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#### **Research Article**

# Factors Associated with the Ineffectiveness of Epidemiological Surveillance in the Health Districts of the South Cameroon Region

#### \*aJean Ndibi Abanda, bBetty Best, cYokyu Zachary Pangwoh and dPeter Mbondji Ebongue

<sup>a</sup>Jean Ndibi Abanda, PhD, Doctor of Public Health, Epidemiologist and Head of the Service of Data Managing at Ebolowa Régional Hospital, and Lecturer in Catholic University of Central Africa <sup>b</sup>Betty Best, PhD, Lecturer in University of Douala, Cameroon <sup>c</sup>Yokyu Zachary Pangwoh, PhD (c) Texila University, Guyana, South America <sup>d</sup>Peter Mbondji Ebongue, Lecturer in Catholic University of Central Africa \*Corresponding Author Email: jnabanda89@yahoo.com

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#### Abstract

In order to better assess the effectiveness of any surveillance system, one of the evaluation criteria remains its ability to capture the desired event. Epidemiological surveillance in the Cameroonian health system in general and more particularly in the health districts of the Southern region faces several challenges which undermine its effectiveness and prevent the achievement of the set objectives. The objective of this mixed cross-sectional study was to analyze the factors associated with the ineffective operationalization of epidemiological surveillance in the health districts of the South Cameroon Region. In order to achieve our objectives, a cross-sectional study was carried out in the ten health districts in the South Cameroon Region during the period from June to August 2019. Data were collected from epidemiological surveillance focal points; those responsible for community participation structures and with one hundred and seventy-six (176) health facilities using the ODK Collect v1.22 application. Semi-structured interviews were also conducted. The data collected from those responsible for epidemiological surveillance of health facilities were analyzed using STATA 13.0 software, while those from the interviews were subject to thematic and content analysis. Bivariate analyzes were based on Chi-squar e and Cramer's V statistics while binomial logistic regression was used for multivariate analysis. The results obtained show that epidemiological surveillance deteriorates depending on the age of the person in charge (Odds Ratio=0.87; 95% CI=0.76-1.003). We note that the effectiveness of epidemiological surveillance decreases as the age of the focal point increases. Beyond the average age (37.95 years), when the age of the focal point increases by an additional vear this would multiply by 0.13 time, the risk of inefficiency in the implementation of the epidemiological surveillance process. Health structures having a person responsible for surveillance other than the head of the structure have a greater chance of better operationalizing it compared to those which have a person who combines both responsibilities (Odds Ratio=0.065; 95%; CI=0.004-0.93). The majority of epidemiological surveillance focal points (64%) came from less qualified professional categories (nursing assistants and medical and health technical agents).

Keywords: Associated Factors, Ineffectiveness, Epidemiological Surveillance, Health District.

#### Background

Epidemiological surveillance is a method of observing a phenomenon based on continuous data recordings, making it possible to monitor the state of health or risk factors within a defined population, in order to detect the appearance of pathological processes and study their development over time and space, with a view to adopting appropriate response measures. It represents an important activity of the health system. Indeed, it makes it possible to follow in time and space the trends of events which threaten the quality of life of populations based on health indicators (epidemiological surveillance) or from health monitoring at the door level entrance. The control of infectious diseases has been a staple of international diplomacy for more than a hundred years. Yet despite many advances, global health threats continue to loom large and might even be on the rise. As global economic integration proceeds, health interdependence is deepening [1]. Several researchers have been interested in surveillance activities to better control public health events. They have thus redefined the actions which relate to surveillance, control and health monitoring. Langmuir's

contributions to the conceptualization, development, and implementation of public health surveillance were enormous. He successfully applied the concept of surveillance to populations, rather than individual patients. He defined surveillance as a practice distinct from disease control activities but linked to intervention. Third, Langmuir emphasized the importance of using provisional morbidity data for public health action. Fourth, he emphasized the important role of disseminating data. Fifth, he recognized and fostered the critical role of state health departments in national disease surveillance. Finally, he recognized the importance of applying surveillance concepts to noninfectious diseases and newly identified public health problems [2]. The Metrology Network of the Ministry of Public Health of Cameroon, jointly with the WHO, carried out an analysis of the Cameroonian health system in 2008. From this work, the following weaknesses were highlighted, classified according to their severity on a scale of 0 to 100%: Data management (28%)-civil status system-declaration of births and deaths (18%), access to information on the census (38%), access to information on the health card (39%) and access to information on human resources (59%). Indeed, relative attributes the quality of an epidemiological surveillance system are: i) sensitivity; ii) specificity. iii) the representativeness, iv) expediency, v) simplicity, vi) flexibility and vii) acceptability [3].

# Methods

# Site of the Study and Inclusive Criteria

We carried out our study in the Southern Health Region which has ten health districts in which three hundred (300) legally existing health facilities are distributed. As far as inclusive criteria concerns, were included in the study: (i) Health facilities in the South Cameroon region having legal existence at the time of the study and carrying out epidemiological surveillance activities; (ii) The presidents of the health committees of the different health districts or their representatives; (iii) Health district heads or their representatives.



Figure 1. South region map.

# Participants and Type of Study

To achieve our objective, a cross-sectional descriptive survey was carried out among one hundred seventy six (176) health facilities of the region. The study population consisted of health facilities that conduct epidemiological surveillance.

# **Bias Control**

For bias control, in other to be selected as a data collection agent, the candidate had to have experience of at least two participations in data collection activities in surveys of national and/or regional scope; be a professional in the field of health or statistics with a minimum level of study equivalent to a Baccalaureate. The investigators then received one day of training with ourselves and one other public health experts. This training was to review data collection strategy and the field investigation procedure. Data were collected using a structured questionnaire addressed to the head of health facilities and focal point of surveillance.

# **Sampling Technic**

In order to guarantee the validity and reliability of our survey, a probabilistic technique has been used. We chose a proportionally stratified sample. Indeed, the organizational structure of the Cameroonian health system is pyramidal in shape with three levels. Health facilities are grouped from the first (the highest ranking) to the seventh category (the smallest). For the sake of representativeness, we have selected health training from all categories that exist in the field.

To achieve our objective, a sample of 176 health facilities out of a total population of 300 was selected from the sample size estimation table of Dépelteau with a confidence level of 95% and precision of 5%. The population of our study therefore consists of district and similar hospitals; district medical centers and similar; and integrated and similar health centers. The sample was also designed so that it was representative of the 10 health districts in the Southern region. Indeed, operationally and in order to guarantee representativeness in the different types of health facilities, we used stratified hazard sampling. Firstly, we carried out an exhaustive selection of the health facilities of the first two strata composed of District Hospitals (HD) and similar (13 health facilities) and sub-divisional Medical Centers (SMC) (41 health facilities). Concerning the third stratum made up of Integrated Health Centers (IHC), the simple random drawing of a sample of health facilities (Table 1 and Table 2).

Health distrit (HD)	Number of IHC in each health district	Proportion of IHC in the sample	Number of IHC in the sample
	Ν	%	n
Ambam	22	12	15
Djoum	09	05	06
Ebolowa	45	24	30
Kribi	27	15	18
Lolodorf	16	08	11
Meyomessala	26	13	17
Mvangan	09	05	06
Olamze	03	01	02
Sangmelima	16	11	10
Zoétélé	11	06	07
Total	184	66.30	122

**Table 1.** Sampling of integrated health center (IHC).

	Table 2. 1	Fotal of health	n facilities by	y pyramid level.
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Type of health facilities	Number in sample
District hospitals (HD) and similar	13
Sub-divisional medical centers and similar	41
IHC and similar health centers	122
Total	176

# **Data Collection Procedure**

Data for our study have been collected from June to August 2019. The data collection procedure concerns administrative and ethical issues. Our investigation took place in two stages. During the preparatory (step that corresponds of first stage), we recruited and trained ten (10) data collection agents on using ODK Collect v1.22 application. After this training, a selection test was organized, after which four (04) data collection agents have been selected.

The study was approved by the Regional Ethics Committee of the Human Health Research of the South (The Ministry of Public Health of Cameroon) (Authorization N° 002/CRERSH SUD/SE/2019 signed on April 13, 2019), by all participants and administrative authorization of the Regional delegation for public health of the South. Before the data collection, our questionnaire was pre-tested. It was submitted to our supervisor and our biostatistician for a critical analysis of content and form, in order to adapt the language level to the context of the respondents. Questions were related to socio-demographic characteristics, indicator of surveillance, etc.

The East Cameroon region served as the setting for this pilot study. Once in the field (second stage), each interviewer stated their identity, presented the data collection authorizations, the information notices. After

obtaining the consent of the respondent, the administration of the questionnaire began immediately in «face to face» mode and lasted approximately 10 to 15 minutes. After then we proceeded for the validation of data by reviewing all the indicators. Questionnaire with missing data and outliers were left aside.

#### **Statistical Methods**

The purpose of our data analysis was to emphase on statistical associations among variables. Firstly, the results were presented either in the form of graphs, frequencies or percentages. These graphs and tables present the categories of variables and the corresponding numerical data, characteristics of their distributions for both quantitative and qualitative data. This was done using the Microsoft Office 2016.

## **Normality and Reliability Tests**

The Chi-square test was used for data with a qualitative value and that of Kolmogorov–Smirnov for data with a quantitative value.

## Analytics

The data collected from those responsible for epidemiological surveillance of health facilities were analyzed using STATA 13.0 software. Bivariate analyzes were based on Chi-square and Cramer's V statistics while binomial logistic regression was used for multivariate analysis.

## Results

The average age of the epidemiological supervisor 37.95 years with a maximum of 58 years and a minimum of 21 years (Table 3).

Characteristic of epidemiological supervisor				
Average	37.95			
Maximum	58			
Minimum	21			
Standard deviation	9.13			
Professional seniority				
Average	12.34			
Maximum	34			
Minimum	1			
Standard deviation	9.01			
Seniority in the district				
Average	8.46			
Maximum	30			
Minimum	1			
Standard deviation	6.18			

Table 3. Central tendency and dispersion parameters.

Table 4 informs us that the responsibility for activities related to epidemiological surveillance falls to the nurses aids; state registered nurses; laboratory technicians and senior nurses in the following respective proportions: 50.77%; 35.38 %, 12.30% and only 1.54%. Among these agents in charge of epidemiological surveillance, more than half have a level of study of the first secondary cycle.

Epidemiological supervisor profession	Number	Proportion
Nurses aids	33	50.76
State registered nurses	23	35.38
Senior nurses	1	1.54
Laboratory technicians	8	12.30
Total	65	100.00

Table 4. Socio-professionals characteristics.

Table 5 highlights the statistically significant associations between the explanatory variables and the operationalization of surveillance epidemiological analysis in a bivariate analysis model at a significance threshold of 5%. The table also provides information on the intensity of such an association when its existence is certain. It is therefore a question of verifying the association between the dependent variable and each of the independent variables based on the probability associated with the Chi-square. The critical

probability threshold retained is 5%. We retain that if the value of p-value is less than 5%, this directly leads to the rejection of H0 (null hypothesis) and the conclusion results in the existence of a relationship between the two variables. Thus, we note that certain operating practices of health facilities are significantly associated with the operationalization of epidemiological surveillance. Indeed, participation in coordination meetings by the structure has an influence at the threshold of 1%. Health facilities that take part in coordination meetings at the health district and health area level tend to better operationalize surveillance than those that participate in these meetings only at the health district level and those who do not even attend. The organization of debriefing sessions relating to epidemiological surveillance in health facilities also has a significant influence on the dependent variable. 34.2% of structures organizing these refresher sessions operationalize monitoring compared to 24.7% of those which do not. In addition, the means used for transmitting surveillance activity reports has a significant impact on timeliness indicators. In fact, half of the health structures transmitting their report by electronic forms are done on time compared to only 27% of those using biodegradable forms, in this case paper. On a completely different level, community participation when it is effective through the involvement of those responsible for dialogue structures in health activities organized by health facilities also influences the dependent variable which is the operationalization of epidemiological surveillance. In the 46% of structures which benefit from this involvement, the indicators of better surveillance are palpable unlike the 24% of structures not benefiting from it.

The problem of isolation and geographical accessibility must also be taken into consideration. The closer the health structure is to its place of submission of activity reports, the more it tends to better operationalize epidemiological surveillance than those which are further away. A situation which seems to corroborate the comments made by a district head during an interview: "we are in an essentially rural district, which poses accessibility problems". You may have a case that requires a sample for analysis for example but you are unable to do so. This situation unfortunately leads us to carry out supervisions out of opportunity and not through planning as we would have liked. Worse, we do not visit health facilities by priority level as planned, but when an opportunity arises due to lack of resources.

Explanatory variables	Operationalization of epidemiological			p-value	V-Cramer
	surveillance				
	Never	At time	Always		
	N (%)	N (%)	N (%)		
Participation in coordination	meetings by the str	ucture			
Yes, at district level	9 (23.7)	14 (36.8)	15(39.5)	0.00***	0.33
Yes, at the health area level	20(15.0)	77(57.9)	36(27.1)		
No	5(100.0)	0(00.0)	(00.0)		
Have participated in a trainin	g seminar on epider	miological surv	eillance	•	
Yes	18(22.8)	34(43.0)	27(34.2)	0.999	0.19
No	14(15.4)	58(59.8)	24(24.7)		
Involvement of dialogue structures in activities					1
Yes	8(15.4)	20(38.5)	24(46.2)	0.017***	0.19
No	11(15.4)	42(60.0)	17(24.3)	_	
NSP	7(18.4)	24(63.2)	7(18.4)		
Means of transmitting reports					
From papers	23(19.7)	73(62.4)	21(17.9)	0.000***	0.61
Electronic means	7(14.0)	18(36.0)	25(50.0)		
Distance between the health facility and the place of submission of activity reports					
Less than 10 Km	2(3.8)	27(50.9)	24(45.3)	0.000***	0.33
11-50 Km	14(15.6)	49(54.4)	27(30.0)		
50 Km and above	16(50.0)	16(50.0)	0(0.0)		
Transportation allowance for reporting					
Yes	1(4.3)	11(4.8)	11(4.8)	0.000***	0.41
No	31(20.4)	81(53.3)	40(26.3)		

**Table 5.** Association between the variables characterizing the functioning of the health structure and the<br/>operationalization of epidemiological surveillance.

The V-Cramer statistic recorded in the table above reflects the intensity of the association between the independent variables and the dependent variable at the bivariate level. Thus, electronic transmission of

reports and participation in a surveillance seminar are strongly correlated with the operationalization of epidemiological surveillance.

operationalization of epidemiological surveillance in the health districts of the South Cameroon		
Variables significantly associated with the operationalization of ES	V-Cramer	
Participation in coordination meetings	0.33	
Existence and involvement of dialogue structures	0.19	
Electronic transmission of activity reports	0.61	
Distance from reporting location	0.33	
Have participated in a seminar on epidemiological surveillance	0.73	

**Table 6.** Intensity of the relationship between the variables significantly associated with the

 operationalization of epidemiological surveillance in the health districts of the South Cameroon region.

According to Table 7, overall, the explanatory level, retains among the variables that have been used, only those which, taken together, make it possible to better explain in a significant way the phenomenon of operationalization of epidemiological surveillance. Thus, the following variables significant at a significance threshold of 5% are retained to take place of the factors influencing the operationalization of epidemiological surveillance in the health districts of the South Cameroon region. These factors were identified from the "Logit" command putting together the modalities of the variables (dependent and independent) previously dichotomized and with low weight. The modalities of the strongly represented variables constitute the reference modality. Only modalities having a significant value at the 5% threshold are constituted as determinants. The interpretation is done using the "Odds Ratio". Note that the subsequent results are interpreted "CeterisParibus" or "all other things being equal"; that is, the influence of one variable is analyzed while keeping the effects of other variables unchanged. The determinants of the operationalization of epidemiological surveillance in the health districts of the South Cameroon region are therefore: the category of the health facility, the age of the surveillance officer, the existence in the health facility of a person responsible for surveillance different from the person responsible for the structure, the profession of the person responsible for surveillance, the means of transmission of activity forms and the distance between the health facility and the place of submission of the activity reports. These analyzes allow us to draw the following conclusions:

As for the age variable, it is constant that epidemiological surveillance deteriorates depending on the age of the person responsible for it. For an additional year, the risk of deterioration increases by 0.13 times OR= 0.87 ([95% CI: 0.76-1.0]; p= 0.050). The category of health facility also plays an important role in the "prognosis". Indeed, district hospitals are those which seem to best reach the objectives pursued by epidemiological surveillance. These first-reference health facilities increase their chance by 73.9 times compared to district medical centers and integrated health centers with risk estimates of OR=73.9 ([95% CI: 1.88-29.02]; p= 0.022). On a completely different level, the existence in the health facility of a person responsible for surveillance different from the person in charge of the structure is a variable which significantly discriminates epidemiological surveillance. A reality rather to be taken into consideration from a logical point of view with regard to the contribution of the workload and the availability of human resources on both a quantitative and qualitative level in the efficiency and effectiveness of actions. In health facilities with only one staff, such working conditions expose the latter to the risk of burn-out, also called professional burnout, which is a sequential process in which the first stage is marked by emotional exhaustion, followed by feeling of depersonalization, which results in a sharp reduction in self-realization, accompanied by self-depreciation. Although burnout primarily affects the well-being and health of workers, several studies have shown that it also has different consequences on the organization. Indeed, it reduces job satisfaction and involvement in the organization, increases the intention to change jobs, increases absenteeism, and reduces job performance [4]. The distribution of human resources in the professional field could hardly contradict this state of affairs. The reason is obvious in relation to the situation of personnel in the field; you will see that the majority of health centers are run by very poorly qualified personnel, specifically nursing assistants, and sometimes laboratory technicians. This staff is most often solitary in these health facilities, and their track record is well above their professional qualification and their competence. District medical centers and district hospitals are those which have a better staff distribution index compared to sixth category health facilities (CSI). They thus see their chance multiplied by 0.94 times compared to structures which benefit from the services of a single individual combining the two charges [OR = 0.064 (95% CI: 0.0044 - 0.93); p = 0.045]. The profession of the supervisor also plays a major role. The presence of the TMS at the head of the FOSA reduces the risk of deterioration of epidemiological surveillance by 41 times, when it is in charge in a health facility with risk estimates [OR= 41.01 (95% CI: 2.2-77.6); p= 0.013]. However, regardless of the profession of the personnel in charge of surveillance, when the means of

transmission of surveillance activity forms is electronic [OR=11.6 (95% CI: 2.362 -56.8) p= 0.003], the risk associated with the deterioration of the promptness and completeness indicators decreases by 11.6 times. And all the more so since the distance between the health facility and the place where activity reports are submitted has a certain influence on these indicators and, in turn, on surveillance activities. When this distance increases by an additional kilometer, that is to say as we moves away from the delivery point of activity reports the risk of negatively affecting surveillance increases by 0.01 with the risk estimates of [OR= 0.93 (95% CI: 0.89 -0.97); p = 0.002]. Especially in certain health districts in the South Cameroon region, "the further away the health facilities are from the places where they submit reports on their activities, the more the degree of isolation increases. And it is less easy for many managers of these structures to honor some of their commitments to the health district"

Variables	Odds ratio	95% CI	p-value		
Private hospital	0.63	0.107-3.75	0.617		
Workplace					
Urban	0.64	0.14-2.96	0.577*		
Type of health facility		•			
District hospital and similar	73.90	1.88-29.02	0.022**		
Sub-divisional medical centers	8.35	0.729-95.62	0.088*		
Gender of head of structure		·			
Female	0.24	0.31-14.93	0.434		
Gender of supervisor		·			
Female	0.24	0.04-0.13	1.539		
Age of head of structure		•			
Female	1.24	0.97-1.58	0.079		
Age of supervisor	0.87	0.76-1.00	0.050**		
Seniority of the supervisory officer	1.04	0.90-1.20	0.533		
Existence of an epidemiological supervisor other than the head of structure					
No	0.06	0.0044-0.93	0.045**		
Grade of head of structure					
Nurse aids	2.59	0.24-27.31	0.428		
Medical doctor	0.20	0.009-4.37	0.31		
Laboratory technician	0.20	0.006-6.46	0.36		
Seniority of the head of structure	1.01	0.90-1.13	0.80		
Epidemiological supervisor profession					
Nurses	1.35	0.18-9.92	0.766		
Medical health technician	41.01	2.16-77.6	0.013**		
Means of transmitting activity reports					
Electronic means	11.58	2.36-56.8	0.003***		
Distance to reporting location	0.92	0.88-0.97	0.002***		
Transportation cost allocations for reporting					
Yes	3.24	0.57-18.38	0.184		
The epidemiological supervisor was to	ained on surveilland	e			
Yes	1.47	0.35-6.12	0.59		

**Table 7.** Logistic regression of factors associated with the operationalization of epidemiological surveillance in the health districts of the South Cameroon region.

#### Discussion

The epidemiological surveillance encompasses several activities and involves several actors. It is not superfluous to note that previous studies related to the world of the epidemiological surveillance system have approached the subject from both direct and indirect angles. They were thus interested either in the evaluation of the quality of health data, or in the evaluation of the abilities of health professionals to implement knowledge acquired as part of training in relation to decision-making based on evidence, in this case the work of [5, 6]. This study aims to take up the challenge of analyzing the factors associated with the operationalization of epidemiological surveillance in the health districts of the South Cameroon health region starting from the postulate that these factors are socio-demographic, organizational and community-based. Each dependent variable which would distinguish such a situation at the 5% threshold would validate the hypothesis of the existence of an association. It will therefore be considered as determining the operationalization of epidemiological surveillance.

Thus, the results from this study showed that age of the person responsible for epidemiological surveillance discriminated against it at the threshold of 5%. All other things remaining equal, surveillance deteriorates depending on the age of its supervisor. Certainly, these studies address one of the aspects of epidemiological surveillance, namely the quality of the data, the fact remains that this is indeed the problem of the empirical contribution in achieving the objectives linked to epidemiological surveillance. How can we explain that a professional who is supposed to gain experience over the years can be in this state of mind? Firstly, empiricism which bases the origin of knowledge on experience could not only be linked to age, but also to habituation. In the theories of learning of empirical filiation, knowledge are available in the environment that the subject integrates, knowing in the empirical perspective is also and above all making a copy of the environment. The expected behavior is the faithful restitution of the knowledge acquired without alteration. It would seem that as the people in charge of surveillance get older, they would put more trust in routine rather than in cognition and self-actualization, in the renewal of knowledge which is otherwise biodegradable.

Secondly, seniority could have perverse effects that would need to be corrected and controlled to establish behavior that would make it possible to bear in mind the advantages of epidemiological surveillance on both a personal and collective level. For the success of such a design, some authors suggest capitalizing on helping relationships, the objective here being the consolidation of behavior by considering obvious possibilities of relapse depending on the individual [7]. Indeed, age could lead to demotivation, a decline in vigilance and excessive complacency, thus inhibiting the questioning of one's own knowledge. This state of affairs could also be explained by the insufficiency of human, financial and material resources and finally the consequence of poor management of human resources. In fact, 43.60% of health facilities managers are unqualified academically, technically and in management of Human Resources in the center region of Cameroon and all over. In those health facilities, 82.20% of human resources are in professional insecurity. They are mainly contractual (49.00), Decision-making agents (24.40%), casual agents (08.80) [8]. In Fayol's functionalist approach, human resources management in a health system aims to have staff who are both qualified and motivated, equitably distributed throughout the territory. Unfortunately, it is established that in sixth category health facilities, there is most often unqualified and solitary staff responsible for preventive, curative and promotional activities in a context of continuous, integrated and global care. Sometimes in precarious ergonomic conditions characterized by the isolation of service and communication routes. The study having shown that the electronic transmission of activity reports is positively associated with the operationalization of epidemiological surveillance in the health districts of the South Cameroon region. The hospital is a place where civilizations meet and where social and human sciences come together.

#### Conclusion

Epidemiological surveillance, which falls within the framework of the collection, analysis and dissemination of information for decision-making, is one of the missions of any health system. It is in view of its importance in achieving the objectives of protecting global health that the WHO encourages, supports and works with its member states to establish more resilient surveillance systems, adapted to local realities and capable of responding effectively and efficiently to the health challenges of the moment and the future, institutions to fulfill epidemiological surveillance missions. Unfortunately, the gap remains deep between these measures taken and the functioning of its epidemiological surveillance system. It is to better contribute to the strengthening of the latter that we undertook to carry out this study. The main results obtained clearly show that the operationalization of epidemiological surveillance in the health districts of the South Cameroon region is the influence of socio-demographic, organizational and community factors. From now on, we can admit that it is important to take into account the following variables in the implementation of epidemiological surveillance actions to effectively and efficiently achieve the expected objectives:

- ✓ The rejuvenation of the workforce in health facilities in the region and therefore throughout the country, taking into account the profile/workstation pair for greater social justice;
- ✓ The assignment of epidemiologists and archivists to district health services and primary health facilities;
- ✓ Strengthening the community system.

Although having achieved our objectives through the confirmation of some of our research hypotheses and the rejection of others, our study nevertheless has some limitations. Methodological rigor would have recommended an exhaustive investigation which would undoubtedly have allowed us to obtain a better estimate of the statistically significant associations between the independent variables and the dependent variable of our study. Far from us therefore claiming to have exhaustively addressed all the problems and aspects raised by our study, we leave it to subsequent studies the possibility of exploring aspects that are as varied as they are meaningful on a heuristic level. Thus, interest could be focused on ergonomic aspects rightly considered as significant indicators of performance and efficiency from the point of view of professional performance.

# Declarations

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**Authors Contributions:** JNA and PME: Concept and design of the study, prepared first draft of manuscript; JNA, YZP and BB: Reviewed the literature, and manuscript preparation; JNA and PME: Concept, coordination, statistical analysis, and interpretation, interpreted the results; BB and PME: Revised the manuscript.

**Conflict of Interest:** The authors declare no conflict of interest.

**Consent to Publish:** The authors agree to publish the paper in International Journal of Recent Innovations in Academic Research.

**Data Availability Statement:** The data presented in this study are available on request from the corresponding author. The data are not publicly available due to privacy.

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**Institutional Review Board Statement**: The study was approved by the Regional Ethics Committee of the Human Health Research of the South (The Ministry of Public Health of Cameroon) (Authorization No 002/CRERSH SUD/SE/2019 signed on April 13, 2019), by all participants and administrative authorization of the regional delegation for public health of the South.

Informed Consent Statement: Informed consent was obtained from all subjects involved in this study.

**Research Content**: The research content of manuscript is original and has not been published elsewhere.

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