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ABSTRACT

Introduction
In response to the threat of the Ebola Virus Disease in West Africa since March 2014, Côte d'Ivoire has developed some strategies to strengthen the capacities of the health system. The National Institute of Public Health conducted a survey of health facilities with the objectives to assess their level of preparedness against the threat of the Ebola virus disease.

Methods
A cross-sectional survey descriptive purpose, for a period of two (2) monthsfrom 1st December to 31st January 2015 was carried out among 17 health centers belonging to different levels of the health system in seven health regions of Côte d'Ivoire.

Results
Regarding the organization of the fight against Ebola in the 17 health facilities visited, the study has noted that (i) 8 health facilities had a local committee against Ebola, (ii) 11 had designated a focal point Ebola, (iii) 5 health centers had posted the management procedures and (iv) 9 health centers had the suspected case filings.
Concerning fighting equipment, 6 health facilities had isolation rooms and hand washing devices; 13 structures had a cremation site.
Staffing structures support inputs of suspected cases of Ebola was effective for gloves (16), the flaps (10) and personal protection (11).

Conclusion
Regular monitoring of Ebola's threat control interventions should maintain an adequate level of vigilance in Côte d'Ivoire.

Keywords: Health System - Ebola virus disease - Health facilities - Côte d'Ivoire

INTRODUCTION

Ebola virus disease is a serious infectious disease, highly contagious and fatal in humans with a mortality rate up to 90%. It is the Yambuku hospital in the northern Democratic Republic of Congo, then called Zaire that the first case of Ebola hemorrhagic fever was identified in September 1976 announcing a first epidemic that affected 318 people and killed 280 with sporadic appearances in some African countries (Sudan, Gabon), (WHO, 1978).

In 2014, West Africa witnessed an outbreak with cases of Ebola reported March 22, 2014 by Guinea. The epidemic has spread to Liberia and Sierra Leone. In July 2014, Nigeria was the fourth country in the region to report cases. In August 24, 2014, the epidemic reappeared in Central Africa, with confirmed cases in the Democratic Republic of Congo (BAIZE, 2014). The epidemic has been marked by the large number of reported cases, geographic and transmission proven urban expanse, with the social, economic and health in countries affected by the disease. The outbreak of the disease and the inability to contain it are related to weak institutional and infrastructural capacity in affected countries, including the failure of health systems. According to WHO estimates (UNDP, 2014), there are in total 1848 cases of Ebola, with a high proportion of health workers, with 1013 deaths reported (Briand, 2014) (USAID, 2015).

Faced with this public health emergency, since July 31, 2014 a joint response to the epidemic plan prepared by WHO and the governments of the affected countries has been published (OMS, 2014). Indeed, WHO, its technical partners in the Global Alert and Response Network Action Outbreak (GOARN), United Nations agencies and donors

continue to provide the necessary technical support and health facilities to the ministries of health to stop the transmission of the Ebola virus disease in communities. This support is provided by deploying additional experts, the provision of logistical support on ground and the supply of equipment (Field laboratory installation, delivery of medical equipment and supplies).

Apart from this international mobilization to the affected countries, all countries are on high alert to strengthen their system of prevention against Ebola.

In this initiative, Côte d'Ivoire is not outdone by border countries that are affected Guinea and Liberia; it is activated through the Ministry of Health since March 2014 to protect its population through the establishment of a series of preventive measures.

A few months after the adoption of preventive measures and the non-occurrence of cases in Côte d'Ivoire, an evaluation was necessary. It is in this context that the National Institute of Public Health (INSP) initiated a survey of health facilities.

The general objective of this study was to assess the level of preparedness of the Coast Ivory health structures for the fight against Ebola. The specific objectives are (i) Describe the preparedness of health facilities, (ii) Analyze the strengths and weaknesses of the health structures faced with the threat of Ebola virus disease and (iii) Identify the needs of health facilities.

METHODS

Part of the study

Côte d'Ivoire is bordered with the affected countries (Guinea and Liberia in the West). A reasoned choice, based on geographical distribution, has allowed us to select seven health regions which are: Indénié-Djuablin (east), GBEKE (center), Haut Sassandra (center west), Tonkpi (west), Bafing (northwest), Poro (north) and the District of Abidjan (south).

- Site Selection Criteria

The surveys were conducted in health facilities at all levels of the health system, both in urban and rural areas.
For health regions, border cities are Danane and Ouaninou which were surveyed and the capitals of the other health regions namely Abengourou, Bouaké, Daloa, Korhogo and Abidjan. In each locality, the referral hospital and a village with a health center were also visited.

Table 1: The distribution of structures visited by district and health region

Health region	Health district	Health facilities
Abidjan 1 Grand Ponts	Adjamé Plateau	HG Adjamé
	Treichville	CHU Treichville
Abidjan 2	Anyama	CSU Attinguié
Gbeke	Bouaké	CHU Bouaké
		CSR Abolikro
Haut Sassandra	Daloa	CHR Daloa
		CSR Zepreguhe
		CSR Digbapia
IndeniéDjuablin	Abengourou	CHR Abengourou
		CSR Taakro
KabadougouBafing	Ouaninou	CSU Ouaninou
		CSR Ganhoue
		CSR Ferentella
Poro	Korhogo	CHR Korhogo
		CSR Waraniene
Tonkpi	Danané	HG Danané
		CSR Banteapleu

Type and duration of the study

A descriptive cross-sectional study covered a period of two (2) months from 1st December to 31st January 2015.

Target population

The target population concerned by the survey was represented by managers of health facilities in the seven study sites selected.

Tools and Data Collection

A questionnaire for health facilities has been used to collect data such as the characteristics of the structure, the presence or absence of logistics deployed to the fight against Ebola.

The progress of the data collection

- Survey Preparation

Administrative procedures: They are made under the aegis of the General Directorate of Health to inform the Regional Directors, Departmental Directors and officials of the identified health facilities.

- The course of the field survey

Once in a selected locality, the questionnaire was administered to the person investigated by an investigator.

Statistical Analysis

Data entry was performed with Epi-Data. The statistical analysis has used appropriate statistical methods.

Ethical considerations

All respondents were subject to informed consent which took into account the objectives of the study, the sections of the questionnaire, benefits, risks and confidentiality of this study.

RESULTS

The information collected on 17 health facilities are as follows: 2 University Health Centers, 3 regional Health Centers, 2 general Hospitals, 2 urban health centers and 8 rural Health Centers.

Table 2: Inventory of measures of organization of the fight against EVD within health structures

Measures of organization of the fight against EVD	Measures applied		Percentage of applied measures
	No	Yes	
Local committee against the EVD	9	8	47,1
Ebola focal Point	6	11	64,7
Availability management procedure	8	9	52,9
Display management procedure	12	5	55,6
Availability posters on the case definition	1	16	94,1
Display posters on the case definition	1	16	94,1
Availability posters preventive measures	1	16	94,1
Display posters preventive measures	1	16	94,1
Availability posters Ebola symptoms	1	16	94,1
Display posters Ebola symptoms	1	16	94,1
Ebola suspected case filings	8	9	52,9

Table 3: Equipment inventory and equipment in health facilities

Equipment and materials	Number	Percentage
Room isolation of suspected cases	9	52,9
Availability surgical masks	10	58,8
Existence of hand washing device	9	52,9
Availability hydro- alcoholic solutions for practitioners	12	70,6
Availability gloves for practitioners	9	52,9
Availability disposable gown	7	41,2
respirator Availability	6	35,3
Evacuation Procedures	1	5,9
Staff dedicated to disinfect	6	35,3
Availability incineration site or pit burning	13	76,5

It noted the lack of evacuation procedures in almost all health facilities visited (16/17). The availability of gloves was provided in 9 of 17 structures.

Table 4: Inventory of equipment and disinfection products in health facilities

Equipment and disinfection products	Number	Percentage
sprayer availability	9	52,9
liquid chlorine Availability	10	58,8
mop Availability	12	70,6
Availability trash bags	9	52,9
safety box Availability	14	82,4

In hardware and disinfectants, sprayers and trash bags were widely available in health facilities visited.

Table 5: Inventories care products case of EVD within health facilities

Materials to facilitate the management of cases of MVE	Number	Percentage
1- Protective equipment		
Availability gloves	16	94,1
Availability bibs	10	58,8
Availability of Protection equipment	11	64,7
2- Sampling equipment		
Availability red tip tubes	7	41,2
Availability throughout purple tubes	6	35,3
3- Device for the reception and management of cases		
Availability linen room beds	3	17,6
Availability drugs	9	52,9

Inventories care products case MVE within health structures. At the level of support products MVE case, only the gloves were available in almost all health facilities visited.

DISCUSSION

The Ministry of Health has implemented the Measures for the Fight against MVE and provides the equipment in health facilities (CICG, 2014), training sessions of Health workers were organized, and centers of isolation put in place for fighting against Ebola.

All health facilities lacked reasonable inventory of hardware and product kits contrarily in the step 5 of WHO's recommendations (WHO, 2014). Apply basic measures against infections associated care : use the base material

against the medical environment infection (gloves, masks, gowns) and make equipment hygiene (soap, alcohol...) to the health facility level, in the Step 6. Establish actions like equipment of individual protection and to conduct necessary epidemiological surveys to all levels of the districts, regions and the country.

In a study published in 2014, Briand had explained that extraordinary resources were required by any health service confronted by Ebola; those in Guinea, Liberia, and Sierra Leone are severely stretched. Health services are understaffed. Essential personal protective equipment is in short supply. Capacities for laboratory diagnosis, clinical management, and surveillance are limited, and delays in diagnosis impede contact tracing. (BRIAND, 2014)

At the end of our study, we can identify as strengths, the political will and commitment of health authorities in the fight against this disease, resulting in the provision of equipment and devices to protect against Ebola.

Weaknesses identified were among others the low supply of certain materials in some health facilities, lack of equipment and disinfectant in some health facilities and insufficiencies of consumables for the protection of healthcare workers in health facilities.

The personal protective equipment existed in the centers visited. However, this material was not enough as the staff interviewed confirmed. The majority of staff said they had not received training on the types of protective clothing, protective equipment port (blouse, suit, glasses ...). The gloves were found in all health facilities; all staff interviewed claimed to have gloves and did not have stock-outs since the beginning of the preparation of the response. (TOURE, 2014)

The needs of health facilities are essentially the strengthening of the capacity of health facilities by (i) Supply consumable health centers for the protection of healthcare workers, (ii) Supply of health centers with equipments and disinfectants (iii) Provide isolation rooms in health centers (iv) Make available all proxies relating to the EVD and (v) Operate device hand washing.

CONCLUSION

The lack of equipments and disinfectants in some health facilities, inadequate supplies for the protection of health workers led the staff to adopt risky practices for him and for patients. In the light of results achieved and taking into account the risk of spreading the MVE in Côte d'Ivoire, it is important to strengthen the health capacities.

What is already known on this topic?

- Resources are required by any health service confronted by Ebola
- In Guinea, Liberia, and Sierra Leone are severely stretched. Health services are understaffed. Essential personal protective equipment is in short supply
- An high proportion of health workers among the cases of Ebola

What this study adds

- The political will and commitment of health authorities in the fight against this disease, resulting in the provision of equipments and devices to protect against Ebola
- The lack of evacuation procedures in almost all health facilities visited
- The lack of equipment and disinfectant in some health facilities and insufficiencies of consumables for the protection of healthcare workers in health facilities.

COMPETING INTERESTS

The authors declare no competing interest.

AUTHORS' CONTRIBUTIONS

Kevin Sylvestre Yohou, Coordinator of the study and main writer of this article

Sagou Paul Olivier Yayo, Coordinator of the study

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Ehoulé Kroa, co-Writer of this article

Joseph Aka, Supervisor of the study

Dinard Kouassi, Supervisor of the study

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