Health Professionals' Compliance with National Treatment Guidelines for Treatment of Severe Malaria in Children in Bolgatanga Hospital, Upper East, Ghana

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Abstract

Despite the dramatic decline in malaria deaths on the African continent, malaria still kills some 660,000 people each year, most of them young African children. Ghana is currently implementing its new treatment policy for the treatment of uncomplicated malaria. According to the national standard treatment guidelines for malaria treatment, quinine is the drug of choice for complicated/severe malaria in both children and adults. The objective of the study was to investigate the level of health professionals' compliance with the standard treatment guidelines in treating children under five years of age with severe malaria in Bolgatanga Municipality for year 2004 with the view to improving quality care. The research design was descriptive cross-sectional. It involved the analysis of documented in-patient cases, observation of health professionals practice at work, focus group discussions and interviews of a sample of staff in the Bolgatanga Regional Hospital. The main findings indicated that the level of compliance to the standard treatment guidelines by health professional in the hospital was 85%-95% for diagnosis, treatment and supportive care. As regards the drug of choice quinine, the level of compliance was 2 %. There was evidence of high (85%-95%) level of compliance to some of the measuring indicators used in the study. The study recommended hospital management to ensure treatment guidelines are made available for use as well as provide regular in-service training, close monitoring and supervision of staff, and health promotion messages to patients and clients to maintain compliance level of staff and improve their performance levels with guidelines for quality care.

Keywords: Children, Health Professionals, Compliance, Severe Malaria and Treatment Guideline

1.0 Introduction

Malaria is a global public health disease of concern, in many low-income countries including Ghana. The disease is a major cause of poverty and low productivity, especially in poor countries. The direct and indirect costs of malaria are very high (Ghana ISSER, 2003). The World Health Organization (Africa Region), report indicates that malaria causes 10.6 % of loss in Disability Adjusted Life Years. It is estimated to be second only to HIV/AIDS in this respect (WHO, 2003; Malaria Watch, 2004). About 2 % of all children who happen to recover from cerebral malaria are estimated to have suffered brain damage including epilepsy (WHO/UNICEF, 2003). Globally, the most deadly form of malaria, which is widely spread in sub-Saharan Africa, is caused by *Plasmodium falciparum*. In Ghana, malaria is hyper-endemic and accounts for about 40-44 percent of all out-patient department (OPD) attendance, and 22 percent of mortality for children under five years of age (GHS, 2003). The current malaria control strategy includes case management at facility level based on prompt recognition and adequate treatment using first-line drug, promotion and distribution of insecticide treated bed nets for use, home-based management of fevers, and public education on prevention and control (MOH, 1999).

Malaria diagnosis is mostly on clinical grounds based on the presence of fever. The treatment has therefore been presumptive. Parasitological diagnosis has only been done for the diagnosis of treatment failure and severe malaria. Chloroquine was the drug of choice, despite its increasing resistance of about 25% (GHS, 2004).

However, the policy has now changed to the use of artesunate and amodiaquine combination as a first line choice drug for the treatment of uncomplicated malaria. Whilst quinine still remains the drug of choice for the management of severe malaria and treatment failures with full course of amodiatequine artesunate (GHS, 2004).

1.1 Malaria Situation in Upper East and Quality of Malaria Control

In the year 2003, malaria accounted for 55.4% of all OPD attendance, 31.2% of all admissions and 17.0% of all institutional deaths in the Upper East region (GHS/UER, 2003). In 2004, there were 6,423 cases and 159 deaths in the six hospitals in the region. The case fatality rate is 3 %, and population figure of the region is 961,246 (GHS/UER, 2004).

The Upper East regional trend of admissions of under-five cases and deaths due to malaria for four years respectively, range from three thousand two hundred and eighty-eight (3,288) to six thousand four hundred and twenty-three (6,423) cases and deaths - one hundred and three(103) to one hundred and fifty-nine [159] (GHS/UER, 2001-2004). Figures are from registered reported cases of malaria recorded and compiled from all health facilities in the region from January to December yearly.

Some interventions carried out to improve the situation in the region and districts include training of prescribers. These were medical doctors, medical assistants, nurses, community health nurses and community health officers at various levels on proper case management, promotion and use of insecticide treated bed nets (ITN) for under-fives and pregnant women and health education messages given on URA FM Radio Station on environmental sanitation and prompt reporting for treatment. The training has focused on standard treatment of malaria to mainly health care workers in the area. Community-based agents and private drug retailers, volunteers and teachers were trained within the framework of Integrated Management of Childhood Illness (IMCI) at the household level. Health workers, specifically prescribers also had training on the IMCI.

Despite the above interventions, the current drug prescriptions compliance among health professionals with the national guidelines for malaria treatment seems low. This has been observed from various monitoring reports and survey conducted (MOH/GHANA 2001: GHS/UER, 2003); rollback malaria control baseline survey conducted in four-selected districts, which reflected the country epidemiological zones. Health personnel from the district health system, health facility level and community level of the selected districts were interviewed as well as personnel from the national malaria program office. The 2001 baseline survey indicated about a quarter (28%) of severe malaria cases were managed appropriately. The steady increase in morbidity and mortality yearly for children under 5 years in the Bolgatanga hospital compared to other hospitals in the region from annual reports raised some questions regarding the issue of compliance.

Evidence from research suggests that the treatment of malaria by health professionals at all levels of the health care delivery system, most especially in bigger hospitals usually does not conform to standard treatment regimes (Ahmed, 2004). There is normally a great variability in doses, frequency and route of administration and at times duration of treatments. This was observed in a study in Sudan on the impact of the national protocol for malaria treatment on prescribing pattern. The study noted that health workers did not comply with guidelines because prescribers felt the guideline were ineffective and not available. However, about 11.5% of prescribers did so to satisfy patients (Ahmed, 2004). In a similar study in Burkina Faso, staff compliance with guidelines was poor mostly on diagnosis [medical history 27%, and clinical examination, 39%] (Krause, et al. 2000). In Ghana, studies on Medical Assistants clinical management of malaria and drug prescription pattern in hospitals in Upper West Region, Ghana share similar features of non- compliance to guidelines in case management. These were also due to certain contributing factors such as poor management and inadequate skills of staff (Ofori-Adjei, 1996; Yellu, 1997). However, inappropriate doses of chloroquine was observed in a study carried out in two selected sentinel sites, Kassena Nanakana and Wassa West districts of Ghana to determine anti-malarial prescribing practice among prescribers (Abuabu et al, 2005). In the light of the above problems, this study sought to analyse health professionals' compliance to standard treatment of the under-fives on diagnosis, treatment, supportive care and challenges and constraints involved in the Bolgatanga Regional Hospital in Upper East region of Ghana.

1.2 Trend of Malaria Cases in Bolgatanga Hospital and District

Malaria is number one among the hospital ten causes of OPD attendance and admissions for the year 2004 and 2005. It accounted for 38% of OPD attendance and 20% of all admissions for 2005 in the hospital (GHS/UER, 2005).

This is followed by anaemia (12%) and pneumonia (8%) of all admissions (GHS/UER, 2005; Bolgatanga Hospital, 2005). The trend of malaria cases and deaths recorded at the Bolgatanga regional hospital for a four-year period range from six hundred and thirty (630) to eight hundred and thirty seven (837) and death ; thirty- eight (38) to forty (40) respectively.

However, in the Bolgatanga Municipality, 74,697 cases of malaria were recorded for the year 2004, out of which 32,128 representing 43% of the cases occurred in children under five years. Forty-seven of the deaths were due to malaria, of which 36 occurred in the children under five years of age. The case fatality rate for malaria in the Bolgatanga Municipality for the year 2004 was 3.0%, calculated from total reported cases and deaths for the year (Bolgatanga Municipal Annual Report, 2004).This evidently indicates that many causes of morbidity and deaths attributable to malaria are being recorded in the Bolgatanga municipality in the under five-age group.

1.3 Quality of Case Management

Compliance to national treatment guidelines has been a problem in sub-Saharan Africa including Ghana. An increasing trend in morbidity and mortality annually due to malaria is a clear evidence of inappropriate treatment/case management and non-adherence to treatment by patients and lack of control in general. Many intervention programmes and activities over the years have tried to address the situation. In the middle of the 1990s, the Ghana Ministry of Health focused on improving the quality of its services and making services more available, accessible and affordable to the general population by strengthening the health system through reforms. It therefore introduced the Standard Treatment Guidelines (STGs) for Middle Level Health Providers as one of the means by which quality care can be provided for patients seeking health care. The STG content was later modified in 2000 to cover all treatment of common health problems experienced by people in the health system. These include both the private and government sector providers at all levels. In addition, the National Essential Drugs list 2000 was revised and later launched in 2003. Later in November 2004, there was another update on the STGs malaria treatment component of the combine artesunate and amodiaquine drugs as first line drug for the treatment of uncomplicated malaria due to chloroquine resistance. Other drugs used in Ghana are Sulphadoxine-pyrimethamine (Fansider), Amodiaquine - a second line drug, Halofantrine, and lap dap (chlorprogruanil-dapsone).

2.0 Materials and Methods

This study used descriptive cross-sectional approach and employed both quantitative and qualitative methods of data collection to obtain the required information to address the problem identified in the Bolgatanga Regional – cum -District Hospital.

2.1 Study Area

Bolgatanga Municipality is one of the eight districts in the region, covering an area of 1,620 sq km. It is the regional capital and subdivided into nine health sub districts. It borders to the north with Bongo district to the south with West and East Mamprusi Districts of the Northern Region, to the east the Talensi-Nabdam district and to the west Kassena/Nankana District. It has a total population of 146,122 and a growth rate of 1.7 % (Ghana Statistical Service, 2000). The district is located within the Sahelian belt of the country. It has two distinct seasons – a wet season that runs from May to October and a long dry season that stretches from October to April with hardly any rains. Malaria transmission in the district is perennial, particularly high in the wet season. The main occupation of the people is subsistence farming and a little bit of animal rearing.

The regional hospital, which is located in the capital of the Municipality, provides healthcare services to the general population. It is also the referral point for all hospitals in the region. It has four health centres (one private), six clinics (one private, one quasi [police-owned]) and five functioning Community-Based Health Planning and Service zones (CHPS) supporting in health service delivery. There are also eighty-six drug sellers, one hundred and eighty- seven trained Traditional Birth Attendants (TBAs), seven untrained TBAs and seven Registered Traditional Healers (Bolgatanga District Annual report, 2004).

The regional cum district hospital provides practical training for students of the Nurses Training College, the Midwifery Training School as well as Health Aides.

It has a total bed complement of one hundred and eighty nine, out of which 43 are for paediatric ward and 17 for emergency ward (Bolgatanga Hospital, 2005). It has a total staff strength of two hundred and ninety-nine, with only seven medical doctors and one hundred and ninety-nine nurses in all categories of the grading system. There is a shortage of 59% for medical doctors and 20% for nurses (Bolgatanga Hospital, 2005).

2.2 Research Team

The study involved the review of in-patients' medical records of all severe malaria admissions among children under five years of age group in the hospital for 1st January -31st December 2004. This year was chosen because its data set was complete with all necessary registers available in the Biostatics Department of the hospital. The study also looked at the current practice of health professionals in managing severe malaria cases from clinical diagnosis to admission process for management of cases in the Wards. Four health workers from the regional level and one of the districts in the region with previous training and knowledge on the use of both qualitative and quantitative methods of research work were recruited as research assistants and trained to assist during field work. They were public health nurses with nursing background. They had one-day training, which took them through the series of questions in the various data collecting tools. A support team made up of two data entry officers, record clerks were engaged to support in the retrieval of the records for the review activities. Pre-testing of data collecting tools were carried out in Bongo district hospital of the Upper East Region outside the study area. The data collection tools included a checklist, a discussion guide, and an interview guide, which were modified to ensure their adequacy in obtaining the relevant data needed in the actual study.

2.3 Review of In-patients' Records

Records retrieval for review took place after meeting with the hospital leadership in the region. A random sampling method was used in selecting a sample size of two hundred and thirty-three (233) cases of children registered with severe malaria in the year 2004 at Bolgatanga, that has a confidence level of 95% and based on an expected compliance level of 84% of client satisfactory survey report (Regional Clinical Unit Data, 2004) with worst acceptable level of 80%. Lists of all the 837 in-patients folders were considered and each folder assigned with a number. The 233 sample size was generated by selecting increasingly from the assigned numbers. This was done by selecting the first four folders, and then picking one randomly as a starting point. Thereafter, every fourth folder was picked until the 233 patient folders were obtained. The year 2004 records were chosen for review because its records set were complete with all necessary registers and documents at the hospital biostatistics department as the most recent record as compared to the year 2005.

The following data were collected from patients' records for analyses: clinical assessment and case management, anti-malaria therapy prescribed, and supportive care or treatment given. For clinical assessment and case management, the indicators were: age, sex and weight, haemoglobin, haematocrit, blood film, blood glucose, and cerebrospinal fluid. Monitoring of vital signs such as temperature taken, pulse rate, respiratory rate and recordings. The rest of the indicators were anti-malarial drug of choice prescribed, dosage given, treatment duration, route of administration and treatment outcome (survived or died) of cases were reviewed. The supportive treatment given for severe malaria cases were also checked against the recommended treatment guidelines.

2.4 Qualitative Data

The qualitative data collection methods involved focus group discussion, observation and in-depth interviews of forty health professional of different categories drawn from the various units directly involved with offering treatment for children.

Two separate focus group discussions, composed of nine and six participants were conducted using a discussion guide. The participants were from the paediatric ward, emergency ward, consulting rooms, and the OPD. This helped to explore the different perspectives about the effectiveness of the treatment guidelines, possible constraints they encountered in its use, and how these could be solved.

Patient follow-up observation involved twelve health professionals and twenty patients. The health professionals were from the paediatric ward, emergency ward, consulting rooms, the OPD, pharmacy unit and the laboratory. These patients were systematically followed up by researchers through the various service points, (OPD, consulting room, the laboratory, and the admission ward) observing actual practice of professionals and ticking appropriate indicators in the checklist.

Later the researchers wrote the findings on the performance of health professionals. The checklist contained indicators considered good for clinical practice for case management. This demanded health professionals record concrete vital information and clinical findings such as a patient's age, sex and address. Information about laboratory investigation, diagnosis and treatment given were asked. It is expected that the prescription given should contain drug name, form, dose, and frequency of administration and duration all in relation to the standard treatment guidelines. Therefore, the observation was critical about these essential service delivery factors.

In-depth interview was the third qualitative method employed. It involved interviewing twenty health professionals including management on issues concerning clinical assessment, diagnosis, and case management. Pharmacy and the laboratory units' personnel were involved.

The language the research team used in their interaction with the health professionals was English language and Gurune. The local language, Gurune was used in communicating with patients' caregivers and parents.

2.5 Data Handling and Analysis

In-patient review checklists for individual cases were cross-checked on a daily basis and corrections made where necessary. Questionnaires had pre-coded answers but some were coded after data collection. Data was double entered into two computers using EPI info 2002 programme so as to ensure data quality. Data was analysed after further recoding of data and clearing processes. Descriptive statistical analyses of data were done with both EPI info 2002 and SPSS 11.0 programme. Frequency tables were used to determine proportion of children treated with chloroquine and quinine, and cases with laboratory diagnosis performed.

Data from FGDs, written notes and transcribed cassettes were analysed through content analysis by identification of relevant themes used to explain issues of personnel compliance. Data from in-patients observation checklist were all entered and analysed with EPI info 2002 programme, and compared with summary issues from in-depth interviews.
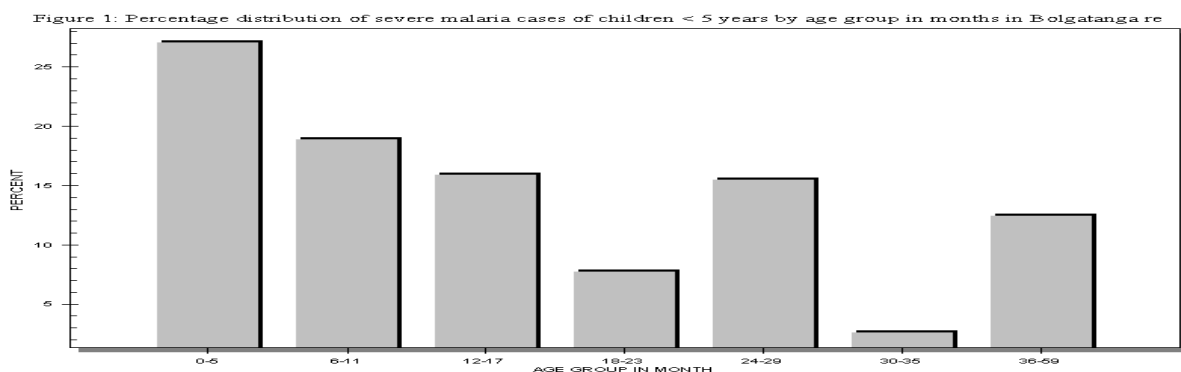
3.0 Results

3.1 Review of In-Patients' Records

Table 1 and figure 1 show the demographic characteristics of cases from the reviewed records. The sex ratio was 56%: 44% (male: female). This differs slightly from the sex ratio in the region 49%:50% and Bolgatanga district 49%: 51% as found in the 2000 national population census (Ghana Statistical Service, 2000). It was observed that the majority of the cases admitted were children under 1 year of age, followed by children under 2 years. Table 1 shows the males were the most affected.

Table 1: Age, Sex Distribution of <5 Severe Malaria Cases Reviewed in the 2004 Records (N=233)

Age group (month)	Male	Female	# of cases	Age Mean	Median	Std Dev
0-5	35	28	63	2.6	3.0	1.21
6-11	18	26	44	8.5	9.0	1.60
12-17	20	17	37	13.8	14.0	1.67
18-23	13	5	18	19.4	19.0	1.50
24-29	18	18	36	25.1	24.0	1.76
30-35	5	1	6	31.2	31.0	1.16
36-59	22	7	29	43.6	42.0	6.45

Figure 1: Percentage distribution of severe malaria cases of children < 5 years by age group in months in Bolgatanga re
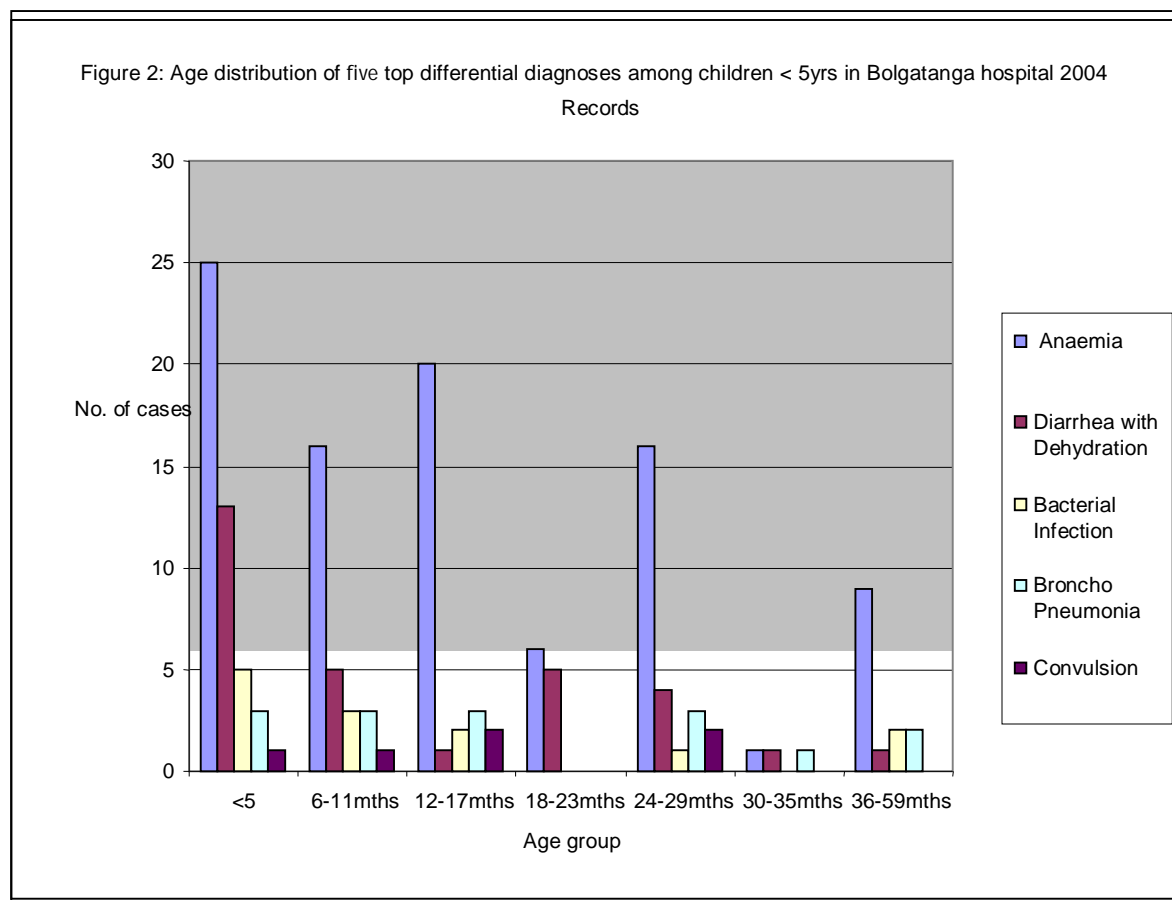
The major complaints, signs and symptoms recorded were fever, vomiting, convulsion, anaemia (pallor presence), difficulty in breathing, not eating, and unable to drink or suck. Few cases had cough recorded as complaints. Table 2 shows additional diagnoses for severe malaria cases. Seventy out of two hundred thirty-three cases had no differential diagnosis to the severe malaria as principal diagnosis. Anaemia in general accounted for majority (57%) of additional symptoms of severe malaria with the < 5 months age group more affected than other age groups as shown in figure 2. Furthermore, diarrhoea (18%), Broncho- pneumonia (9%) and bacterial infection (8%) were observed to be high among the infants

Table 2: Proportion of Severe Malaria Cases with Differential Diagnosis from 2004 Reviewed Records by Age Group in Months (N=233)

Clinical presentation	No	%	<5	6-11	12-17	18-23	24-29	30-35	36-59
Severe anaemia	70	43	17	13	16	5	11	1	7
Anaemia	23	14	8	3	4	1	5	0	2
Severe Diarrhoea with dehydration	15	9	6	2	1	3	3	0	0
Diarrhoea	15	9	7	3	0	2	1	1	1
Bacterial infection	13	8	5	3	2	0	1	0	2
Broncho pneumonia	13	8	2	3	2	0	3	1	2
Convulsion	6	4	1	1	2	0	2	0	0
Meningitis	2	1	0	0	0	0	0	0	2
Severe Broncho pneumonia	2	1	1	0	1	0	0	0	0
Rt. Encephalatis	1	1	0	0	0	0	1	0	0
Dehydration	3	2	1	0	2	0	1	0	0

Percentage is calculated of total differential diagnosis (163)

Figure 2: Age distribution of five top differential diagnoses among children < 5yrs in Bolgatanga hospital 2004 Records

3.2 Vital Signs of Cases

The vitals signs of patients were monitored every fourth hour and recorded in their folders as recommended. The 233 cases were reviewed for their initial temperature, pulse rate and respiratory rate taken on admission in the ward and the subsequent recordings within twenty-four hours as required on admitted cases. Almost all patients (95%) reviewed had their initial vital signs taken and recorded. However, as observed some of the subsequent hour's readings were not taken or taken but not recorded. This was widespread in the eighteenth to the twenty-fourth hours as indicated in table 3. The average percentage adherence was 95% for temperature and 94% for both respiratory and pulse rate as represented in table 3. Table 3 also shows an average of 83% minimum for subsequent readings within the 24 hours, which represents a fall of 12%.

Table 3: Findings of Vital Signs Monitoring Out of the 233 Cases

Guidelines monitoring required	Temperature (degree Celsius) n=233	Respiratory Rate(per minute) n=233	Pulse Rate (per minute) n=233
On admission	95% (222)	95% (221)	94% (220)
6 hour after	95% (222)	94% (220)	94% (220)
12 hours	96% (222)	96% (222)	94% (218)
18 hours	94% (220)	85% (220)	83% (194)
24 hours	85% (198)	85% (197)	83% (194)
% adherence to guidelines	**95%**	**94%**	**94%**

Laboratory Investigation Results

One hundred and eighty-four (79%) of the total cases had their basic laboratory tests requested for haemoglobin, 71% for haematocrit and 76% for blood film for malaria parasites were confirmed. Almost all tests requested were performed as per table 4a. In the case of haemoglobin, total request was 95% but 16% of the requested test were not performed. Table 4a shows the proportion of the various tests performed according to the request made by health professionals. Blood glucose levels of patients were not performed in all the cases reviewed as required by the STGs. The reason that paediatricians gave was that it was obvious that almost all children presenting such conditions were hypoglycaemic. Therefore, health professionals rather maintain the use of dextrose saline infusion, and monitoring the fluid level.

Out of the 177 blood smear that were investigated, 118 (66.7%) were confirmed positive for malaria parasites. Table 4b shows the distribution of the malaria parasites density of the 67% confirmed cases. On timeliness, 100 percent of the total performed tests results were released within 24 hours of request.

Seventy-five percent of the cases were treated for blood film and results released within 24 hours during peak season (May-Ocotober) and 25% for the dry season (November-April). The wet season, however, had higher records of 34 cases out of 233 cases not requested for testing by clinicians. Seven cases out of the requested test of 132 were not performed by laboratory.

Table 4a: Proportion of Cases with Basic Laboratory Diagnostic Request and Performed from Review Records (N=233)

Guidelines requires test	Requested & test done	Requested but not done	Test not requested	% adherence to guidelines
	N %	N %	N %	
Haemoglobin	184 (79)	38 (16)	11 (5)	79
Haematocrit	166 (71)	4 (2)	63 (27)	71
Blood film for MPs	177 (76)	7 (3)	49 (21)	76
Blood glucose	0	0	233(100)	0
CSF	1 (0.4)	0	232 (99.6)	100

4b: Malaria Parasites Density of the 177 Confirmed Cases

Plus	Interpretation of results	No of cases(N=177)
+	1-10 parasites per100 fields	65 (37%)
++	11-100 parasites per 100 fields	23(13%)
+++	1-10 parasites per one field	20(12%)
++++	11-100 parasites per one field	10(6%)
Negative	No parasites seen in field	59(33%)

Anti-Malarial Drugs

All anti-malaria drugs used were in relation to recommended drugs for malaria treatment in the country. However, the recommended choice of drug for the treatment of severe malaria cases as per STGs is quinine, which did not reflect in the 2004 reviewed records. The records revealed ninety-eight percent (229/233) of the severe malaria cases were treated with chloroquine. The remaining 2% received quinine, which is the required drug for treatment out of the total 233 cases. This was so because prescribers seemed unaware that they were supposed to use quinine instead of Chloroquine. Dosages of the cases were checked against corresponding age for weight and duration of treatment. Table 5 presents recorded findings. It was observed that twelve percent (28/229) of the cases treated with chloroquine had their treatment within the recommended dosage for age and treatment duration. Fifty–three percent (123/233) were overdosed for age and thirty percent under-dosed for age. They were all measured against the age because majority of the cases did not have their weight recorded. The two percent quinine treated cases were within the recommended dosage for age.

Out of the 233 cases, only four cases (2 %) had their weight written in admission folders. One of the four cases with weight record was among the four cases dosed with quinine whilst the three were among the 229 chloroquine-dosed cases. The reason given for not recording weights emerged from the FGDs as overload of work and pressure on staff due to inadequate staffing in wards.

Table 5: Anti-Malaria Drugs Used for the Treatment of Severe Malaria Cases Reviewed Measure against Recommended Standard Dosage for Age

Correct dose for Age	Frequency (Total N. of Children who had CHQ= 229)	% of Total N. Children doses with CHQ (%)	Frequency Total N. of Children doses with QUININE=4	% of Total N. Children doses with QUININE (%)
Recommended dosage for Age	28	12	4	2
Overdose for Age	123	53	0	0
Under dose for Age	78	34	0	0
% adherence to drug of choice	0	0	4	2

Recommended dosage by guidelines see annex (25mg/kg body weight given over 3 days as 10mg/kg, 10mg/kg, and 5mg/kg).

Outcome of Admitted Cases

Out of the 233 cases studied, thirteen died representing a Case Fatality Rate (CFR) of 5.6%. The remaining two hundred and twenty of the cases recovered and discharged. Fifty four (7/13) percent of the dead occurred less than 24 hours on admission, 8% was less than an hour and the remaining 38% occurred more than 24 hours between one and five days on admission. The most affected age group recorded among the dead was the under 5 months with 38% (5/13) CFR of the total death and 2.1% of total cases of severe malaria reviewed. The specific conditions associated with disease among the dead were anaemia (severe or mild), severe diarrhoea with dehydration and bacterial infection.

Supportive Drugs

The following supportive drugs were given in relation to complications and conditions seen in each child. These were: Dextrose, Paracetamol, Diazepam, Septrin, Chloramphenicol, Gentamycin, Hydrocortisone, Crystalline penicillin, Flagyl, Phenegan, Folic Acid, Oral rehydration salt, Ringer lactate, Vermox, Piriton, Ventolin, Valium, Amoxicillin, Phenobartone, Laxis, Flucloxacillin, Salbutamol, Mutilates, Nystatin, Paraffin, and Transfuse safe blood. Here paracetamol were given either oral or rectal to lower the high temperature of children. Safe blood was also given to patients with very low haemoglobin levels who really needed it. Some of the cases were transfused with whole blood and others with plasma. Dehydrated patients were also rehydrated with infusions or fluids, for example, normal saline.

3.3 Patients Follow-up Observation on Health Professional Practice

Table 6a: Results of Observation on Professional Practice in the Consulting Room and in-Patient Wards on 20 Patients Observed

Indicators	Observation			
	N	%	N	%
Staff group	Medical Assistants& Paediatrician(OPD/ consulting room)		Nurses (Wards)	
Patients well received (welcome) by providers	20	100	20	100
Offered fluid or liquid to drink by requesting their parents/care givers to breastfeed	13	65	19	95
No. of patient with their age, weight, & temperature check	20	100	20	100
Patient waiting time before consultation/admission 30-40 minutes	17	85	15	75
Patient waiting time before consultation/admission above 40 minutes	3	15	5	25
Clinical Examination				
Checked for presence of fever & duration	20	100	19	95
Enquiry previous treatment taken at home/consulting room	19	95	16	80
Asked & look for reduced urine output/dark urine	11	55	10	50
Checked for fast breathing/chest in drawing, inability to drink/suck	20	100	20	100
General Danger Signs				
Child immunization status	16	80	18	100
Malnutrition status	17	85	20	100
Convulsion	20	100	20	100
Unconsciousness / coma	20	100	20	100
Other disease signs access	18	90	20	100

Generally clinical examination of patients was adhered to in order to arrive at appropriate diagnosis of patients by using key indicators shown in table 6a above. Patients waiting time for consultation or admission observed, range was between thirty to forty minutes minimum and above forty minutes maximum. The lowest indicator scored was enquiry on patients' urine output under clinical examination. Here both nurses and prescribers asked only 50-55% of the patients. It was difficult to determine the reason for the low score.

Table 6b: Results of Observation on Professional Practice in the Consulting Room and in-Patient Wards on 20 Patients Observed

Indicators	Medical assistant/ Paediatrician at OPD/ consulting room		Nurses in Wards	
	N	%	N	%
Ant-malarial prescribed				
Appropriate anti-malaria prescribed	19	100	N/A	N/A
Correct dosage prescribed	19	95	19	100**
Duration according to guidelines	19	95	19	100**
Dosage recorded/ written	20	100	19	100**
Time at given recorded	19	95	18	90
Route of administration	20	100	19	100**
Laboratory Investigation				
Blood film for malaria parasites	20	100	15	75
Haemoglobin or haematocrit	20	90	15	75
Blood glucose	3	15	N/A	N/A
Test result released within 24 hours	20	100	15	75
Test result recorded	N/A	N/A	16	80
CSF	2	100	2	100

**1 case was not a malaria case. N/A means not applicable to that category.

Drugs prescribed were anti-malaria with few antibiotics and multivitamins. Nurses on duty observed administered drugs to all patients observed in accordance with the prescribed anti-malaria drugs. Drugs dosages and intervals given to patients were correct and recorded appropriately in drug treatment charts of the patients. All written drugs given were in accordance with national guidelines and followed hundred percent by the nurses on duty at the time of observation.

There were no standard treatment guidelines seen in the visited consulting rooms and wards. Nevertheless, treatment protocol and a copy of recent anti-malaria drug policy 2004 meant for counselling patients on new drugs were found in the emergency and kids wards with other disease treatment charts pasted on wall in the wards.

3.4 Focus Group Discussions and In-depth Interviews

Clinical Assessment and Case Management

Two sessions of focus group discussions were carried out. Each section was made up of nine and six participants respectively. Fifteen health professionals responsible for the diagnosis and management of severe malaria cases participated in the discussions. Almost all the participants agreed on the following signs and symptoms: presence of fever, high temperature (38 degree Celsius or above), convulsions or history of convulsions, dehydration anaemia or severe pallor and vomiting as key indicators for severe malaria diagnosis. ''You see the child look very pale, pale palms, and feet, pale conjunctiva, very weak and restless on observation,'' remarked one Principal Nursing Officer during the discussions. One of the young male nurses emphasised laboratory test for malaria parasites as a key indicator in the diagnosis. Other signs given were the presentation of repeated malaria after treatment in a child, restlessness, weakness, child unable to suck or breastfeed, loss of appetite and stupor. One female prescriber also noted splenomegaly (enlarged spleen) in some children.

The participants in group discussions and informants during in-depth interviews stated that they used intravenous quinine 10 mg /kg body weight in 5% dextrose every 8 hours for the first 24 hours in the treatment of severe cases. If a patient got better and could swallow medicine by mouth, they changed to oral medication to complete the seven days course of treatment. Emphasis was placed on the child's weight. Participants agreed they gave dextrose for hypoglycaemia, diazepam for convulsions, antipyretics (for example, analgin, paracetamol against fever). A young male nurse said that other treatments are given in addition according to the nature of patients' complications; an example was "safe blood transfusion for severe anaemia".

However, they all said the use of quinine started last December 2005 after training on new anti-malaria drug policy. Prior to the use of the new drug-quinine, chloroquine was used.

The participants in the focus group discussions mentioned that drugs are normally bought from the hospital dispensary by the parents of patients. Patients who the National Health Scheme has insured do not pay for drugs, while those who are not insured buy from the dispensary. In cases whereby those uninsured parents do not have money to buy drugs immediately, their children are given drugs from the emergency drugs stock to initiate treatment. After the treatment parents are requested to buy drugs and some of it taken as a replacement of what was offered to initiate the treatment of their children. However, there are no differences in drugs or drugs cost between the insured patients and the uninsured ones. The difference is the fact that the latter makes out of pocket payment before receiving drugs. What the team observed was that the insured patients at times delayed in obtaining drugs because of records entering processes before drugs are issued.

 During the focus group discussion, participants emphasised that drugs are always available at the hospital pharmacy/dispensary. The facility runs 24-hour services. If for any reason, the dispensary does not have the required drugs, the in-patients usually obtain their drugs from the emergency ward stock and later replace them. Another option is that parents could buy drugs from any pharmacy outside the hospital. Therefore, they unanimously pointed out that drugs availability within the study area was not a problem. The real issue, however, is drug affordability. About 50% of the patients, especially the uninsured ones cannot pay for most drugs. Therefore, in terms of affordability drugs are not affordable to about 50% of patients who report with severe malaria. For example, a 45 year old female participant noted that the breakdown of cost of drugs are as follows: quinine, eight thousand Cedis (GH¢8.00 an equivalent of US $24); cannula GH¢8.00 (US $24); infusion GH¢12.00 (US $36); and giving set GH¢4.50 (US $ 13.5). The participants noted that in addition to these costs they are other accompanying treatment costs that are out of reach of many poor parents.

 On acceptability, all agreed that quinine is acceptable to both staff and patients since it works well when patient take the full course. One of the male nurse said, "it gives positive response within 24 hours, but amodiaquine – artesunate combine drug of choice now for the uncomplicated malaria treatment is still not fully acceptable by all even though it works effectively."

Information obtained from in-depth interviews and focus group discussions show that severe anaemia, dehydration, and diarrhoea are the main complications causing death among children with severe malaria in the hospital. Some participants pointed out that cerebral malaria, shock resulting from severe diarrhoea, vomiting, and repeated convulsions cause death.

Use of Treatment Guidelines and Constraints Encountered

During the in-depth interviews and focus group discussions, participants stated that quinine regimen is difficult to adhere to by patients (mothers/caregivers) resulting in repeated malaria incidence. "Due to the long duration of treatment (7 days), mothers usually break the treatment. For example, if the first bottle of syrup is finished around the fourth day and the child looks better, most mothers do not buy or do not find it necessary to buy the second bottle to complete the course," said one elderly female nurse in charge of the OPD. Another elderly nurse said: "It is difficult to calculate quinine infusion using patients' weight, and because quinine is a new drug and we are not yet used to it, implementation of guidelines has to proceed step by step. It is sometimes difficult and frustrating to use." This is so because 4.3% dextrose in 0.18% normal saline for children is not available.

A male informant said that he has observed some refusal by patients to use amodiaquine-artesunate for the treatment of uncomplicated malaria - the new first line drug of choice currently in used in Ghana. The informant further noted that the difficulty most nurses experience in their attempts to enter into the patients' veins to give intravenous treatment delays in the initiation of the treatment process. Some participants especially the older medical assistants said that the use of guidelines, especially IMCI guidelines is time- consuming. It also emerged from the discussions that some parents only rush their sick children to the hospital when their condition has become critical. Participants also mentioned some of the delays in care seeking were because of lack of money for drugs and transport, cultural belief systems and problems of decision-making at home among parents.

Participants stated that in most of the severe anaemia cases usually need immediate safe blood transfusion to correct it before initiating malaria treatment. However, it is always difficult to get blood from the laboratory instantly for transfusion. In order to address the problem of lack of blood in blood bank, the laboratory runs a replacement system.

In few instances, there is conflict of prescribers' doses with actual doses for children under-five years indicated in guidelines. Periodic power blackout, inadequate microscopes and staff at the laboratory department were strongly emphasised as problems especially during the peak season of malaria.

On the question of standard treatment guidelines availability in wards and consulting rooms, majority of participants claimed that they were not available. However, four persons had their personal copies of the guidelines.

4.0 Discussion

The primary aim of this study was to analyse and document compliance to treatment guidelines by health professionals in the Bolgatanga Regional Hospital. The study revealed health professionals' compliance to STGs in terms of age and sex recording as 100% as seen in table1. Basic laboratory request for confirmation and differential diagnoses were recorded above 75%, indicating satisfactory compliance by health professionals' to STGs. An average of eighty-two percent of laboratory tests requested was performed and the results released within 24 hours for the 2004 records and 75% for 2006 observations as shown in table 4a and 6b. The various laboratory tests findings confirmed clinicians' primary diagnosis. Laboratory findings helped exclude clinicians suspected diagnosis and made differential diagnosis clearer. This guides clinicians in managing cases effectively. Although some of the cases did not have the entire necessary laboratory investigations requested or performed. It is a very good indicator and needs to be maintained for ensuring quality care. Seasonal difference in caseload did not result in any observed delays in the results from the laboratories.

With regard to supportive treatment, health professionals' complied with recommended guideline. Patients with severe anaemia needing blood were transfused, those with electrolyte imbalances were given infusions to correct it, and those who convulsed were given anti-convulsants. Anti-pyretic were administered for hyperpyrexia and appropriate prevention and treatment given to correct hypoglycaemia in patients when and where necessary (WHO, 2000; MOH/GNDP, 2004).

Generally, initial patients' assessment by health professionals were satisfactory and recommendable as seen in observational results of staff practice (85-95%) as well as findings from interviews conducted. Here respondents practice on their diagnosis pattern and treatment both in consulting rooms and the wards might have been influenced by the fact the prescribers' permission were sought for patients follow-up observation. Practically, behavioural change takes time to take concrete shape. Therefore, it is doubtful that there would be a sudden shift in practice to conform to required standards. Nevertheless, the presence of the research assistants and researcher might have drawn the attention of health professionals on to focus on using guidelines in service delivery to clients.

The study showed non-compliance by health professionals to the drug of choice-quinine for the treatment of severe malaria in the year 2004 records reviewed. Instead, the reviewed records have shown the continuous use of chloroquine (98.3%) in treating severe malaria cases, and only 2% of the cases used quinine for treatment. The reason for this could be explained by improper policy implementation and guidelines after launching the guidelines. As deduced from interaction with paediatricians and hospital managers, quinine implementation policy previously was unclear to prescribers. As regards the use of quinine for the treatment of severe malaria, the six sentinel sites established to document anti-malarial drug efficacy in the country relatively use quinine. This emerged from interaction with management of the facility and focus group discussions. Unlike the previous policy, now with the new one (policy) health professionals are trained. Although the study could not evaluate how the introduction of the previous guidelines and quinine policy were carried out. A study by Ahmed and Yousif (2004) in central Sudan on impact of national protocol for malaria prescribing patterns revealed that staff non-compliance were due to non-availability of guidelines, inadequate training, ineffectiveness of the guidelines and the fact that health workers wanted to satisfy patients.

Although records reviewed findings of the non-compliance to the drug of choice by health professionals were from the 2004 records, the findings are still valid and applicable to the current situation on the ground. Remarkably, it draws health professional's attention to worst performance indicators for improvement, and promotes quality maintenance of good performance. For the uncomplicated malaria, the amodiaquine-artesunate replaced the chloroquine. Weight and age of patients are requirement for the treatment of malaria and any other illness.

Nevertheless, from the interviews and focus group discussions, some health professionals mentioned difficulties in calculating actual dosages of quinine and other drugs and fluids required for the treatment of patients. The study also revealed some discrepancy between prescription and actual doses required by patients. Therefore, there is the need to offer more in-service training for health services providers.

Blood glucose scored zero percent in the terms of laboratory request. Observation of staff practice recorded less done 60% for staff inquiry on patients' urine output or colour. Blood glucose 15%, which are for assessing dehydration, a known proven high risk in sign of predictive value for malaria (Schellenberg et al., 1999), rather had low compliance in terms of laboratory diagnosis for severe malaria. However, the good thing is that patients are cared for by given them dextrose. The patients are monitored accordingly to avoid fluid over dose. The observed glucometers in the wards and consulting rooms are use by clinicians used when the need arose. The presence of glucometers has the potential to enhance compliance by the health professionals.

The study showed severe anaemia as the predominant clinical feature among the children admitted with malaria. Severe malaria had an overall prevalence rate of 30% and was the most prevalent among the infants as reported in previous studies conducted in parts of Africa among under-fives with malaria and anaemia (Klinkenberg et al, 2006; Koram et al., 2003; Mockenhaupt et al., 2004).

The study also confirmed non-compliance in terms of appropriate dosage per age/weights of patients. The study recorded 53%, over dose and 34% under dosed of chloroquine among the 233 cases of severe malaria. Inappropriateness of dosage were also observed in previous studies by Ofori-Adjei,1996; Abuaku et al, 2004, and others in sub-Saharan Africa, even though the methods of data collection were different. The cases of over dose and under dose of treatment could have implications on patients' health in terms of drug toxicity and case fatality. However, since weights of cases were not available, it was difficult to assess drugs dosage per weight for age and therefore triangulation was not possible. The interpretation should therefore be taken with caution. This limitation to the study could have had an effect on percentage overdose or under dose.

The study noted discrepancy between knowledge and actual practice. This was observed during focus group discussions and in-depth interviews with health professionals in comparison with findings from records and observational survey. Participants mentioned signs and symptoms crucial to diagnosis and management of severe malaria cases in children under-fives. However, health professional failed to document some indicators on records. For example, one of the indicators - weight, which they said was key to drug and fluid calculation had only 2% recorded out of the 233 cases reviewed. Health professionals also failed to complete some of the records of cases observed by the research team. There were about 20% incomplete charting of vital sign monitoring indicators as well as laboratory results in patients' notes. Such cases of non-compliance by health professionals as indicated by the discrepancy between knowledge and practice could be attributable to the general lack of logistics, large numbers of patients in need of healthcare and inadequate staff. This evidence was collaborated by focus group discussions and in-in-depth interviews. The participants and interviewees stated workload and pressure of work as major factors for non-compliance to treatment guidelines in terms of recording, improper assessment and management of cases. In any case, these were not reflective to findings from records reviewed. It could possibly be due to staffing situation in 2004 as compared to present situation. One limitation the study failed to explore.
Another limitation of the study was the inability to categorise health professional's adherence to the treatment guidelines to give an insight to quality of staff performance to various indicators such as prescription, weight. The selection of the study site, which serves as a referral District hospitals in the region, might have had influenced the high level of compliance by health professionals. Good case management can be expected better at regional level than at the lower level facilities, where only one medical officer is in charge of all facility with a handful of nurses taking care of all manner of cases. Unlike the district level, the regional hospital has specialists and paediatricians taking care of patients including children.

The study has focused only on in-patients without considering out patients prescription to guidelines. There is the possibility that more care and attention could have been given to in-patients in terms of quality standard care, quality assessment and drug prescription probably than out patients' attendances.

5.0 Conclusion

This study has provided evidence of high compliance by health professionals to some aspects of the national treatment guidelines except for weight recording and quinine as drug of choice for the treatment of severe malaria before the introduction of the new drug policy.

It has discussed several factors that contribute to compliance and non-compliance of health professionals during treatment of severe malaria in under-five children in Bolgatanga Hospital in Upper East, Ghana. The factors that influenced compliance and non-compliance were knowledge and skills adequacy, lack of awareness of what was expected to be done, the availability of medical equipments and workload.

Lack of these resources has an adverse effect on compliance to required standards in the treatment of severe malaria cases. In this study, this did not completely reflect in the quality performance of health professionals in the study facility.

The non-availability of standard treatment guides and inadequate monitoring and supervision could have contributed greatly to health professionals' non-compliance to required drug of choice for the 2004 records and weight taken/recordings for the management of cases. The present compliance of health professionals with drug of choice and weight recordings, despite the fact that guidelines are still not widely available is possibly due to recent in-service training they received. Besides current media campaigns on educating health personnel and the general population on the new treatment policy is an influential factor. Although findings from the study show invariably some level of compliance to guidelines, health professionals need not be complacent; there is room for improvement, especially in the use of appropriate drugs in right dosages for effective management of cases.

There is the need to ensure staff that receive regular in-service training to update their skills and knowledge on current treatment guidelines and case management issues. Management could provide regular supervision and monitoring of staff in wards on their performance. This would ensure that policy guidelines regarding management of severe cases of malaria and other health problems are properly implemented. There is the need for hospital management to make available national treatment guidelines at all service delivery points within the hospital. The management also needs to ensure inexperienced staff receive adequate training and close supervision by the most experienced seniors on duty.

Wards and consulting rooms could be provided with weighing scales for use in addition to the OPD ones. Considering the fact that cases of most children with severe malaria are reported late to hospital, and majority die in less than 24 hours, efforts could be made to educate mothers and the public on the need to report cases early to hospital. There is also the need to improve the referral system at the peripheral health centres and district hospitals.

Looking at the nature of the problem as revealed by this study, there is the need for a more extensive research in future. This could cover the entire region in order to make comparison between facilities and outcome for malaria morbidity due health professionals' non-compliance to treatment guidelines. Another study could examine socio-cultural factors in the region as well as health professionals' attitudes and values that could prove useful in complementing reforms of Ministry of Health/Ghana Health Service, aimed at fighting the scourge of malaria in the region. Such a study could examine into detail factors influencing the nature of professionals' compliance to the treatment guidelines, particularly among categories of prescribers. This future research project could be useful because this study could not associate any correlation among different providers.

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