

Characteristics of the measles outbreak in 2019 in the health zone of Dungu, Haut-Uélé province, in the North-West of the Democratic Republic of the Congo

Nicolas Kinamboli Kangoyangala¹, Augustin Kadiata Bukasa^{2*}, Didier Mutoba Tshimpapa³, Dieudonné Goni Mboligikpele⁴, Michel Amohima Kasonga³, Nene Kabyahura Novi⁵, Guy Mukendi Kalonji⁶

¹Department of Pediatrics, Higher Institute of Development Techniques of Dungu, City of Isiro, Republic Congo Democratic

²Section of Nursing Sciences, Higher Institute of Medical Techniques of Kinshasa, Republic Congo Democratic

³Department of Gyneco-Obstetrics, Higher Institute of Development Techniques of Dungu, City of Isiro, Republic Congo Democratic

⁴Department of Surgery, Higher Institute of Development Techniques of Dungu, City of Isiro, Republic Congo Democratic

⁵Faculty of Health Sciences, National Pedagogical University, Kinshasa, Democratic Republic of Congo

⁶Section of Nursing Sciences, Higher Institute of Medical Techniques of Tshilenge, Mbuji-Mayi, Democratic Republic of the Congo

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*Corresponding author: Augustin Kadiata Bukasa

Section of Nursing Sciences, Higher Institute of Medical Techniques of Kinshasa, Republic Congo Democratic

Abstract

Introduction: The objective of this study is to determine the characteristics of the epidemic outbreak in the health zone of Dungu with low routine vaccination coverage of children aged 0 to 59 months in VAR, in order to contribute to the implementation specific strategies to prevent new outbreaks. **Method:** This is a cross-sectional and descriptive epidemiological study. It focused on an exhaustive evaluation of all cases of measles confirmed by epidemiological link declared in the Dungu health zone during the period from April to December 2019 and on the evaluation of the response implemented. A comprehensive literature review was conducted taking into account all confirmed measles cases from the period April to December 2019, residing in Dungu health zone and notified to the national health system report database. health information (SNIS) and data on the response to this epidemic. The information collected was entered on Epi Info in a mask designed for this purpose. **Results:** The results show that out of a total of 5616 children targeted for measles vaccination in the health zone in 2019, 2117 cases (38%) of measles were confirmed. But thanks to adequate case management and the implementation of sectoral responses, there were only 2.3% of deaths. 70% of cases were confirmed on the basis of the existence of an epidemiological link with one or more confirmed cases. Just over half of the measles cases were male, or 58%. The epidemic age peak is 13-24 months (67.4%), more than the majority of measles patients (78.9%) have never been vaccinated against measles. Only 446 measles patients, or 21%, received a dose of measles vaccine (VAR). None of the measles patients received 2 or more doses of VAR. The Moussa health area was most affected by measles, ie 38.5%, followed by Wandote 22.5% and Sambia 16.8%. **Conclusion:** In order to avoid such epidemics in the future, it is recommended to make parents aware of the interest of vaccination, to combine vaccination systematically with activities of vitamin A supplementation and deworming with mebendazole wormer, to organize national vaccination campaigns with the targeting of specific groups of children of Mbororo herders, children of gold miners, children from armed groups such as the LRA, children who live in areas where logging is carried out, to institute the second dose of vaccine in the school environment which makes it possible to catch up with children who have missed the first vaccination and also to correct primary vaccination failures in those who have been vaccinated.

Keywords: Characteristics, Outbreak, Measles, Dungu Health Zone.

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INTRODUCTION

A highly contagious disease, measles is still a cause of mortality and morbidity in developing countries, but also in industrialized countries. It remains

the leading cause of vaccine-preventable child mortality worldwide, with more than 31 million cases and 777,000 deaths per year (Murray CJL *et al.*, 2000).

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WHO's global strategic plan for measles control, published in 2001 (World Health Organization and UNICEF 2005), sets out a broad program of action and a framework for the sustained reduction of mortality from measles. Measles and make significant progress towards stopping measles transmission in regions and countries where measles elimination has been set as the goal.

The strategy adopted is centered on the strengthening of existing immunization services and foresees, by 2005, a joint evaluation which will make it possible to measure the progress made and to determine whether the global eradication of measles is a feasible project. This eradication requires vaccination coverage above 95% worldwide (WHO and UNICEF, 2006).

Despite the significant measures deployed by the World Health Organization (WHO), these figures have not been reached, and epidemic waves are and may reappear again in several regions of the world, and this is the case in 2019 in the health zone of Dungu, in the province of Haut-Uélé, in the north-west of the DRC.

Measles cases between April and December 2019 mainly affect very young children and young adults, populations that are not or insufficiently vaccinated. Especially vulnerable children such as children of Mbororo herders, children of artisanal gold miners, children released from the LRA and those who live in isolated places.

Although the incidence was significantly reduced in 2012, the disease remains present in the territory of Dungu, forcing any clinician to be alerted to the symptoms and its complications.

The factors favoring the appearance of the new measles epidemic outbreak in the Dungu health zone in 2019 are the non-vaccination coverage of children of Mbororo herders, children of gold miners, as well as children leaving armed groups of the LRA and the myths linked to the vaccine like that which inoculates the disease which reduces the intelligence of the children.

These children are not part of the vaccination coverage target and yet, we had to set up a special booster program for children who missed their vaccination during campaigns or appointments in health facilities.

This means that there is a kind of marginalization of certain vulnerable children from access to vaccination, which violates their rights. In addition, these children are victims of the activities of their parents who are migratory.

This does not allow the children to be vaccinated because of the perpetual mobility of the parents either in search of pasture for the breeders, or in search of gold for the miners and either in search of a secure area for the families of the children from the LRA armed group.

The strategy to mitigate the occurrence of measles in the Dungu health zone is the planning and adaptation of a seasonal vaccination schedule in door-to-door or market day strategy or introduction of compulsory vaccination of all children at the primary school level.

Because the only way to protect yourself remains that of optimal vaccination coverage. Vaccination is recognized as one of the most effective measures to prevent mortality, morbidity and complications from infectious diseases in children.

By vaccinating, about 3 million deaths are avoided each year worldwide and this prevents nearly 750,000 children each year from suffering serious physical, mental or neurological disabilities (WHO, 2005).

The World Health Organization (WHO), in 1974 launched a global immunization program, known as the Expanded Program on Immunization (EPI), as one of the major public health interventions to prevent morbidity and disease. infant mortality. This program aimed to vaccinate children around the world to prevent disease, reduce disability and death from vaccine-preventable diseases (Ministry of Public Health, 2011).

According to the Global Immunization Vision and Strategy 2006 - 2015, developed by WHO and UNICEF and adopted at the 56th session of the WHO Regional Committee for Africa envisions a world in which every child, adolescents and adults have equitable access to immunization services. It also recommends that we achieve: "A national vaccination coverage rate of at least 90% in all countries and at least 80% in each health zone or equivalent administrative unit by the year 2010 if not earlier (WHO and UNICEF, 2006).

But, in the DRC, this program is operational and has a multi-annual plan with an objective of vaccination coverage for all routine EPI antigens, including Vitamin A, of at least 88% at the national level, following the vaccination.

According to administrative data from Dungu Health Zone, its vaccination coverage was 90% in 2016, 87% in 2017, 69% in 2018 and 60% in 2019 (Dungu Health Zone, 2019).

In 2019, the health zone was hit by an epidemic outbreak of measles which extended from April to December.

In view of this epidemic and this basic administrative vaccination coverage, no study has been conducted in this health zone of Dungu to determine the characteristics that marked it. It is for this reason that this study comes to fill this gap.

The objective of this study is to determine the characteristics of the epidemic outbreak in the health zone of Dungu with low routine vaccination coverage of children aged 0 to 59 months in VAR, in order to contribute to the implementation of strategies specific to prevent the appearance of new outbreaks.

MATERIALS AND METHOD

2.1 Research quote

This is a cross-sectional and descriptive epidemiological study. It focused on an exhaustive evaluation of all cases of measles confirmed by epidemiological link declared in the Dungu health zone during the period from April to December 2019 and on the evaluation of the response implemented.

2.2 Description of the research field and study population

This study was carried out in the Health Zone of Dungu, in the province of Haut-Uélé, in the North-West of the Democratic Republic of Congo.

The study population consisted of 5616 children targeted for measles vaccine (VAR) for 2019 from health facilities in the Dungu health zone.

The sample is made up of 2117 children who presented with measles, ie 38%. The variables retained in this study are (1) the dependent variables such as age, sex, vaccination coverage and effectiveness of the response. (2) Independent variables such as health areas and duration of response.

Dungu health zone

The ineligibility criteria are children outside the Dungu health zone and not targeted for measles vaccine (VAR).

2.3 Data collection and processing technique

The collection was done on identified cases of measles during the period of the epidemiological outbreak. The technique used is documentary analysis, which consists of consulting the documents and records of children with measles (the national health information system report, SNIS).

The measles surveillance databases for the year 2019 were used and analyzed with Epi info version 3.5.1 software. A descriptive study of the results was then carried out with the calculation of the frequencies. We also examined the response procedure set up to combat the epidemic.

RESULTS

3.1 Characteristics of the measles outbreak in 2019.

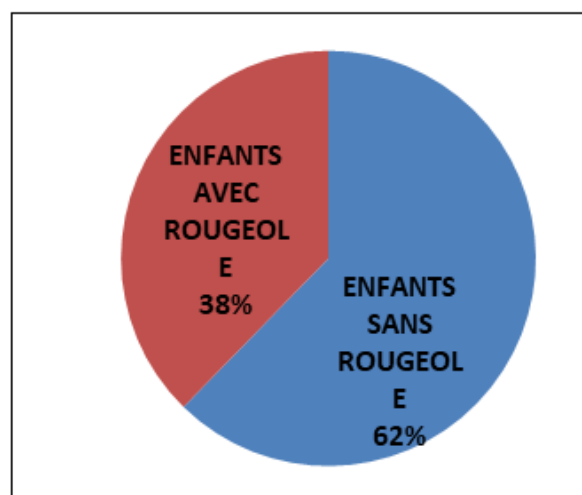


Figure 1: Measles rates in children during the outbreak

This figure shows that out of a total of 5,616 children targeted for measles vaccination in the health zone in 2019, 2,117 cases (or 38%) of measles were confirmed.

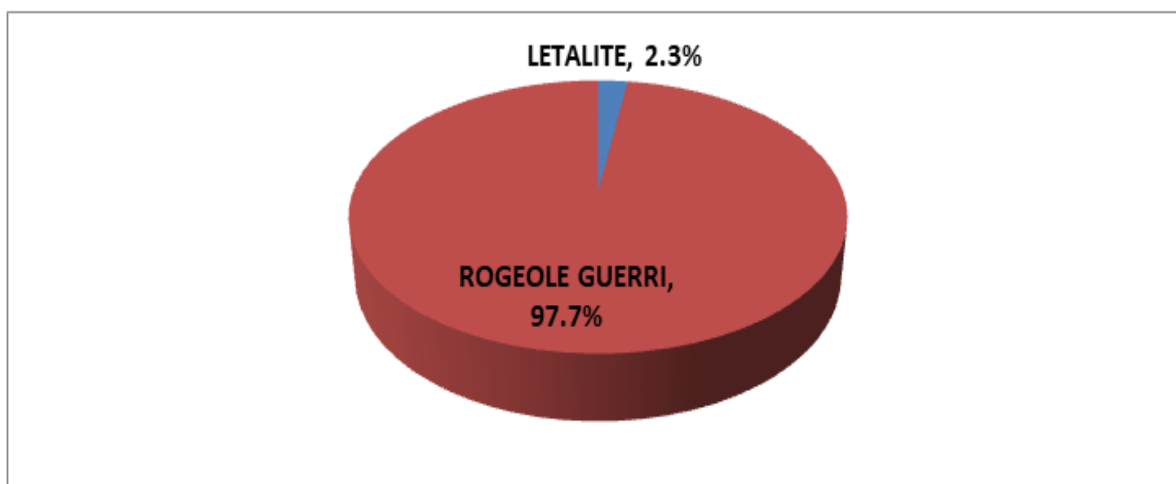


Figure 2: Case fatality rate

Of all the children who developed measles, 49 or 2.3% died and 97.7% were cured.

Table 1: Characteristics of children

Features	Workforce n=2117	%
Diagnostic modalities		
Laboratory	635	30.0
Signs of an epidemiological link	1482	70.0
Sex		
Male	1228	58.0
Feminine	889	42.0
Have received the VAR vaccine before the epidemic		
Never	1671	78.9
Single dose	446	21.1
No		
Age		
0-12 months	380	17.9
13-24 months	1427	67.4
25-36 months	184	8.7
37-48 months	90	0.4
49-59 months	36	0.1

Of the 2117 confirmed cases of measles, just under a third or 30% were confirmed by laboratory, and were the subject of a blood sample. The remaining 70% of the cases were confirmed on the basis of the existence of an epidemiological link with one or more confirmed cases.

Just over half of the measles cases were male, or 58%. The sex ratio was 1.09. The peak epidemic age

is 13-24 months (67.4%), followed by 0-12 months, then 25-36 months and then 37-48 months and 49-59 months.

More than the majority of measles patients (78.9%) have never been vaccinated against measles. Only 446 measles patients, or 21%, received a dose of measles vaccine (VAR). None of the measles patients received 2 or more doses of VAR.

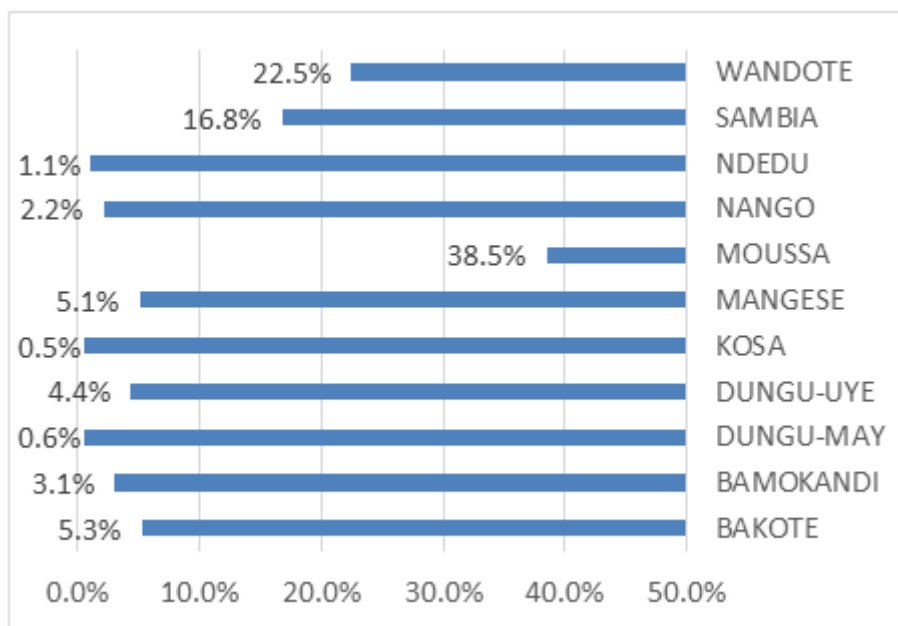


Figure 3: Measles rate by health area

We observe in this figure that the Moussa health area was most affected by measles, ie 38.5%, followed by Wandote 22.5% and Sambia 16.8%.

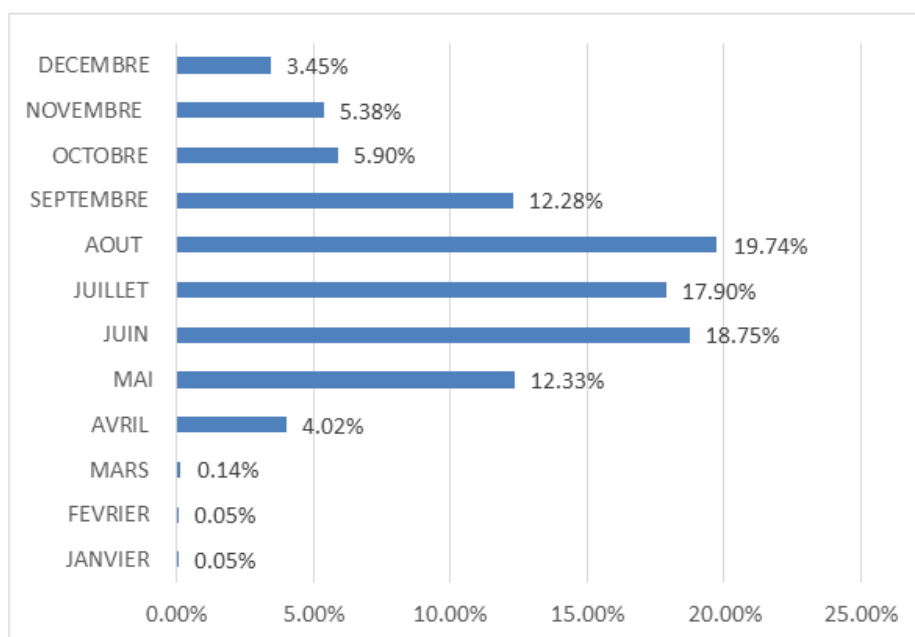


Figure 4: Monthly frequency of measles in 2019

The peak of the epidemic is in August during which more than 19.7% of cumulative cases were recorded with 417 cases of measles. We then observe a downward trend during the month of December, even before the implementation of the vaccination response in the health zone.

3.2 Evaluation of the response

To assess the effectiveness of this vaccination response, a survey was conducted among the

management team of the health zone, supervisors and responsible nurses concerned and also used the report of the national health information system of the zone of health of Dungu who coordinated this activity. The results of the analysis made at the end of the survey were as follows.

1° Preparatory activities for the response

Information and sharing meetings were held with all stakeholders in the Dungu health zone. This is

how an analysis of VAR coverage by post in previous years was carried out by all the nurses in charge of the health areas, as well as the identification of areas at risk.

All the nurses in charge of the health areas carried out a microplanning of the response which took into account the vaccination and supervision teams, the routes and the vaccination schedule. This microplanning was developed for almost all of the health areas in the Dungu health zone in collaboration with the health zone's management team, the registered nurses and some members of the Health Committee.

A major communication and social mobilization plan has also been deployed with the holding of information meetings with neighborhood leaders and other opinion leaders; the mobilization of community relays for local information through home visits (VAD); the course of the zones with the megaphones in order to warn and sensitize the populations.

2° Implementation of vaccination activities

This response vaccination began on August 20, 2019 and was spread over 10 days in all the health areas of the Dungu health zone, under the medical coordination of the Chief Medical Officer of the Dungu health zone.

The areas targeted as a priority were those with low coverage in routine VAR vaccination, areas at risk where there was an unvaccinated community as well as areas where cases were reported.

The regrouping zones of the communities of Peul herders and gold miners were particularly targeted, especially since the first cases recorded came from these zones and the investigations had objectified a total absence of recourse to vaccination services.

This vaccination targeted unvaccinated children aged 9 months to 5 years. Concomitantly with this response vaccination, catch-up vaccination activities for the other antigens, in particular the Yellow Fever Vaccine (VAA), were organized in all the health areas of the Dungu health zone.

3° Strategies used

Advanced and mobile strategies were used the most:

1. Advanced strategy vaccination: at neighborhood level. The referral of children to vaccination sites was done by community relays through home visits. Every day, the advanced strategy vaccination team changed site in order to reach the greatest number of children;
2. Vaccination in mobile strategy: with the rental of vehicles. Each mobile team was made up of 3 vaccinators and 3 support staff.

4° Monitoring

Dungu health zone and the management teams of the health zone. It made it possible to ensure compliance with directives, particularly on the quality of social mobilization, the proper implementation of strategies and the quality of services.

DISCUSSION

Data on the response are not available for the health zone of Dungu in which a withholding of health information was observed due to the nurses' strike during the study period.

Therefore, the 60% coverage does not represent the entire health zone. On the other hand, the reliability of the data did not pose a problem since the management team of the Central Office and the supervisors of the health zone of Dungu made regular visits to the field to verify them. In addition, the non-governmental organization Médecins Sans Frontières was sent to support the local response team, which also collected reliable data.

In this study, the peak epidemic age is 13-24 months, followed by 0-12 months, then 25-36 months and then 37-48 months and 49-59 months. As part of the expanded vaccination program (EPI) of the Ministry of Public Health (MSP), the DRC has adopted WHO recommendations aimed at vaccinating all children before their first birthday against the main preventable diseases including measles (WHO and UNICEF, 2005).

The first dose of measles vaccine is recommended at nine months of age and the second dose between 13 and 24 months with a delay of at least one month between the two vaccinations (World Health Organization, 2013). According to the Demographic and Health Survey and Multiple Indicators (EDSN-MICS IV) in Niger, only 69% of children aged 12-23 months were vaccinated against measles and 58% had received them before the age of 12 months (Institut National Statistics (INS) Niger, 2017; Antona D, Dina J, Soing-Altrach S, Alt- Belghiti F *et al.*, 2019).

By comparing these studies, this means that in our study, the children do not benefit from VAR, often they do not observe the vaccination schedule for several reasons, namely: the missed appointment, the rupture of the vaccine, the geographical barriers, the neglect of the children of Mbororo herders, the children of gold miners, children from the LRA armed group, etc. this is what justifies this epidemic appearance of measles in the health zone with its peak in this age group.

The sex ratio observed in our study is 1.09, close to that observed during the measles epidemic in 2006 in Mayotte (World Health Organization, 2014). Analysis of the proportion of measles cases by age group highlighted the fact that more than half of the cases were under the age of 5 (Ministry of Health and

Prevention of Senegal/Direction of Medical Prevention/Immunization Division, 2009). One might therefore think that these children were not reached during the 2016 monitoring campaign, especially since the Dungu health zone was among the least efficient in the country.

This is the same situation described in Burkina Faso where despite recent national vaccination days, the rural province of Houet had reported 1,400 cases of measles in 2001 (82% are not vaccinated) (Mulders MN, Nebie YK, Fack F, Kapitanjuk T, Sanou O, Valéa DC., 2003).

The limit among these cases, the presence of 15.8% of children under one year of age, is explained on the one hand by non-compliance with the vaccination schedule (in children aged 9 months and over) and on the other hand by the fact that the youngest are mainly contaminated by older children (Borderon JC, Goudeau A, Barthez MA, 2007).

More than the majority of measles cases (78.9%) have never been vaccinated with VAR. A lower percentage of unvaccinated was found in 2019 in the health zone of Dungu (60%) which had recorded 2117 cases of measles from January to December 2019. This situation can also be explained by the dropout rate of the vaccine against measles compared to other vaccines (eg BCG) which is still high (> 10%) in Senegal and in many countries in Africa (Service Régional de la Statistique et de la Démographie de Dakar, 2008).

This situation is favored by the fact that vaccination against measles occupies the last place in the vaccination schedule. It would also be accentuated by the ignorance of mothers about the vaccination schedule due to the lack of parental awareness of the interest of vaccination (Diane NN., 2002).

This situation could be alleviated by introducing a second dose of VAR at school age, as in developed countries. This would also make it possible to catch up with the children lost to sight and above all to increase the immunity of the children (Relevé des Maladies Communiquées au Canada (RMTC, 2002)) .

Dungu health zone did not prevent the outbreak of a measles epidemic. This has already been observed in Burkina Faso which had recorded coverage rates close to 100% (Mulders MN, ²⁰⁰³).

Since more than the majority of cases (88.5%) were unvaccinated against measles, this means that many children are still missing out on EPI. And it is these children who form a group vulnerable to measles, which constitutes a “breeding ground” for measles epidemics (WHO/UNICEF, 2010).

Dungu health zone is experiencing a significant migratory flow exacerbated in recent years by insecurity, transhumance and gold panning. This migrant population often gathers in precarious housing in the most affected health areas and rarely visits health services.

The first cases of measles were also observed in the Moussa health area where Mbororo herders and gold miners often frequent and live. This would explain why the southern part of the Dungu health zone, which is home to Mbororo herders , gold miners and the families of children released from LRA groups, recorded the highest incidence while its average coverage in VAR for the last 3 years was satisfactory (> 80%).

This same situation was described in Burkina Faso in 2002 and 2009, when VAR coverage in 2008 was 100% following the events in Côte d'Ivoire (Borderon JC, Goudeau A, Barthez MA²⁰⁰⁷).

Indeed, it would seem that 3 factors explain the resurgence of this epidemic: the gradual arrival of people who have lost their immunity after years without vaccination, the presence of children who have not benefited from routine expanded vaccination programs such as the children of Mbororo herders , the children of gold miners, children from the LRA armed group and the existence of vaccinated subjects, but who have certainly not developed immunity (Centre for Documentation and Information on Medicines/Ministry Health Burkina Faso, 2009).

The period of the epidemic stretched from April to December with a peak in August and cases throughout the rainy season (Regional Statistics and Demography Service of Dakar, 2008). However, it is described that measles epidemics are observed during the dry season to settle down as soon as the first rains appear.

This would lead one to think that it was the rainy season that caused the number of recruited cases to be so low compared to measles epidemics in certain countries of the sub-region.

But on the contrary, the low quantities of water recorded in Dungu would explain the progression of the epidemic in the middle of the rainy period. In reality, the seasonality of measles epidemics is more related to population movements. Indeed, a study carried out in Cameroon was able to demonstrate that the correlation between the seasons and measles epidemics in urban areas was attributed to a seasonal movement of the population between rural and urban areas (Diane NN., 2002).

This suggests that social and agricultural reasons promote the movement of populations and lead

to contact between sufficient numbers of children likely to maintain transmission of a measles epidemic.

There were 2.3% deaths reported. Such a situation had already occurred in the Dungu health zone in 2010. This low death rate could be explained by the good quality of case management, in particular the systematic administration of vitamin A. It would be However, it is important to emphasize that deaths due to measles are very often not or under-reported. A low measles mortality rate was also reported in 2006 in Mayotte, while in Cameroon in 2000, the lethality of measles was 2.3% (Diane NN, 2002; Ortenzio E, Sissoko D, Landreau D, Benoît- Cattin T, Renault P, Pierre V., 2008). Yet measles is considered one of the major causes of morbidity and mortality among children in some developing countries, even though the WHO considers that it is possible to eliminate it through routine vaccination supported by periodic national vaccination campaigns (Executive Secretariat of the World Health Organization²⁰⁰⁹).

CONCLUSION

Our study, which focused on the measles epidemic that raged in the Dungu health zone from April to December 2019, showed that out of a total of 5616 children targeted for measles vaccination in the health zone in 2019, 2117 cases (or 38%) of measles were confirmed. But thanks to adequate case management and the implementation of sectoral responses, there were only 2.3% of deaths.

In order to avoid such epidemics in the future, it is recommended to make parents aware of the interest of vaccination, to combine vaccination systematically with vitamin A supplementation activities and deworming with mebendazole wormer, to organize campaigns vaccination campaigns with the targeting of specific groups of children of Mbororo herders, children of gold miners, children from armed groups such as the LRA, children who live in areas where logging is carried out, to institute the second dose vaccine in the school environment which makes it possible to catch up with children who have missed the first vaccination and also to correct primary vaccination failures in those who have been vaccinated.

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