




# Assessment of Staffing Needs for Frontline Health Workers in Selected Maternal and Child Health Services in 3 Countries of Sub-Saharan West Africa: Cote d'Ivoire, Burkina Faso, and Niger

Health Services Insights  
Volume 15: 1–10  
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DOI: 10.1177/11786329221139417



Denise Kpebo<sup>1,2</sup>, Antarou Ly<sup>3</sup>, Wambi Maurice Evariste Yameogo<sup>2</sup>, Sujata Bijou<sup>4</sup>, Meda Bertrand Ivlabèhirè<sup>3</sup>, Halima Tougri<sup>3</sup>, Marguerite Ndour<sup>4</sup>, Orsot Tetchi<sup>1</sup>, Stéphane Parfait Sablé<sup>1</sup> and Seni Kouanda<sup>2,3</sup>

<sup>1</sup>Public Health Department, Felix Houphouët Boigny University, Abidjan, Côte d'Ivoire. <sup>2</sup>African Institute of Public Health, Ouagadougou, Burkina Faso. <sup>3</sup>Institut de recherche en Sciences de la Santé (IRSS), Ouagadougou, Burkina Faso. <sup>4</sup>Intrahealth International, Chapel Hill, NC, USA.

**ABSTRACT:** Sub-Saharan African countries health systems are generally faced with shortages and inequitable distribution of qualified health workers. The application of provider-population ratio or fixed staff establishments, not considering variation in workload, given contextual variations in service utilization rates, cannot adequately match the human resource needs of different health facilities. The Workload Indicators of Staffing Need (WISN) method uses workload to determine staffing needs in a given facility. The aim of this study was to assess the current workload and staffing needs of maternal and child health services in 12 primary healthcare facilities from Burkina Faso, Niger, and Cote d'Ivoire. We employed the WISN methodology, using document reviews, in-depth interviews with health providers, and observations, to obtain the data needed for estimating the required number of staff in a given facility. Then, we calculated both the WISN difference (current–required staff), and the WISN ratio (current staff/required staff). Using the WISN ratio, we assessed the work pressure that health workers experience. The results showed a shortage of health workers in most services in Cote d'Ivoire and Niger (WISN ratio <1), in contrast to Burkina Faso where services were either adequately staffed or overstaffed (WISN ratio ≥1). The workload pressure was generally high or very high in Cote d'Ivoire, while in Niger, it was very high in maternity services but rather low in dispensary ones. There was also a geographic discrepancy in health workers staffing, rural areas services being more understaffed, with a higher workload pressure as compared to urban areas ones. This study results strengthens the body of knowledge on the shortage of health workforce in sub-Saharan Africa French speaking countries. Policies and strategies to increase students training capacities and the application of regular WISN studies for a better staff distribution are necessary to address the human resource needs of health facilities in these countries.

**KEYWORDS:** Workload indicators of staffing needs, human resources for health, health workforce, frontline health workers, maternal and child health

**RECEIVED:** June 16, 2022. **ACCEPTED:** October 28, 2022.

**TYPE:** Original Research Article

**FUNDING:** The author(s) received no financial support for the research, authorship, and/or publication of this article.

**DECLARATION OF CONFLICTING INTERESTS:** The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

**CORRESPONDING AUTHOR:** Denise Kpebo, Public Health Department, Felix Houphouët Boigny University, 01 BPV 34 Abidjan 01, Abidjan, Lagunes Region, Côte d'Ivoire. Email: dkpebo@gmail.com

## Background

Maternal and child health was one of the main global health challenges in which the least progress was witnessed in the year 2015.<sup>1,2</sup> Hence, greater progress is required to meet the Sustainable Development Goals (SDGs) by ensuring equitable access to skilled and motivated health workers within a performing health system.<sup>2</sup> The SDGs 3.1 and 3.2 related to maternal and child health aim at reducing the global maternal mortality rate to less than 70 per 100 000 live births, and the under-5 mortality to at least 25 per 1000 live births.<sup>3</sup>

To achieve these goals, a health worker density of 4.45 per 1000 population (or 44.5 health workers—doctors, nurses, and midwives—per 10 000 population) is required.<sup>4</sup> However, there is a global health worker shortage in 57 developing countries, 36 of which are in Africa.<sup>5,6</sup> The need for sufficient health workers is particularly high in Sub-Saharan Africa (SSA) as this region accounts for approximately 66% (196 000) of the

estimated global maternal deaths in 2017, and about 53% of all under-5 deaths in 2019 (2.8 million).<sup>7,8</sup>

Admittedly, there is no single, straightforward intervention which can significantly decrease maternal and child mortality, but it can be addressed by providing an efficient health system with trained health workers being a key component.<sup>2,9–11</sup> However, many challenges related to human resources for health (HRH) impede access to quality health care in SSA. They include shortages and inequitable distribution of health workforce, poor HRH planning, uninformed policy decisions, inadequate recruitment and retention structures, and inadequate training capacities.<sup>11–17</sup> These result in disparities in health workforce densities by geographical locations (urban and rural areas) and levels of health care delivery.<sup>13,15,18</sup> Such situations show that there is an increasing need for health organizations to identify the most appropriate staffing levels and skills mix to ensure efficient and effective use of limited resources.<sup>19,20</sup>



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Evidence shows that most primary-level facilities in SSA are staffed either by using the practitioner-to-population ratio threshold or a majority is not staffed using any evidence-based method.<sup>19</sup> These methods fail to estimate staffing requirements in relation to actual workloads given contextual variations in service utilization rates, health workers' daily activities, and time expended in service delivery, as well as the regional discrepancies in morbidities, are not considered in staffing the facilities.<sup>15,19</sup> In view of the numerous staffing challenges for human resources in health, the World Health Organization developed the Workload Indicators of Staffing Need (WISN) in the late 1990s, as a way to analyze and compute the different health cadres required by health facilities, based on workload.<sup>16</sup>

WISN studies have been conducted in sub-Saharan Africa but mainly in eastern Africa.<sup>6,21,22</sup> Very few of them have been conducted in West Africa, especially in French speaking African countries, and were not specifically targeted at maternal and child health services. Moreover, some of the few studies conducted in Niger and Burkina Faso were specifically concerned with the effect of the subsidy fee policy and no study in the 3 countries under study, has been conducted to assess staffing needs and provider's staffing workload under routine circumstances.<sup>23</sup>

With the aim to fill these gaps, this study was conducted to determine the staffing requirements and to measure the workload pressure of the frontline health workers in selected maternal and child health services in Burkina Faso, Cote d'Ivoire, and Niger.

## Methods

### *Study design*

This was a cross-sectional study design with mixed methods, conducted in the 3 countries. We used the updated WISN manual (2010), developed by the World Health Organization for calculating the optimal distribution and deployment of health staff.<sup>16</sup> This is a human resources management tool that is to determine how many staff are needed to cope with the workload of a given health facility and to analyze the workload pressure of existing staff.

The steps of the WISN method, as described in the manual,<sup>16</sup> are:

- Determining the priority cadre(s) and health facility type(s) for applying the WISN method;
- Estimating available working time (AWT), defined as the time a health worker has available in 1 year to do his or her work, taking into account authorized and unauthorized absences;
- Defining workload components, consisting of 3 types of activities: health service activities, support activities, and additional activities. Health service activities are the core functions performed by all members of the staff category, and for which regular service statistics are collected.

Support activities relate to those activities performed by all members of a cadre, but for which service statistics are not collected (ref WISN). Additional activities are only performed by certain members of a cadre and regular statistics are not collected on them;

- Setting activity standards, defined as the time necessary for a well-trained, skilled, and motivated worker to perform an activity to professional standards in the local circumstances, made of 03 sub-categories: service standard for health service activities, category allowance standards (CAS for support activities), and individual allowance standards (IAS for additional services);
- Establishing standard workloads that is the amount of work within a health service workload component that one health worker can do in a year;
- Calculating allowance factors in order to take account of the staff required for both health service and support activities (category allowance factor, CAF) and additional activities (individual allowance factor, IAF);
- Determining staff requirements based on WISN by calculating the total staff required to cope with all the workload components of the cadres under study;
- Analyzing and interpreting the WISN results.

### *Study duration and setting*

The study was conducted between March and May 2019. In each of the 3 countries, the study was conducted in 4 primary level healthcare facilities (PHC facilities) of 2 health districts, meaning 2 PHC facilities per district, for a total of 12. The selection of the district and health facilities in each country was purposively made by a working group on Maternal, Neonatal and Child Health (MNCH) from the Ministry of Health in the context of the implementation of an integration project of PFPP, MNCH, and Nutrition services.

### *Cadres/study population*

The study population included front-line workers of maternity and dispensary services, specifically nurses and midwives, who were the main targets of the intervention. These cadres have been shown to bear the brunt of the clinical workload, have significant financial implications for the health sector due to their large numbers<sup>5,24</sup> and have been the subject of similar studies in Burkina Faso, Niger and elsewhere, thereby facilitating local and international comparisons.<sup>15,23,25</sup> Volunteer staff as well as trainees were not taken into account, since they are not part of the official staff of these services.

### *Sampling strategy*

This was an exhaustive sampling, both for the qualitative and the quantitative part of the study. Any eligible health provider present at the time of the survey and willing to participate was

included in the study. These eligible health providers were nurses and midwives with at least 1 year experience, who were part of the official staff of the health facility.

### Data collection

Data were collected in 2019, over a 2-week period in each country. More precisely, data were collected from March 25th to April 7th in Burkina Faso, from April 13rd to 27th in Cote d'Ivoire and from April 22nd to May 7th in Niger.

In Cote d'Ivoire and Burkina Faso, data related to services statistics were collected by a team of 9 field data collectors (FDCs) divided into 3 teams and 2 supervisors. In Niger, these data were collected by a team of 6 FDCs divided into 2 teams with 2 supervisors. These investigators were made up of doctors, sociologists, nurses/midwives, and other investigators selected on the basis of their experience working within the health system.

Workload components and activity standards were determined based on both focus group and in-depth interviews with key informants. They were experienced nurses and midwives having thorough knowledge about the nursing and midwives practice and administrative issues. In addition, data from previous WISN studies were also examined.<sup>23</sup> Information obtained from these sources was used to develop the data collection tools adapted from the data elements in the WISN software.

A structured observation tool was also designed for FDC to measure the average time it took to complete the services activities calculated from surveyor's observations (mean observed duration = MOD) containing 3 sections: background information on the setting and the staff, time—a column for the activity under observation (eg, ANC, curative consultation, immunization, delivery) and the time spent in minutes for completing the activity. FDCs observed healthcare delivery points every day, both in the morning and the afternoon, whenever services were provided to minimize bias due to the timing of patient loads (assuming higher patient load in the morning and lower in the afternoon).

For qualitative data collection, a semi-structured interview guide for in-depth interviews (IDIs) with providers was developed to explore the challenges faced by nurses and midwives regarding their working conditions and their perceived workload.

### WISN variables

WISN calculations require 4 variables: available working time (AWT), annual workload, activity standards, and current staffing.

- Estimating available working time

The AWT was calculated using information obtained from previous WISN studies<sup>23,25</sup> and from government documents and health facilities on working days per week, working hours per day,

annual leave, public holidays, casual leave, compassionate leave, and estimated training days. For all categories of staff, a common number of weeks per year (52 weeks), working days in 1 week (5 days), possible working days in 1 year ( $52 \times 5 = 260$  days) were estimated. Next, leave of absences, holidays days, and training days, were deducted to obtain the annual working time in days. By multiplying this by daily working hours (8 hours/day), we obtained the annual working time in hours. Available working time only takes into account an 8 hours work day; to address the 24 hours coverage provided by nurses and midwives in primary level health care facilities, we used the calculations methods provided in the WISN manual to estimate the number of staff required to cover evening and night shifts,<sup>16</sup> and we considered them in the “individual allowance factors,” as done in previous studies.<sup>24</sup>

- Defining workload components and setting activity standards

Workload components and activity standards were determined based on both focus group and in-depth interviews with key informants, supplemented by observation and in-depth interviews from the study sites providers using the elaborated survey tools. For this study, activities standards were estimated in 2 ways: through the mean observed duration (MOD) reported by FDCs and through providers' estimates (mean declared duration = MDD).

Workload components were reconciled and validated, combining information collected from the in-depth interviews with key informants, the focus groups and the in-depth interviews with the study site healthcare providers. For this study, activity standards were estimated in 2 ways: through the mean observed duration (MOD) reported by FDCs and through providers' estimates (mean declared duration = MDD). Following experts' advice, we rely more on MOD for interpreting the results. However, both were kept because they were in the range of standards activities provided by experts and also because authors wanted to underscore the discrepancy between both, hence the need for nationally validated standards activities.

- Determining annual workload

FDCs and supervisors worked with the staff (managers, healthcare providers, and data managers) to assemble facility service statistics data. The teams reviewed the data for each facility for the 1-year period from January 1 to December 31, 2018. Data that were not available at facility level were retrieved from the national health management information system (HMIS), where facilities report to the district level on a monthly basis.

- Establishing standard workloads

Standard workload is the amount of work within a health service workload component that one health worker can do in a year.<sup>16</sup> This was done by dividing the annual working time by unit time

of health service activities. Then, allowance factors, to document the additional and support activities performed by a health staff, were also calculated using formulas from the WISN manual.<sup>16</sup>

- Determining staff requirements based on WISN

Then, as indicated in the WISN manual, standard workload, annual service statistics, and activity standards for support and additional were combined to calculate the requirement for staffing at a particular health facility.

$$\text{WISN staff requirement} = \sum \frac{\text{Annual workload} \times \text{CAF}}{\text{Standard workload}} + \text{IAF}$$

- Analyzing and interpreting WISN ratio

With regard to the number of required staff, the fractional results were rounded up or down, following the guideline provided in the WISN manual<sup>16</sup>:

Finally, based on the existing number of staff in each of the health facilities, we calculated both the WISN difference (current number of staff–required number of staff by WISN), and the WISN ratio (current number of staff/required number of staff by WISN).<sup>16</sup> The WISN difference is used to identify the health facilities that are relatively understaffed or overstaffed: a negative value signifies a shortage, and a positive value represents an excess in staffing.<sup>16</sup> Using the WISN ratio, we assessed the work pressure that health workers experience, either high workload (ie, when the WISN ratio is lower than 1), low workload (ie, when the WISN ratio is higher than 1), or normal workload (ie, when the WISN ratio is equal to 1).<sup>16</sup> We interpreted workload pressure according to the classification developed by investigators in Indonesia, who defined pressure as ranging from “low” (1%–29%) to “high” (30%–40%), “very high” (41%–60%), or “extremely high” (>60%).<sup>26</sup>

### *Ethical issues*

Prior to the implementation, the protocol has been approved by the national ethics committee of the 3 study countries. Participation in the study was free and voluntary, after obtaining participants informed consent.

## **Results**

### *Available working time (AWT)*

The officially available working time for health workers was 1628 hours in Cote d'Ivoire, 1627 hours Burkina Faso, and 1623 hours in Niger (Table 1).

### *Workload components and of activity standards*

*Services activities.* The workload components of services activities as well as activity standard are presented in Table 2. In general, vaccination was the activity that took the least time on

average, while childbirth, from labor to delivery, as well as examinations carried out during observation was the longest activity.

However, the mean duration declared (MDD) by health workers is, in most cases, greater than the mean duration observed (MOD) during the survey. These observed times reflect the real time taken by health workers to perform the activity, but caregivers estimate that MDD is the time required if they met the quality standards for each activity. In addition, the staff consider that they cannot strictly comply with these quality standards because of the dilapidated health infrastructure and lack of materials.

*Support and additional activities.* Administrative activities, wound dressing, and injections were the main support activities in health facilities (Table 3). The average time taken for the support activities varied from 30 min/day to 6 hours/month in Cote d'Ivoire, and the number of people required varied from 1.21 to 2.45. In Burkina Faso, the average time to carry out support activities was 15 min/day to 5 hours/month, requiring an average number of people of 1.32 to 2.81. Finally, in Niger, according to the data analyzed, the average time taken for support activities varied between 30 min/day and 6 hours/month, requiring a staff number of between 1.31 and 2.92.

General administration related activities, trainees' supervision, and districts meetings were the main additional activities (Table 4). The average time taken for these activities varied from 2 hours/month to 1 hour/day in Cote d'Ivoire and Niger, and from 1 to 25 hours/month in Burkina Faso.

### *Midwives' status in the facilities according to the WISN methods*

The number of staff required per health facility was calculated based on both the mean observed duration (MOD) and the mean declared duration (MDD) according to providers' point of view (Table 5). In Cote d'Ivoire, with regard to the required number of maternity staff, 3 out of 4 health facilities were understaffed, taking into account the MOD, but according to the MDD, all health facilities were understaffed. For maternity services in Niger, with the exception of Aguié urban CSI, all maternity services were also understaffed; the number of staff who were present at the time of the survey was lower than what was required. In Burkina Faso, according to the WISN results based on MOD, maternity services were not suffering from a lack of staff. In fact, all the structures were either overstaffed or at least equally staffed. However, when based on the MDD, all the maternity were suffering from a lack of healthworkers. Workload pressure was very high in half maternity services in Cote d'Ivoire and Niger ( $\leq 40\%$ ), according to the MOD.

### *Nurses' status in the health facilities of the 3 countries*

The nurse's status in the health facilities of the 3 countries are presented in Table 6. In Cote d'Ivoire, the MOD indicates that

**Table 1.** AWT for health workers in Cote d'Ivoire, Burkina Faso, and Niger.

	COTE D'IVOIRE		BURKINA FASO		NIGER	
	MIDWIVES	NURSES	MIDWIVES	NURSES	MIDWIVES	NURSES
A: Total week/year	52	52	52	52	52	52
B: Working days/week	05	05	05	05	05	05
C: Working hours/day	08	08	08	08	08	08
D: Potential working days ( $A \times B$ )	260	260	260	260	260	260
E: Annual holidays	16	16	17	17	14	14
F: (Annual leave)	30	30	30	30	30	30
G: Sick leave	03	03	03	03	03	03
H: Absence for training	10	10	10	10	10	10
AWT (d) = $D - E - F - G - H$	204	204	204	204	203	203
AWT (h): $AWT (d) \times 8$	1628	1628	1627	1627	1623	1623

**Table 2.** Workload components and standard activities for health services in Cote d'Ivoire, Burkina Faso, and Niger, intervention versus control districts (in minutes).

	COTE D'IVOIRE				BURKINA FASO				NIGER			
	ABENGOUROU		AGNIBILÉKRO		PÔ		KOMBISSIRI		AGUIÉ		GUIDAN MOUSSO	
Activities	MOD	MDD	MOD	MDD	MOD	MDD	MOD	MDD	MOD	MDD	MOD	MDD
Delivery	102	233	80	120	92	163	99	180	98	245	108	240
CC	16	22	13	16	13	22	15	21	11	23	12	21
Healthy infant visit	7	15	5	12	7	15	5	12	6	15	5	13
ANC	21	25	18	20	21	25	18	20	10	26	13	22
IEC	30	21	11	17	18	27	16	21	16	30	15	21
Immunization	3	10	3	9	3	9	5	14	3	9	3	8
PNC	13	28	8	20	14	29	15	23	11	30	10	27
Family planning	20	26	13	20	10	24	25	25	10	24	11	25

Abbreviations: ANC, antenatal care; CC, curative consultation; IEC, Information-Education-Communication; MDD, mean declared duration; MOD, mean observed duration; PNC, post natal care.

all the rural study sites were understaffed, while the urban sites were rather adequately staffed. However, taking the MDD into account, only the CSU Damé was adequately staffed, all the others health facilities were understaffed.

In Niger, the services were understaffed according both to the MOD and the MDD which means that the number of staff who were present at the time of the survey is greater than the number required to carry out the activities of these services. In Burkina Faso, all of the CSPS, except that of Tiébélé, were either overstaffed or adequately staffed. However, according to the MDD, all dispensary services were understaffed.

Workload pressure was low in CSR Assuamé and very high in CSR Elinso in Cote d'Ivoire, while it was extremely high in

CSPS Tiébélé in Burkina Faso, all these facilities being in rural areas. In Niger, the workload was generally low, only the CSI Débi had a very high workload pressure.

#### *Assessment of workload and working conditions by health workers*

The general observation, from the qualitative survey, was that healthcare providers in Burkina Faso found their workload to be acceptable, unlike those in Cote d'Ivoire and Niger who found it too high. The main reasons mentioned in these 2 countries were mainly the shortage of staff, the excessive volume of administrative paperwork, as well as the fact that there

**Table 3.** Support activities and category allowance standards for nurses and midwives in selected health facilities.

WORKLOAD COMPONENTS	COTE D'IVOIRE		BURKINA FASO		NIGER	
	MIDWIVES	NURSES	MIDWIVES	NURSES	MIDWIVES	NURSES
General administrative activities	90 min/day	90 min/day	1 h/day	1 h/day	2 h/day	2 h/day
Wound dressing	1 h/day	1 h/day	1 h/day	1 h/day	1 h/day	1 h/day
Injections	1 h/day	1 h/day	1 h/day	1 h/day	1 h/day	1 h/day
Staff meetings	90 min/week	1 h/week	1 h/week	1 h/week	2 h/week	1 h/week
Follow-up care/home visits	3 h/week	3 h/week	2 h/week	2 h/week	3 h/week	3 h/week
Daily cleaning	30 min/day	15 min/day	15 min/day	15 min/day	30 min/day	30 min/day
Outreaches/community-based services	6 h/month	6 h/month	5 h/month	5 h/month	6 h/month	6 h/month

**Table 4.** Additional activities and individual allowances standard for nurses and midwives in selected health facilities.

WORKLOAD COMPONENTS	COTE D'IVOIRE		BURKINA FASO		NIGER	
	NUMBER OF STAFF PERFORMING THE TASK/SERVICE	ACTUAL WORKING TIME	NUMBER OF STAFF PERFORMING THE TASK/SERVICE	ACTUAL WORKING TIME	NUMBER OF STAFF PERFORMING THE TASK/SERVICE	ACTUAL WORKING TIME
Monthly report writing	1	2 h/month	1	1 h/month	1	2 h/month
General administration	1	6 h/month	1	3 h/month	1	5 h/month
Supervision of students/trainees	All unit heads	1 h/day	All unit heads	25 h/month	All unit heads	1 h/day
District coordination meetings	1	3 h/month	1	2 h/month	1	3 h/month
District technical meetings	1	2 h/month	1	1 h/month	1	2 h/month

were not enough days off after the nights on call. On the other hand, they recognized that this high workload was not continuous over the week, but was rather episodic, especially seen on busy days such as vaccination/healthy infant visits days, for example.

Most of the service providers in the 3 countries underlined the poor working conditions, mainly due to the dilapidated facilities and the insufficient number of staff in Niger and Cote d'Ivoire, an insufficient technical platform, as well as the frequent lack of drugs and other working materials in Burkina Faso, all things which do not allow an efficient work organization, hence resulting in an increased perception of the workload.

« . . . There is the lack of drugs, the frequent ruptures (you see) and often you (try to) explain to the population, but they cannot understand and they think that you are the one who wants to deprive them of these drugs. So that creates problems with the patients and their relatives, lot of arguments and also a disorganization of work for the staff. This influences our workload because we cannot rest well to face the number of patients that awaits us . . . ». (Nurse, Kombissiri).

However, on the whole, providers recognize that the main problem remains the poor organization of services because, according to them, with good organization, even a heavy workload could be manageable.

A midwife, supports these remarks: « . . . To tell the truth, it is not so much the workload which poses problems. All depends on the way in which one is organized. Because I think that if you manage to get well organized, you can do a lot of things without problems., It all depends on the organization. Actually, if it's not a busy day, it's okay. The problem is the organization. » (Midwife, CSU Affalikro, Ivory Coast).

Likewise, staff cited poor collaboration between nurses in dispensary and midwives in maternity as negatively influencing providers' workload.

We say we have to share but in reality, it is not the case. Often you are overwhelmed here in the maternity ward while the nurses next door are free, but the collaboration is not spontaneous, you see . . . you will perhaps insist, otherwise it is not spontaneously that they will come to help you. » Midwife, CSU Damé, Cote d'Ivoire.

## Discussion

This study was conducted to determine the staffing requirements and to measure the workload pressure of the frontline health workers in selected maternal and child health services in Burkina Faso, Cote d'Ivoire, and Niger. The results show a shortage of health workers in most services in Cote d'Ivoire and Niger, in contrast to Burkina Faso where services were either adequately staffed or overstaffed.

**Table 5.** WISN results for midwives' status in the 3 countries.

HEALTH FACILITIES	CURRENT STAFF (A)	MOD				MDD			
		REQUIRED STAFF (B)	DIFF WISN (A-B)	RATIO WISN (C=A/B)	WORKLOAD PRESSURE (1-C) × 100 (%)	REQUIRED STAFF (D)	DIFF WISN (A-D)	RATIO WISN (E=A/D)	WORKLOAD PRESSURE (1-E) × 100 (%)
Cote d'Ivoire									
CSU Damé	2	4	-2	0.50	50	6	-4	0.33	67
CSU Affalikro	3	3	0	1	0	5	-2	0.60	40
CSR Assuamé	3	4	-1	0.75	25	6	-3	0.50	50
CSR Elinso	1	2	-1	0.50	50	3	-2	0.33	67
Burkina Faso									
CSPS Niché Po	6	5	+1	1.20	—	8	-2	0.75	25
CSPS Tiébélé	4	4	0	1	—	5	-1	0.80	20
CSPS Niché Kombissiri	6	5	+1	1.20	—	8	-2	0.75	25
CSPS Toécé	4	4	0	1	—	5	-1	0.80	20
Niger									
CSI Aguié	10	7	+3	1.43	—	9	+1	1.11	—
CSI Débi	3	5	-2	0.60	40	6	-3	0.50	50
CSI Guidan Roundji	4	5	-1	0.80	20	6	-2	0.67	34
CSI Karazomé	3	5	-2	0.60	40	5	-2	0.60	40

The workload pressure was generally high or very high in Cote d'Ivoire, while in Niger, it was very high in maternity services but rather low in dispensary ones. There was also a geographic discrepancy in health worker staffing; rural areas services being more understaffed, with a higher workload pressure as compared to urban areas ones. In addition, there was an overall discrepancy between the required staff as estimated by the MDD given by providers, and the one that was calculated based on MOD reported by data collectors, the first being generally higher than the latter.

Based on the study results, facilities in Burkina Faso were better staffed than those in Cote d'Ivoire and Niger, these results being in alignment with a previous study conducted in 2013 in Burkina Faso and Niger.<sup>23</sup> In Burkina Faso, health workers are recruited on an annual basis not only from national nursery and midwives training schools but also from private training schools. In Cote d'Ivoire, nurses and midwives are also recruited on an annual basis, but only from the national public training school, whereas in Niger, no official recruiting policy have been implemented in the past 10 years, the MOH recruiting only occasionally. Such a different recruitment policy in Burkina Faso may have made it possible for the country to have an overall larger workforce at health centers compared to neighboring countries such as Mali or Niger and it is estimated

that Burkina Faso has many more nurses and midwives per capita than Niger and Cote d'Ivoire.<sup>5</sup> More generally, suboptimal staffing recruitment is a common issue for SSA countries health systems.<sup>2,12</sup> Evidence showed that the shortage in many countries could be attributed to limited Human Resources for health production capacity because of poor planning and underinvestment in health education and training institutions, thus frustrating the supply of young graduates.<sup>27</sup> Governments and policy makers should prioritize capacity building to develop HRH plans that quantify health workforce needs, demand, and supply of different cadres of health workers.<sup>27</sup> This will help making better decisions on the production, recruitment, and retention of sufficient numbers of health workers, and limit shortages for cadres such as midwives and nurses.<sup>27</sup>

The staff gap between current and required numbers is accentuated at rural centers. This could be explained by the high concentration of health workers in urban areas. A previous study conducted in Niger and Burkina Faso showed similar findings.<sup>23</sup> Other studies in SSA have also revealed this great disparity in human resources between urban and rural health centers. For instance, in Cameroon, Yaoundé the capital city has 45 times more health workers than the poorest province in the country.<sup>12</sup> In Malawi also, approximately 80% of the

**Table 6.** WISN results for nurses' status in the 3 countries.

HEALTH FACILITIES	CURRENT STAFF (A)	MOD				MDD			
		REQUIRED STAFF (B)	DIFF WISN (=A-B)	RATIO WISN (C=A/B)	WORKLOAD PRESSURE (1-C) × 100 (%)	REQUIRED STAFF (D)	DIFF WISN (A-D)	RATIO WISN (E=A/D)	WORKLOAD PRESSURE (1-E) × 100 (%)
Cote d'Ivoire									
CSU Damé	4	4	0	1	—	4	0	1	—
CSU Affalikro	4	4	0	1	—	5	-1	0.80	20
CSR Assuamé	3	4	-1	0.75	25	6	-3	0.50	50
CSR Elinso	1	3	-2	0.33	66	3	-2	0.33	67
Burkina Faso									
CSPS Niché Po	6	6	0	1	—	9	-3	0.67	33
CSPS Tiébélé	2	5	-3	0.40	60	7	-5	0.28	72
CSPS Niché Kombissiri	6	4	+2	1.5	—	7	-1	0.86	14
CSPS Toécé	4	4	0	1	—	6	-2	0.67	33
Niger									
CSI Aguié	3	4	1	0.75	25	7	-4	0.43	57
CSI Débi	2	4	-2	0.50	50	5	-3	0.40	60
CSI Guidan Roundji	4	5	-1	0.80	20	6	-2	0.67	33
CSI Karazomé	3	4	-1	0.75	25	5	-1	0.60	40

Malawian population lives in rural areas, yet only 30% of the country health staff work there.<sup>12</sup> Faced with this situation, an effective strategy for health worker retention is required to expand coverage of essential intervention; health workers must be incentivized with improved working conditions and good accommodations to retain them to serve in rural areas. In Zambia for instance, health workers that serve in rural areas receive an additional 25% rural and remote hardship allowance, where these policies have been effective in decreasing the migration of nurses.<sup>28</sup> Such policies could also help in improving health workers retention in the countries under study in this research.

The required number of staff according to the MDD as provided by health workers is generally higher than the number coming from the MOD collected by surveyors. This discrepancy may be explained by the fact that the higher workload perception by health workers is more related to an organizational problem rather than a lack of staff. This observation was also mentioned in the study by Ly et al.<sup>23</sup> Indeed, workload does not remain constantly high on all working days of the week. There are days of high attendance (market days, healthy infant exam days), but also days of low ones where health providers start working later and finish earlier, without meeting the standard 8 hours. A better organization that takes into

account the variations in the flow of patients could make it possible to reduce workload as perceived by providers.

The results of the qualitative survey also highlighted some issues that are worthy to notify. Indeed, providers mentioned challenges related to service organization and delivery, as well as issues with task sharing. Evidence showed that poor management, sub-optimal communication, and unplanned activities are part of the factors that exacerbate the difficulties of PHC staff to deliver high-quality patient care in SSA.<sup>29</sup> With regards to task sharing, countries are doing quite well in terms of policies adoption; however, at delivery point, there are still challenges that prevent the effective implementation of such policies.<sup>30</sup> So, countries must insist by emphasizing awareness and training but also by making data-driven decisions to settle this problem and to ensure an effective application of task sharing policy at delivery points.

All in all, our results strengthen findings of shortages and inequitable distribution of the health workforce in Africa and provide further evidence of non-availability of frontline health workers to serve maternal and child population especially at the primary level of care.<sup>15,21,22</sup> Shortages may result in reduced quality of care by increasing waiting times. At a minimum, this reduces patient satisfaction (leading to decreased utilization), but in an obstetric emergency, can cause delays resulting in death,



illness, or disability for mother and infant.<sup>12</sup> Further, shortages can also result in reduced time for patient consultations thus, poorer infection control.<sup>12</sup> In a 2005 infection outbreak at a South African hospital, resulting in 21 neonatal deaths, contributory factors cited were among others, staff shortages and heavy staff workloads.<sup>12</sup>

Although this is a pre-intervention study, there are still some policy implications worthy to be noted. First, in order to increase the availability of workforce, especially nurses and midwives, their number needs to increase. Hence, long-term policy response is needed to increase the intake of nursing students, train them with quality education and deploy them in larger numbers in a secure and gender-friendly work environment.<sup>26</sup>

Second, the discrepancy between the required number of staff according to the MDD as provided by health workers and from the MOD as collected by surveyors stresses out the need of validated and standardized activity standards at national level. This is especially indicated for sub-Saharan Africa countries where the shortage and unequal distribution of health workers is so important. Such a work has already been done for some countries, and it is worth noting that our results were not different from theirs regarding workload components and activity standards.<sup>31</sup> However, additional efforts are needed for more countries to be provided with validated national standardized estimates. That will facilitate workload assessment studies for better human resources planning and distribution. In addition, healthcare workers should be sensitized to consider the job description and available working time of each category, rather than getting used to the workload derived from their internal organizations. Thus, they will not feel overwhelmed when estimating their real workload, rather than the one set by their working habits.

Finally, this study confirms the need for health authorities to implement regular and systematic WISN assessment studies for improving health workforce planning and management, policies, strategies, and plans at national level. Regular and evidence-based redistribution of health workers is going to further improve access to healthcare and quality service delivery, and to ease workforce shortages in certain facilities. Apart from activities related to the free healthcare, the literature does not reveal any WISN study that was conducted at national level and under routine circumstances in most of the countries selected for this study.

## Conclusion

This study results strengthens the body of knowledge on health workforce in sub-Saharan Africa French speaking countries, helping in filling the gap of insufficient evidence-base information on provider's workload in this region. Human resource management remains a big challenge in these countries and the reduction of maternal and child mortality by 2030 require an optimization of existing human resources. Policies and strategies to increase students training capacities and the application of regular WISN studies for a better staff distribution

are necessary to address the human resource needs of health facilities in these countries. Further research could help in deciding how the workload-based staffing decisions can be systematically integrated into the health systems.

## Acknowledgements

The authors acknowledged IntraHealth and the INSPIRE Project for implementing this project. The overall project was funded by the Bill and Melinda Gates Foundation, but this analysis was not. We wish to acknowledge helpful key people in the study countries that were kind enough to provide additional information and explanations when needed.

## Author Contributions

DK conceptualized and wrote the first draft of the manuscript. AL, SK, and MY substantially contributed to the study methodology, data collection and data analysis, and critically reviewed the subsequent drafts of the manuscripts. SB, MB, HT, MN, OT, SP critically reviewed the manuscripts. All authors read and approved the final manuscript.

## ORCID iDs

Denise Kpebo  <https://orcid.org/0000-0002-5185-2516>

Meda Bertrand Ivlabèhère  <https://orcid.org/0000-0002-9717-3770>

Marguerite Ndour  <https://orcid.org/0000-0002-3071-2020>

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