



## Patients' Perception of Health Care Services in Malaria Endemic Area in Mali: Villages with Health Care Services Versus villages Without Health Care Services

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### Authors' contributions

This work was carried out in collaboration among all authors. Authors MKCC, DAS and BM designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors SD, AD and IN managed the analyses of the study. Author MTB managed the literature searches. All authors read and approved the final manuscript.

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### ABSTRACT

**Aims:** To assess the distribution of diseases and the reality of health service by taking the patients' perception in villages with health center versus those without health center.

**Study Design:** The assessment of distribution of diseases was done through a retrospective study from January 2010 to October 2011. The patients' perception of health care service was done

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through a prospective descriptive study conducted from September to October 2011.

**Methodology:** Five hundred fifty eight (558) patients from Bacoumana health district register database were included in the study for the assessment of malaria and other infectious diseases parameters using data already collected and recorded in the register. In addition, 464 adults living for at least 6 months in the rural community of Bancoumana located 60 km from Bamako (the capital of Mali) in the health district of Kati were included in the study during malaria transmission season to check their perception about health care service via the interview technique.

**Results:** Malaria was the most prevalent disease with 43.4% of cases. *Plasmodium falciparum* was the most prevalent with 97.6% of malaria cases. There was a statistical significant negative association between age and malaria ( $P = .007$ ) and respiratory infections ( $P = .04$ ). The village with health center rated significant interpersonal communication higher than those without health center such as compassion and support patients, reception of patients and quality of clinical examination and diagnosis.

**Conclusion:** Malaria remain a public health problem especially *Plasmodium falciparum*, the most parasite causing malaria. The study contributes for better understanding of the behaviors and the relationships between patients and health care service workers, which has a practical value for designing personalized health care services in Mali and provides a more accurate way to reflect public's opinion in reality of health care service.

**Keywords:** Malaria; health care services; perception and access.

## 1. INTRODUCTION

The recent levelling-off of progress in malaria control and the increase in cases across high-burden countries is a source of worry for stakeholders. The provision of robust, affordable and people-centered health services could be vital in getting lagging countries back on track, but, the health systems of high-burden countries like Mali often lack such attributes. Like most high-burden countries, Mali's health system is characterized by low access to key preventive and primary curative interventions, especially, in rural and poorer communities.

A combination of factors influences the access to health services and the deciphering of the principal components among a myriad of contributory factors has been the focus of several studies in the past years. This task has, however, been complicated by the multidimensional nature of the concept of "access" in healthcare which encompasses the physical, economic, and socio-psychological aspects of people's ability to access healthcare [1-5].

However, if health program are to succeed in resource-poor countries, it is important to elicit the knowledge, aptitude and practice of local people, as well as their degree of satisfaction and opinion with available services and the prevalence of the common diseases. In most African countries, including the low-income like Mali, poor and rural populations have low access and coverage rates for key preventive and

primary curative interventions. There are many reasons including poor physical and financial access to care, socioeconomic factors, cultural factors and perceptions about the quality of care [6-10]. This is why, patients' perception of the quality of care is critical to understand the relationship between quality of care and utilization of health service and prevalence of certain diseases such as malaria.

Research in developing countries is both qualitative and quantitative, referring to a wide range of services like family planning, primary health care and urban health facilities. In previous studies, various ways have been used to evaluate the patients' perception of quality of care: like exit interviews [11, 12], mystery clients [13], household interviews [14] and focus groups discussion [15]. Experiences in many incoming countries provide evidence that the perceived quality of care of health care services has strong impact on the utilization of the health services [16]. There is a large domain of health services or health systems research that continuously changes over time and space but also show some trends.

Mali continues to grapple with the scourge of malaria in spite of its commitment to international and Sub Regional malaria control efforts (Global Technical Strategy for Malaria (GTS) 2016 – 2030, High Burden to High Impact (HBHI) approach, the Nouakchott Declaration and the Sahel Malaria Elimination Initiative (SaME)) [17]. The current malaria control policy in Mali aims to

achieve the objectives of Abuja 2005 and the Millennium Development Goals (MDGs). Many actions have been taken in recent years to achieve these objectives [18] such as intermittent preventive treatment in pregnancy (IPTp3), insecticide treated nets (ITN), indoor residual spraying (IRS), seasonal malaria chemoprevention (SMC) and many more.

Bancoumana, a rural commune in Mali is atypical of Mali's rural communities. Unlike the others, Bancoumana has been supported by Malaria Research and Training Center (MRTC) since 1992. The Malaria Research and Training Center (MRTC) has an operational building where all its activities are coordinated. In addition to their vaccination activities, they organize information communication sessions on malaria among children and pregnant women, the factors promoting mosquito breeding, and methods of preventing malaria. The MRTC presence in Bancoumana should presumably boost the fight against malaria in that community, but there are no apparent and solid data to show if this is the case.

The difficulties to introduce malaria control efforts common to endemic countries are lack of sustained financing; emergence of resistance in parasite and vector; and inadequate of health systems. There are, however, situations where local transmission dynamics and political settings favors tailored strategies over generic interventions. Local communities become central for effective planning, implementation and uptake of tailored health interventions in such situations. An important first step is involving local communities to better understand their attitudes and practices with regards to malaria and its interventions. Previous KAP surveys in some rural commune in Mali have provided valuable insights into how some communities' perceived malaria [19,20]

Knowledge of personal perspectives of health care services and its access of people living in villages with health center versus those without health center of malaria and others diseases management in malaria endemic district can help in reducing the growing burden of malaria. In this paper the reality of the health service in health district of rural commune of Bancoumana by examining the distribution of diseases in the study area and assessing the reality of the health service by taking the patients' perception of health care service in villages with health center versus those without health center.

## 2. MATERIALS AND METHODS

### 2.1 Study Area

The study was conducted in the rural area of Bancoumana, which is located 60 km from Bamako (the capital of Mali) in the health district of Kati. The rural community of Bancoumana is composed of 14 villages (Bancoumana (chief town of the commune), Kolé, Niaganabougou, Nanguilabougou, Kéniéroba, Ticko, Woronina, Samako, Missira, Tema, Niamé, Gonsolo, Djiguidala and Madina).

The rural community of Bancoumana has an estimated population of 23,524 (Kati health information system 2011), with a growth rate of 0.02; the density is 37 inhabitants per km<sup>2</sup>. Several ethnic groups are represented in the community namely: malinkés (90%), fulani (3%), bambara (3%), sarakolés (2%), bozo (1%) and others (1%). Manlike is the main language of communication [21]. The table below shows the villages, their populations and their distances from the CSCOM in 2011 (Table 1).

The climate of the rural community of Bancoumana is Sudano-Guinean with three seasons: i) a cold season from October to January; ii) a dry season from February to June and iii) a rainy season from July to September with a rainfall of about 1500 mm of water per year. The savanna is arboreal with vegetation dominated by large trees such as: caïcedrat, kapokier, shea tree, mango tree etc ... The town is watered by the Niger River, the marigots, ponds and rainwater. The commune has more than a dozen boreholes, traditional wells and large diameter wells, water pumps.

The dominant socio-economic activities in the rural community of Bancoumana are: agriculture, animal husbandry, fishing, handicrafts, trading and picking. The dominant religion is Islam followed by Christianity and Animism.

### 2.2 Sample Size Calculation

The assessment of the distribution of diseases concerned the entire population residing in the Bancoumana health district area. All cases of illness, such as malaria recorded in the register from January 2010 to October 2011 were reported. A total of 588 patients were concerned.

For interviews, the sample size was calculated based on previous surveys. From a frequency of

19% (study done in Burkina Faso) (1) with an accuracy of 5% and a confidence interval of 95%, the size calculated was 480 individuals (men and women).

**Table 1. Villages of Bancoumana, their populations and their distances to CSCOM in 2011**

Bancoumana	0	8 590
Kolé	4	1 953
Niaganabougou	8	817
Samako	5	2 230
Nanguilabougou	6	401
Missira	9	273
Tema	11	511
Kéniéroba	13	2 017
Djigidala	13	1 080
Niamé	14	2 410
Madina	18	327
Ticko	16	851
Woronina	23	988
Gonsolo	16	1 076

(Source: Kati Sanitary District Health Information System)

### 2.3 Study Design

The examination of the distribution of diseases was done from the Bancoumana health district register database through a retrospective study from January 2010 to October 2011. Five hundred fifty eight (588) patients were included in the study. Parameters of malaria and other infectious diseases were assessed using data already collected and recorded in the register.

The patients' perception about health care service was done through a cross-sectional study conducted from September to October 2011. Four hundred sixty four (464) adults living for at least 6 months in the rural community of Bancoumana located 60 km from Bamako (the capital of Mali) in the health district of Kati were included in the study. Information was collected from the participants using the interview technique as already described by Baltussen R et al. in 2006 (2).

Briefly, a structured questionnaire was designed and administered by trained field workers. The first part of the questionnaire included demographic characteristics, whereas the second part had questions on, adult residents' attitudes and understanding of malaria and others infectious and non-infectious diseases and perception of health care service.

At the village level, the survey was organized in several stages:

- Meeting with the village chief or other notable person to explain the objectives of the study and obtain their agreement.
- In the village where the participants were reluctant, we used the village chief who appointed a counselor to accompany us.
- Data were collected during the day and also at night in the villages near Bancoumana (Bancoumana, Niaganabougou, Nanguilabougou and Kéniéroba) depending on the availability of the participants since they were occupied by field work.
- The questionnaire was translated into local language and piloted before being administered to 464 randomly participant for two months from September to October 2011. Questionnaire administration was monitored daily for quality control.

### 2.4 Statistical Analysis of Data

Data collected were double entered into Microsoft Access database and descriptively analyzed using Epi Info 6 Version 6.04 software. The data processing was both manual and computer. The analysis was performed using R studio according to the following steps:

- Demographic variables such as age and sex were compared across presence or absence of health care services using the Fisher exact test ( $\chi^2$ -test)
- To gain insight into the distribution of diseases in the study population, the distribution of these indices was compared across age groups using Mann–Whitney U test and Kruskal–Wallis analysis of ranks.
- Quality of modern health service was also compared across presence or absence of health care services using the Fisher exact test ( $\chi^2$ -test).
- $P < .05$  was deemed statistically significant.

## 3. RESULTS AND DISCUSSION

### 3.1 Results

#### 3.1.1 Distribution of diseases in the study population

Prevalence of malaria and diseases has been assessed to see the first motive of consultation in

these different health centers. We noticed that malaria was the most common diseases (n=258 (43.4%)). In additional to malaria, other diseases such as respiratory infections (n = 95 (16.2%)), diarrhea (n = 21 (3.6%)) and intestinal parasitosis (n=14 (2.4%)) were also present (Table 2).

Among the 258 positive to malaria, 252 (97.67%) was infected by *Plasmodium falciparum*. Only 4 (1.55%) were co-infected by *Plasmodium falciparum* and *Plasmodium malaria* and 2 (0.78%) was co-infected *Plasmodium falciparum* and *Plasmodium ovale*. No infected people by *Plasmodium vivax* and *Plasmodium knowlesi* was noticed in the study population (Table 2).

There was a significant negative association between age and infection such as malaria, respiratory infection, diarrhea and intestinal parasitosis. The difference was statistical significant for malaria [0 to 5 year (n = 105 (40.7%)), 5 to 15 years (n = 90 (34.8%)) and more than 16 year (n = 63 (24.4%)) P = .007] and respiratory infections [0 to 5 year (n = 55 (57.9%)), 5 to 15 years (n = 23 (24.2%)) and more than 16 year (n = 18 (18.9%)) P = .02] (table 3). In contrast there was a significant positive association between age and non-infectious diseases [0 to 5 year (n = 14 (7.0 %)), 5 to 15 years (n = 49 (24.5%)) and more than 16 year (n =137 (68.5%)) P = .04] (Table 3).

**3.1.2 Rural community characteristics**

In the Table 4 is the summary of the characteristic of the rural community according to the villages with health center and village without health center. The mean age was similar between the two defined groups 41.7 years for village without health center versus 42 years for village with health center. The sex ratio was 1.8 versus 1.3 respectively for villages without and with health center. In both groups, the predominant religion was Islam with more than 98% of the total participants. Most of the study participants were married. The predominant

ethnic group was Malinké with more than 70% of total study participants in both groups. In additional to Malinké, we noticed the presence of Fulani and others ethnic groups. More than 60% of study participant had no formal education (Table 4).

**Table 2. Distribution of diseases in the study population**

Diseases	Effectif	%
* Malaria	258	43.9
P.f	252	
P.f + P.m	4	
P.f + P.o	2	
Respiratory Infections	95	16.2
Diarrhoea	21	3.6
Intestinal parasitosis	14	2.4
Others	200	34
Total	588	100

*\*Plasmodium index in the 258 malaria positive cases were assessed. The prevalence of P.f (Plasmodium falciparum) was 97.67%, co-infection P.f+P.m (Plasmodium falciparum and Plasmodium malaria) was 1.55% and co-infection P.f+P.o (Plasmodium falciparum and Plasmodium ovale) was 0.78%*

**3.1.3 Quality of modern health service**

To perceive the quality of modern health care services in the rural community, we compared certain aspect of health quality between two defined groups: participants from villages without health center and participants from villages with health center.

Both groups without and with health center were relatively favorable about health personal practices and about health care delivery. However, we noticed that in the village with health center, more people were favorable than in the village without health center (Table 5).

Both groups were not favorable regarding the availability of health providers and the adequacy of payment arrangement and cost of treatment. Overall, the group with health center rated significant interpersonal communication higher

**Table 3. Frequency of diseases according to the age of the participants**

Diseases	Total Number (%)	Age (years)			P value
		0-5	6-15	16-83	
Malaria	258 (100)	105(40.7%)	90(34.8%)	63(24.4%)	.007
Respiratory Infections	95 (100)	55(57.9%)	23(24.2%)	18(18.9%)	.023
Diarrhoea	21 (100)	11(52.4)	4(19%)	6(28.6%)	.71
Intestinal parasitosis	14 (100)	4(28.6%)	5(35.7%)	5(35.7%)	.29
Others	200 (100)	14 (7.0)	49 (24.5)	137 (68.5)	.04

*\*P <.05 was deemed statistically significant*

**Table 4. Rural community description**

Characteristics	Villages	
	Without health center (%)	With health center (%)
<b>Mean age (years)</b>	41.7	42.0
<b>Sex gender proportion (F/M)</b>	128/72 (1.8)	151/113 (1.3)
<b>Religion</b>		
MUSLIM	197 (98.5)	262 (99.2)
CHRISTIAN	2 (1.5)	2 (0.8)
<b>Marital status</b>		
Married (Polygamous)	85 (42.5)	104 (39.4)
Married (Monogamous)	78 (39)	121 (45.8)
Single	25 (12.5)	26 (9.8)
Widowed	12 (6)	12 (4.5)
<b>Ethnicity</b>		
Malinke	156 (78)	238 (90.1)
Fulani	26 (13)	11 (4.2)
Others	18 (9)	15 (5.7)
<b>Level of Education</b>		
No formal education	120 (60)	162 (61.4)
Arabic	25 (12.5)	20 (7.6)
Primary school	29 (14.5)	51 (19.3)
Secondary school	8 (4)	28 (10.6)
University	1 (0.5)	3 (1.1)

than those without health center such as compassion and support to the patients, reception of patients and quality of clinical examination and diagnosis, quality of drugs used for clinical treatment (Table 5).

### 3.2 Discussion

The assessment of the distribution of diseases in the study area was done from the Bacoumana health district register database through a retrospective study from January 2010 to October 2011 to check the first motif of consultation. In addition, the potential contribution of KAP studies to diseases management and control which has not received much attention in most African countries was also done to assess the perception of quality of modern health service in study adults' population. All data was collected from 4 villages of Bancoumana commune rural (Mali).

In order to better understand the objectives of the study, we have adopted qualitative and quantitative approaches. The qualitative approach was important not only in understanding the daily experiences of the study population but also it complemented the quantitative approach. The individual interview was used for the collection. Discussions focused on health issues in study area. Thus, from the qualitative analysis, some additional information emerged from the quantitative such as health

care therapeutic itineraries, action of community relays in the locality, perception about health structure and service.

We noticed that malaria was the most common disease with 43.9% of cases. These results is due to the fact that malaria in this region is endemic and compares well with studies in others endemic countries such as Nigeria, Burkina Faso and Guinea [22-24]. In addition to malaria, respiratory infection was the second motive of consultation, then diarrhea and intestinal parasitosis. The prevalence of non-infectious diseases was also not inconsiderable with 34% of case.

Hearing about malaria is not enough, but should be seen as a foundation through which a whole range of issues about malaria should be understood, for example, plasmodium index. *Plasmodium falciparum* was the predominant malaria parasite accounting for more than 95% of infections in the study population. This has similarly been reported by a number of other studies in Burkina Faso, Mali, Ghana, Nigeria, and Senegal... [22-27].

To study the effect of age on the prevalence of the infections, we compared the prevalence of these diseases among the different age groups. There was a significant negative association between age groups and infection.

**Table 5. Perceived quality of modern health services by rural community**

	Villages		P value
	Without health center (%)	With health center (%)	
<b>Quality of health personal practices and conduct</b>			
Health providers show compassion and support	151 (76)	212 (80)	.0001
Health providers are fair	157 (79)	219 (83)	.081
Health providers follow up patients adequately	113 (57)	183 (69)	.026
Health providers do a good clinical examination	171 (86)	229 (87)	.0001
<b>Adequacy of resource and services</b>			
Medical equipments are adequate	121 (65.5)	103 (39)	.000
Rooms are adequate	182 (91)	204 (77)	.001
Health providers for women diseases are adequate	96 (48)	138 (52)	.393
There are sufficient good health providers	71 (35.5)	58 (22)	.0001
Drugs for all diseases are available on the spot	165 (82.5)	220 (83)	.415
<b>Health care delivery</b>			
Health providers make a good diagnosis	156 (78)	227 (86)	.052
Health providers prescribe correct drugs	150 (75)	204 (77)	.083
Quality of drugs is good	105 (52.5)	162 (61)	.0001
Treatment is effective for recovery and cure	90 (45)	148 (56)	.062
<b>Financial and physical accessibility of care</b>			
Payment arrangements can be made	73 (36.5)	120 (45.5)	.085
Cost are adequate	79 (39.5)	98 (37)	.741
Drugs can be obtained easily	169 (84.5)	179 (68)	.0001
The distance to the health centre is adequate	71 (35.5)	240 (91)	.0001
<b>Global appreciation of health center quality</b>			
Excellent	38 (19)	63 (24)	.045
Good	81 (45.5)	102 (39)	.052
Reasonable	49 (24.5)	57 (21.5)	.089
Bad	30 (15)	39 (15)	.81
Total number	200	264	

\*P <.05 was deemed statistically significant

The difference was statistical significant for malaria and respiratory infections. This present study showed that malaria and respiratory infection are a public health problem among children under 5 years old in the study site. During this period children are most vulnerable as they have lost maternal immunity and they haven't yet developed specific immunity to infection. They gradually develop clinical protection against the disease over a period of several years. The phenomenon called premunition is believed to results from the combination of humoral and cellular component of the immune system which is acquired with age. [25-27].

The potential contribution of KAP studies to malaria research and control has not received much attention in most African countries. One of the objective of this study was based on the assessment of patients' perception about the

quality of modern health. The participants were categorized in two groups (participants from villages without health center versus participants from village with health center) in order to see whether there was a difference regarding the quality of modern health service between these two groups.

We noticed that the quality of health care services and its access to the rural communities have long struggle for the village without health center than village with health center. There were clear differences between villages with health center compared to village without health center. Thus, participants in villages with health center were more likely to have compassion, support, good clinical examination, good diagnosis, effective drugs, and effective treatment from health providers. The health center providers were shown to be fairer and to better follow up adequately the patients in village where they are

than participants from others villages without health center. The majority of villages without health center usually still need to travel more than 5 km to obtain health care facilities which usually require few hours of walk or other mode of transportation to access the services and medications. Bancoumana health care system faces multiple challenges. Villagers mainly encounter unique barriers when attempting to get benefit from health care services. Several causes make this population in risk medical mistakes which include limited awareness, application of traditional medical knowledge, superstitious practice, and lack of common education, personal health care and presence of poverty and infrastructure limits to health care.

#### 4. CONCLUSION

The study contributes for better understanding the behaviors and relationships of patients and health care service workers, which has a practical value for designing personalized services in Mali and provides a more accurate way to reflect public's opinion in reality of health care service. We noticed that the quality of health care services and its access to the rural communities have been a long struggle for villages without health center than village with health center. Malaria was the most prevalence and the first motif of consultation. Plasmodium falciparum was the most parasite caused malaria in the study area.

#### CONSENT AND ETHICAL APPROVAL

The ethical committee of the National Ethics Committee in Mali approved the study. Informed consent was obtained from study population in a two-step procedure. First, oral community consent was obtained prior to the study, where the whole community was informed of the aim of the study.

Secondly, individual consent was obtained at the time of data collection, with all participants included in the study. Literate volunteers consented by signing a consent form, and illiterate volunteers consented by fingerprint.

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#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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