

Vulnerability of the Katana Health Zone in the Democratic Republic of the Congo: A Resilience Strategy to Malaria Treatment in Healthcare Facilities from 2014 to 2018

Hermès Karemere^{1,2*}, Nadine Muhune¹, Rosine Bigirimana¹ and Samuel Makali¹

¹Catholic University of Bukavu, Democratic Republic of the Congo

²Université du Cinquanteaire de Lwiro, Democratic Republic of the Congo

*Corresponding Author: Hermès Karemere, Catholic University of Bukavu, Democratic Republic of the Congo.

DOI: 10.31080/ASMS.2022.06.1212

Received: October 04, 2021

Published: March 09, 2022

© All rights are reserved by Hermès Karemere, *et al.*

Abstract

Synopsis

Introduction: The Katana Rural Health Zone has experienced several events, including looting of health centers, the stoppage of funding, or the instability of nursing staff, which could have hampered the functioning of its health structures. These structures continued to function in this unfavourable context, thus showing themselves to be resilient. The objective of this study is, on the one hand, to understand whether the various events that have occurred in the Katana Health Zone partly explain the sustainability of malaria and, on the other hand, to identify the different adaptation mechanisms put in place to facilitate the resilience of the Health Zone in the face of these events in the treatment of malaria.

Methods: The methodology applied approach uses a case study using mixed methods (qualitative and quantitative) for data collection. The study covers the period from 2014 to 2018 and is based on the identification of events that have occurred in the Katana health zone, the analysis of the evolution of cases and deaths linked to malaria, and perceptions of key actors on the nature of the events and their link with the number of cases. The study used a document review and individual interviews targeting 8 key players.

Results: The main destabilising events identified are linked to the management of human resources, the use of health services, the disruption of funding, the availability of curative or preventive inputs, community participation, and security and safety issues. infrastructure. The trend in the development of new cases of malaria is similar for all age groups. Death, on the other hand, evolves in a different way. The health services continued to provide care thanks to the coping mechanisms developed.

Conclusion: The study demonstrates the precariousness of a health system heavily dependent on humanitarian aid, the termination of which can generate dysfunction with effects on mortality, including infant mortality; the weak involvement of the government in supporting structures confronted with the effects of disasters such as the earthquake and looting; the poverty of the population, making it inaccessible to health care despite the drop in prices; and the resilience of health centres following the establishment of endogenous adaptation mechanisms.

Keywords: Resilience; Health System; Malaria; Katana; Democratic Republic of Congo

Introduction

For three decades, the DR Congo has been confronted with a series of socio-political disturbances, including successive wars and

rebellions. These have caused a significant increase in the burden of morbidity and mortality for the Congolese population [1-3]. This situation caused the massive arrival of humanitarian aid, favouring

emergency interventions [4] in the provinces most affected by the instability, including that of South Kivu [5,6], and had a negative impact on the overall health status of the population [7].

South Kivu is one of the 26 provinces of the Democratic Republic of the Congo and has 34 Health Zones (ZS) including Katana. During the period from 1990 to 2017, the Katana ZS experienced several events, some of which could have hampered the functioning of health structures. The latter, however, continued to function and develop. Among the events identified by Karemere, *et al.* in a previous study [8], four groups of events emerge: (1) wars and rebellions; (2) periodic breaks in funding; (3) selective approaches to humanitarian interventions; and (4) institutional reforms.

In the face of these events, Katana's ZS was resilient, as Kenanewabo demonstrates [9]. Resilience enriches the clinic by offering new perspectives on the understanding of suffering and the care of patients. This concept participates in the constitution of an original theoretical-clinical model whose applications are numerous and varied in contemporary clinical practise [10].

In sub-Saharan Africa, the resurgence of diseases such as cholera, malaria, meningitis, and diarrheal diseases [11] shows to what extent the health systems are not responding effectively to the needs of the populations. In the DRC, joint government efforts with WHO and various international partners have been made over the past two decades in the fight against malaria. Thus, from 2010, there was a marked decrease in the morbidity and mortality of this disease. However, although the 2017 estimates were down 20 million from 2010, data for the 2015-2017 period highlights the lack of significant progress against this indicator during this time frame. In addition, the latest world malaria reports from the World Health Organization show a tendency to slow down both the results of the fight against malaria and the financing of this fight [12,13]. With the One Health concept, it becomes more and more relevant to seek to understand health phenomena in dimensions that go well beyond the field of medicine, even in its broadest sense, in order to better understand the reasons for the failure of response programs. Thus, we believe that dysfunctions in the health pyramid caused by various unfavourable events could partly explain the sustainability of some of the diseases, including malaria, despite the considerable resources deployed for its eradication. These dysfunctions are of a security, administrative and internal governance nature, and can

affect any level of the health pyramid. These events are also an opportunity for a break in the continuity of health management and thus constitute a certain type of vulnerability in the health system. This study aims to analyse the dysfunctions in the health pyramid based on the fight against malaria in the Katana health zone in South Kivu. It is carried out in partnership with the Institutional Strengthening of Health Policies Program based on Evidence, or RIPSEC in its acronym.

The objective of this study is, on the one hand, to understand whether the various events that have occurred in the Katana Health Zone partly explain the sustainability of malaria and, on the other hand, to identify the different adaptation mechanisms put in place to facilitate the resilience of the Health Zone in the face of these events in the treatment of malaria.

Methodology

Description of the study area

The study took place in the Katana ZS, covering in 2019 a population of 236,986 inhabitants. It has 17 health centers, including 3 denominational, 7 health posts, 1 private dispensary, 2 referral health centres (Ihimbi and Mugeru), a general referral hospital, a hospital centre (CH) in Birava and an Institute of Medical Education [14]. The choice to study this health zone is justified by the high prevalence of malaria that was recorded there: a study has indeed identified this health zone as being one of only two zones in the highest cluster at risk of the disease. province [12]. Formal paraphrase. In addition, the Katana health zone experienced a history of security instability between 1996 and 2018, not to mention that it has also recorded major impacts from geo-climatic events over the past 10 years.

Type and period of study

The methodology applied approach uses a case study using mixed methods (qualitative and quantitative) The mixed design used was of the convergent type. The qualitative and quantitative data were collected at the same time, analysed separately, and finally triangulated [15]. The study was extended over a period of 5 years from January 1, 2014 to December 31, 2018.

Collection of data

Data collection used both document review and individual interviews.

Review of documentary films

The number of new cases and deaths recorded in the Health Zone per month for the period from 2014 to 2018 were collected using a template previously developed and from the annual reports of the ZS and the database. PNL data. These data were collected for children under the age of five, pregnant women, and adults. During the review of the annual reports of the ZS, the various events that occurred in the ZS during the period from 2014 to 2018 were also identified and listed. Any case diagnosed as a case of malaria at the health zone level and reported to the Provincial Health Division (DPS) was considered and counted in the study.

Individual interviews

An open interview guide was developed and administered individually to targeted care providers in a reasoned manner according to their availability and their seniority in the health structures of the ZS. The guide made it possible to collect information related to the events that occurred in the health zone, their nature and their link with the evolution of cases and deaths linked to malaria in children, adults and pregnant women. A Benjie C6 digital voice recorder was used to collect this information. A total of 8 people were interviewed, coded from IC 1 to IC8, including two officials from the Central Office of the Health Zone, two officers from the Katana General Referral Hospital, three nurses from the health centres and a nurse attending a health center, on the basis of their seniority of at least 5 years in the Health Zone. Any event that occurred in the area having a positive or negative impact on the malaria control programme was considered in the study as an event of instability.

Data processing and analysis

The quantitative data collected concerning the annual numbers of cases and deaths from malaria were transcribed into an Excel file and then analysed. Malaria-related cases and deaths have been grouped into three categories based on age: under 5, over 5, and pregnant women. Trend curves were then drawn using Excel to analyse the evolution of cases and deaths between 2014 and 2018 while identifying the related events for each year.

The qualitative data collected, including the events that occurred in the Katana HZ during the study period, their nature and their link with the numbers of cases and deaths linked to malaria, as well as the adaptive mechanisms put in place, were transcribed in a Word file. The identified events were categorised into three

groups as shown in Table 1. The qualitative analysis established the relationship between the event and the change in each trend-line during the study period. Feedback to key informants (IC1 to IC8) facilitated understanding of the changes observed during the analysis.

The mixed techniques used have several advantages, including the possibility of triangulating information [16], giving robustness to the methodology applied.

Group of events	Sub-groups of events
Events related to the organization and operation of the Health Zone	Human Resource Management
	Use of health services
	Funding interruption
Events related to the treatment of Malaria	Curative events
	Preventive events
	Community involvement
Other events	Security issues
	Infrastructure events

Table 1: Groups of events sought.

Ethical considerations

The research protocol for this study was submitted to the Ethics Committee of the Catholic University of Bukavu for approval. Authorization to use Health Zone data for this research was obtained before the start of the study from the Health Zone Chief Physician. The participation of the various people questioned was conditioned by their informed and free consent, written or oral, and respect for their anonymity and confidentiality.

Results

The main events identified in the Katana ZS between 2014 and 2018

The main events and their location in the Zone are identified in figure 1. The years 2015 and 2017 seem more affected, recording a large number of unfavourable events.

Annual frequency and citation of events destabilizing the functioning of the ZS

Some events are recurring, difficulty in paying costs, drop in attendance, armed robberies, etc.), others are occasional (staff turn-

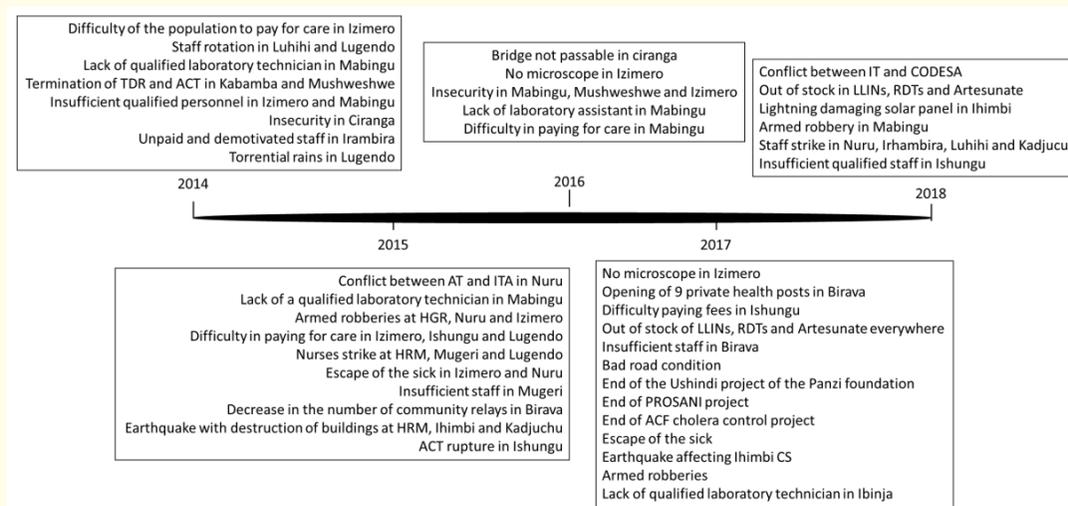


Figure 1: Main events identified by health area.

over, out of stock of drugs or mosquito nets, love at first sight, withdrawal of partners, ...) As shown in table 2.

Events	Years					Number of Health Areas	Frequency of citation by key informants
	2014	2015	2016	2017	2018		
Difficulty paying fees	x	x	x	x		8	16
Staff rotation	x					2	1
Lack of qualified laboratory technician	x	x	x	x	x	6	10
TDR rupture	x					2	1
Insufficient qualified personnel	x	x		x	x	5	5
Decrease in attendance	x	x	x	x	x	18	22
Rupture of RDTs and ACTs	x					1	1
ACT break		x				1	1
Out of stock of LLINs, TDRs, Artesunate				x		1	5
Out of stock of LLINs, ACT, Artesunate					x	1	13
Increased attendance	x			x		2	3
Demotivation of unpaid staff	x					1	1
Heavy torrential rain with problem of accessibility to the BCZ	x					1	1
Conflict between IT and ITA		x				1	1
Conflict between CODESA and IT					x	1	1
Creation of 9 private positions				x	x	2	2
Staff strike		x			x	7	6

Escape of the sick		x		x		3	5
No microscope			x	x	x	4	5
Earthquake		x		x		4	4
Reduction in the number of community relays		x				1	1
Bridge not passable and poor road condition			x	x		2	2
Panzi Foundation withdrawal from its USHINDI project (sexual violence)				x		1	1
Withdrawal from Prosani Plus (Drug Supply)				x		1	1
ACF's withdrawal from its cholera prevention project (Water supply)				x		1	1
AAP/CORDAID disengagement for the PBF project				x		1	1
Lightning strike damaging the solar panel					x	1	1
Armed robberies and land disputes and cases of insecurity	x	x	x	x	x	10	15

Table 2: Annual frequency and citation of events.

Categorization of destabilizing events

Figure 2 shows all the events listed in the Katana Health Zone by category. The vast majority of events that have occurred are related to the organization and functioning of the Health Zone.

Figure 2: Category of events.

Influence of instability events on malaria

Type 1 events (organizational and functional events) are the most significant in order of frequency each year (Figure 3). We note a peak of this type of event in 2017 (year 4), a peak that coincides with the sharp rise in the number of malaria cases recorded in the health zone.

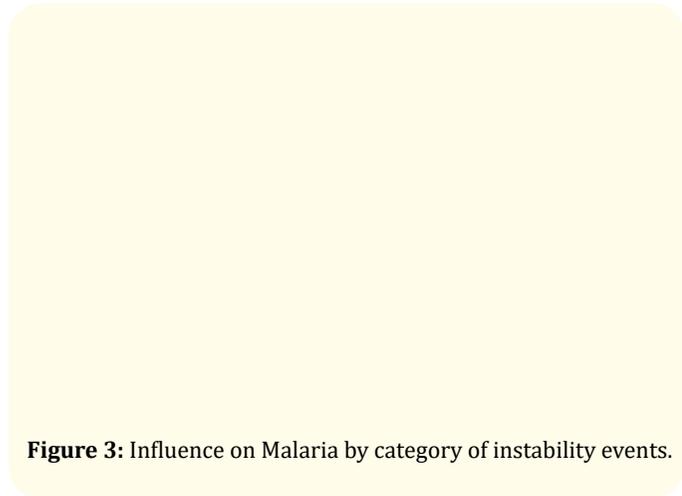


Figure 3: Influence on Malaria by category of instability events.

The malaria situation during the period 2014 to 2018

The trend in the evolution of new cases of malaria between 2014 and 2018 is similar for both children under five and pregnant women and people aged 5 and over (Figures 5, 6 and 7) and corroborates the overall evolution of all cases (Figure 4). On the other hand, the trend in the evolution of deaths is different. That of children under 5 years old dictates the overall trend of deaths from malaria from 2014 and 2018 (Figure 4 and 5 are similar but very different from Figures 6 and 7 with regard to deaths). The trend of the curves of new cases and those of deaths are highly overlapping if we consider all cases (Figure 4) and cases in children under 5 years (Figure 5). On the other hand, this superposition is not effective in pregnant women (Figure 6) or in children 5 years and over (Figure 7). Malaria mortality thus seems to affect more children under 5 years old.

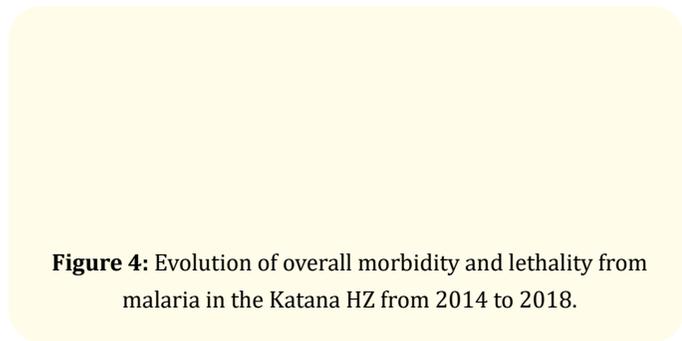


Figure 4: Evolution of overall morbidity and lethality from malaria in the Katana HZ from 2014 to 2018.

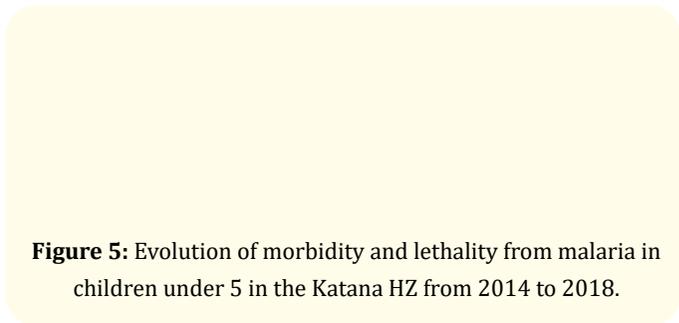


Figure 5: Evolution of morbidity and lethality from malaria in children under 5 in the Katana HZ from 2014 to 2018.

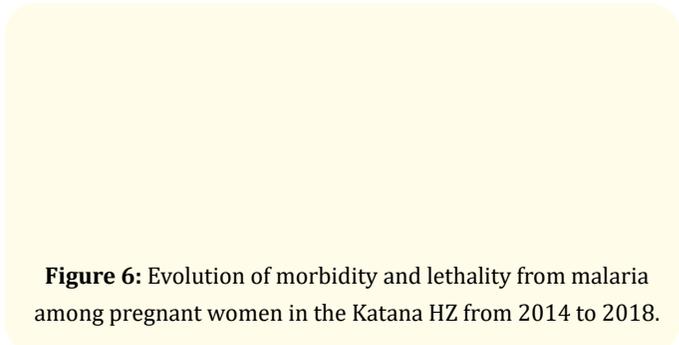


Figure 6: Evolution of morbidity and lethality from malaria among pregnant women in the Katana HZ from 2014 to 2018.

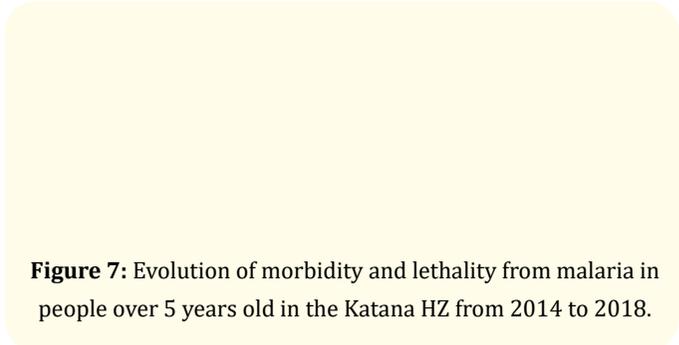


Figure 7: Evolution of morbidity and lethality from malaria in people over 5 years old in the Katana HZ from 2014 to 2018.

Malaria-related morbidity and mortality (6.1)

The actors interviewed associated the reductions in new malaria cases observed from 2014 and 2017 with the distribution and awareness campaign on the use of long-acting insecticide-treated mosquito nets through the PNL (13, 14, 15, 16, 17, 18). One of the people interviewed said: “The decrease in malaria cases is due to the mass distribution of mosquito nets”. 8th.

On the other hand, these same actors associate the increase in new cases in 2018 with the misuse of LLINs by the majority of the population (14, 15, 17, 18), with a decrease in the effectiveness of LLINs against mosquitoes (17, 18) but also with a decrease in awareness of the use of LLINs (16). The difficult supply of rapid diagnostic tests for malaria (13) has also been questioned.

While the increase in competition represented by informal care centres not integrated into the health system (I1, I2), the mass distribution of mosquito nets (I3, I4, I5, I6, I7, I8) and the counter-campaign in period of conflicts between the chief of the locality and the BCZ (I4) were mentioned to justify the reductions in new cases of malaria observed ; the misuse of mosquito nets or their use for other purposes (fishing, construction), the loss of the effectiveness of old mosquito nets, the resistance of mosquitoes to common insecticides and the increase in diagnostic capacity with the presence of rapid tests for malaria would however justify the increase in new cases in 2018.

Malaria-related mortality is 6.2

Actors I4, I6, I7, and I8 argue that late recourse to health centres because of poverty and/or self-medication and/or prior passage in informal dispensaries and prayer rooms was the basis of the high mortality of children under 5 years old. Actors I1, I2, I3, I8 also evoke the fact that some patients are transferred to the hospital but do not arrive there alive because of the long journey or are transferred late.

The stakeholders interviewed all agree on the fact that good care and awareness among pregnant women in antenatal consultation between 2013 and 2018 made it possible to completely avoid malaria-related deaths in them during this period.

The withdrawal of financial partners (I1, I2); late consultations (I1, I2, I3, I4, I6, I7, I8); inadequate care (I3); the poverty of the population (I6, I7) and self-medication (I8) are mentioned to explain the increase in the number of deaths in 2018.

The large number of deaths due to malaria in children under 5 years of age during the study period is explained by the late appeals linked to financial problems, or to first-line consultations in pirate centers, or to ineffective transfers because of long journeys and, at times, impractical roads.

“The first cause of high mortality of children under 5 years old is the community itself, because there are many pharmacies authorised by the hierarchy; before going to the hospital, the patient first takes care of himself, and does not come to the hospital once it is complicated. It is not a problem of money, because we do not ask for money first when it comes to a small child”. 6th.

Use of the services

Certain actors evoke the problem related to the financing of care, the impoverishment of the population, and the delay in care (I1, I2, I4, I6, I7) as events influencing the use of services for malaria; others evoke the problem of accessibility due to torrential rains (I1, I2, I6, I7) and still others, the disengagement and end of the Prosani plus and AAP projects (I3, I6, I7, I8).

Adaptation mechanisms

All the health facilities in the Katana area have undergone at one time or another a series of changes during our study period. These changes have led to several disturbances. To maintain a certain consistency in the functioning of the system, these structures have initiated certain adaptation mechanisms to get by.

The following mechanisms have been put in place to facilitate continuity/adaptation to change (Figure 8).

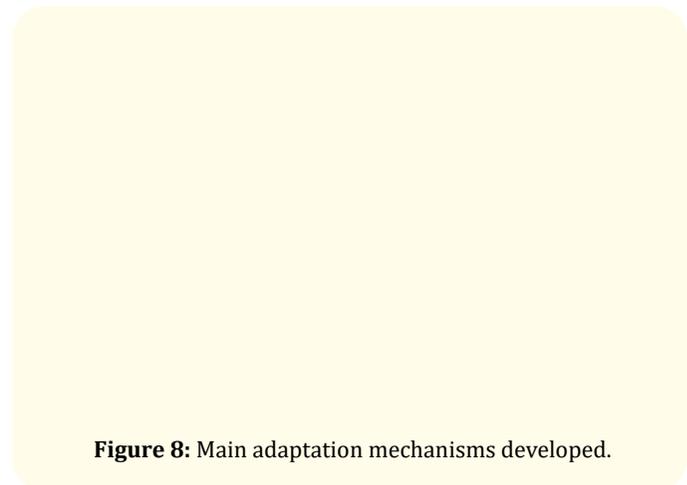


Figure 8: Main adaptation mechanisms developed.

The adaptation mechanisms that the zone has deployed in the face of the various events likely to hinder its proper functioning are essentially internal. The staff of the health zone had to take it upon themselves and sometimes make some sacrifices, without resorting to outside help other than the help of the local population for certain types of problems.

Discussion

The goals of this study were to identify vulnerable events in the health system in the Katana health zone, analyse the impact of these events on the health system’s functioning in relation to the

evolution of malaria incidence, and describe the adaptive mechanisms used by this area in times of vulnerability.

The major constraints of this study are mostly methodological in character.

This includes the difficulties of contacting all of the health centre players, particularly registered nurses, for interviews, as well as the complexities of evaluating comprehensive information by each of the Katana Health Zone health regions. The information gathered at the level of health areas and sent back to the whole health zone does not always reflect the situation in specific health areas. We have taken care to identify the health regions impacted by the observed occurrences in Figure 1. Another methodological constraint is the use of key informants to identify destabilising events that happened in the region over the five years of the research, which may have resulted in the gathering of incorrect information owing to recall bias. To minimise this limitation, we have taken care to only employ informants with at least 5 years of experience in the field. We also triangulated the informant information with that gathered in the health zone operational reports. In contrast, the informants enabled us to verify the events documented in the reports as having an effect on the area's malaria control efforts.

The results of (1) the identified events; (2) the evolution of malaria-related morbidity and mortality; (3) the links between events and the evolution of malaria-related morbidity and mortality; and (4) the mechanisms put in place to strengthen the HZ's resilience in the fight against malaria in the face of the events that have occurred are discussed in the following paragraphs.

Recognized events

The major destabilising events highlighted include issues with human resource management, the usage of health services, financing disruptions, the availability of curative or preventative inputs, community involvement, and security and infrastructure issues.

Human resource administration

Human resource management continues to be a critical problem in the operation and dynamism of a given service. The quality of service is determined by the calibre of its employees [17,18]. Personnel turnover, inadequate qualified staff, demotivation of low-paid employees, disputes among employees, and staff strikes have all had a detrimental impact on the workforce, according to

the instabilities found in this research. In terms of the difficulties of human resource management, the operation of health facilities in the Katana ZS. Such instabilities necessarily result in poor service functioning and, as a consequence, inadequate or even mediocre results in respect to the service's goals [18,19].

Service utilisation, funding disturbance, and input availability

The incidents associated with the usage of the specified services mostly involve families' inability to pay the fees. The utilisation of basic health services is one of the most important elements in improving population health. Other variables related to the person (age, sex, degree of education of the head of household, etc.), his surroundings [20], and the low buying power of families [21-23] are listed in addition to the quality of services. Payment for treatment by third-party payers [24,25] or external financing removes the financial barrier to access to health services in poor nations. The lack of financing as a result of the withdrawal of some partners from the Katana health zone resulted in a scarcity of certain medicines and consumables, particularly those required for the battle against malaria, the prices of which are excessive [26].

Participation in the community

The highlighted event, related with community involvement, is the decrease in the number of community intermediaries in specific health regions of the Katana health zone, as a result of the departure of technical and financial partners in particular. The importance of community relays in the battle against malaria has been well established [27-29].

Concerns about security and infrastructure

In the Katana Health Zone, we discovered numerous instances of insecurity in the form of armed robberies. These theft incidents in the community, as well as in some medical facilities, have had a detrimental effect on the everyday lives of this group. This is consistent with study published in 2017 by Stearns J and Vogel C., who argue that the eastern DRC is prone to recurrent instabilities that lead to regions of armed conflict, which destabilise the health system [30]. Instabilities have also been reported in many African countries, including Uganda [31], Zimbabwe [32], South Sudan [33], and the Highlands of South Kivu [34], with implications for service usage.

Other contextual occurrences

External events occurred, including severe torrential rains, the establishment of 9 private posts, the earthquake, and the deterioration of the road leading to specific health facilities, which resulted in bridge damage. These circumstances impacted physical access to health care facilities. The establishment of 9 private positions has placed the health facilities in a competitive position.

The malaria scenario from 2014 to 2018

The evolution of new malaria cases between 2014 and 2018 follows the same pattern for children under the age of five, pregnant women, and individuals aged 5 and older; and confirms the general development of all cases. The development of fatalities, on the other hand, is different; the general trend of malaria deaths between 2014 and 2018 is dictated by children under the age of five. If we examine the whole population, the trend of the curves for new cases and those for fatalities is highly superimposable. cases and cases in children under the age of five. This superposition, on the other hand, is ineffective in pregnant women or children aged 5 and above. Malaria mortality seems to impact more children under the age of five, with an average of 37.4%. This supports the findings of a 2008 research at the Lwiro paediatric hospital, which found an admission frequency of 38% [35].

Resilience-building mechanisms

Faced with numerous instabilities (mostly armed robberies, property conflicts, instances of insecurity, decrease in attendance, lack of a trained laboratory technician, problems in paying for treatment) in Katana's health zone Managers used different adaptive strategies to keep health structures running throughout the research period. These methods are targeted at mobilising resources [36] to address the low buying power of households [23], increasing financial access to health care for the public [37,38], and simplifying health centre administration. A study conducted in the same ZS on the adaptive management of HCs [9] mentions other groups of adaptive mechanisms put in place by the HCs that could supplement the latter, specifically good collaboration between various actors, the establishment of procedures for the good management of financial aid, the development and application of new directives and standards, and the exercise of leadership. Another strategy that may guarantee the functioning of a health zone in a critical or vulnerable scenario is the deployment of emergency interventions

in conjunction with the arrangement of equitable services [39]. Other studies have shown the critical role of health players in crisis absorption through consultation systems [31,33,40].

Conclusion

The research shows the vulnerability of a health system that is largely reliant on humanitarian assistance. This occurs immediately following the disengagement of financial partners in the health sector, with consequences for mortality, particularly infant mortality; the government's lack of involvement in supporting structures confronted with the effects of disasters such as the earthquake and looting, making these structures more vulnerable and ill-prepared to deal with the consequences of these disasters; and the poverty of the people. Despite their resiliency, the study was unable to investigate the level of performance of health facilities in the Health Zone, highlighting the necessity to pursue this path in future research.

Bibliography

1. Ahoua L., *et al.* "High mortality in an internally displaced population in Ituri, Democratic Republic of Congo, 2005: results of a rapid assessment under difficult conditions". *Global Public Health* 1.3 (2006): 195-204.
2. Control CfD, Prevention. "Elevated mortality associated with armed conflict - Democratic Republic of Congo, 2002". *MMWR Morbidity and Mortality Weekly Report* 52.20 (2003): 469-471.
3. Depoortere E and Checchi F. "Pre-emptive war epidemiology: lessons from the Democratic Republic of Congo". *The Lancet* 367.9504 (2006): 7-9.
4. Mukengere Mukwege D and Nangini C. "Rape with extreme violence: the new pathology in South Kivu, Democratic Republic of Congo". *PLoS Medicine* 6.12 (2009): e1000204.
5. Fenton G. "Coordination in the great lakes". *Forced Migration Review* 18.18 (2003): 23-24.
6. Karemere Bimana H. Adaptive hospital governance in a changing context: study of Bunia, Logo and Katana hospitals in the Democratic Republic of Congo: UCL-Université Catholique de Louvain (2013).
7. Makali SL., *et al.* "Comparative analysis of the health status of the population in six health zones in South Kivu: a cross-sectional population study using the WHODAS". *Conflict and Health* 15.1 (2021): 1-11.

8. Karemere H., et al. "Analyzing Katana referral hospital as a complex adaptive system: agents, interactions and adaptation to a changing environment". *Conflict and Health* 9.1 (2015): 1-10.
9. Kenanewabo N., et al. "Adaptive management of health centers in a changing environment in the Democratic Republic of the Congo". *Public Health* 32.4 (2020): 359-370.
10. Kruk ME., et al. "What is a resilient health system? Lessons from Ebola". *The Lancet* 385.9980 (2015): 1910-1912.
11. Amat-Roze JM. "Health in sub-Saharan Africa, between progress, setbacks and renewal". *Bulletin of the Association of French Geographers* 87.1 (2010): 105-118.
12. Bigirinama R., et al. "Environmental and anthropogenic factors associated with increased malaria incidence in South - Kivu Province, Democratic Republic of the Congo". *Tropical Medicine and International Health* 25.5 (2020): 600-611.
13. Ren M. "Greater political commitment needed to eliminate malaria". *Infectious Diseases of Poverty* 8.1 (2019): 1-4.
14. DPS. "Health pyramid 2019: Health mapping of the province of South Kivu". *Provincial Health Division, South Kivu, DR Congo* (2019).
15. Guével MR and Pommier J. "Research using mixed methods in public health: issues and illustration". *Public Health* 24.1 (2012): 23-38.
16. Pinard R., et al. "The choice of a mixed methodological approach to educational research". *Qualitative Research* 24.1 (2004): 58-80.
17. Karemere H. "Analysis of attitudes and behaviors of doctors and nurses as a strategic lever in the management of hospital resources". *Pan African Medical Journal* 21.1 (2015).
18. WHO. "Human resources for health: global strategy for 2030". Geneva: World Health Organization (2016).
19. Stovall JG., et al. "The impact of an employees' strike on a community mental health center". *Psychiatric Services* 55.2 (2004): 188-191.
20. Munyamahoro M and Ntaganira J. "Determinants of household health service use in Rubavu district" (2012).
21. Philippe CM., et al. "Factors determining the low household use of the curative service in the health zone of Pweto, Katanga province, Democratic Republic of Congo in 2013". *Pan African Medical Journal* 21.1 (2015).
22. Wilkinson D., et al. "Effect of removing user fees on attendance for curative and preventive primary health care services in rural South Africa". *Bulletin of the World Health organization* 79 (2001): 665-671.
23. Konate MK., et al. "Community health policy and economic and social viability of community health centers in Mali: Case study in urban and rural areas" (Draft).
24. Bashi J., et al. "Mutuelles de santé in Bukavu in the Democratic Republic of Congo: factors favorable to the use of health services by members". *The Pan African Medical Journal* 35 (2020).
25. Doumbouya ML. "Accessibility of health services in West Africa: the case of Guinea" (2008).
26. Nkemba B., et al. "Coverage and cost of care for an episode of malaria in the health zone of Miti-Murhesa, Democratic Republic of Congo [Taking in charge and cost of malaria treatment in Miti-Murhesa health zone, Democratic Republic of Congo]". *International Journal of Innovation and Applied Studies* 8.3 (2014): 920.
27. Karemere H., et al. "An experience of setting up community care sites in the Democratic Republic of Congo [Integrated community case management: An experience from the Democratic Republic of Congo]". *International Journal of Innovation and Applied Studies* 20.1 (2017): 42-51.
28. Faye SL. "Empowering community relays for seasonal intermittent preventive treatment of malaria (IPT) in Senegal: issues, modalities, challenges". *Somewhere Else* 1 (2012): 129-146.
29. André AMCM and Adolphe KC. "Involvement of "community relays" in a clinical trial project: example of the development of a vaccine against placental malaria in pregnant women in Sô-Ava (South Benin)".
30. Stearns J and Vogel C. "The landscape of armed groups in Eastern Congo: fragmented, politicized networks". *Kivu Security Tracker* (2017).
31. Namakula J and Witter S. "Living through conflict and post-conflict: experiences of health workers in northern Uganda and lessons for people-centered health systems". *Health Policy and Planning* 29 (2014): ii6-ii14.
32. Chirwa Y., et al. "Deployment of human resources for health in Zimbabwe: synthesis report". *Liverpool: ReBUILD* (2016).
33. Cometto G., et al. "Health sector recovery in early post - conflict environments: experience from southern Sudan". *Disasters* 34.4 (2010): 885-909.

34. OCHA. Highlights: overview of the situation: needs and humanitarian response: South Kivu and Maniema 2 (2015): 1-6.
35. Mitangala Ndeba P, *et al.* "Protein-energy malnutrition and malaria-related morbidity in children 0-59 months in the Kivu region, Democratic Republic of Congo". *Med too* 68.1 (2008): 51-57.
36. Baxerres C., *et al.* "What family resources finance children's health?" *Third World Review* 2 (2010): 149-165.
37. Ridde V., *et al.* "Improving the affordability of health care in Burkina Faso: A research strategy potentially favorable to the use of evidence". *Global Health Promotion* 18.1 (2011): 110-113.
38. Soors W., *et al.* "Health microinsurance in sub-Saharan Africa: an opportunity to improve access to emergency obstetric care?" Reduce financial barriers to obstetric care in low-resource countries (2008).
39. Porignon D. "Adequacy of district health systems in critical situations: experiences in the African Great Lakes Region: Free University of Brussels, Brussels, Belgium" (2003).
40. Ager AK., *et al.* "Health service resilience in Yobe state, Nigeria in the context of the Boko Haram insurgency: a systems dynamics analysis using group model building". *Conflict and Health* 9.1 (2015): 1-14.

Assets from publication with us

- Prompt Acknowledgement after receiving the article
- Thorough Double blinded peer review
- Rapid Publication
- Issue of Publication Certificate
- High visibility of your Published work

Website: www.actascientific.com/

Submit Article: www.actascientific.com/submission.php

Email us: editor@actascientific.com

Contact us: +91 9182824667