

## Original Research Article

## Impact of Insecurity on the Health of the Population of the Douentza Health District From 2012 to 2019

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### Article History

Received: 12.06.2024

Accepted: 16.07.2024

Published: 22.07.2024

### Journal homepage:

<https://www.easpublisher.com>

### Quick Response Code



**Abstract:** Health is a state of complete physical, mental and social well-being; it is not just the absence of disease or infirmity" [1, 2]. The resources mobilized in developing countries to deal with health problems in general, and particularly in the context of primary health care, are low in most cases and sometimes unevenly distributed. **Objective:** To analyze the health impacts of this insecurity on the population of the Douentza circle. **Method:** this was a retrospective, prospective and analytical study which took place. from March 2012 to December 2019. **Results:** During the study period, the incidence of severe malaria was between 22-31%, diarrheal diseases between 9-11% While the prevalence of SAM was between 25-. 57%, that of SAM with complications was between 2-4% in the district. Malaria-related mortality was under-reported. As part of epidemiological surveillance, only cases of measles and meningitis were regularly reported. reference evacuation was disorganized with the mobility of the population and nursing staff. **Conclusion:** Insecurity has had a negative impact on the entire health system in general and particularly on the state of health of the population with direct and indirect consequences.

**Keywords:** Insecurity, Impact, Health, Douentza.

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## INTRODUCTION

Health is a state of complete physical, mental and social well-being; it is not merely the absence of disease or infirmity." [1, 2]. The resources mobilized in developing countries to deal with health problems in general, and particularly in the context of primary health care, are weak in most cases and sometimes inequitably distributed.

Since January 2012, an armed conflict has opposed, in northern Mali, the Malian army to the Tuareg rebel groups of the National Movement for the Liberation of Azawad (MNL), fighting for the autonomy of this region, and to Islamist movements, advocating the establishment of an Islamic republic [3].

The Douentza circle was particularly affected by these conflicts which were worsened by the addition of banditry and inter-community clashes. Despite the efforts made to secure northern Mali, incidents ranging from simple robberies to armed conflicts between bandits and soldiers.

This insecurity has had effects which can be analyzed according to:

- Their impact on civilian populations and on the military,
- Their direct consequences on people through war injuries,
- Their indirect consequences in terms of public health.

Their impact on public health represents a greater burden than that of personal trauma. In most major conflicts, civilians have been directly targeted and accounted for between half and two-thirds of the total number of casualties [4].

Several elements characterize an upheaval in society which are among others: the displacement of the population (internally displaced persons and refugees), impoverishment, the collapse of food and hygiene conditions, the lack of drinking water and the disorganization of medical systems etc.

It is in this context that we propose to analyze the health impacts of this insecurity on the population of the Douentza circle.

**Specific Objectives**

- Determine the frequency of pathologies frequently encountered in Douentza.
- Describe the organizational aspects of the provision and continuity of care;
- Analyze the level of access to essential services and resources in areas affected by a deterioration of the security situation.

**METHODOLOGY**

**1- Definition of concepts:**

- **The concept of Health:** Health is a state of complete physical, mental and social well-being and not just the absence of disease or infirmity.
- **An impact:** is defined as the consequence; the effect of an event. This involves identifying all the direct and indirect health consequences on the population linked to insecurity.
- **Insecurity:** is the state of a place, or the feeling of living in a physical and/or social environment favoring attacks on people and property. [5]

In our context, in Mali in general and in Douentza in particular, this insecurity seems to take different forms classified into 3 categories:

- *Insecurity linked to residual banditry,*
- *That linked to intercommunity clashes*
- *Insecurity linked to terrorism*

➤ **The Population:**

A population is defined “as a human group located within a delimited geographical space and endowed with a certain social significance. (.)

This human group most generally corresponds to the population of a country or a group of countries having certain common traits from a political or socio-economic point of view (...). It can also correspond to the population of a part of the territory of a country with political, sociological or economic significance (provinces, districts, rural areas, linguistic regions, geographical regions, etc.)." [6, 7].

**2. Study Framework**

The Douentza circle is a local authority in Mali, located 820 km from Bamako and 175 km from Mopti, the capital of the region to which it falls. The circle, which includes several communities, has an area of approximately 24,531 km<sup>2</sup>.

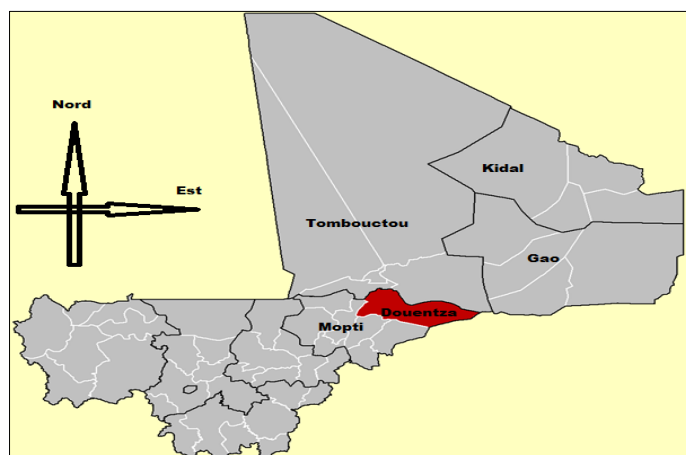
The population is estimated at 330,947 inhabitants in 2018, or nearly 13 people per km<sup>2</sup>. This low density makes access to health services difficult, especially characterized by very high mobility.

The commune of Douentza constitutes the only urban commune out of the fifteen (15) in the circle. It constitutes an important crossroads where vehicles coming from Timbuktu, Gao and Mopti pass.

Several partners support the health district structures in carrying out their missions.

Their main areas of intervention are the fight against malnutrition, the fight against

HIV/AIDS, malaria, tuberculosis, hygiene, sanitation and maternal and child health.



### 3. Type and Period of Study

The study combined a sample survey and a documentary review. The survey was descriptive and analytical. It took place from March 2012 to December 2019.

All 21 health areas in the district, including the Reference Health Center, were included in the study.

### 4. Data Collection

The following techniques were used to collect data for the study:

- The qualitative, semi-directed interview carried out face to face with the service providers; patients and their loved ones.
- A documentary review focused mainly on the analysis of data collected from the various data sets in Mali (Dhi2, PDSEC, Csref Registers).

Data analysis was carried out using Word, SPSS and EXCEL software.

## RESULTS

Between 2018 and 2019, the security situation deteriorated significantly in Mali, particularly in the so-called “three borders” region. Populations, victims of conflict and violence, have massively displaced within the country. The general population has also suffered the effects of climatic hazards.

Most of the usable data was recorded between 2016 and 2019.

### Overview of some Health indicators:

#### 1- Morbidity:

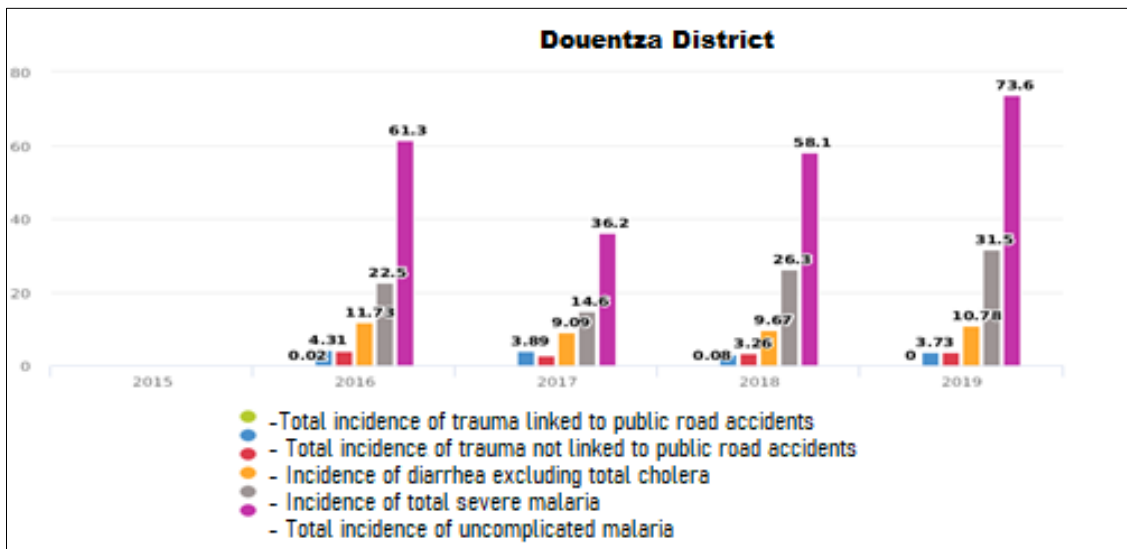


Fig. 1: Overview of some Indicators

#### 2- Nutrition:

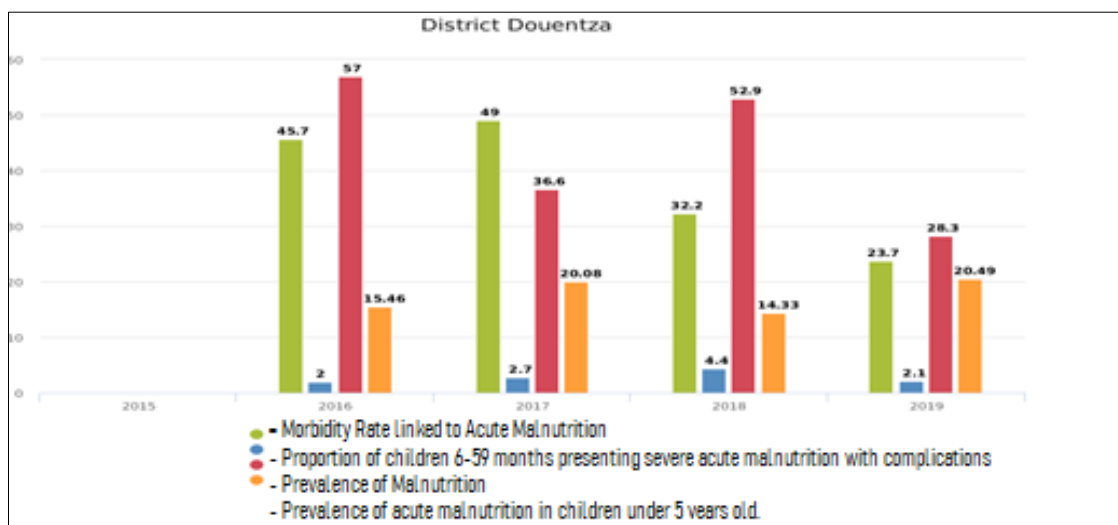


Fig. 2: Prevalence of Malnutrition

3- Malaria:

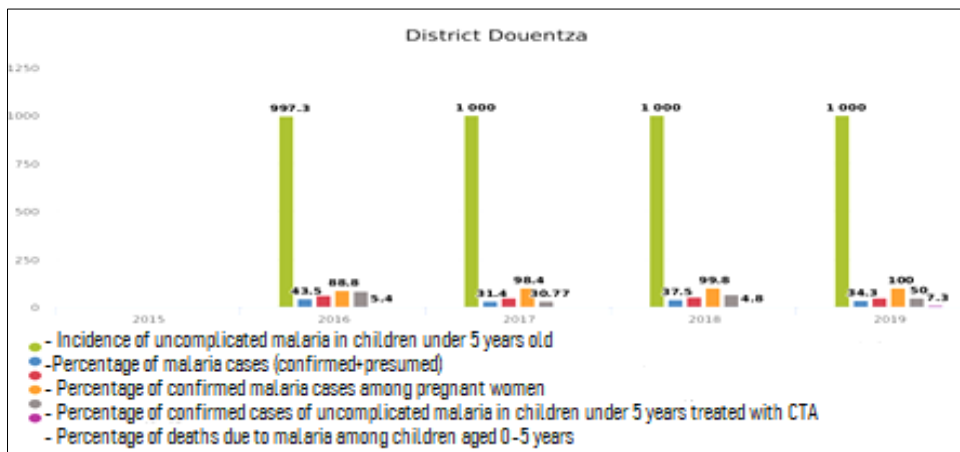


Fig. 3: Prevalence of Malaria

4- The Expanded Vaccination Program:

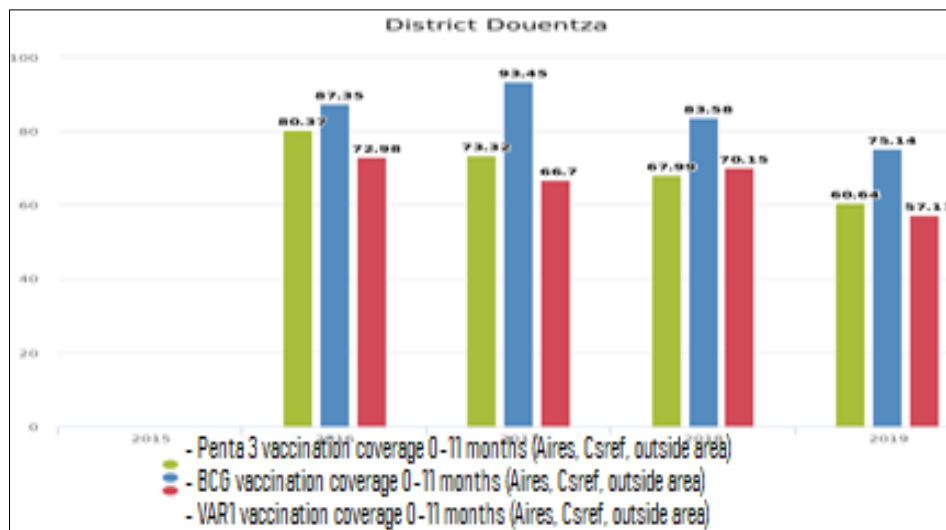


Fig. 4: Coverage of certain antigens

5- Epidemiological surveillance:

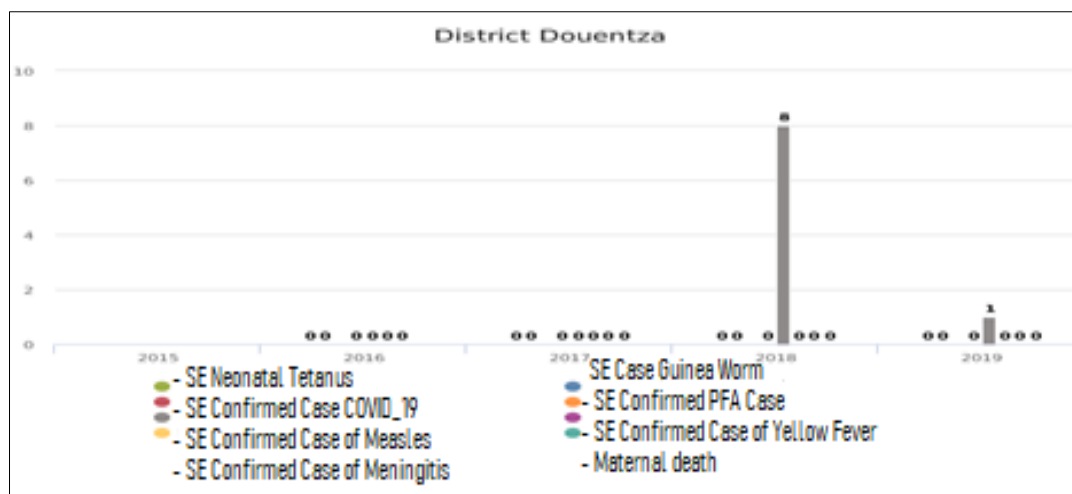


Fig. 5: meases

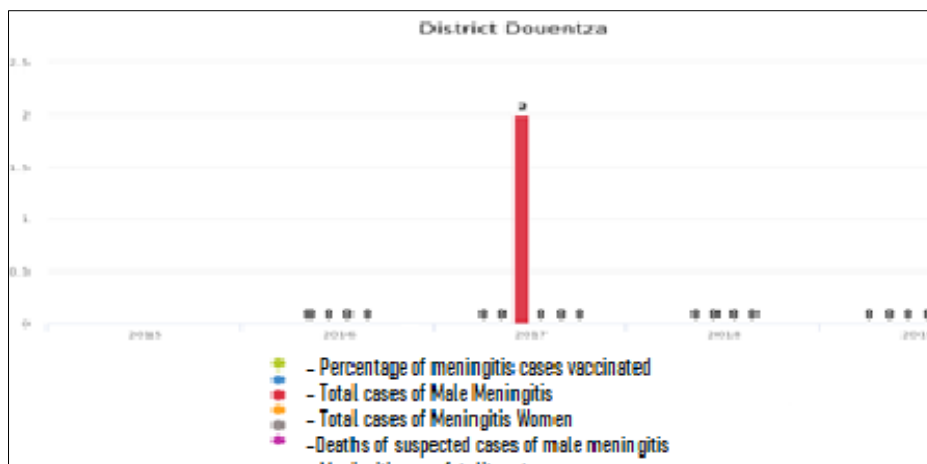


Fig. 6: Meningitis

## COMMENTARY AND DISCUSSION

During this study; We encountered some difficulties including:

- Inaccessibility to certain primary media;
- Insufficient data reporting in the DHIS2 software
- The recording of certain aberrant data.

The combination of the consequences of the conflict and climatic hazards has exacerbated tensions and worsened poverty in already vulnerable communities.

Indeed, the prevailing insecurity and crime in the North and Center has reduced access to pasture land or arable land for tens of thousands of breeders and farmers [8], including health facilities.

The insufficient data collected during the years from 2012 to 2016 would be linked to the disruption of health activities with a massive movement of staff. This is why our comments will mainly focus on 2016 and 2019.

### 1. The Context of Access and Delivery of Care

Reception in community health centers: patients are received and treated according to the Cscm technical platform and according to the different algorithms for treating pathologies. Deliveries, vaccination in fixed centers and advanced strategies, including management of malnutrition, are regularly carried out. It is when care is not possible at the Cscm that patients are referred or evacuated to the reference health center depending on the context.

Since 2012, this system has been implemented irregularly and has suffered due to the fact that populations have moved to areas where distance, travel and financial means become a major handicap in receiving care.

All these instabilities weaken access to care and jeopardize overall health security since health systems, underfunded and understaffed, appear difficult to cope with epidemic crises.

These numerous factors have negatively influenced the delivery of care with an impact on health data.

While malaria, respiratory infections and diarrheal diseases remain at very high levels, nutritional crises are recurrent and cyclical. In a region where malnutrition rates are permanently around the alert level, the agricultural lean period leads to an increase in cases of malnutrition each year [9]. This state of affairs required humanitarian assistance throughout the region in that access to drinking water was improved for more than 94,000 people while 152,000 patients had access to health care in centers supported [8].

This insecurity has also had a direct effect on access to health care in several other circles such as Bankass and Koro. Thus, in the areas assessed in December 2018, an NGO noted a -64% decline in the number of curative consultations given by health personnel, compared to the same period the previous year.

This decline in the use of services can be explained firstly by physical barriers and then by economic barriers which also complicate access to care.

Indeed, patients and local medical staff have difficulty traveling due to intercommunity tensions. The impoverishment of the population means that some households can no longer pay for health care. This situation weakens the health system which until now operated with a cost recovery system [10].

Insecurity and fear had led to a sharp deterioration in access to health care (physical access and economic access). And this, in a context of impoverishment of local populations linked to the effects

of the conflict and the security measures put in place, such as market closures [10].

Also, this agrees with the conclusion of a mission report from another NGO that refugees from the sub-region, particularly Burkinabe, the majority of whom live in Koro, experience enormous difficulties in accessing care because they do not have financial means for their medical care within medical training; this is a factor aggravating the morbidity and mortality of the population [11].

**2. The Context of Continuity of Care**

In the Mopti region, since the beginning of 2016, community conflicts and terrorist attacks have intensified [10].

In central Mali, on the border with Burkina Faso, the districts of Douentza, Bankass and Koro are experiencing a significant deterioration in security, making access and continuity of health care complicated.

Continuity of care requires sufficient staff with an average level of training. This is very worrying when we think that in our health structures this is not always a given and is consistent with the WHO report, which highlights that in the human resources pillar, coverage was below the standards recommended by the WHO. WHO for doctors, nurses and midwives [9]. During these periods, the small population with access to care is insufficiently monitored due to the high mobility of healthcare personnel and insufficient training; this had numerous repercussions on morbidity and vaccination, explaining the occurrence of epidemics, outbreaks of ARI and severe malnutrition.

The shortage of health personnel negatively affected the delivery of care during emergencies and their motivation took a hit.

Points of dissatisfaction included:

- **Non-payment of certain monthly salaries,**
- **The absence of insecurity bonus, and remoteness and**
- **The heavy workload.**

The majority of community health workers (CHWs) and community relays were sometimes inactive because of their ethnicity, their collaboration with the local authority, the feeling of experiencing insecurity through threats and sometimes the average lack of travel.

Service delivery has therefore negatively affected the availability and quality of care. The attendance and occupancy rate of health center beds was sometimes high during peak periods, leading to a disorganization of services in favor of emergency response.

Several health centers stopped functioning in the circle following the massive departure of health workers to the south of the country as was also noted by the study by Comille *et al.*, These health structures closed following the attacks and abuses by armed groups against populations and health workers.

The displaced local populations and the arrival of certain refugees, especially Burkinabe, have overwhelmed the health centers of the host localities because of the significant demand for care.

As available resources are insufficient to meet demand, the quality of care has been affected [9], and sometimes with a long delay in the treatment of certain urgent pathologies where patients could make detours of more than 400km to access quality care; to avoid armed groups and intercommunity conflicts.

**Table 1: Obstacles to continuity of care according to information sources**

Difficulties in continuity of care Occurrence	Number of Structure
Financial barrier to health care	21/24
Geographic barrier and high cost of transport	8/24
Out of medication	7/24
Mobility of qualified agents	10/24

➤ **Morbidity and Malaria**

The incidence of uncomplicated malaria remained high throughout the period with a low mortality rate. This would be due to insufficient reporting of malaria data in an area where malaria is endemic, it could also be explained by the inaccessibility of patients to health centers.

According to a study carried out in Mali, the peaks of malaria, acute malnutrition and diarrhea overlapped from June to September (4 months) during the last five years. However, the health system was also under pressure from ARI during the months of March,

April, May, sometimes lasting until July (5 months). Consequently, the health system suffered the joint effects of the peaks of the four main pathologies during the months of March to September, that is to say 7 months out of 12 of the year [9].

Diarrhea and trauma not linked to AVP occupied 3rd and 4th place, these were cases of non-choleraic diarrhea, falls from height and physical attacks with bladed weapons.

### ➤ **Malnutrition**

Around 5.9 million children aged under 5 suffered from moderate acute malnutrition during 2016, with 1.9 million at risk of severe acute malnutrition [9].

The persistent presence of armed groups and intercommunity conflicts make it difficult for basic health services to operate. The year 2016 was marked by an increase in tensions and violence in the Kidal region. Finally, food insecurity currently affects more than one in five Malians [10].

At the same time, the Sahelian zone is particularly affected by climate change, which aggravates nutritional deficits in a region where 29 million people today suffer from food insecurity [12].

The prevalence of malnutrition has been persistently high since 2016 to the present with almost proportional morbidity. The proportion of malnourished children with complications seems low during the same period, this could be explained by the absence of admission of serious cases which were not seen and taken care of and or the insufficiency of the health unit support which is only one in the district.

In numerous studies, it appears that 50% of cases of malnutrition are associated with infections; to insufficient hygienic conditions or unsanitary water and the non-existence of sanitation. Several pathologies linked to WASH have an impact on the nutritional status and lead to chronic or acute malnutrition of children.

Thus diarrhea of fecal origin leads to severe dehydration which in turn causes very rapid malnutrition in children under five (05) years old [13].

*According to the same survey, insecurity can have an effect on food security and the nutritional status of populations. We observed an increase in severe acute malnutrition in the Bankass circle between 2017 and 2018. A survey carried out in December 2018 showed rates of severe acute malnutrition exceeding the WHO emergency thresholds [10].*

The Central African Republic is struggling to emerge from the spiral of political instability and violence in which it has been for many years, the needs of the population are still very important, particularly for the most vulnerable people (women and children). where severe acute malnutrition persists with 55% of health sub-prefectures above the emergency threshold set by the WHO [14].

Despite the various factors linked to malnutrition, 3 essential factors have been identified in our context, namely:

- **Low access to basic foods** due to difficulties linked to agriculture (poor rainfall, inter-

community conflicts) preventing the population from farming;

- **Poor access to drinking water, hygiene and sanitation** (poor maintenance of large diameter wells, displacement of populations);
- **Insufficient health coverage and nutritional care** due to the frequent absence of qualified health workers;

### ➤ **Vaccination and Epidemiological Surveillance**

Diseases with epidemic potential (cholera, meningitis, yellow fever, measles); whose measles epidemic was experienced in 4 series with a relatively effective response given the low vaccination coverage, poverty and especially limited access to water and good hygiene practices. This was also confirmed in the Chadian study [15].

The high prevalence of epidemic diseases is due to several factors including:

- Low vaccination coverage and epidemiological surveillance;
- Dysfunction of health structures;
- Destruction, abandonment or contamination of water points and above all
- insecurity limiting the movement of vaccinators for advanced strategies.

During the last 4 years, BCG has remained stationary with the achievement of vaccine objectives unlike VAR and PENTA 3 which are gradually decreasing.

Measles peaks were observed in December and February with particular periods in March and June.

These observations would be linked to low vaccination coverage and the absence of advanced population displacement strategies [9].

### ➤ **The Wounded of War**

Since 2012, many NGOs have participated in maintaining and strengthening the capacities of populations to face the combined effects of conflict and climate change through an adapted humanitarian response. This action combined emergency actions with longer-term projects that ensure a "sustainable humanitarian impact". In addition, caring for those injured by weapons, as well as improving conditions of access to health services, remained a priority.

The loss of human life linked to the conflict is difficult to assess because of the persistence of armed conflicts and intercommunity conflicts; Weak presence of local protection structures.

Orthopedic and then visceral trauma represented the majority of injured people admitted to the Csref, i.e. 63% of surgical emergencies, 52% of which were civilian with an average age of 46.4 years ± 17.6.

This demonstrates the breakdown of several income-generating activities within the population, particularly agriculture, which is the essential activity of these injured people who are young people.

This frequency does not seem to reflect the reality of the exact number of wounded because the number of wounded not having been admitted to the center due to the inaccessibility of the access routes to the health structures and the number of deaths in the theater of operations does not have not been evaluated.

#### ➤ **The Reference / Evacuation**

Like other regions of northern Mali, the Timbuktu region is experiencing situations of insecurity, shortage of basic necessities (water, food), problems of access to basic infrastructure (health, education, etc.) And high peaks of malnutrition affecting more children under 5 years old.

The conflict in northern Mali has contributed to the worsening of the food, nutritional and structural crisis which affects hundreds of thousands of vulnerable households. This situation led to massive displacements of populations towards the South of the country [9].

The Reference / Evacuation, according to the national policy which was based on contribution and community management supervised by decentralized services, experienced great disruption throughout the period of the crisis. This disruption continues to have a

negative impact on the early treatment of patients and access to health services.

Despite the efforts made by NGOs in this area, numerous inadequacies are observed in particular the triage of patients according to the priority of the NGOs creating a certain stigmatization of certain patients, the difficulties linked to logistics in particular the number and maintenance of ambulances including 2 ambulances kidnapped by armed groups in one year (2019) and the availability of agents to support patients.

Mortality linked to the difficulties of reference / Evacuation is difficult to assess, because several factors come into play, including degraded access routes and the presence of armed bandits preventing the free movement of men and equipment.

#### ➤ **Morbi-Mortality**

Infant mortality (children under one year old) increased from 96‰ in 2006 to 104‰ in 2009 and 107‰ in 2013, for a target in 2015 of 43‰. Infant and child mortality, on the other hand, decreased from 191‰ according to the Demographic Health Survey (EDS) of 2006 to 154‰ according to the RGPH of 2009 but still remains well away from the target in 2015 which is 77‰ [9].

Maternal mortality is linked to various factors including harmful cultural practices, gender inequality, dysfunction of health structures (insufficiency of qualified personnel and necessary equipment including the technical platform).

**Table 2: Prevalence of the most frequent pathologies**

Year	Diarrhea	Acute Low Respiratory Infection	Trauma not linked to accidents on public roads	Trauma linked to accidents on public roads	Severe malaria	Simple malaria	Confirmed simple malaria	Confirmed severe malaria
2015								
2016	3	23,88	4,04	4,31	22,5	61,3	61,3	22,5
2017	669	19,93	2,7	3,89	14,6	36,2	36,2	14,6
2018	1575	26,93	3,26	2,87	26,3	58,1	58,1	26,3
2019	1793	35,78	3,7	3,73	31,5	73,6	71,8	30,5

The data for 2015 was not sufficiently usable.

**Table 3: Overview of malnutrition indicators.**

Year	Total number of patients admitted Acute Severe Malnutrition	Total number of patients admitted SAM	Prevalence of malnutrition	Prevalence of acute malnutrition in children under 5 years old	Total Severe Acute Malnutrition without complications
2015					
2016	11625	5014	57	15,46	0
2017	8391	3903	36,6	20,08	1
2018	8122	5180	52,9	14,33	2
2019	7483	4297	28,3	20,49	337



**Table 4: Overview of HIV indicators**

Year	Adults notified as HIV+	Mortality linked to HIV/AIDS per 100,000 inhabitants	Percentage of pregnant women seropositive for HIV	Percentage of HIV-infected pregnant women who gave birth in a health facility
2015				
2016	0	0		
2017	0	0		
2018	0	0		
2019	2227	0	0,27	33,33

The frequency of pathologies is diverse despite the insufficient data available from 2012 to 2015.

This insufficiently reported data could be due on the one hand to the mobility of staff, the failure of collection media and on the other hand to the destruction of socio-sanitary infrastructures by armed bandits.

## CONCLUSION

Insecurity has had a negative impact on the entire health system in general and particularly on the state of health of the population with direct and indirect consequences; notably

- **Access to drinking water having** been responsible for multiple diarrheal diseases, parasitoses, etc....
- **Access to adequate nutrition** (food) hence the high prevalence of cases of malnutrition;
- **Access to health services** (Access and continuity of care) hence the high frequency of epidemics of measles, AFP, meningitis.

## War Wounds

The fight against insecurity in all its forms, national reconciliation and the return of authority over the entire extent of the territory in general and that of Douentza in particular, would be an outline of a remarkable solution in order to reverse the indicators of health towards an improvement in the quality of life of the Malian population, particularly that of Douentza.

**Conflicts of interest:** The authors declare no conflict of interest.

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**Cite This Article:** Dembele K S, Malle K, Konate S, Coulibaly M, Dicko A, Maiga S, Sissoko M, Sanogo A, Bah A, Kamissoko S, Diarra I, Dembele Sb, Samae M, Dianessy Y, Kante D, Dabo B, Keita M, Guindo S, Diarra Z, Cisse D, Kante S (2024). Impact of Insecurity on the Health of the Population of the Douentza Health District From 2012 to 2019. *East African Scholars J Med Surg*, 6(7), 238-246.