

# Nomads' access to the current healthcare system is impaired by their perception of its cost, quality, and accessibility and by gender segregation in Timbuktu, Mali: A cross-sectional study

**Moussa Sangare** (✉ [mbsangare@icermali.org](mailto:mbsangare@icermali.org))

Mali International Center of Excellence in Research, University of Sciences, Techniques, and Technologies of Bamako, Mali

**Yaya Ibrahim Coulibaly**

Mali International Center of Excellence in Research, University of Sciences, Techniques and Technologies of Bamako, Mali

**Siaka Yamoussa Coulibaly**

Mali International Center of Excellence in Research, University of Sciences, Techniques and Technologies of Bamako, Mali

**Housseini Dolo**

Mali International Center of Excellence in Research, University of Sciences, Techniques and Technologies of Bamako, Mali

**Abdoul Fatao Diabate**

Mali International Center in Research, University of Sciences, Techniques and Technologies of Bamako, Mali

**Kueshivi Midodji Atsou**

Mali International Center in Research, University of Sciences, Techniques and Technologies of Bamako, Mali

**Abdoul Ag Souleymane**

Mali International Center in Research, University of Sciences, Techniques and Technologies of Bamako, Mali

**Youssef Ag Rissa**

Mali International Center in Research, University of Sciences, Techniques and Technologies of Bamako, Mali

**Dada Wallet Moussa**

Mali International Center in Research, University of Sciences, Techniques and Technologies of Bamako, Mali

**Fadimata Wallet Abdallah**

Mali International Center in Research, University of Sciences, Techniques and Technologies of Bamako, Mali

**Massitan Dembele**

Universite de Bamako

**Mahamadou Traore**

National Program to Combat Schistosomiasis and Geo helminthiasis

**Tieman Diarra**

World Health Organization, African Office

**William R. Brieger**

Department of International Health, Health System Program, The Johns Hopkins Bloomberg School of Public Health, Baltimore, MD 21205, USA

**Sekou Fantamady Traore**

Mali International Center in Research, University of Sciences, Techniques and Technologies of Bamako, Mali

**Seydou Doumbia**

Mali International Center in Research, University of Sciences, Techniques and Technologies of Bamako, Mali

**Samba Diop**

Mali International Center in Research, University of Sciences, Techniques and Technologies of Bamako, Mali

---

## Research article

**Keywords:** Nomadic, Access, Healthcare, Mali, Perception

**Posted Date:** March 23rd, 2020

**DOI:** <https://doi.org/10.21203/rs.3.rs-18664/v1>

**License:** © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License. [Read Full License](#)

---

**Version of Record:** A version of this preprint was published on February 28th, 2021. See the published version at <https://doi.org/10.1186/s12889-021-10481-w>.

## Abstract

**Background** Access to community-based healthcare services is one of the key characteristics in successful public health policy. In Mali, community-based interventions do not reach nomadic communities, remote and hard-to-reach areas.

**Methods:** In order to determine a better healthcare strategy for these nomadic populations, we conducted a cross-sectional survey in the administrative region of Timbuktu in Mali using the administration of questionnaires to community members.

**Results:** A total of 520 individuals from two nomadic communities, Gossi and Ber, were included in the questionnaire survey. Inhabitants of the two nomadic communities were livestock breeders (27%), housekeepers (26.4%), local traders (11%), farmers (6 %) and artisans (5.5%). The median age of the study participants was 38 years (18-86 years). The participants from Gossi and Ber lived at a mean distance of 40.94 km and 23.19 km from the closest health center, respectively. The major complaints with respect to accessing healthcare were cost (35.7%), distance to the health center (46.2%), quality of the provided services (39.2 %) and means of transportation (79.4%). More than 25% of the participants from the community stated that they will never accept to being examined by a health care provider of the opposite gender.

**Conclusion** It appears from the interviews results that these nomadic populations have health needs not presently covered by the current health delivery system. Tackling the method and organization of health care delivery by adapting them to the local lifestyle, culture and values could lead to significant improvements health outcomes.

## Background

In Malian rural areas, especially in the northern part of the country, local populations experience the highest infantile mortality rates (191 per 1000 births). In other words, one out of five Malian children dies before reaching 5 years old [1]. The distribution of health structures throughout the country is disparate and based not only on demographics but also on politics and socio-economic aspects [2]. Indeed, the health services and human resources are generally concentrated in the populated urban areas of the country, 57% of the medical doctors, 47% of the nurses and 64% of the midwives are currently working in the capital city, Bamako [3].

On the fringe of the Sahara desert in the Sahel region of West Africa, 65% of Mali's land is desert or semi-desert [4]. Wealth and natural resources are unevenly distributed across the country. Those living in the northern regions of the country suffer from recurring periods of drought and widespread food shortages [5, 6].

An estimated 50–100 million people or 30–60% of the world's nomadic and semi-nomadic people live in Africa. Nomadism is common in many sub-Saharan African countries including Mali [7–9]. Nomadic populations access health services less than the general population. Nomadic populations are also disproportionately vulnerable to infectious diseases such as malaria, tuberculosis, Guinea worm disease, leishmaniasis, onchocerciasis, Schistosomiasis, soil-transmitted helminthiases, brucellosis and trachoma [10].

Little is known how to efficiently provide essential health care services to nomadic populations and those living in remote rural areas [11]. The constant mobility of nomadic populations excludes them, or at best places them at the edge of health delivery services. The recruitment, training and community support of nomadic community health workers (CHWs) constitute an additional challenge [12]. In this study we aimed to describe the characteristics of nomadic populations and determine factors limiting nomads' access to current health services and identify health interventions accessibility-related issues among the nomads.

## Methods

### Study setting

The study was conducted in two districts of the Timbuktu region in the commune of Ber in the district of Timbuktu and the commune of Gossi in the district of Gourma Rharous, both of which are located at about 900 km from Bamako, the capital city of Mali [4].

### Study population

The study was performed among *Kel Tamasheq*, Songhai, Arab, Fulani and Bozo people. The main lifestyle of these populations is pastoralism that requires a nomadic lifestyle for a significant part of the community. The population is made of encampments with 25-35 people each. Each encampment regroups around 3-5 families with 5 to 7 households each living in 4-6 tents around a leader who is usually the eldest family member. They settle with their animals around a waterhole sometime in transhumance between northern and southern parts of the country depending on the season and availability of food for their animals. With these conditions and cultural values, nomads prefer not to stay in these communities due to the constant search for new pastures for livestock. They spend most of their time and effort caring for their animals. Therefore, it seems as if the welfare and the health of their animals is as important as their own wellbeing [13].

### Study design

We conducted a cross-sectional survey from January to March 2011 in the communes of Ber and Gossi by administering a questionnaire to community members. In each municipality, 3-4 nomadic communities who were related to the two study communes were randomly selected. Reachable villages during the study period were selected to represent the nomadic communities at each study site. Only adults capable of giving informed consent (age 18 years old and above) have been included in this study.

### **Sample size and statistical considerations**

The sample size has been estimated by using Epi Info software; assuming 95% confidence level, power of 80 % and 20% of no access in healthcare among the nomadic population. The level of significance was set at 0.05 (two-tailed). Data were analyzed using chi-square tests to compare proportion as appropriate by SPSS 20.0. [14]. Missing data were not included in the analysis as there were very few missing values. The graphs were generated by using GraphPad Prism 8. Chi square test was use to proportions.

### **Data collection methods and instruments**

A questionnaire regarding health care and suggested solutions was administrated to community members by trained enumerators. The content of the questionnaire referred to health issues nomadic communities faced such as the lack of medicine or means of transportation in emergency, for example pregnant women in case of delivery complications, cost of treatment, low frequentation rate of the area's health center, the relationship with their animals. In this study, key informant guides for in depth interview were used to better understand the local context and help for data interpretation.

### **Limitations**

Any method of gathering information (documentary analysis, interviews, questionnaires, etc.) must be used, observation) has biases and limitations. We used a questionnaire for data collection and this study could therefore have information biases. In order to minimize these biases, we have explained the questions to the participants in a very precise manner.

## **Results**

A total of 520 of surveys were accepted for analysis. The sex ratio of participants was 1.34 in favor of men with a median age of 38 [18–86] years. The 31–45 years group was the most represented among the study population. Most of the interviewed population was livestock breeders. Housekeeping, livestock breeding and traders, were the most important occupations. Among them, livestock breeding, and housekeeping were the most frequent respectively for men and women (Table 1). Other occupations have been cited like craftsmanship, agriculture, civil servant and marabouts during the interviews.

Table 1  
Characteristics of the study population

Characteristics	Ber	Gossi	Overall
	n (%)	n (%)	N (%)
Male/Female (Ratio)	164/95(1.72)	134/127 (1.05)	298 /222 (1.34)
Median age (min; max)	38 (18–86)	38 (18–86)	38 (18–86)
Age-groups (in years)			
18–30	107 (41.31)	75 (28.74)	182 (35)
31–45	89 (34.36)	101 (38.7)	190 (36.54)
≥ 46	63 (24.32)	85 (32.57)	148 (28.46)
Total	259 (100)	261 (100)	520 (100)
Marital status	n (%)	n (%)	N (%)
Single	41 (15.83)	20 (7.66)	61 (11.73)
Divorced	10 (3.86)	13 (4.98)	23 (4.42)
Married	159 (61.39)	181 (69.35)	340 (65.38)
Separated	9 (3.47)	7 (2.68)	16 (3.08)
widowed	5 (1.93)	13 (4.98)	18 (3.46)
Non specified	35 (13.51)	27 (10.34)	62 (11.92)
Total	259 (100)	261 (100)	520 (100)
Education	n (%)	n (%)	N (%)
Kel Tamasheq alphabet	0 (0)	4 (1.53)	4 (0.77)
College	2 (0.77)	0 (0)	2 (0.38)
Arabia	51 (19.69)	48 (18.39)	99 (19.04)
Primary school	37 (14.29)	20 (7.66)	57 (10.96)
illiterate	145 (55.98)	187 (71.65)	332 (63.85)
secondary	18 (6.95)	2 (0.77)	20 (3.85)
University	6 (2.32)	0 (0)	6 (1.15)
Total	259 (100)	261 (100)	520 (100)
Main occupation	n (%)	n (%)	N (%)
Livestock breeding	50 (19.31)	69 (26.44)	119 (22.88)
Trading	35 (13.51)	9 (3.45)	44 (8.46)
Housekeepers	41 (15.83)	67 (25.67)	108 (20.77)
worker	36 (13.90)	7 (2.68)	43 (8.27)
Total	259 (100)	261 (100)	520 (100)

In both Ber and Gossi, 63% of those surveyed in this study were illiterate. The other types of training most encountered among our respondents in both cities were schooling in an Arab school or primary schooling in a conventional school (respectively 19.04% and 10.96% of those surveyed in this study). Most of participants (65.38%) were married. The other two most common marital statuses encountered were singles (11.73%) and married (65.38%) (Table 1).

The distance to the health care facility was not too far away for 40% of our respondents; this distance was similar to that (35.58%) of those who felt it was too far away (Table 2). With respect to cost, there was a huge difference between those who thought that health care costs were not too high (48.08%), and those who thought otherwise (27.50%). Most of respondents (45.38%) said that the quality of health care was not good while 30.19% thought it was good (Table 2).

Table 2  
 Perception of the study population about  
 some factors that decrease the medical  
 centers frequentation (distance, cost,  
 healthcare quality) in Ber

Most factors cited	n	(%)
Distance (very far)		
Non	208	40.00
yes	185	35.58
No respondents	127	24.42
Total	520	100.00
Cost (very high)		
No	250	48.08
yes	143	27.50
No respondents	127	24.42
Total	520	100.00
Healthcare quality (good)		
No	236	45.38
Yes	157	30.19
No respondents	127	24.42
Total	520	100.00
lack of funding		
No	76	14.62
Yes	317	60.96
No respondents	127	24.42
Total	520	100.00

Lack of resources (financial and mean of transportation) was an obstacle for 60.96% of respondents. This rate was statistically significant compared to that of those who said otherwise (14.62%). Over 63% in the study population had a monthly income less than \$120 US Dollars (Table 3).

Table 3  
 Average monthly income of respondents by gender

Average monthly income in USD	Female		Male	
	n	%	n	%
Unknown	76	34,23	46	15,44
< 120	137	61,71	192	64,43
0,12–200	6	2,70	46	15,44
0,20–350	2	0,90	10	3,36
0,35–500	1	0,45	3	1,01
> 500	0	0	1	0,34
USD = United States Dollars;				

The most common barriers to nomads' access to health services included health care cost and means of transportation, visits to traditional healers, refusal of opposite gender medical examination and distance to the health center. Health care cost and means of transportation, visit traditional healers were the most frequent barriers among all of them cited (Fig. 1). Respondents asserted a lack of resources in 60.96% of cases.

People settled in sites where there is no health center were located at an average distance of 40.94 km and 23.19 km respectively of Ber and Gossi. This distance is statistically higher in Ber than in Gossi (Mann-Whitney U test  $p < 0.0001$ ), (Fig. 2).

Health care cost is the main reason for non-access to health centers, with about 60.96% of respondents stating that they cannot afford to pay for consultations. Over 77% of respondents stated that they will never accept being examined by a practitioner of their opposite gender (Fig. 3).

## Discussion

Most of the study population (47%) were illiterate and were mostly represented by the age group of 38–47. The reluctance on the part of older people to send their children to formal education system may be due to a loss of confidence between the country authorities and other partners as part of studies or miscellaneous development projects. There were more men among the study participants because the prevailing perception in these communities amongst women is that it is the men's responsibility to represent or to talk on behalf of the community. Also, in Tamashek settings, women are inaccessible from men, unwilling to speak to a stranger or a man who can be her husband because of customs and being Muslim (100% of the study population was Muslim). Most of the study enumerators were men, so it is possible that some women would not have felt comfortable speaking with them during the study. This is a limitation on our study.

Tamashek was the most widely-spoken local language (65%). Tamashek is the language of the Tuareg desert nomads and it is the common point of a whole group (cluster) of ethnic groups known as "Kel Tamashek (meaning people of the Tamashek language)". Most of the population was literate in Arabic for learning the Holy Quran or "tifinagh (Tamashek alphabet)". So if they are not educated they may certainly not value these mass public interest interventions. The linking with nomadic ancestral values is a key element that hinders social and health development. The standard of living is not very high hence; the society is based on a very strong tribal model and mutual assistance. When implementing public health interventions, the actors must take into account these factors for the success of the programme [15–17]. This is likely the reason that people don't participate in public health interventions.

In Mali, the number of qualified health personnel is inadequate at all levels of the health system. It is also unequally distributed over the country. The same scenarios is observed for health infrastructure [18–20]. The nomadic community pays a heavy price because of population lifestyle and the extent of the occupied area.

The most used means of transportation to reach the health center was the car in nearly 40% of cases. This give evidence of the inadequacy of fix health centers in nomadic area. All these centers are leading by nurses except the health center of Gossi which is led by a physician. Furthermore, 41.15% of our study participants lived less than 5 km from the nearest health center. This is due by the fact that the investigators because of the insecurity were not able to go very far from the village of Ber which hosts a military camp to avoid exposure to attacks of any kind. The same situation was observed in Gossi. The villages of Gossi and Ebang imalane in the commune of Gossi, each have a faith health center. Indeed, these services are available only to those who live near these centers. Very remote nomadic sites have not been included because of the very limited means of transportation and the also the insecurity.

In Ber, El Moctar et al, in 2006 found that care is not available to all in this area. Indeed, those who have access to care are those who are essentially living near health centers and those with the means to ensure the costs of transportation and medicines. For others, going to the health center is difficult or even impossible [21]. High transportation costs and poor-quality of roads remain one of the main barriers that limit access to health centers in this area. The long distances to health facilities and the unavailability of transportation for emergencies have exacerbated existing inequalities in access to quality obstetric care in the northern part of Mali (21).

Approximately 39.04% of respondents found that the cost of care was too expensive against 11.54% who thought that the cost of care was affordable compared to neighboring countries like Burkina Faso or Algeria or Niger. However, there is a cultural problem: many of these people have, cattle, and other animals but do not want to sell their animals for cash to resolve health needs. In 2006 El Moctar et al. found in Ber that 96.6% of people said they were ready to go to the health center if care was free [21]. Lack of money was cited as the main obstacle to access to health care among women respondents (53%) [12]. Studies indicate that the most vulnerable do not receive all necessary care when the needs are greater than elsewhere. Inequality in access to care is present almost everywhere in nomadic areas even in sedentary and nomads' communities. More than 63.26% of the study participants had an average monthly income lower than 120\$. The cost of health care is a burden increasingly unbearable for the socially and economically vulnerable communities; [11, 22, 23].

Another factor cited was the use of traditional medicine, 44% of the participants visits first traditional healers and marabouts (person who use Koranic verses to treat diseases) in case of illness. El Moctar et al. report that 57.4% of nomadic communities use traditional medicine and modern medicine as an alternative. Although cost is important, this factor should not be overestimated in the analysis of the conditions of access to basic health services. Many studies have shown the link between improved quality and increased attendance within nomadic population [19, 26, 27].

## Shortcomings Of Health Systems In Mali

Advanced strategy (for health areas located beyond 5 km from community health center) and mobile strategy (mobile for remote health areas and nomadic areas located beyond 15 km from community health center) currently used to achieve non-functional health areas are often considered as the best approach in nomadic areas. An evaluation made by AVSF/ADESAH in 2010 reported that 84% of respondents said that the actions of the joint mobile health component (human and animal health) were in line with their needs [28]. Furthermore, a lot of people would prefer a fixed center for several reasons like cost, stability of personnel, health facilities, short stays of the mobile team on sites, non-functionality of certain markets (weekly local markets), the lack of communication & community leadership. All these reasons make the above-mentioned approaches inappropriate for better access to health care. The data presented in this article will certainly have changed since the 2012 crisis, which is still going on, and we believe that access to care would have become worse than when we collected the data.

## Conclusion

On completion of the study, it appears that despite the efforts from the Malian government and its health partners, the increase in health centers and strategies, access to basic health interventions is meeting expectations in nomadic areas. This study shows the importance of a set of factors that should be considered to improve access to health interventions in nomadic areas. These factors include the underutilization of health services, quality of services offered, the attachment to ancestral nomadic values, poverty, gender and the current strategies recommended by health policies. However, nomads are interested in all strategies that will allow them to participate in the management of their health problems.

## Abbreviations

CHW: Community health workers; SPSS: Statistical Package for Social Sciences; NGO: Non-governmental organization; ADESAH: Association pour le Développement Endogène au Sahel; AVSF: Agronomes et Vétérinaires Sans Frontières; ASACO: Community health association; PMA: Minimal Package of Activities.

## Declarations

### Ethics approval

The ethic approval was obtained from both the ethical committee of the Faculty of Medicine, Pharmacy and Odonto-Stomatology of Bamako (N010-42-FMPOS) Ethic Review Committee. Researchers obtained individual informed consent from all the study participants. Information was anonymous and treated as confidential.

### Consent for publication

Not applicable

### Availability of data and materials

The datasets generated and analyzed during this study are presented in Tables 1, 2, 3 and 4 and figures 1 and 2. Additional information can be available from the authors upon reasonable request.

### Competing interests

The authors declare that they have no competing interests.

### Funding

The study was supported by the UNICEF/UNDP/World Bank/WHO Special Program for Research and Training in Tropical Diseases (TDR) (No A90361) granted to YIC and the Faculty of Medicine and Odontostomatology of Bamako. Funders have no role in the study design, data collection, analysis and interpretation or the decision to write the manuscript.

### Authors' contributions

The study was designed and conceived by MS, YIC, AAS, YAR, SFT, WRB, TD, SD and SD; data were collected by MS, YIC, SFT, AAS, YAR, DWM, FWA and SD; data processing and analysis and manuscript drafting were performed by MS, YIC, KMA, AFD, MT, MD, SD, and SD; and the final version of the manuscript was approved by MS, YIC, SFT, WRB, SD, and SD. All authors read and approved the final version.

### Acknowledgements

We would like to address special thanks to the local health care staff of Timbuktu (Ber) and Gourma Rharous (Gossi), the villagers and all the participants for their cooperation and participation to the study activities. We would like to thank Dr. Alison Krentel for reviewing the manuscript.

### Authors' information

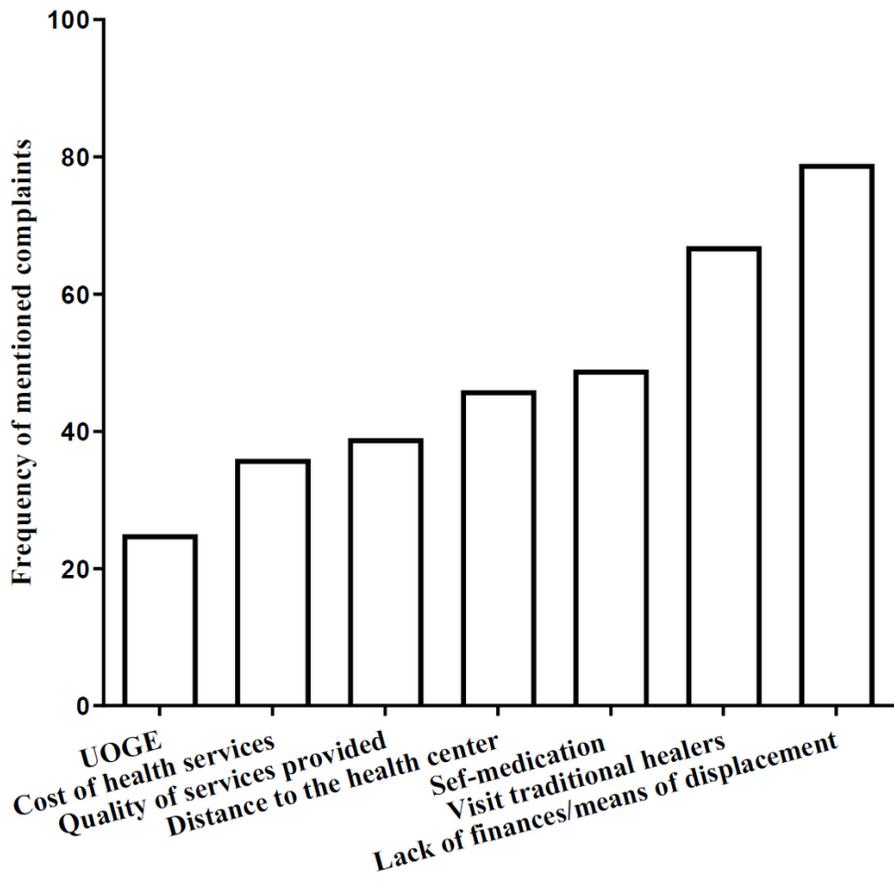
<sup>1</sup>Mali International Center for Excellence in Research (ICER), University of Sciences, Techniques, and Technologies of Bamako (USTTB), Bamako, Mali ; <sup>2</sup> Ministry of Health and Social Affairs of Mali; <sup>3</sup>World Health Organization (WHO), Regional Office for Africa, Cite du Djoue, PO Box 06 Brazzaville, Congo ; <sup>4</sup>Department of International Health, Health System Program, The Johns Hopkins Bloomberg School of Public Health, Baltimore, MD 21205, USA;

## References

1. Cellule de Planification et de Statistique (CPS/SSDSPF), Institut National de la Statistique (INSTAT/MPATP), INFO-STAT et ICF International, 2014. Enquête Démographique et de Santé au Mali 2012-2013. Rockville, Maryland, USA : CPS, INSTAT, INFO-STAT et ICF International.
2. Keïta M. Typologie urbaine et accessibilité géographique potentielle des établissements de santé dits «modernes» dans le district de Bamako (Mali). Espace populations sociétés. 2018.
3. KONATE MK, KANTE B, DJENEPO F. Politique de santé communautaire et viabilité économique et sociale des centres de santé communautaires au MALI. 2003.
4. BENOIST (Joseph Roger de) : Le Mali. — Paris, L'Harmattan, 1989.pp. 297-298.

5. Diop M, Revenga A, Fajnzylber P, Hoogeveen J, Etang-Ndip A, Sanoh A, et al. Évaluation de la situation socio-économique des populations du nord Mali et leurs priorités. 1998.
6. Diarra S, Cissé P. Migrations et pauvreté au Mali. Questions de population au Mali Bamako: Le Figuier/UNFPA. 2003; 203–226.
7. Aliou S. What health system for nomadic populations. *World health forum*. 1992;13(4):311-4.
8. Sangaré MB. Accès aux Soins de Santé des Communautés en Milieu Nomade, Cas des Communes de Ber et Gossi à Tombouctou au Mali". 2012 Thèse de la Faculté de Médecine d'Odontostomatologie de Bamako. 12M85.
9. Ahmed MAA, Hamelin-Brabant L, Gagnon M-P. Nomads' perceptions of quality, accessibility, and affordability of health services as determinants of using skilled birth attendants in Gossi, Mali. *Midwifery*. 2019; 79 :e102556.
10. Sheik-Mohamed A, Velema JP. Where health care has no access: the nomadic populations of sub-Saharan Africa. *Tropical Medicine & International Health*. 1999; 4(10):695-707.
11. Abakar MF, Schelling E, Béchir M, Ngandolo BN, Pfister K, Alfaroukh IO, et al. Trends in health surveillance and joint service delivery for pastoralists in West and Central Africa. The future of pastoralism (J Zinsstag, E Schelling & B Bonfoh, eds) *Rev Sci Tech Off Int Epiz*. 2016;35 (2):683–691.
12. Ag Ahmed MA. Des agents de santé communautaires pour la promotion de la santé des pasteurs nomades au Mali. *Global health promotion*. 2016 ; 23(4) : 80–84.
13. Wyss: Réflexions pour une meilleure prise en charge... - Google Scholar [Internet]. [cité 19 déc 2019]. Disponible sur: [https://scholar.google.com/scholar\\_lookup?hl=en&publication\\_year=2000&pages=1429&author=M+Wiese&title=R%C3%A9flexions+pour+une+meilleure+prise+en+charge+de+la+sant%C3%A9+en+r](https://scholar.google.com/scholar_lookup?hl=en&publication_year=2000&pages=1429&author=M+Wiese&title=R%C3%A9flexions+pour+une+meilleure+prise+en+charge+de+la+sant%C3%A9+en+r)
14. IBM. IBM SPSS Statistics 20 Available for Download - India [Internet]. 2012 [cited 2020 Feb 29]. Available from: <https://www.ibm.com/support/pages/spss-statistics-20-available-download> .
15. Balique H, Ouattara O, Iknane AA. Dix ans d'expérience des centres de santé communautaire au Mali. *Sante Publique*. 2001; 13(1):35-48.
16. Balique H. Le concept de communauté et ses limites: à propos des centres de santé communautaires du Mali. In: Communication au Colloque «Anthropologie des systèmes et des politiques de santé», organisé à Paris par l'Amades 2001. 7(8): e016558
17. Iknane AA, Balique H, Diawara A, Konate S, Niangaly A, Thiero TA, et al. La santé communautaire au Mali: Acquis, enjeux et perspectives après deux décennies de mise en oeuvre. *Mali Santé Publique*. 2011;1(1):40–48.
18. HFG Project. Évaluation du Système de Santé au Mali [Internet]. Gouvernement et associations à but non lucratif présenté à; 13:05:50 UTC [cité 16 déc 2019]. Disponible sur: <https://fr.slideshare.net/HFGProject/valuation-du-systeme-de-sant-au-mali>
19. Coulily L. Etude sur la sous fréquentation des CSCOM dans la région de Koulikoro (Mali). 2005. Thèse de la Faculté de Médecine d'Odontostomatologie de Bamako. 05M210.
20. Deville C, Hane F, Ridde V, Touré L. La Couverture universelle en santé au Sahel: la situation au Mali et au Sénégal en 2018.
21. Mohamed E-M. Logique de production et utilisation des services de santé en milieu nomade au Mali: cas de la commune de Ber (Tombouctou) [MD Thesis]. Thèse de médecine Bamako, FMPOS, 2006, 147 p Mali; 2006.
22. Okeibunor JC, Onyeneho NG, Nwaorgu OC, l'Aronu N, Okoye I, Iremeka FU, et al. Prospects of using community directed intervention strategy in delivering health services among Fulani Nomads in Enugu State, Nigeria. *International Journal for Equity in Health*. 8 avr 2013; 12 (1):24.
23. Ahmed MA, Hamelin-Brabant L, Gagnon MP. Sociocultural determinants of nomadic women's utilization of assisted childbirth in Gossi, Mali: a qualitative study. *BMC pregnancy and childbirth*. 2018;18(1):388.
24. Gautier L, Ridde V. Les politiques visant la couverture sanitaire universelle et les perceptions de la qualité des soins de santé. 2017.
25. Song J, Akbari A, Cox C, May L, Watkins W, Aitken S, et al. The Inverse Care Law programme: evaluating a population based intervention in primary care within deprived communities in Wales. *International Journal of Population Data Science*. 2018;3(2).
26. Doumbouya ML. Accessibilité des services de santé en Afrique de l' Ouest: le cas de la Guinée. HAL. 2008;18(2):1–18.
27. Després C, Dourgnon P, Fantin R, Jusot F. Le renoncement aux soins: une approche socio-anthropologique. 2011;8.
28. Ndiaye P, Lecomte P. La gestion durable des parcours dans le Sahel: Stratégies, Pratiques, Gouvernance et Promotion. Note de cadrage de la première édition des entretiens techniques du PRAPS. 2016.

## Figures

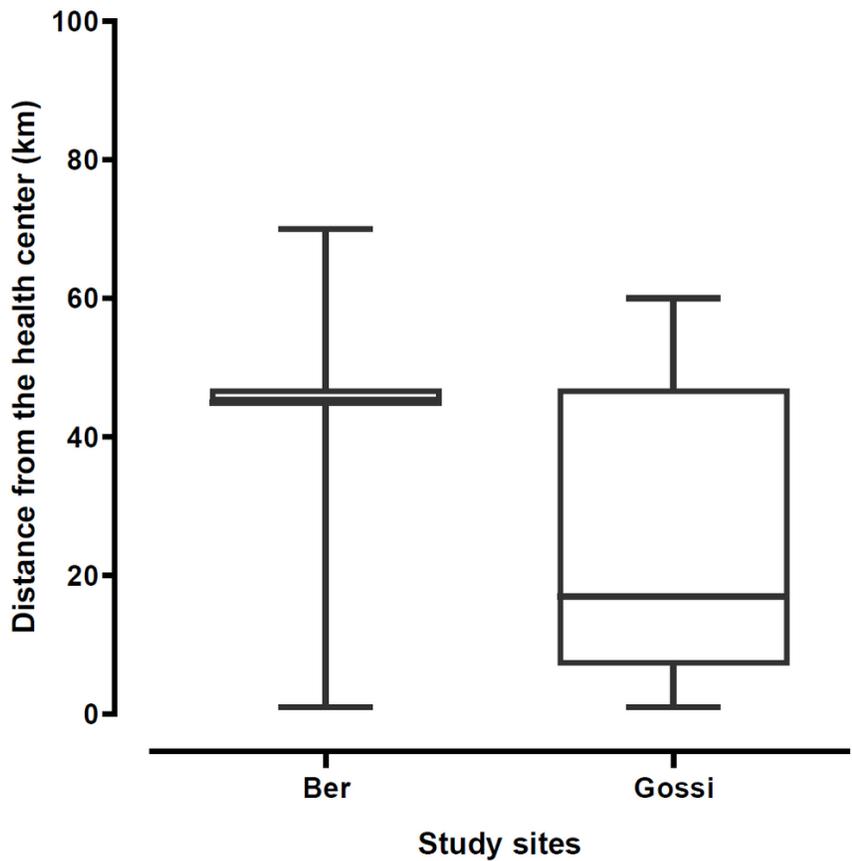


N=520

UOGE= Unwillingness of opposite gender examination

Figure 1

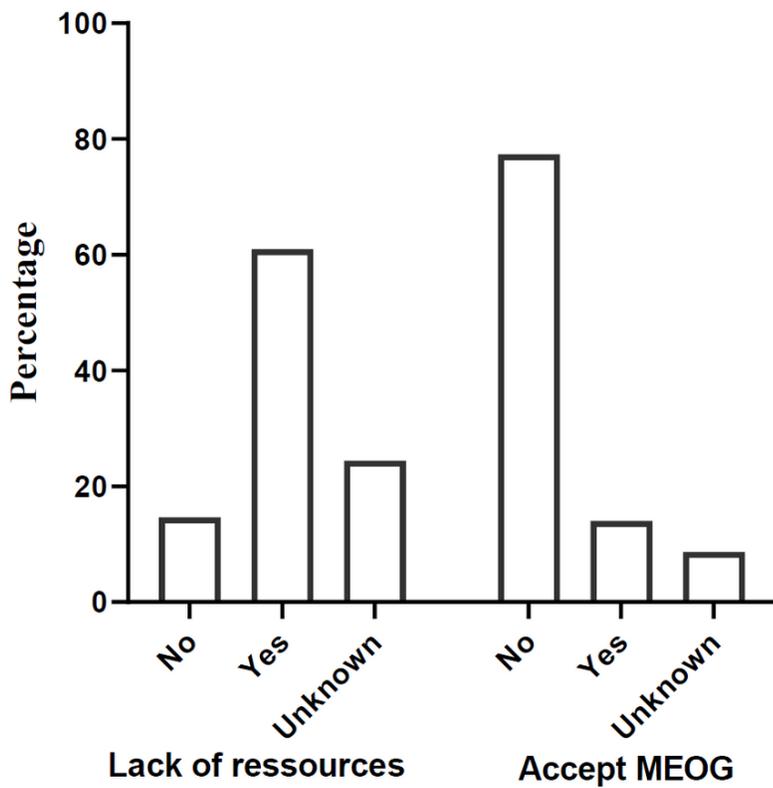
Frequency of the most common barriers to nomads' access to health services mentioned by the respondents



**Median distance between respondents' location and the closest health center in Ber and Gossi**

Figure 2

Variation of the median distance between respondents' location and the closest health center in Km



MEOG: medical examination by the opposite gender

Perceptions of respondents about Lack of resources and accept MEOG

Figure 3

Perception of respondents about the lack of resources and the acceptance of the consultation by the opposite gender

### Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [STROBEchecklist.pdf](#)