

Research Article

Social and Economic Profile of Beneficiaries of Community Health Mutual Insurance in Senegal in 2019

Ibrahima Ndiaye^{1, 2, *} , Jean Augustin Diegane Tine^{1, 2} , Aldiouma Ba^{1, 2},
Oumar Bassoum^{1, 2} , Fatoumata Binetou Diongue^{1, 2}, Amadou Ibra Diallo^{1, 2},
Maty Diagne-Camara^{1, 2} , Ndeye Mareme Sougou^{1, 2}, Adama Sow^{1, 2}, Lamine Gaye^{1, 2},
Mamadou Makhtar Mbacke Leye^{1, 2}, Ibrahima Seck^{1, 2}

¹Preventive Medicine and Public Health Department, Cheikh Anta Diop University, Dakar, Senegal

²Health and Development Institute, Cheikh Anta Diop University, Dakar, Senegal

Abstract

Introduction: Lack of access to healthcare is a major public health problem in developing countries such as Senegal. To compensate for this, the State of Senegal launched universal health coverage in 2013 based on the extension of community mutual health insurance companies. The objective of this study was to study the epidemiological profile of beneficiaries of community mutual health insurance companies in Senegal in 2019. **Methods:** This was a population-based, cross-sectional, descriptive and analytical study conducted between April and December 2019. Data were extracted from the 2019 Continuing Demographic and Health Survey (DHS-Continuous 2019) database. The analysis was carried out by the Epi-info7 software. **Results:** The study involved 41016 individuals, mostly female (53.84%). The 19-59 age group was predominant (38.25%). Most were uneducated (59.60%) and belonged to the poorest quintile (26.68%). The membership rate for community mutual health insurance was 5.49%. The factors associated with the benefit of community mutual health insurance services in Senegal were: school education (OR=1.38; p=0.000), belonging to the poorest quintile (OR=1.29; p=0.000), living in the central zone (OR=3.57; p=0.000), marriage (OR=2.63; p=0.000), and use of health care in the past 12 months (OR=1.25; p=0.000). **Conclusion:** Raising awareness of the need to join community mutual health insurance companies will increase the number of beneficiaries and reduce the financial risk associated with health expenses. Strategies for targeting the uneducated population and those living in the northern and southern zones will have to be addressed by the Agency for Universal Health Coverage (ACMU).

Keywords

Access to Care, Universal Health Coverage, Community Mutual Health Insurance, Social Protection, Senegal

1. Introduction

Nearly 800 million people spend more than 10% of their household budget on health care. Thus, a hundred million

people plunge into extreme poverty each year because of these direct household expenditures. The latter account for

*Corresponding author: ibrahima125.ndiaye@ucad.edu.sn (Ibrahima Ndiaye), neyaid@gmail.com (Ibrahima Ndiaye)

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about 32% of each country's health spending [1].

Without universal access to quality care, millions of people die every year from preventable and curable diseases. Universal health coverage aims to ensure that everyone, everywhere has access to quality health services without suffering financial hardship. Recognizing the importance of universal health coverage in promoting equity, global health security, development and growth, world leaders have integrated this concept into the Sustainable Development Goals (SDGs), which includes protection against financial risks, access to quality essential care, and access to safe medicines and vaccines efficient, quality and affordable for all [2].

In developing countries such as Senegal, the supply of and accessibility to care is a thorny problem, particularly for the poorest populations and those living in rural areas. Indeed, the supply seems to be insufficient to meet the demand because most health care structures are often not able to offer quality and quantity of care adapted to users. Despite a lot of efforts in terms of healthcare provision, difficulties in accessing healthcare still persist [3].

Since 2013, the year of the launch of the universal health coverage program in Senegal, many efforts have been made to improve access to health care. However, the objective of extending basic health coverage to 75% of the population by December 2017 has not yet been achieved [4].

The development of community mutual health insurance is one of the main means on which the program is based for a wider enrolment of beneficiaries of universal health coverage.

The theoretical Andersen-Newman model (Andersen & Newman 1973) has been used to better understand and define the profile of beneficiaries. This model classified the factors influencing use like predisposing, facilitating and need-based [5].

In Senegal, there are few studies on knowledge of the reasons for the low proportion of beneficiaries of community mutual health insurance companies. Thus, it seemed appropriate to study the epidemiological profile of the beneficiaries of mutual health insurance in Senegal.

2. Materials and Methods

2.1. Study Framework

Senegal is located in the extreme west of the African continent [6]. It is organized into fourteen regions. In 2019, the population is estimated at 16,209,125 inhabitants with a population growth of 2.5%. The average population density is 82 inhabitants per km². However, there is a large disparity in the distribution of the population among the country's 14 administrative regions.

The majority of the Senegalese population is mainly active in the agricultural sector, which contributes little to GDP [7]. The informal sector represents about 95% of the active population in Senegal. [8].

2.2. Type and Period of Study

This work is a secondary analysis of data from the 2019 Continuous Demographic and Health Survey (DHSc). This was a cross-sectional, descriptive and analytical population-based study conducted at the household level. It took place from April to December 2019 in the 14 regions of Senegal.

2.3. Study Population

This work focused on individuals found in households. They were children, women and men. The unit of analysis in this study was the household. The sampling frame consisted of two levels:

- 1) Elementary level: This was the Census District (CD).
- 2) Secondary level: This was the household to be surveyed at the level of each neighbourhood/village.

2.4. Selection Criteria

2.4.1. Inclusion Criteria

This study included anyone with the following characteristics:

- 1) Female 15-49 years old
- 2) Male 15-59 years old
- 3) Children
- 4) Men and women aged 60 and over
- 5) be a resident of the household

2.4.2. Non-inclusion Criteria

Excluded was anyone who:

- 1) Absent during the collection period
- 2) Refusing to participate

2.5. Sampling

2.5.1. Sample Size Calculation

As the 2019 Continuous DHS sample is a stratified sample drawn at two stages, complex formulas were used. An SAS procedure was used to calculate sampling errors according to an appropriate statistical methodology. This procedure uses the linearization method (Taylor) for estimates such as means or proportions, and the Jackknife method for more complex estimates such as the total fertility rate and mortality quotients [9].

$$ET \{r\} = Var(r) = (1 - f) * (1/x) * \sum_{h=1 \rightarrow H} [(m_h / (m_h - 1)) * (\sum_{i=1 \rightarrow m_h} z_{hi}^2 - z_h^2 / m_h)]$$

In which

$Z_{hi} = y_{hi} - rx_{hi}$, et $Z_h = y_h - rx_h$

With h: stratum that goes from 1 to H

MH: total number of clusters drawn in stratum H

y_{hi} : sum of the weighted values of the parameter y in cluster i of stratum h

x_{hi} : sum of weighted numbers of cases in cluster i of stratum h

f : overall sampling rate which is negligible

The sample size obtained was 41016 individuals

2.5.2. Sample Design and Sampling Procedures

The sample was drawn on a stratum-by-stratum basis. Thus, the sample is based on a stratified random sampling and drawn at two stages. At the first stage, 214 clusters (Primary Sampling Units (PSUs)) were drawn from the list of Enumeration Areas (EAs) established during the General Census of Population and Housing, Agriculture and Livestock (GCPHAL) carried out in 2013, by proceeding to a systematic sampling with probability proportional to size, the size of the UPS being the number of households. A count of households in each of these clusters provided a list of households from which a sample of 22 households per cluster was drawn, in both urban and rural areas, with a systematic selection of equal probability. In each drawn household, also considered a cluster, all eligible members were included in the study. A total of 4,708 households (1,848 in urban areas and 2,860 in rural areas) were selected, i.e. 41,016 individuals.

2.6. Data Collection

Collection Tools

Three questionnaires were used in the 2019 DHS-Continuous: the household questionnaire, the female questionnaire and the male questionnaire. The questionnaires, based on The DHS Program's model questionnaires, were adapted to take into account demographic and health issues appropriate to Senegal.

Collection Methods and Process

The training of the investigators was organized from March 12 to 20, 2019.

The fieldwork of the pilot survey took place in four clusters of the city of Dakar.

All training sessions focused on interview techniques and the completion of questionnaires on Computer-Assisted Personal Interviewing (CAPI).

Data collection was conducted from April to December 2019 with a 30-day break, for an eight-month period of collection. Thirty agents have been recruited and divided into five work teams, each composed of six people, including a team leader, three investigators and a driver. The five teams were placed under the responsibility of three supervisors-analysts in the field.

2.7. Data Analysis

At the end of the investigation, the database was extracted in Microsoft Office Excel format. The data were analyzed with the Epi info 7.2 software.

1) For the descriptive study

(a) Qualitative variables

(b) Absolute and relative frequencies (95% confidence intervals) were presented in frequency tables

(c) Quantitative variables

Quantitative variables were summarized according to the mean with its standard deviation.

2) For the analytical study

Bivariate analyses were conducted to reflect some of the concerns expressed in the objectives, and related to the search for factors associated with the benefit of the services of the MS. The benefit of the services of the MS was the dependent variable. We had carried out statistical independence tests with a margin of error of 5% implying a 95% confidence level. The Chi2 test, the Fisher test, as well as the T test were used with an alpha risk of 5%. The odds ratio (OR) surrounded by its confidence interval (CI) made it possible to establish and quantify the strength, meaning and significance of the link.

2.8. Ethical Aspects

This is a national survey conducted by the National Agency for Statistics and Development in collaboration with the MSAS (Order No. 007426 of 4 March 2020 on the statistical visa for censuses and surveys taken pursuant to Article 11.-ter of Law 2004-2 of 21 July 2004 on the organization of statistical activities amended and supplemented by Law No. 2012-03 of 3 January 2012 [10].

3. Results

3.1. Descriptive Results

3.1.1. Predisposing Factors

The study was conducted on 41016 individuals, most of whom resided in the southern zone (32.74%) and also in the Kaolack region (9.16%). The most representative age group was between 19 and 59 years old with 38.25% of respondents. The majority of respondents were uneducated (59.60%), married (61.61%) and female (53.84%). Nearly 65.33 per cent of the population lived in rural areas (Table 1).

Table 1. Distribution of the population according to predisposing factors.

Predisposing factors	Absolute Frequency (N=41016)	Relative Frequency (%)
Residential area		
Center	12744	31,07
North	8465	20,64
West	6379	15,55
South	13428	32,74
Region		
Dakar	2771	6,76
Diourbel	3228	7,87
Fatick	2719	6,63
Kaffrine	3038	7,41
Kaolack	3759	9,16
Kédougou	2280	5,56
Kolda	2917	7,11
Louga	2714	6,62
Kill	3157	7,70
Saint-Louis	2594	6,32
Sédhiou	2942	7,17
Tambacounda	2926	7,13
Thiès	3608	8,80
Ziguinchor	2363	5,76
Living environment		
Rural	26794	65,33
Urban	14222	34,67
Level of education		
Don't know	295	0,72
Upper	731	1,78
Uneducated	24444	59,60
Primary	10173	24,80
Secondary	5373	13,10
Sex		
Female	22085	53,84
Male	18931	46,16
Age range		
0-5	7606	18,55
6-18	14626	35,68
19-59	15680	38,25
60 and over	3084	7,52

Predisposing factors	Absolute Frequency (N=41016)	Relative Frequency (%)
Marital status		
Divorced	542	2,45
Married	13642	61,61
Bachelor	6791	30,67
Widower	1166	5,27

3.1.2. Facilitating Factors

The lower socio-economic level predominated with 26.68%. Most of the participants interviewed had paid for their last con-

sultation (88.29%). The household fully covered the costs of this last consultation for 88.98% of the population (Table 2).

Table 2. Distribution of the population according to the factors facilitating.

Facilitating factors	Absolute Frequency (N)	Relative Frequency (%)
Wellness Quintile		
Medium	8480	20,67
Poor	10083	24,58
The poorest	10944	26,68
Rich	6401	15,61
The richest	5108	12,45
Payment for last consultation (N=18328)		
Yes	16182	88,29
Not	2146	11,71
Payment for the last consultation (N=16182)		
Don't know	7	0,04
Partially by complete MS	508	3,14
Partially per household	795	4,91
Totally by government	473	2,92
Totally per household	14399	88,98

3.1.3. Factors Related to Need

91.95% of the participants had a good mental health status. Only 44.69% of the population had used health care in the past 12 months.

3.1.4. Beneficiaries of Community Health Mutuals

A small proportion of respondents (5.49%) had benefited from community-based health mutual services (Table 3).

Table 3. Distribution of the population according to the benefit of community HM services.

Beneficiaries of community health mutuals	Absolute Frequency (N=41016)	Relative Frequency (%)
Yes	2251	5,49
Not	38765	94,51

3.1.5. Free and Social Protection Initiatives

Several free policies have been analysed in this study. The results of the survey showed that the beneficiaries of an equal opportunities card were in the minority at 1.12%; The same is

true for beneficiaries of a family security grant with a proportion of 8.44%. Nearly 7.02% of the population benefited from free care for children aged 0-4 years and 0.47% from the Sesame plan (Table 4).

Table 4. Distribution of the population by type of medical assistance plan.

The different free policies	Absolute frequency	Relative Frequency (%)
Equal Opportunities Card		
Yes	30	1,12
Not	2659	98,88
Social Security Scholarship		
Yes	227	8,44
Not	2462	91,56
Free childcare 0-4 years old		
Yes	2878	7,02
Not	38138	92,98
Sesame Plan 60 years and over		
Yes	193	0,47
Not	40823	99,53

3.2. Analytical Results

3.2.1. Predisposing Factors Associated with the Benefit of MS Services

Area of residence and region were associated with the benefit of HM services: Residents of the North and West zones were 3 times less likely (OR=0.28 [0.24-0.33]; OR=0.32 [0.27-0.38]) to benefit from the services of MS than those who lived in the Central zone; those living in the Dakar region were less likely to benefit from HM services than those living in the regions of Fatick (OR=11.47 [8.18-16.09]), Kaffrine (OR=7.68 [5.45-10.81]), Ziguinchor (OR=6.90 [4.86-9.80]), Kolda (OR=6.39 [4.52-9.03]), Diourbel (OR=4.5 [3.22-6.50]), Kaolack (OR=4.49 [3.17-6.36]),

Sékhio (OR=4.19 [2.93-5.99]), Kédougou (OR=3.51 [2.41-5.10]), Louga (OR=3.47 [2.41-5.01]), Thiès (OR=3.03 [2.11-4.35]) and Tambacounda (OR=1.45 [0.96-2.20]).

The benefit of HM services was also associated with age group; Individuals in the 0-5 age group were 2 times less likely to benefit from these services than those aged 19 to 59 years (0.49 [0.43-0.57]).

The results of the study showed that gender, educational attainment, living environment and marital status were also associated with receiving HM services. Female were more likely to benefit from these services than male (OR=1.22 [1.12-1.33]). Those who had reached primary (OR=1.38 [1.25-1.53]) and secondary (OR=1.36 [1.21-1.54]) were also more likely to benefit from HM services than those who were not educated. Divorced and never-married participants were 2 times less likely (OR=0.38 [0.23-0.63]; OR=0.54 [0.47-0.62])

to benefit from the services of HM than those who were in union (Table 5).

3.2.2. Facilitating Factors Associated with the Benefit of MS Services

Participants who were considered to be the richest, richest, middle-income and poorest were less likely, respectively (OR=0.77 [0.66-0.89]; OR=0.77 [0.67-0.89]; OR= 0.78 [0.69-0.89]; OR=0.85 [0.76-0.95]) to benefit from these

services than those classified as poorest. The same was true for those who had paid for the last consultation, who benefited 2 times less from the services of the HM than those who had not paid (OR=0.52 [0.45-0.61]). Participants for whom the costs of the last consultation were fully borne by the household were less likely to benefit from these services than all other categories depending on the method of payment (Table 6).

3.2.3. Need Factors Associated with the Benefit of HM Services

Healthcare use in the past 12 months increased the likelihood of receiving HM services (OR=1.25 [1.15-1.36]). (Table 7).

Table 5. Predisposing factors Associated with the Benefit of HM Services.

MS com Beneficiary						
Predisposing factors	Yes		Not		P value	OR
	n	%	n	%		
Residential area						
Centre	1081	8,48	11663	91,52	Ref	-
North	215	2,54	8250	97,46	0,000	0,28 [0,24-0,33]
West	184	2,88	6195	97,12	0,000	0,32 [0,27-0,38]
South	771	5,74	12657	94,26	0,000	0,66 [0,60-0,72]
Region						
Dakar	38	1,37	2733	98,63	Ref	-
Diourbel	193	5,98	3035	94,02	0,000	4,57 [3,22-6,50]
Fatick	374	13,76	2345	86,24	0,000	11,47 [8,18-16,09]
Kaffrine	293	9,64	2745	90,36	0,000	7,68 [5,45-10,81]
Kaolack	221	5,88	3538	94,12	0,000	4,49 [3,17-6,36]
Kédougou	106	4,65	2174	95,35	0,000	3,51 [2,41-5,10]
Kolda	238	8,16	2679	91,84	0,000	6,39 [4,52-9,03]
Louga	125	4,61	2589	95,39	0,000	3,47 [2,41-5,01]
Kaolack	55	1,74	3102	98,26	0,252	-
Saint-Louis	35	1,35	2559	98,65	0,944	-
Sédhiou	162	5,51	2780	94,49	0,000	4,19 [2,93-5,99]
Tambacounda	58	1,98	2868	98,02	0,073	1,45 [0,96-2,20]
Thiès	146	4,05	3462	95,95	0,000	3,03 [2,11-4,35]
Ziguinchor	207	8,76	2156	91,24	0,000	6,90 [4,86-9,80]
Living environment						
Urban	734	5,16	13488	94,84	0,034	0,91 [0,83-0,99]
Rural	1517	5,66	25277	94,34		
Level of education						

Predisposing factors	MS com Beneficiary				P value	OR
	Yes		Not			
	n	%	n	%		
Uneducated	1188	4,86	23256	95,14	Ref	-
Don't know	14	4,75	281	95,25	0,928	-
Primary	672	6,61	9501	93,39	0,000	1,38 [1,25-1,53]
Secondary	350	6,51	5023	93,49	0,000	1,36 [1,21-1,54]
Upper	27	3,69	704	96,31	0,147	-
Sex						
Female	1315	5,95	20770	94,05	0,000	1,22 [1,12-1,33]
Male	936	4,94	17995	95,06		
Marital status						
Married	1012	7,42	12630	92,58	Ref	-
Divorced	16	2,95	526	97,05	0,000	0,38 [0,23-0,63]
Never married	283	4,17	6508	95,83	0,000	0,54 [0,47-0,62]
widower	85	7,29	1081	92,71	0,872	-
Age range						
19-59 years old	967	6,17	14713	93,83	Ref	-
0-5 years	239	3,14	7367	96,86	0,000	0,49 [0,43-0,57]
6-18 years old	780	5,33	13846	94,67	0,002	0,86 [0,78-0,94]
60 years and over	265	8,59	2819	91,41	0,000	1,43 [1,24-1,65]

Table 6. Facilitating Factors Associated with the Benefit of HM Services.

Facilitating factors	HM Beneficiaries				P value	OR
	Yes	No				
	n	%	n	%		
Quintile of well-being						
The poorest	697	6,37	10247	93,63	Ref	-
Medium	429	5,06	8051	94,94	0,000	0,78 [0,69-0,89]
Poor	551	5,46	9532	94,54	0,006	0,85 [0,76-0,95]
Rich	320	5,00	6081	95,00	0,000	0,77 [0,67-0,89]
The richest	254	4,97	4854	95,03	0,000	0,77 [0,66-0,89]
Payment for the last consultation						
Yes	906	5,60	15276	94,40	0,000	0,52 [0,45-0,61]
Not	219	10,21	1927	89,79		
Last consultation payment method						

Facilitating factors	HM Beneficiaries				P value	OR
	Yes	No				
	n	%	n	%		
Totally per household	426	2,96	13973	97,04	Ref	
Partially by complete MS	230	45,28	278	54,72	0,000	27,14 [22,23-33,13]
Partially per household	209	26,29	586	73,71	0,000	11,70 [9,72-14,08]
Totally by government	41	8,67	432	91,33	0,000	3,11 [2,23-4,35]
Don't know	0	0	7	100	0,644	-

Table 7. Need factors associated with the benefit of the services of the HM.

Need factors	HM Beneficiaries				P value	OR
	Yes	Not				
	n	%	n	%		
Mental health status						
Good	2093	5,55	35622	94,45	0,065	-
Bad	158	4,79	3143	95,21		
Past 12-month health care use						
Yes	1125	6,14	17203	93,86	0,001	1,25 [1,15-1,36]
Not	1126	4,96	21562	95,04		

4. Discussion

The development of community health mutuals is one of the main strategies for extending UHC, which is a priority in Senegal. The study was population-based, cross-sectional, descriptive and analytical and aimed to study the epidemiological profile of beneficiaries of community HM in Senegal in 2019. It was conducted between April and December 2019 and involved a sample of 41016 individuals. The main limitation of this study is the lack of evaluation of the costs of care when covering beneficiaries. The use of secondary data reduces the richness of information; some indicators such as the type of pathology covered were not found in the 2019 DHS database.

4.1. Characteristics of the Beneficiaries

Nearly 65.33% of the population lived in rural areas; compared to 58.42% in Sarker's study [11] in Bangladesh compared to 48.1% in the WHO report in Nigeria, which is

therefore marked by greater urbanisation [12]. This difference could be explained by the demographic structure and the speed of urbanization: Senegal remains a country where the rural population is still in the majority, unlike Nigeria, whose urban transition is more advanced [13].

Women were more represented than men. They accounted for 53.84% of the participants, which differs from the results of Otieno [6] who found 48.3% in Kenya. Socio-cultural and organizational factors can influence membership in health mutuals: in Senegal, membership campaigns often target women through community structures, which encourages their overrepresentation [14].

In addition, the uneducated were in the majority at 59.60% compared to 33.61% in the Manortey study in Ghana [15]. This disparity is probably linked to the overall level of literacy: Ghana has a higher rate of education than Senegal, which may influence the structure of its member populations [16].

Regarding the well-being quintile, the poorest were in the majority at 26.68%; this was confirmed by the study by Otieno [6] with 21%. As Senegal is a lower-middle-income country, the proportion of households living below the pov-

erty line remains high, explaining a higher representation in this quintile [17].

Community HM recipients represented 5.49% of our study population. This rate is lower than that observed in Rwanda, where the community insurance policy is compulsory and heavily subsidized by the state [18]. The low coverage in Senegal could be linked to voluntary membership as well as to contributions perceived as high [19].

Another reason mentioned in the literature is the lack of information on HM; a population with little or no information will adhere less and therefore will not benefit less from the services of the HM [20].

4.2. Factors Associated with the Benefit of HM

People living in urban areas benefited less from the services of mutual health insurance companies than those living in rural areas. Studies in Benin and Burkina Faso have shown that urban populations often prefer private insurance or direct payment, while rural areas rely more on mutuals out of economic necessity and local community campaigns [21]. There was a larger enlistment of women than men in the HM. This phenomenon has also been reported in Mali, where women, who are often responsible for family health, participate more actively in community initiatives [22].

Individuals who had completed primary and secondary school were more likely to benefit from the services of the HM than those who were not educated. Literacy promotes understanding of the insurance mechanism, which was demonstrated in De Allegri's study in Burkina Faso [23].

The poorest were the largest category of beneficiaries. Indeed, mutual health insurance companies were initially designed to meet the needs of vulnerable households who cannot cope with out-of-pocket payments for care, unlike wealthier populations who often prefer private insurance or direct payment [21].

5. Conclusions

The study addressed the various predisposing, facilitating and need factors associated with the beneficiaries of MS services in all 14 regions of Senegal.

It shows a low rate of beneficiaries which was 5.49%. The benefit of the MS services was favoured by several factors; thus we have regained the fact of living in the central zone, of living in the regions of Fatick, Kaffrine, Ziguinchor and Kolda, but also of being in union, of reaching the primary and secondary cycles of education or of having a low socio-economic level. These results highlight the thorny problem of access to quality health care in Senegal, especially for the poor and those in the informal sector. The solution undoubtedly lies in the development of professionalized mutual health insurance companies offering a wide range of care, but also in the involvement of community actors in the management and operation of health insurance

companies.

Abbreviations

UHCA	Universal Health Coverage Agency
CAPI	Computer-assisted Personal Interviewing
CD	Census District
CI	Confidence Interval
DHS	Demographic and Health Survey
EA	Enumeration Area
MoH	Ministry of Health
HM	Health Mutuals
OR	Odds Ratio
PSU	Primary Sampling Unit
GCPHAL	General Census of Population and Housing, Agriculture and Livestock
UHC	Universal Health Coverage
WHO	World Health Organization

Author Contributions

Ibrahima Ndiaye: Conceptualization, Data curation, Formal Analysis, Writing – original draft

Jean Augustin Diegane Tine: Conceptualization, Validation, Writing – review & editing

Aldiouma Ba: Supervision

Oumar Bassoum: Supervision

Ibrahima Seck: Supervision

Conflicts of Interest

The authors declare no conflicts of interest.

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