each HF should develop its own protocol for the management of pregnant women, and that the protocol should be available in the form of posters, individual booklets and/or tool kits [29, 32]. The MCHD and Ngxongo describe the protocols as providing detailed instructions for managing a condition derived from guidelines and as being specific to each institution and/or level of care [6, 32].

WHO states that a list of factors is supposed to be put in place to ensure the successful implementation of ANC, mentioning that protocols and guidelines should not just be available but should be known and be understood by all ANCPs. Snyman in the same light holds that having guidelines and protocols is essential, but not enough because continuous training and revision of these protocols are essential in all institutions [33].

The checklists for first and follow up ANC visits were always used 53.6% of the time. Pattinson recommended that the checklists for the first and follow up ANC visits should be used for ANC [29]. The checklists are important in ensuring that the ANC consultation process is complete. The follow up checklist for example assists in ensuring that all ANC procedures and tests are done in due time, results are available and action on abnormal findings is instituted [29].

Antenatal care consultation processes

The findings from observations and interviews regarding the ANC process concur. They all indicated that, although some of the processes were performed well, there was lack of evidence of using a recommended standard guideline. WHO recommends that national evidence-based guidelines should exist, detailing the essential minimum components of ANC, in line with the country epidemiological profile and country priorities and based on WHO guidelines and recommendations [34].

Rapid appraisal was not done 62.5% of the time. According to MCHD rapid appraisals are supposed to be done when the women arrive the HF to identify those that require emergency care. When the ANCPs do not do this, it is a potential source of delay at the HF which is one of the main causes of maternal mortality in developing countries like

Cameroon. An auxiliary staff can be trained to carry out rapid appraisals in the waiting area. Putting up posters with directives is a great way to assist in carrying out rapid appraisals. However, although rapid appraisals were not done most of the time in this study, emergencies were given priority all the time at all the levels of care. This is similar to the findings reported by Ngxongo which indicated that emergencies were given priority even when rapid appraisals were not done.

Performance of ANCP

Gross *et al*. stated that in many studies national guidelines serve as a "gold standard" to assess healthcare workers' observed performance during patient consultations [35]. WHO also recommends that ANC should be directed by guidelines. These guidelines should be adapted from the standard WHO guideline following countries' specific contexts. Each region, right down to the districts, should further adapt this guideline to suit its local context. In this study, it was not possible to use a national guideline because such a guideline is not available in Cameroon, which implies the impossibility of having an adapted version for the BHD. Thus, it was difficult to do the assessment. However, we had to use other national guidelines in union with WHO guidelines for quality care, from both the guideline of the FANC approach and the WHO 2016 guideline since all national guidelines stems from these. Consequently, the assessment of ANCP performance in this study was drawn from different sources although these sources are all rooted in WHO guidelines.

The ANCP were observed not to be using guidelines when carrying out procedures in all the HFs. Gross *et al*. in their study about ANC practices in the ANC clinics in Kilombero Valley in South-Eastern Tanzania found out that quality assessment of ANC services raised questions about healthcare workers' performance with practice often diverging from the standard required in the guidelines [35]. According to these authors inadequate and inappropriate care not only leads to a higher incidence of iatrogenic incidents, contributing to disabilities and/or chronic illnesses among women and new born babies, but it also leads to a lack of confidence in the system and low utilisation of these services. Similar findings were evident in our study where relevant tests were not done and preparation for delivery was not done most of the time.

The findings of this study concur with the findings of the study by Grosss *et al*. done in south-eastern Tanzania, where provision of ANC was not done according to the guidelines [35]. Some services were not delivered to the women, while others were given to nearly all women, performance during repeat visits was poor, and discrepancies in practices and the requirements of the ANC guidelines, especially concerning health education and counselling, were noted.

Commitment

The ANCPs spent most of their time attending to clients and actively working 83.9% of the time. The results were similar at all the levels of care. Effective utilisation of time is an important aspect of quality management. Clients get frustrated when they noticed that the ANCPs do not spend most of their time attending to clients and actively working[6]. According to Hendrich *et al*., an understanding of how health care providers spend their time is essential to target opportunities for improving health care effectiveness through improvements in management, workforce-related issues, work processes, and organizational culture[36]. These authors further observed that, the health care provider's work process and the physical working environment contribute to the efficiency and safety of client care, thus making how the health care providers spend their time a key driver of distinct changes in the work environment.

Communication

The study assessed communication between the ANCPs and the PW, and between the referral institutions and the EMRS. It was observed that clear directions were given to the PW 85.7% of the time. A contrary finding was observed by Ngxongo, where clear directions and instructions were given to PW only 51% of the time[6]. The PW were informed about examination findings 94.6% of the time. When compared at the different levels of care, the results were significant with the 5th and 3rd levels of care informing the PW about examination findings all the time, while at the 6th level it was done 90.6% of the time. This is probably because the 5th and 3rd levels of care are more equipped than the sixth level of health care. As opposed to the findings of Ngxongo, good communication was observed between the ANCP and the PW [6].

Regarding communication with referral institutions, it was possible 85.7% of the time. It is imperative for the referral system to be efficient to enable prompt interventions during emergency situations.

Unlike in the study carried out by Ngxongo which reported that pregnancy management plan were drawn up in consultation with the pregnant women only 3% of the time[6], it was observed that it was only during 14.3% of the time that management of pregnancy planning was not done in collaboration with the PW. This again expressed good communication between the ANCP and the PW.

Since emergency responses could not be directly observed, ANC providers were interviewed. Emergencies were handled in 91.2% of cases, but only 5% were attended to promptly; significantly more often at the 5th level of care than at the 6th and 3rd levels ($p = 0.01$). Contrary to expectations, referrals at the better-equipped 3rd level were less prompt. As noted by Ngxongo and De Bernis *et al*., timely access to appropriate care is critical, and poor communication between health facilities, emergency services, and referral institutions can further delay treatment [6, 37].

Communication with the referral institution and EMRS forms an important aspect of ANC management. Due to the heavy reliance on primary care since the 1970s, limited attention has been given in many resource-poor countries to addressing the need to build adequate and appropriate emergency response systems, including referral systems and facilities that can deal with all types of medical emergencies, especially obstetric emergencies [6].

Culture

Culture in any business is defined as a belief that pervades the organization about how business should be conducted[24], and how employees should behave and should be treated. Ngxongo avers that, cultural issues relating to language and

staff insensitivity, are important factors that could deter some women from accessing ANC early and regularly [6]. In this study it could be concluded, from the various positive cultural behaviours that were observed at the various levels of care, that, a positive culture prevailed in the HFs in the BHD. At all the levels, ANCPs were approachable, and courteous and assisted each other where needful. This result corroborates the high satisfaction rate that PW expressed with the attitude of the ANCPs [38].

While a generally good culture was noted across all care levels, a significant difference emerged regarding professionalism and courtesy among ANC providers. At level 6 facilities, only 25% were sometimes professional and courteous to one another, whereas providers at levels 5 and 3 displayed consistent professionalism and collaboration. This suggests stronger teamwork at the 5th and 3rd levels compared to the 6th level.

Follow-up visits were scheduled without considering pregnant women's convenience 75% of the time across all care levels. Involving stakeholders improves participation and cooperation [6]. In ANC, engaging women in planning their care enhances compliance with visit schedules, supports implementation of care plans, and empowers them to monitor their own pregnancies [6].

Conclusion

ANC quality in the BHD is generally good based on clinical indicators but limited by the absence of standard ANC guidelines, weak emergency response, and poor attention to social determinants of pregnancy. Achieving Cameroon's maternal mortality target requires strengthening provider skills and implementing clear, standardized ANC protocols.

Conflict of Interest

Not available.

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