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ABSTRACT

Background Epidemiological surveillance is a key intervention to break the epidemiological silence of a disease. The complexity and workload of maintaining surveillance systems on an ongoing basis, as well as the ability to mobilize human resources in an alert situation, requires specialized professionals, material resources and financial resources. In many developing countries, particularly francophone ones, the development of surveillance systems is hampered by a number of difficulties, including the lack of financial means and specialized human resources. This study therefore assesses the availability and allocation of resources for epidemiological surveillance in the health facilities of the Edea health district.

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ABSTRACT

Background Epidemiological surveillance is a key intervention to break the epidemiological silence of a disease. The complexity and workload of maintaining surveillance systems on an ongoing basis, as well as the ability to mobilize human resources in an alert situation, requires specialized professionals, material resources and financial resources. In many developing countries, particularly francophone ones, the development of surveillance systems is hampered by a number of difficulties, including the lack of financial means and specialized human resources. This study therefore assesses the availability and allocation of resources for epidemiological surveillance in the health facilities of the Edea health district.

Methodology This was a descriptive cross-sectional study conducted from 15 January to 30 March 2021 among 17 surveillance focal points in 17 health facilities in the Edea health district. Our sampling was a non-probability sampling by convenience. Data were obtained using several tools, namely: The questionnaire entitled "Cameroon Integrated Supportive Supervisory Checklist" with Open Data Kit (ODK) and the binder "Edea Monitoring Surveillance 2021".

Results The coverage of health facilities was 100%, i.e. 17 health facilities surveyed and 17 surveillance focal points. Concerning material resources, 59% (10/17) of health facilities had computer equipment, although this equipment was not always entirely dedicated to epidemiological surveillance. In 47% (8/17) of health facilities, data entry was done on personal tablets and/or smartphones. Concerning human resources, 6% (1/17) of the focal points were trained in epidemiological surveillance. Also, 24% (4/17) surveillance focal points were briefed at the Edea district health service on the use of the DHIS 2 (District Health Information System 2). None of the health facilities, or 0%, had operating funds for monitoring surveillance activities.

Conclusion Surveillance and monitoring programs must be able to adapt to new epidemiological scenarios. The lack of material resources, the lack of training of focal points on epidemiological surveillance and the DHIS 2 as well as the lack of financial resources dedicated to epidemiological surveillance contribute to the inefficiency of this surveillance in the Edea health district and the lack of anticipation of potential public health emergencies.

Keywords: availability, resource allocation, epidemiological surveillance.

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I. INTRODUCTION

Availability and allocation of resources for epidemiological surveillance needs arise from the state's interference with the allocation function, which seeks to promote the adjustment of resources with the provision of certain public goods and services [1]. Surveillance is the

continuous, systematic collection, analysis and interpretation of health-related data needed for the planning, implementation, and evaluation of public health practice [2]. Event-based and community-based surveillance are being implemented for priorities zoonotic diseases and illnesses of public health importance in Cameroon [3].

The surveillance strategy depends on the diseases under surveillance, the objectives of the surveillance system, the methods for conducting surveillance and how the surveillance data are used to inform public health policy and practice.

For example, an early warning surveillance system needs to be more comprehensive while a system that serves a program monitoring function could be conducted through sentinel sites [3]. The important surveillance levels are central, intermediate (province/region, district) peripheral (sub-district, health facility) and community level. Each of these levels may comprise formal and private health-care providers that may or may not be included in the surveillance system. Other stakeholders and implementers include the disease-specific programs, public health laboratories, and public health training institutions [3]. Thus, the establishment of an effective and integrated epidemiological surveillance system requires the existence of an efficient health information system and governance, which in turn requires a number of materials, human and financial resources and mechanisms [4].

However, enhanced surveillance and response activities can only be performed if the required and appropriate financial, human and logistic resources are in place. This means identification of the resources needed to implement the various surveillance activities at each level of surveillance during planning stage. These resources should be mobilized from potential sources, managed and used efficiently [3]. In many developing countries, particularly francophone countries, the development of surveillance systems is faced with multiple difficulties, including the lack of financial means and specialized human resources [4]. Very few studies have examined the availability and allocation of resources for zoonotic disease of public health interest surveillance and response activities in Cameroon. This study assesses the availability and allocation of resources for integrated epidemiological surveillance in the health facilities of the Edea health district, in Cameroon.

II. METHODS

2.1 Study Design and Study Duration

This was a descriptive cross-sectional study conducted from 15 January to 30 March 2021

2.2 Study Sites Selection

A total of 17 surveillance focal points in 17 health facilities in the Edea health district, namely: Plateau Integrated Health Centre, Mount Charity Health Centre, Domus Mariae Health Centre, Manna Health Centre, the military garrison Health Centre, Trinity Health Centre, Santa Maria Health Centre, Malimba park Integrated Health Centre, Balm in Gilead Health Centre, Esperance Health Centre, Ekite Integrated Health Centre, Malimba urban Integrated Health Centre, Ad lucem Hospital, Regional hospital annex Edea, Delangue Medical District Centre, Sainte Odile Catholic Hospital, Beon Integrated Health Centre.

2.3 Sample Size

Our sampling was a non-probability sampling by convenience and a total of 17 surveillance focal points in 17 health facilities.

2.4 Inclusion Criteria

- Health facility present in the Edea health district
- Health facility present in the planning of epidemiological surveillance site visits.

2.5 Exclusion criteria

- Health facility outside the Edea district
- Health facility present but not planned in the epidemiological surveillance site visits.

2.6 Data collection tools and data processing

Data were obtained using several tools, namely: The questionnaire entitled "Cameroon Integrated Supportive Supervisory Checklist" and the binder "Edea Monitoring Surveillance 2021".

2.7 Quality assurance of data and information

520\ata collected was protected and stored at the Edea health district and in password protected software (ODK, DHIS 2).

2.8 Data analysis

We used MS Excel to calculate the proportion of staff trained on epidemiological surveillance; the proportion of staff trained/briefed on DHIS 2; the proportion of health facilities with computers and the proportion of health facilities with funds for epidemiological surveillance.

Ethical considerations

We proceeded through a series of steps to obtain the various authorizations necessary for data collection. In addition, all health personnel in the health facilities concerned were informed of the purpose of the study and had voluntarily agreed to participate.

III. RESULTS

In the Edea health district, there are 23% (4/17) high priority sites, 18% (3/17) medium priority sites and 59% (10/17) low priority sites.

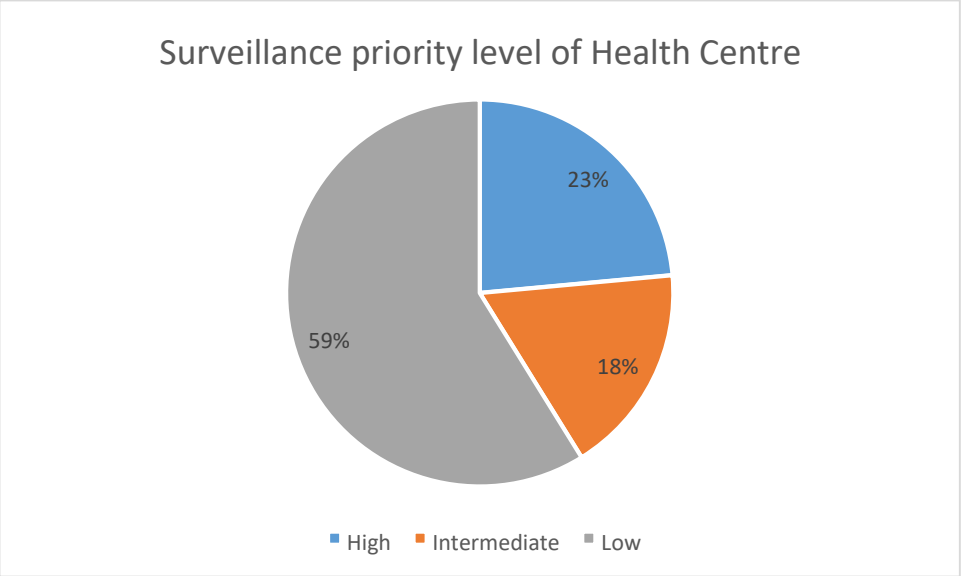

Figure 1: Surveillance priority level of Health Centre

3.1 Material resources

Fifty nine per cent (10/17) of health facilities had computer equipment, although this equipment was not always entirely dedicated to epidemiological surveillance.

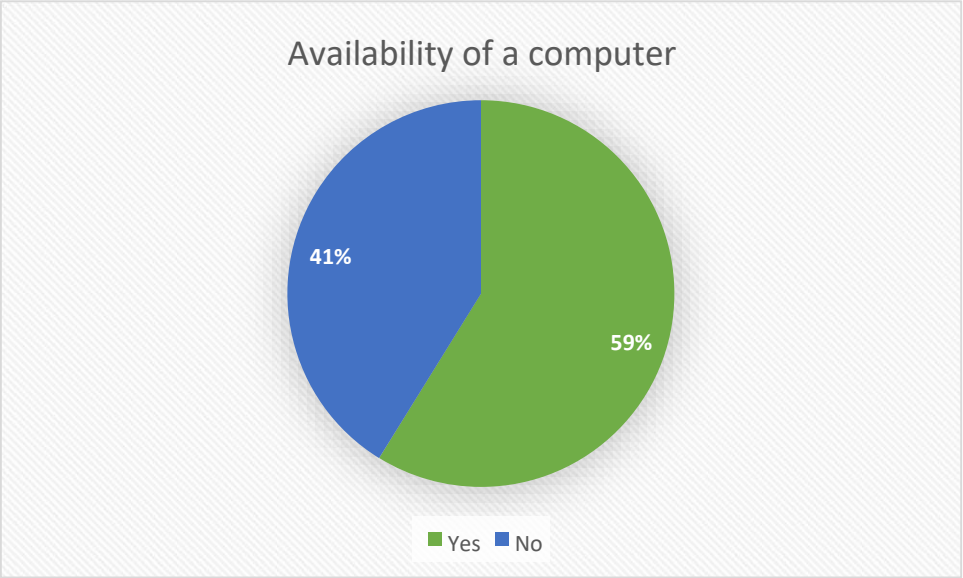

Figure 2: Availability of computers

Human resources

Six per cent (1/17) of the focal points were trained in epidemiological surveillance.

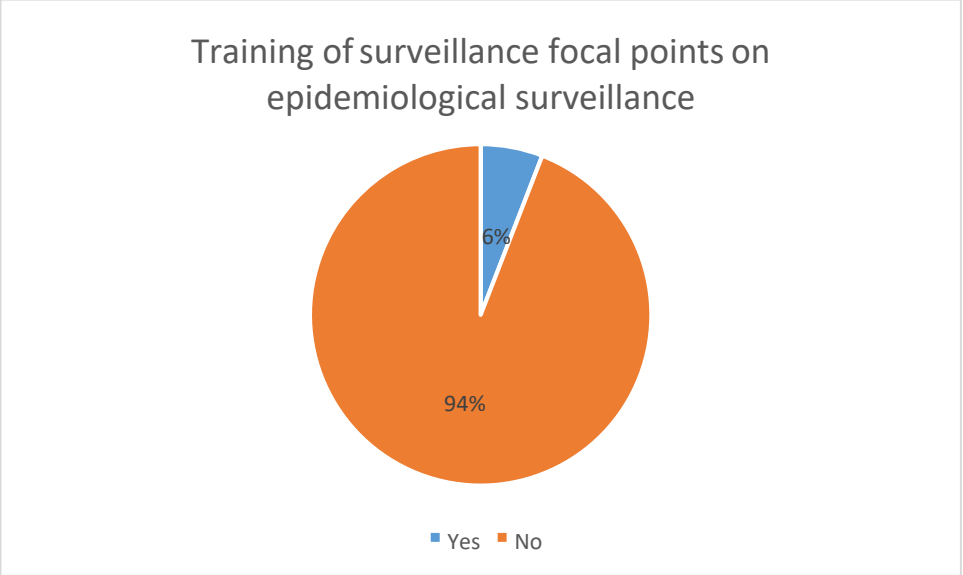

Figure 3: Training of surveillance focal points on epidemiological surveillance

Twenty four per cent (4/17) of the surveillance focal points were briefed at the Edea district health service on the use of the DHIS 2. However, at least one of the health personnel in these facilities had been trained/briefed on the use of the DHIS 2.

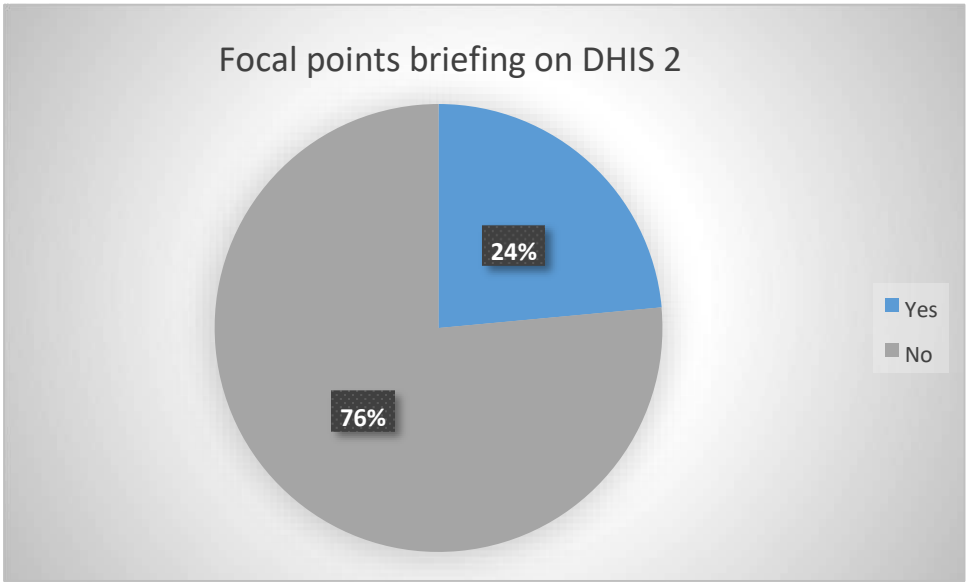

Figure 4: Focal points briefing on DHIS 2

Financial resources

None of the health facilities, or 0%, had operating funds for monitoring surveillance activities.

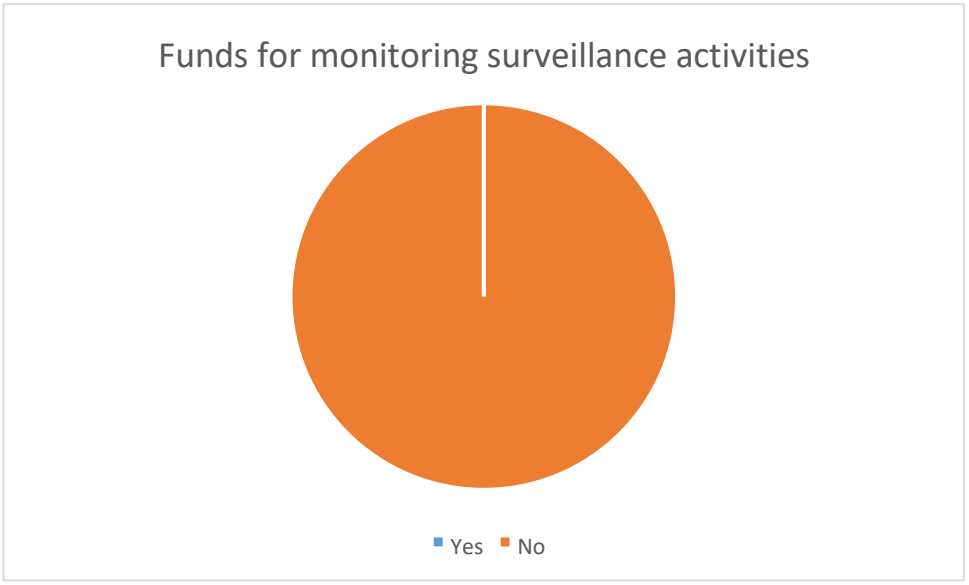

Figure 5: Funds for monitoring surveillance activities

IV. DISCUSSION

Our study focused on the availability and allocation of resources for epidemiological surveillance in the Edea health district. Our objective was to assess the availability and allocation of resources for epidemiological surveillance in the health facilities of the Edea health district; this is in line with a study in Cameroon in 2019 [4] which aimed to assess the availability and allocation of resources for epidemiological surveillance in Cameroon as well as a study carried out in Brazil in 2020 [1] which focused on the systematic review of resource allocation in public health. This shows the need expressed in terms of resources allocated to epidemiological surveillance although international literature indicates that the topic is

still unexplored with a current lack of theoretical basis that needs to be highlighted [1].

The coverage of health facilities was 100%, that is 17 health facilities surveyed, which is contrary to the study by Ngo Mouaha et al. which was 68.4%. This is certainly due to the difference in sample size which was quite large (118/17) [4].

Fifty-nine percent (10/17) of the health facilities had computer equipment although this equipment was not always entirely dedicated to epidemiological surveillance. This result corroborates that of a study conducted in Cameroon in 2019 in which none of the public health facilities had computer equipment entirely dedicated to event and community-based epidemiological surveillance [4].

In 47% (8/17) of the health facilities, data entry was done on personal tablets and/or smart phones. However, on 3 December 2013, WHO handed over 1,200 telephones to the Ministry of Public Health for the extension of the telephone surveillance fleet to the health areas, that is, equipment to strengthen epidemiological surveillance worth 67,000,000 CFA francs, and the 2013 e-Health Award for the "Telephone Fleet" initiative was presented to the Minister of Health. These telephones were supposed to enable the finalization of telephone coverage in the health areas of the regions, with a view to increasing the telephone fleet to a national scale, with the hope of further improving the circulation of health data and information between the different levels of the health pyramid "at zero cost" [5].

There is no doubt that hardware resources such as computers, smartphones, and tablets will allow health workers to have access to all information in real time, to consult data via the internet and thus check consistency and quality, to analyze data and to ensure interoperability between different databases [6].

Regarding human resources, 6% (1/17) of the focal points had been trained in epidemiological surveillance. This is a major problem as untrained staff could miss cases of diseases under epidemiological surveillance. The Minister of Public Health, Manaouda Malachie, prescribed the reinforcement of epidemiological surveillance during his visit to the district medical centres of Ambam and Kye-Ossi in the South region of Cameroon, drawing the attention of staff to the recognition of cases of diseases of epidemiologic potential [7].

Training for epidemiology and laboratory personnel and/or community health agents is a support function of integrated surveillance systems. Capacity building and training refers to the needs for engagement and empowerment of staff involved with integrated surveillance and response systems through workshop training and knowledge transfer. Surveillance staff at different levels have varying training needs. An assessment can help to identify the training needs for different categories of staff, which in turn can be used to draw up a training plan. The implementation of the training plan and the proportion of surveillance staff (epidemiology, laboratory and community resource persons) trained on the different aspects of surveillance and response can then be improved and monitored. Evaluation could examine the quality, relevance, impact and cost-effectiveness of the training as these resources should be mobilized from potential sources, managed and used efficiently [3]. It was in this context that, following the establishment of 47 Epidemiological Surveillance Centres, the Mérieux Foundation and the Centre for International Cooperation in Health and Development (CICIHD) organized several training workshops in West Africa; at the end of this training, one staff member declared: "The 14 days of training had a real impact on my life and my career. During the training, I learned the importance of my role in the laboratory. I was trained on the main diseases with epidemic potential such as measles, cholera, shigellosis, meningitis, E. coli, etc. I learned the importance of biosafety and biosecurity in the lab and at home] We also covered equipment maintenance and data management. Before the training, I was only dealing with one of the diseases with epidemic potential: Ebola virus disease. " [8]. This statement highlights the impact of the epidemiological surveillance training for health

staff in general and for the epidemiological surveillance focal points of the health facilities in the Edea health district.

Also, 24% (4/17) surveillance focal points were briefed at the Edea district health service level on the use of DHIS 2 which is a software tool to facilitate the collection of individual or primary data; the aggregation, storage, sharing and analysis of data [9]. It is also a database that can be consulted by all health workers to facilitate decision-making in the event of epidemics. Its use is important because it allows the collection of all the data needed to improve epidemiological surveillance [6]. However, at least one of the health personnel other than the focal points of these health facilities had been trained/briefed on the use of the DHIS 2. This result is in line with the previous study which found that at least one staff in the visited sites had been trained in the use of the DHIS 2, but was not systematically in charge of the data [4]. This can be explained by the fact that the National Health Information System in Cameroon (NHIS) is fragmented and not very efficient due to the absence of an organic framework for coordination and management of health information, the absence of mechanisms that promote the use of health information in decision making, the archaic nature of the data collection and processing infrastructure, and the absence of norms and standards for the use of health information [10].

Thus, this deficit influences the efficiency of the system, the quality of the data collected, and their use. The surveillance of a disease or health-related event requires careful monitoring, based on a network of actors and well-coordinated sources of information. It involves observing the emergence of pathologies, depending on people, time and place; alerting on acute problems requiring rapid action; evaluating epidemiological trends over time; and measuring the impact of health policies. Collect, analyze, interpret, disseminate to those who need this knowledge for public health decision-making. Basically, data are generated by health care providers who continuously record procedures, diagnoses and treatments. Depending on the information and the time needed for decision-making, the organizations that centralize the collection and analysis of data set up various collection and analysis systems; these concern the choice of actors, the data to be collected, the collection tools, the data transmission circuit and the periodicity of collection and transmission operations [11].

None of the health facilities had operating funds for monitoring surveillance activities, which is in line with the study by Ngo Mouaha et al. which showed that no operating funds were available for monitoring surveillance activities in the sites visited [4]. This lack of funds allocated to epidemiological surveillance leads to negligence and non-involvement in the monitoring of related activities by health personnel, yet epidemiological surveillance must be an integral part of the activities of professionals, especially on the front line. Data collection should not overburden them, because it is an essential duty to learn through data about the population we are caring for, its state of health and the factors that influence it in order to take measures to improve it [12].

According to Tonia Marek, health outcomes in Africa are often disappointing, as are most government-funded projects, and some health indicators are struggling and others are stagnating because only half the picture in terms of resource allocation for health has been considered. This would be due to the concentration of interventions on the public sector, without taking into account that half of health spending in Africa goes to the private sector. It is time to look at the health system as a whole, not just the public sector [13]. This idea is not consistent with the results of our study because no funds were allocated to either public or private hospitals.

Surveillance and response activities can only be performed if the required and appropriate financial, human and logistic resources are in place. This means identification of the resource needs to implement the various surveillance activities at each level of surveillance during planning stage. These resources should be mobilized from potential sources, managed and used efficiently [3].

Enhanced and integrated epidemiological and laboratory surveillance and response activities can only be performed if the required and appropriate financial, human and logistic resources are in place. This means identification of the resource needs to implement the various surveillance activities at each level of surveillance during programming and implementation stage.

V. CONCLUSION

The event- and community-based surveillance and response system is an important component of programs for the prevention and control of persistent zoonotic diseases and emerging epidemics. Our study therefore assessed the availability and allocation of resources for epidemiological surveillance in the health facilities of the Edea health district. It was found that the availability and allocation of material, human and financial resources are very inadequate in the health facilities of the Edea health district. It is with this in mind that it is urgent to remedy the lack or limitation of material resources and the lack of financial resources, coupled with the lack of training of focal points on epidemiological surveillance and the DHIS 2 dedicated to epidemiological surveillance which contribute to the inefficiency of epidemiological surveillance in the Edea health district and the lack of anticipation of potential public health emergencies. This remediation will facilitate the identification of suspected cases of diseases under epidemiological surveillance and subsequently the notification and investigation of suspected cases, followed by the prompt transmission of data to the health district. Future research should therefore focus on the factors associated with the lack of availability and poor allocation of resources in the health facilities of the Edea Health District.

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Abbreviations

DHIS 2 District Health Information Software 2, ODK Open Data Kit, NHIS National Health Information System, CICIHD Centre for International Cooperation in Health and Development.

Availability of data and material

All data are available on request.

Ethics approval and consent to participate

This study was approved by the institutional ethics committee of the University of Douala. Also, research authorizations were obtained from the Regional Tuberculosis Technical Group of the Littoral and from the various officials of the Douala Tuberculosis Diagnostic and Treatment Centres. Informed consent was obtained from the participants.

Competing interest

The authors declare no conflict of interest.

Consent for publication

All authors have read and approved the final version of the manuscript.

Authors' contributions

ANN gathered the literature, drafted the manuscript and was responsible for the data collection, EEA and SS were responsible for the follow-up of this research. RY, CT, LPM, MT and FWK supervised this research. ICD and ET supervised and substantially revised the manuscript.

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