International Journal of Formal Sciences: Current and Future Research Trends (IJFSCFRT)
ISSN (Print), ISSN (Online)

https://ijfscfrtjournal.isrra.org/index.php/Formal_Sciences_Journal/index

Assessing the First Semester of Decentralization by Devolution in Human Resources for Health on Malaria Management in Djoungolo Health District

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Abstract

Purpose: The goal of this study was to assess the implementation of decentralization by devolution in human resources for health on the management of malaria in the health district of Djoungolo.

Problem: Data from the Cameroon national health database (DHIS-2) shown that the number of deaths from malaria increased by 1.5 folds in this health district during the first semester of 2021; which was also the first semester of implementation of decentralization by devolution of powers to locals elected in Cameroon. Human resources for health quantity and quality attributed to a population is a real issue in health service performances and its shortage was nationwide in Cameroon until 2020, before implementation of decentralization. The General Code of Regional and Local Authorities devolved to communal council duties to recruit and manage nurses and paramedical staffs of integrated health centres and sub-divisional health centres of their communities. The main question was the effectiveness of communal council duties toward their local health facilities.

Methods: To achieve this objective, we performed a quantitative approach by carrying out a retrospective cross-sectional study with analytic aim. We had to compare admission of patients and the management of malaria cases during 2020 and the first semester of 2021.

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We collected data through kobo-collect template application at the integrated health centres of Emana and Abom; and sub-divisional health centres of Elig Essono and Nkolmesseng in the health district of Djoungolo which was under the decentralized administration of Yaoundé 1 and Yaoundé 5 communal councils. Harmonized data collected had been analyzed using SPSS version 25.0 statistics software and the results presented in tables, graphs and percentages.

Results: Context-based theory (CBT) led us to discuss the results. Nurses and paramedical staffs increased from 65 to 70% at the local public health facilities of Djoungolo health district. Aggregate density of health personnel/population increased from 1.3 to 1.4 per 1000 but still below the critical threshold. There was 10% increased nurses and paramedical staffs' work force for malaria management in the Djoungolo health district. The profile of State registered nurses' increased to 4% and Assistant nurses' to 10%. However, there was uneven repartition of staff profile between health facility categories and between decentralized territorial collectivity administrations.

Conclusion: Decentralization by devolution had positive impact on the management of malaria at Djoungolo health district. Devolution in human resources for health reduced the work load and positively influenced continuity and sustainability of health services. The profile of staff recruited in the local health facilities of Djoungolo health district during the first semester of decentralization by devolution gave an additional work force for the management of malaria despite an uneven repartition of staff profile. Devolution had no additional effect on malaria mortality rate (MMR) in public based health facilities of Djoungolo health district.

Keywords: decentralization by devolution; human resources for health; malaria management; Cameroon.

1. Introduction

Cameroon is experiencing since January 2021 decentralization of its administration through the devolution of powers, to overcome the shortcomings of the central administration. At Alma Ata Conference in 1978, decentralization of health system reforms had been suggested to improve health service delivery (Panda & Thakur, 2016). Human resources for health (HRH) are argued to be a critical component of a health system that is also a large consumer of health sector resources [2]. The concept of decentralization in health leads to the transfer of management authority and discretion for human resource management (HRM) from national levels to subnational levels [3]. In Cameroon, the General Code of Regional and Local Authorities devolved to communal council the power to recruit and manage nurse and paramedical staffs of integrated health centres (IHC) and sub-divisional health centres (SHC) of its locality. This aimed at improving the density of health personnel-to- population for a better management of diseases. HRH shortage affects Kenya in general, HRH numbers in all Kenyan facilities (public, private and faith based facilities) was estimated to be 22.7% of the required HRH numbers for effective health service delivery [4]. According to Muyenga, Zambian health system has less than half of the required numbers of HRH In terms of ratios, estimates indicate 1 doctor per 14, 500 people and 1 nurse per 1, 800 people [5]. In Cameroon, the aggregate density of health personnel-to-population is 1.3 per 1,000, which is lower than the WHO's recommended critical shortage threshold of 2.5 per 1,000 (Joint Learning Initiative, 2004) and public health services personnel represents 65.32 % of the nation of health force

[6]. In a general context of HRH shortage, malarias' management is facing difficulties and impact mortality rate. In Uganda the human resource staffing level and profile were inadequate and unevenly distributed, thus, affecting the capacity to plan and implement malaria control adequately in some areas (Batega, 2007). In Cameroon Tandi (2015) shown a combined density of physicians, nurses and paramedics in under 5 years' infant mortality was Coeff=-1,052 t=-1,206 p-value=0,206 R2 =0,226 (Tandi and colleagues 2015). Malaria is the most prevalent life threatening disease in Cameroon. In the health district of Djoungolo there was a 1.5 folds' increase in number of death from malaria during the first semester of decentralization in 2021 when comparing to 2020 [7]. The context-based theories guided our theoretical framework, and according to this fact we formulated the main hypothesis that decentralization by devolution had negative impact on the management of malaria at Djoungolo health district. Specifically, that communal councils did not recruit and manage nurse and paramedical staffs to reinforce insufficient human resources for health which negatively affected continuity or sustainability of services for management of malaria and that decentralization by devolution in human resources for health did not improve on management of malaria at the health district of Djoungolo. As objectives, we measured the impact of recruited human resources for health under decentralization on sustainability to access services and we measure its impact on the management of patients suffering from malaria.

2. Materials and methods

2.1. Inclusion and exclusion

Decentralized territorial collectivities are in two levels: the region and the commune. Our study was at the commune level where decentralization by devolution devolved power to local authorities to act in some public facilities. Djoungolo health district was under decentralized administration of two communal councils namely, the communes of Yaoundé 1 and Yaoundé 5. We included all public health facilities of 5th and 6th category according to the health sanitary pyramid. These were sub-divisional health centres and integrated health centres. In these centres we assessed nurse and paramedical staffs in duty, we looked at the monthly activity report (MAR) registers of 2020 and first semester of 2021 where only patients suffering from malaria interested us. Were excluded from our study medical staff, private and faith (confessional) based health facilities and public health facility of 1st, 2nd, 3rd and 4th categories of Djoungolo health district which were not under the communal council administration and other diseases in the MAR registers during the study period.

2.2. Participants

Participants were adults, nurses and paramedical staffs in duty at the sub-divisional (SHC) and integrated health centres (IHC) of Djoungolo health district. From the highest educated status to the lowest, we looked at the number of Senior nurse, State graduated nurse, Midwife/Maïeutician, Laboratory technician, Assistant nurse, Assistant laboratory technician, Assistant pharmacist posted by the Ministry of Public Health as civil servants and those recruited and managed by the communal council.

2.3. Sampling procedures

We selected all the SHC and IHC of Djoungolo health district, there were four (04) health facilities. Under the decentralized administration of Yaoundé 1communal council, we had the SHC of Elig-Essono and IHC of Emana and for Yaoundé V communal council we had the SHC of Nkolmesseng and IHC of Abom. A research protocol has been approved by the Ethical committee of the School of Sciences of the Catholic University of Central Africa and the Head of the health district of Djoungolo which provided an authorization to collect data on the field. Data were collected in December 2021.

2.4. Data collection

We collected data through a questionnaire which was pretested in public health facilities of the health districts of Nkolbison and Cite-verte. The questionnaire has been filled after informed consent approval by authorized representatives of integrated health centres of Abom and Emana and sub-divisional health centres of Elig Essono and Nkolmesseng. This questionnaire has been installed in our android phone as a kobo-collect template application into which data have been keyed in. Data have been obtained by interviewing an authorized representative and consulting monthly activity report (MAR) registers. An authorized representative gave information about the functioning and the human resources of the health centres. The monthly activity report (MAR) registers gave data related on malaria management in 2020 and from January to June 2021. At each health facility we checked on opening time and working shift. We also checked on the human resource for health needs and the number available for the functioning of the health centre. In the monthly activity report (MAR) we looked for data related on the number of cases suffering from simple or severe malaria and its management. Harmonized data collected through Kobo-collect tool have been analyzed using SPSS version 25.0 statistics software. Statistical processing of the data collected in the field have been performed. Thus, these analyses had been done in the following way:

- Statistical tests: ratios;
- Analysis model: We used a descriptive analysis (univariate and bivariate) but explanatory analysis (binary logistic regression) could not be done.
- We presented the results in tables, graphs and percentages.

3. Results

3.1 Staff recruited and managed and its impact on sustainability to access services / staff profile

There was a real need in HRH for a better functioning of health facilities. Results presented in figure 1 shown that requirements were not completed. Assistant laboratory technician job qualification was sufficient in the local public health facilities of Djoungolo health district since 2020; and therefore did not necessitate a recruitment on this specialty.

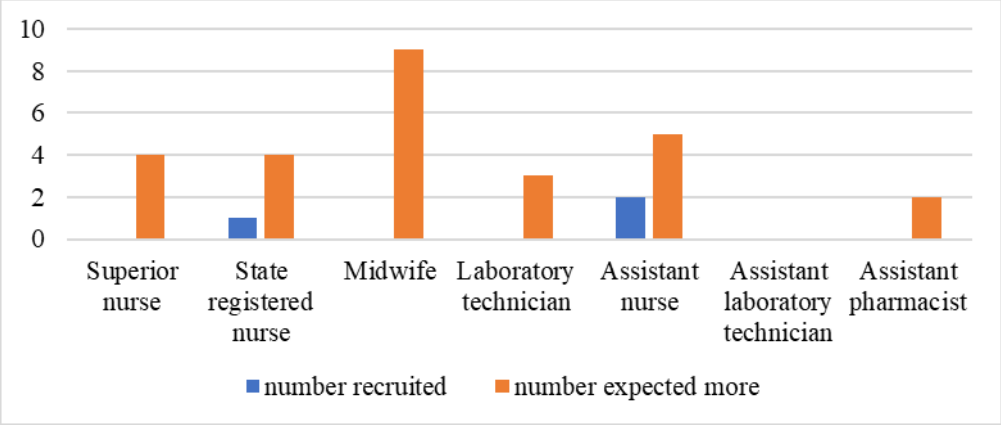

Figure 1: Requirements and qualification of HRH recruited in DHD.

All health facilities had full time opening working shift in 2020. Recruited staff under decentralized administration did not have an additional effect on continuity or the sustainability to access services. Malaria is endemic and severe clinical forms could necessitate inward admissions, a 24/7 opening was a consistent motivation in an increasing population area. The health district of Djoungolo is geographically situated in urban and rural areas and its health facilities ensured a continuous service for management of malaria.

Table 1: Working shift in the public health facility of Djoungolo health district

Health facility	Opening working shift
IHC Abom	Full time
IHC Emana	Full time
SHC Elig-Essono	Full time
SHC Nkolmesseng	Full time

3.2 Impact of devolution in human resource for health on management of malaria

HRH impact on management of malaria was assessed by measurement of ratio. For the management of suspected simple malaria, needs for Senior nurses were less important in SHC because they were medicalized health centres and general consultations were made by medical doctors; but in IHC, there was essential (table 2).

Table 2: Ratio number of suspected simple malaria cases / number of senior nurses

	sim/sn 2020	**sim/sn optimal**	**sim/sn 2021**
SHC	0	0.0041708	0
IHC	0	0.0243939	0
Yde 1 HF	0	0.0136916	0
Yde 5 HF	0	0.0148731	0

Needs for State registered nurses were 5 times more important in IHC than SHC for an optimal functioning. During the first semester of 2020, SHC of the Djoungolo health district lacked 11% of State registered nurses

for the clinical management of simple malaria and this gap had not been filled during the first semester of decentralization. However, an improvement occurred at the level of IHC where there was an increase of 20% toward the goal. The health facilities (HF) under the decentralized territorial collectivities (DTC) of Yaoundé 1 double the density of State graduated nurses for the clinical management of simple malaria during the first semester of the decentralization by devolution for an optimal functioning.

It is not the case for the HF under the DTC of Yaoundé 5 for which the needs for State registered nurses were 1.5 higher than HF under the DTC of Yaoundé 1 but did not fill in the difference of 54% for an optimal clinical management of patient suffering from suspected simple malaria during the first semester of the decentralization (table 3).

Table 3: Ratio number of suspected simple malaria cases / number of State registered nurses.

	Ratio sim/srn 2020	**Ratio sim /srn optimal**	**Ratio sim/srn 2021**
SHC	0.0111664	0.0125123	0.0111664
IHC	0.0243939	0.060836	0.0367396
Yde1 HF	0.0150375	0.0287291	0.0273832
Yde5 HF	0.0205228	0.0446192	0.0205228

Among public health facilities (HF) of the Djoungolo health district, IHC had a gap of 42% in Assistant nurses for the clinical management of suspected simple malaria during the first semester of 2020. Under decentralized administration this gap had been reduced to 25% during the first semester of 2021 while in SHC the ratio of assistant nurses for the clinical management of suspected simple malaria was sufficient since the first semester of 2020 and also during the first semester of decentralization by devolution.

The local public HF of Yaoundé 1 had a ratio of 55% for assistant nurses for an optimal clinical management of suspected simple malaria during the first semester 2020 while those of Yaoundé 5 had 70%. During the first semester of decentralization by devolution, there was an improvement to 85% in HF under the DTC administration of Yaoundé 1 (table 4).

Table 4: Ratio number of suspected simple malaria cases / number of assistant nurses

	Ratio sim/an 2020	**Ratio sim/an optimal**	**Ratio sim/an 2021**
SHC	0.01655	0.01655	0.01655
IHC	0.0852298	0.1463633	0.1099212
Yde1 HF	0.0451124	0.0821495	0.0698038
Yde5 HF	0.0566674	0.0807638	0.0566674

For the management of severe malaria, local public health facilities of the health district of Djoungolo were lacking Senior nurses. Demand was double for IHC compare to SHC. The respective communal administrations did not impact the heath facilities of the health district to improve this human resource issue (table 5).

Table 5: Ratio number of suspected severe malaria cases / number of senior nurses

	Ratio sm /sn 2020	Ratio sm/sn optimal	Ratio sm/sn 2021
SHC	0	0.015496	0
IHC	0	0.0054722	0
Yde1 HF	0	0.0100541	0
Yde5 HF	0	0.0109141	0

There were disproportions between needs and availability in State registered nurse for the management of severe malaria. Sub-divisional health centres (SHC) of the Djoungolo health district were overstaffed since the first semester of 2020 with a ratio 3 times higher than expected for an optimal functioning. Integrated health centres (IHC) were understaffed at the same period; with only 9% of the requirements achieved for the clinical management of suspected severe malaria. Under the decentralized administration this score slightly improved to 13% during the first semester of 2021 (figures 2). There was an overall shortage in State registered nurses for management of suspected severe malaria in local health facilities of both decentralized territorial collectivities (DTC). HF in DTC of Yaoundé 1 and 5 had respectively 60% and 61% of their goals achieved for an optimal clinical management of suspected severe malaria in 2020. Under the DTC administration no additional effect occurred in local HF of Yaoundé 5 but an increase to 70% in Yaoundé 1 (figure 3).

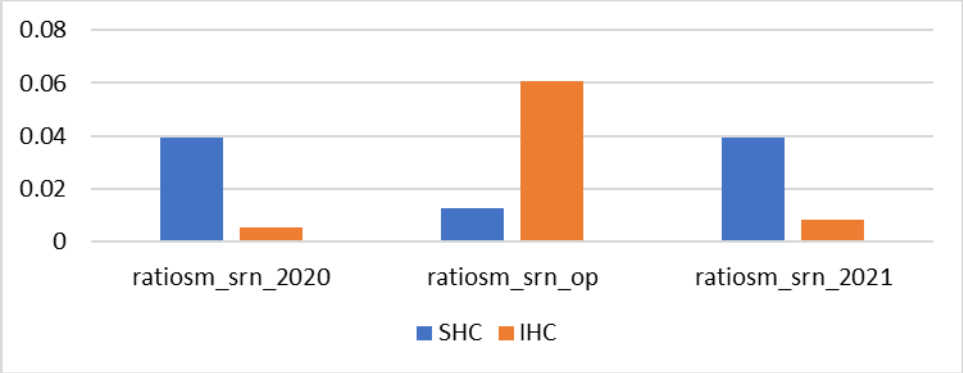

Figure 2: Ratio number of suspected severe malaria cases / number of State registered nurses in HF category.

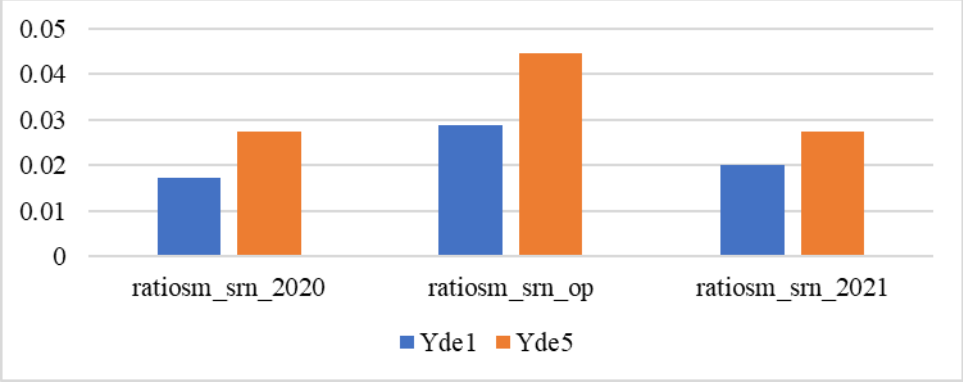

Figure 3: Ratio number of suspected severe malaria cases / number of State graduated nurses in DTC.

Assistant nurse staff was sufficient since the first semester of 2020 in SHC for the clinical management of suspected severe malaria. Under the decentralized administration there was an improvement from 58% to 75% in the IHC of the health district (figure 4).

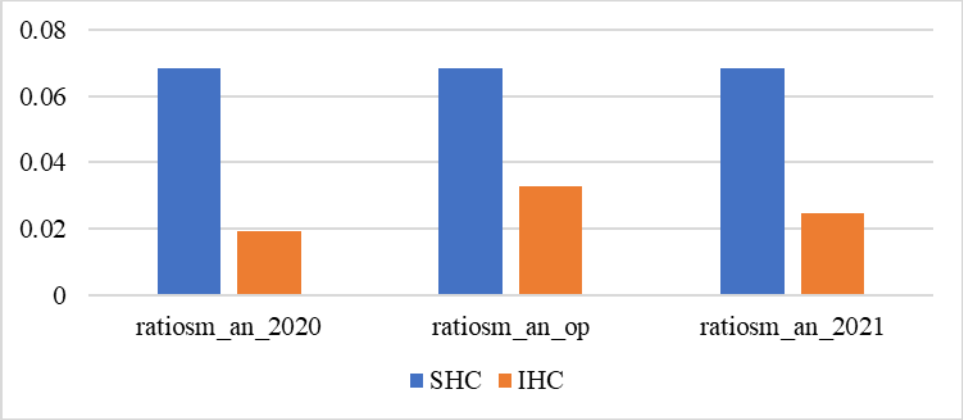

Figure 4: Ratio number of suspected severe malaria cases / number of assistant nurses in HF category.

Sub-divisional health centres SHC) of Djoungolo health district had sufficient Laboratory technician to perform rapid diagnostic test for the confirmation of malaria before the decentralization which did not give an additional resource. Integrated health centres (IHC) suffered from shortage of this human resource by 50% and there was no improvement under the decentralized administration (table 6). Assistant laboratory staff was sufficient since and there was no additional need for this human resource in the local public health facilities (HF) prior the first semester of decentralization to perform rapid diagnostic test to confirm malaria (table 7).

Table 6: Ratio rapid diagnostic test/number of laboratory technician.

	Ratio rt/lt 2020	**Ratio rt/lt optimal**	**Ratio rt/lt 2021**
SHC	0.0614902	0.0641568	0.0614902
IHC	0.005	0.013367	0.005
Yde 1 HF	0.0588235	0.0621905	0.0588235
Yde 5 HF	0.0076667	0.0153333	0.0076667

Table 7: Ratio rapid diagnostic test/number of assistant laboratory technician.

	Ratio rdt/alt 2020	**Ratio rdt/alt optimal**	**Ratio rdt/alt 2021**
SHC	0.1898039	0.1898039	0.1898039
IHC	0.025101	0.025101	0.025101
Yde1 HF	0.1865716	0.1865716	0.1865716
Yde5 HF	0.0283333	0.0283333	0.0283333

The first semester of decentralization by devolution did not improve the score of 58% of the number of Laboratory technician to perform blood smear test for the confirmation of malaria in SHC nor the 26% in IHC. The same applied to both decentralized administrations, score were respectively 25% and 50% for Yaoundé 1 and Yaoundé 5. However, it should be noted that decentralized territorial administration (DTC) of Yaoundé 5

had scored better (table 8). Assistant laboratory technician fulfilled the task of blood smear diagnostic test of malaria in all the public health facilities of Djoungolo health district under decentralized administration (Figures 5 and 6).

Table 8: Ratio blood smear confirmation test /number of laboratory technician.

	Ratio bs/lt 2020	Ratio bs/lt optimal	Ratio bs/lt 2021
SHC	0.0089177	0.0154112	0.0089177
IHC	0.0040816	0.0153575	0.0040816
Yde1 HF	0.0024242	0.0096184	0.0024242
Yde5 HF	0.0105751	0.0211503	0.0105751

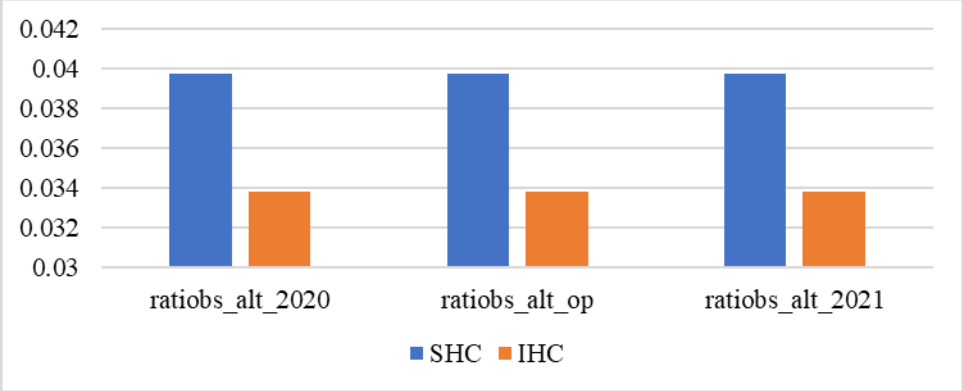

Figure 5: Ratio blood smear confirmation test /number of assistant laboratory technician in HF category.

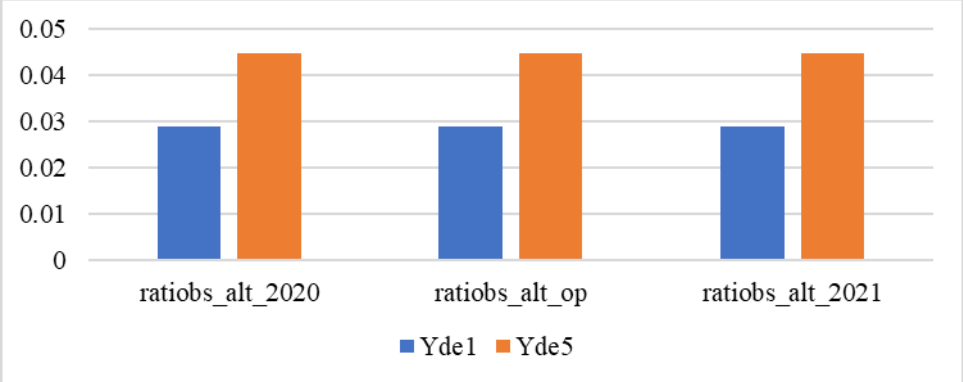

Figure 6: Ratio blood smear confirmation test /number of assistant laboratory technician in DTC.

4. Discussion

4.1 Impact of human resources under decentralization on the sustainability to access services

The density of nurse and paramedical staff have been assessed in the health district of Djoungolo. In 2020, nurses and paramedical staffs represented 65% of Djoungolo health district local public health force. This percentage was similar to Tandi and colleagues (2015), who revealed a score of 65.32% representing the public

based health workforce in Cameroon [6]. Although this score was not optimal, it was better than those obtained by Munywoki and colleagues in 2020 who estimated human resources for health (HRH) numbers at 22.7% of the required for effective health service delivery in Kenya [4]. According to Tandi and colleagues (2015), a score of 65% corresponded to an aggregate density of health personnel to population of 1.3 per 1000 [6].

Decentralization by devolution of power to local authorities started in 2021; and during its first semester nurses and paramedical staffs increased to 70% at the local public health facilities of Djoungolo health district. This score increased the aggregate density of health personnel/ population to 1.4 per 1000 which was below the critical threshold of 2.3 per 1000 populations but demonstrated the effectiveness of the decentralization by devolution in this health district. WHO estimated that below this critical threshold, basic health services cannot be provided to the population [6]. In the Djoungolo health district basic public health services were provided 24 hours daily during 7 days a week (24/7) since 2020 and devolution in human resources for health reduced the work load by 10 % and positively influenced continuity and sustainability of health services.

Since 2020 staffing profile in the local public health facilities of Djoungolo health district for clinical management of malaria was unevenly distributed. Out of 4 required Senior nurses none was present (100% less), 7 out of 11 for Registered nurses (36 % less), 5 out of 14 Midwifes (64% less), 16 out of 21 Assistant nurses (24% less) and 17 out of 17 Assistant laboratory technicians (100%). In Uganda, Batega (2007) compared Tororo and Bugiri Districts and found inadequate and unevenly distributed human resource staffing level and profile; thus, affecting the capacity to plan and implement malaria control. 21 Senior nurses out of the approved 29 (27.5% less); 58 Enrolled nurses out of the approved 90 (36% less); 8 Laboratory assistants out of the approved 18 (56% less) in the district of Tororo; which was overstaffed with 102 nursing aides out of the approved 66 (45% more) while Bugiri district was globally understaffed and needed 25 enrolled nurses, 11 laboratory assistants [8].

The profile of staff recruited in the health district of Djoungolo during the first semester of decentralization by devolution gave an additional work force for the management of malaria. Staffing requirements had not met but there was an improvement. Needs for enrolled nurses (State registered nurses and Midwifes) drop from 52% to 48%, and Assistant nurses from 24% to 14%. However, understaffed health work force still persisted, devolution did not improve the Senior nurse staff which was still inexistent despite a requirement of 4. Sumah and Baatiema (2018) concluded that the practice of decentralization in the Ghanaian health sector was more apparent than real; there was a limited autonomy and discretion in the management of human resource at the subnational units which had potential adverse implications on effective recruitment, retention, development and distribution of health personnel [3].

4.2 Devolution in human resources for health and management of malaria at Djoungolo health district

According to the staff profile and the requirements for an optimal clinical management of suspected simple and severe malaria, we observed unequal repartition in local public health facilities.

- overstaffed State registered nurses for the management of suspected severe malaria in sub-divisional

health centres (SHC).

- normal staffed Assistant nurses for the clinical management of suspected simple and severe malaria in SHC; and Assistant nurses for the clinical management of severe malaria in health facilities (HF) of Yaoundé 1.
- understaffed Senior nurses for the management of simple and severe malaria in all the local health facilities of Djoungolo health district; State registered nurses for the clinical management of suspected simple malaria in HF of Yaoundé 5 decentralized administration and suspected severe malaria in HF of both decentralized administration; and Assistant nurses for severe malaria in HF of Yaoundé 5 decentralized administration.

The confirmation diagnostic of malaria was performed through rapid diagnostic tests and/or blood smear tests. As for the clinical management of suspected cases, we observed unequal repartition in local public health facilities. In the health facility (HF) categories and decentralized administrations of the health district of Djoungolo; there were

- understaffed Laboratory technician to perform and validate; rapid diagnostic tests for malaria in IHC categories, and in HF of Yaoundé 5 decentralized administration; blood smear test for malaria in all local health facilities of Djoungolo health district.
- normal staffed Laboratory technician to perform and validate rapid diagnostic tests for malaria in SHC and in Yaoundé 1 decentralized administration; Assistant laboratory technician to perform rapid diagnostic and blood smear tests for malaria in all local health facilities of Djoungolo health district.

Assessing the first semester of decentralization in the health district of Djoungolo revealed disparities in repartition of health work force in its local health facilities. This; has also been seen by Djibuti (2008) who concluded after ten years of public health reforms in Georgia that the public health force still had irrational and inadequate knowledge and skills [9]. Taarushokye (2008) in his thesis on factors affecting access to decentralized health system at Makerere University in Uganda stated that lower units of public health facilities were not functional under decentralized health district services and that malaria burden and mortality are mainly due to lack of staff or sheer absenteeism [10]. As a new administrative reform in health, decentralization by devolution in the health district of Djoungolo was ongoing and despite the persistence of inequalities. We noted from the analysis of the results obtained that devolution improved in the profile repartition with considerable normal staff and did not worsen the number of death at the local public health facilities of Djoungolo health district. The impact of decentralization by devolution in the management on malaria in the health district of Djoungolo shown 10% increase in the local public health force of the health district of Djoungolo during the first semester of decentralization by devolution. This score positively influenced the management of malaria in the district including; clinical management of suspected cases and confirmation diagnostic for a better care of patients. No death has been reported in the local public health facilities of Djoungolo health district since 2020 and during the first semester of decentralization by devolution health district. This observation shown that malaria mortality rate (MMR) was not relevant in local public health facilities of Djoungolo health district before the decentralization which did not influence it.

In Kenya decentralization by devolution occurred in March 2013, Kodhiambo and colleagues performed a 6 years' retrospective quasi-experimental study in all the 164 public health facilities of Homa-Bay County and they compared malaria mortality rate (MMR) before and after decentralization by devolution. they concluded that devolution did not have a positive impact with 0.5% increase [11]. The research in Homa Bay County included all the 164 public health facilities, while only 4 local public health facilities of the health district of Djoungolo had been screened; there was a functional reference-counter reference system working in this health district which has in addition of 1 district hospital, 5 public references centres (HGY, HGOPY, HJY, CHE, CHRACERH) for management of complicated cases of malaria and 280 private and confessional based health facilities not under decentralized administration.

5. **Conclusion**

We assessed the first semester of decentralization by devolution in human resources for health in the management of malaria in in health district of Djoungolo. We formulated the hypotheses that communal councils did not recruit and manage nurse and paramedical staffs to reinforce insufficient human resources for health. This negatively affected continuity or sustainability of services for management of malaria. We also formulated that decentralization by devolution in human resources for health did not improve on management of malaria at the health district of Djoungolo. As objectives, we measured the impact of recruited human resources for health under decentralization on sustainability to access services and we measured its impact on the management of patients suffering from malaria. Context-based theories (CBT) allowed us to assess the impact of human resources for health in a context of decentralization by devolution with regard to the management of malaria. The results shown that devolution in human resources for health reduced the work load by 10 % and positively influenced continuity and sustainability of health services. The profile of staff recruited in the local health facilities of Djoungolo health district during the first semester of decentralization by devolution gave an additional work force for the management of malaria. There was uneven repartition of staff profile with some overstaffed, normal staffed or understaffed human resources according to the needs or requirements. Malaria mortality rate (MMR) was not relevant in local public health facilities of Djoungolo health district before the decentralization which did not influence it. Our research was limited in time and scope. We performed a one-semester period research to evaluate the impact of decentralization by devolution to locals in the health district of Djoungolo, this duration was extremely short for a good assessment when comparing to studies over years. The study was also conducted at a single health district, the involvement of more health districts of the Cameroon can give an accurate impact of the decentralization. When taking into consideration problems identified and their consequences on health services delivery we advocated for more nursing and paramedical staffs' recruitment by communal councils; we recommended even assignment and redeployment of staff within the health district and services based on needs.

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