

Knowledge and practices among healthcare workers regarding dengue in Togo

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Abstract

In Togo where malaria is endemic, because main signs of malaria and dengue are similar, the use of malarial drugs first could contribute to a delay in the diagnosis of dengue and the dissemination of the disease. Thus, it is important that healthcare workers (HCW) have a good knowledge of these diseases.

To assess the knowledge, and practices regarding dengue infection among HCW in Togo.

A cross-sectional study was carried out from November 2020 to March 2021 among HCW in Togo. A pre-tested digital questionnaire was used for data collection. Based on clinical signs of dengue, preventive measures, infection type and disease type, a knowledge score was constructed with eight questions.

A total of 334 HCW with median age 32 years, IQR:(28-38) responded to the survey and the sex ratio male/female was 5.9. The majority (94.0%) of HCW have heard about dengue through training (73.3%), internet (38.0%) and media (33.2%). Compared with lower executive HCW, senior manager were more knowledgeable about the causative agent, the symptoms and preventive methods of dengue infection ($p < 0.001$). Globally, good knowledge (score ≥ 6) about dengue was found for 47.1% of HCW. More than 9 out of 10 HCW (91.3%) reported the lack of dengue diagnostic tools.

Providing health structures with dengue diagnostic tools and training health personnel in their use in any febrile patient with a negative or positive malaria test would help prevent dengue epidemic.

Introduction

Dengue is a viral infection responsible for fever or hemorrhagic fever in severe cases. The disease is prevalent in tropical and subtropical regions.¹⁻³ With a very high global incidence in the most affected regions, dengue is the cause of approximately 10,000 deaths per year.^{4,5} According to the World Health Organization (WHO), half of the world's population is at risk and there are an estimated 100-400 million infections each year.⁶ West Africa is facing the re-emergence of arboviruses of human importance such as dengue, chikungunya, or yellow fever, which constitute one of the health challenges of this region for the coming decades.^{7,8} However, in Africa, dengue is under-reported and under-recognized due to low awareness of healthcare workers (HCW), other prevalent febrile illnesses, lack of diagnostic testing, and systematic surveillance.⁹ Data from endemic countries are limited to estimate the burden and only 22 countries have reported sporadic cases or outbreaks of dengue from 1960-2010.¹⁰ A study describing the dengue situation in Africa reported that Togo was among the countries reporting dengue cases since 2000.¹¹ Also, a study conducted in 2017 reported a dengue prevalence of 17% among patients with febrile syndrome at the Centre Hospitalier Universitaire Sylvanus Olympio (Salou *et al.*, unpublished data).

In the absence of a specific treatment or vaccine for dengue, clinical interventions such as accurate and early diagnosis can reduce the burden of this disease.^{12,13} Indeed, dengue vectors, human good knowledge and behavior may play an important role in the transmission of the diseases.¹⁴ Since the HCW are in the front-line in the fight against dengue, their knowledge on the mode of the transmission and prevention of the dengue is crucial. However, studies showed that knowledge on dengue among HCW in sub-Saharan Africa is variable. It ranged from 49.3% in Ethiopia¹⁵ to 74.1% in Tanzania¹⁶ and 97.8% in Malaysia.¹⁷

In the areas where malaria is endemic, HCW's knowledge on dengue is essential because symptoms of malaria and dengue are similar¹⁸⁻²⁰ and misdiagnosis would result in poor treatment that could be harmful to patients. A study conducted in Abidjan (Ivory Coast) in public hospitals showed that only one fifth of health professionals had a good knowledge and good diagnostic practice of dengue fever.²¹

In Togo, a 2017 study (not published) found that 38% of febrile syndromes had

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Key words: Dengue; healthcare workers; knowledge and practices; Togo.

Acknowledgements: The authors would like to thank all respondents whose data were used for this study.

Contributions: DKE, AA, and WICZC were responsible for conceiving the study. WICZC, MKT and FAGK executed the data collection. WICZC, MKT, AJS and YRK analyzed the data. DKE and WICZC wrote the first draft of the article. All authors read and reviewed the final submitted version of this manuscript.

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

Funding: None.

Availability of data and materials: All data generated or analyzed during this study are included in this published article.

Ethics approval and consent to participate: All procedures performed in studies involving human participants were in accordance with the ethical standards of the Institutional Research Committee and with the 1964 Helsinki declaration and its latest amendment.

Informed consent: The manuscript does not contain any individual person's data in any form.

Received for publication: 31 May 2021.
Accepted for publication: 25 April 2022.

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Licensee PAGEPress, Italy
Journal of Public Health in Africa 2022; 13:1937
doi:10.4081/jphia.2022.1937

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positive dengue serology. In case of febrile illness, due to the endemic nature of malaria and the fact that malaria and dengue share the similar clinical manifestations, the use of malarial drugs first could contribute to a delay in the diagnosis of dengue and the dis-

semination of the disease. It is therefore important that HCW have a good knowledge of these diseases. The objective of this study was to assess the knowledge and practices (KP) regarding dengue infection among HCW in Togo.

Materials and methods

Study design and setting

A cross-sectional study was carried out from November 2020 to March 2021 among HCW in Togo.

Togo is a West African country covering a 56,800 km² area with an average density of 145 inhabitants per square kilometer. The population was 8.08 million in 2019, of which 50.2% were women. Most of the population is under 25 years of age (60%), and lives in rural areas (62%). Togo's health system has a pyramidal structure with three levels: primary, secondary and tertiary. Each level has administrative and health care delivery components.

The climate that characterizes this country is tropical. It divides the country into two main zones: a Guinean-type zone in the south with two dry seasons (November to March and July to August) and two rainy seasons (March to July and September to October); a second zone of Sudanese type covering the northern half, is characterized by a single rainy season (May to October) and a dry season (November to April). Togo's hot and humid climate is favorable to the proliferation of vectors of diseases and is partly responsible for the national epidemiological profile dominated by infectious and parasitic diseases.

Study population

The target population was all HCW who work in private or public health facilities in Togo. Inclusion criteria were: (i) being a health professional and (ii) being 18 years and older. The sample size was calculated using a single proportion population

formula with a 95% confidence level. Based on the following assumptions: 20% of HCW would have good knowledge on dengue;²¹ margin error of 3% and a 10% non-response rate, the minimum number of participants was estimated at 271.

Data collection

A pre-tested online questionnaire was used for data collection. It was subdivided into three sections to collect data on socio-demographic characteristics, knowledge of dengue, and practices of dengue. The questionnaire was anonymous and was made available to HCW using a free online platform through the internal communication networks of the Ministry of Health for self-completion.

Data analysis

Data were analyzed with R[®] software. Descriptive statistics were performed. Categorical variables were presented with frequency tabulations and percentages and quantitative variables were presented as medians with their interquartile range (IQR).

A knowledge score on dengue was constructed with eight questions based on clinical signs of dengue, preventive measures, infection type and disease type (Table 1). Each correct answer was worth one point and total score ranged from 0 (no correct answer) to 8 (correct answers to all eight items). A score greater than or equal to 6 was defined as good knowledge on dengue. p value < 0.05 is considered as statistical difference.

HCW were classified in two groups: senior manager defined as medical doctors and pharmacists; and lower executive HCW defined as clinical assistant, nursing officer, laboratory technicians, physiotherapists and other support staff.

Ethical considerations

To implement the survey, the objectives of the study were explained, then consent

was obtained from each participant using an introductory consent to participate question.

Results

A total of 339 participants answered our questionnaire. However, four were not HCW and were excluded in the survey. Finally, we analyzed data from 334 HCW.

Characteristics of the study population

The sex ratio male/female was 5.9 and median age was 32 years, IQR:(28-38). HCW who are in secondary level health structures represented 50.9% of our sample. Around a third HCW (34.2%) had between 3 and 7 years of professional experience. The other characteristics of the population are described in Table 2.

Knowledge and prevention practices

Table 3 summarizes knowledge and prevention practices regarding dengue infection among HCW in Togo.

At least nine HCW out of 10 (94.0%) have heard about dengue through training (78.0%), internet (40.4%), media (35.3%). More than three-quarter (76.6%) of HCW who were senior manager knew that the viral infection is responsible of dengue against 46.7% of lower executive ($p < 0.001$).

Senior manager HCW were most likely to know the symptoms of dengue infection ($p < 0.05$) and 88.3% of them knew that dengue can be transmitted by mosquitoes compared to 82.9% lower executive HCW ($p = 0.252$).

Approximately seven senior manager HCW out of 10 (67.5%) compared to 5 lower executive HCW out of 10 (55.6%) thought that using repellents is a preventive method of dengue ($p = 0.008$).

Knowledge score about dengue was 0 for 0.6%; 6 for 25.8% and the highest score of 8 was reported for 1.6% (Figure 1). Good knowledge (score ≥ 6) about dengue was found for 47.1% of HCW.

Table 1. Construction of knowledge score regarding dengue.

Domain	Question statement	Expected correct answer
Symptoms	Do you know clinical signs?	Yes (1 point)
	Headache?	Yes (1 point)
	Fever?	Yes (1 point)
	Joints pain?	Yes (1 point)
Prevention	Is it recommended to use mosquito net?	No (1 point)
	Is it recommended to apply healthy lifestyle measures?	Yes (1 point)
Infection type	Viral infection?	Yes (1 point)
Contagious	Is it a contagious disease?	No (1 point)

Diagnostic practices regarding dengue

Regarding dengue diagnostic tools, 91.3% of HCW reported the lack of these tools with a higher proportion in primary and secondary level health structures ($p=0.003$). HCW from secondary and tertiary level health structures were most likely to mention Rapid Diagnostic Test (RDT) ($p=0.026$) and Enzyme-Linked Immunosorbent Assay (ELISA) as diagnostic methods ($p=0.392$). These results presented in Table 4.

Discussion

This is the first KP study on dengue among HCW in Togo. Globally, almost half of HCW who participated in the study had a good knowledge on dengue. However, senior manager HCW have a better knowledge of symptoms, transmission and prevention of dengue compared to lower executive HCW.

Global knowledge

Less than half of HCW had a good knowledge score of dengue. There is a need to train HCW to strengthen their knowledge about dengue. Indeed, a study conducted in Yemen, reported a significant association between knowledge and practices about dengue fever.²²

Knowledge by category of HCW

Senior manager (medical doctor, pharmacist) had the best knowledge about the causative agent of dengue, symptoms of dengue infection, mode of transmission and preventive method of dengue comparatively to lower executive (nurses, clinical assistant, laboratory technicians). Similar results have been found in a survey on Taiwanese HCWs' knowledge on dengue: physicians scored higher than nurses about infectious agents, common symptoms, behavior of disease vectors, and epidemic area.²³ Unlike,

studies in Karachi, Pakistan where physicians had basic knowledge but were lacking in clinical diagnosis and management and needed training.²⁴ This may be explained by the fact that lower executive represent the first contact with patients and they are the first to receive awareness of the management of diseases in the populations. Also, Kouadio *et al.* in Abidjan, Ivory Coast²¹ have reported that medical doctors had worse practices than nurses as well as Ho *et al.* in Taiwan.²⁵ Studies showed differences in clinical practice of primary care physi-

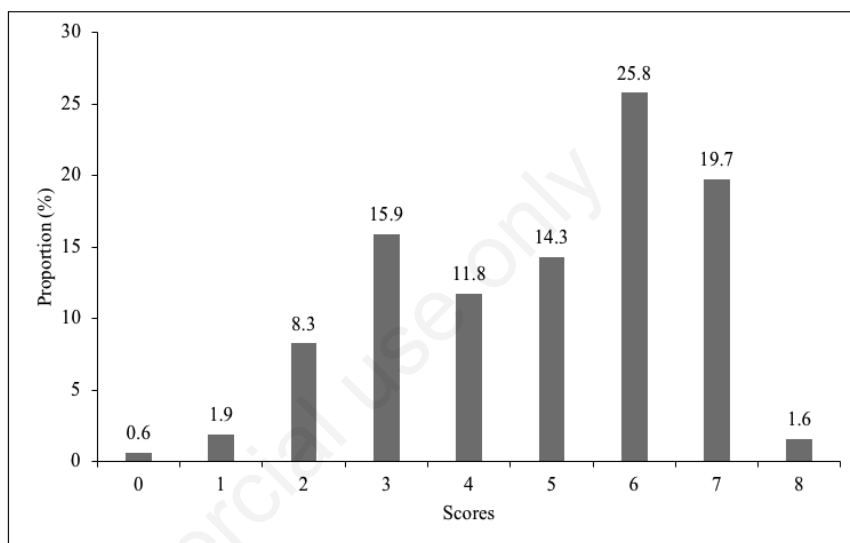


Figure 1. Knowledge score on dengue among healthcare workers in Togo, 2020-2021.

Table 2. Demographic and socio-professional characteristics of healthcare workers, Togo, 2020-2021 (N=334).

	Senior manager ^a n=77	Lower executive ^b n=257	Total N=334	p-value
Age (years), median (IQR)	29 (27-32)	33 (29-38)	32 (28-38)	<0.001
Age categories (years), n (%)				<0.001
<30	39 (50.6)	79 (30.7)	118 (35.3)	
30-40	19 (24.7)	42 (16.3)	61 (18.3)	
40-50	6 (7.8)	72 (28.0)	78 (23.4)	
50-61	13 (16.9)	64 (25.0)	77 (23.0)	
Gender, n (%)				0.693
Female	10 (13.0)	38 (14.8)	48 (14.4)	
Male	67 (87.0)	219 (85.2)	286 (85.6)	
Duration of professional experience (years), n (%)				<0.001
<3	49 (63.6)	64 (24.9)	113 (33.8)	
3-5	9 (11.7)	46 (17.9)	55 (16.5)	
5-7	4 (5.2)	55 (21.4)	59 (17.7)	
≥7	15 (19.5)	92 (35.8)	107 (32.0)	
Duration of training (years), n (%)				<0.001
≤3	0 (0.0)	188 (73.2)	188 (56.3)	
4-6	0 (0.0)	69 (26.8)	69 (20.7)	
≥6	77 (100.0)	0 (0.0)	77 (23.0)	
Health facility type, n (%)				<0.001
Primary level	10 (13.0)	92 (35.8)	102 (30.5)	
Secondary level	39 (50.6)	131 (51.0)	170 (50.9)	
Tertiary level	28 (36.4)	34 (13.2)	62 (18.6)	

^aMedical doctor and Pharmacist; ^bClinical assistant, Nursing officer, Laboratory technician, Physiotherapist, Organizational Communication Technician, Orthoprosthesis, Caregiver, Health and Development Sociologist.

cians by practice setting.^{25,26} According to Ho *et al.*²⁵, knowledge of primary healthcare professionals regarding dengue also determines the outcome of dengue control. HCW in our study were predominantly male with a majority of nurses and all professional categories existing in the health structures of Togo were represented. These results are representative of the professional categories of the Togolese HCW.

Sources of information

HCW in Togo had heard dengue through education, internet and media. Similar observations were reported in Tanzania,²⁷ in Saudi Arabia²⁸ and in Ivory Coast.²¹ In studies conducted in the general population, the major source of information about dengue was radio and television.^{29,30} All results show that awareness on dengue is being raised through communication channels, but specific training is needed for

HCW. However, knowledge about dengue in Singapore and Taiwan was related to the frequency of epidemics in those countries.^{25,26}

Diagnosis

The lack of diagnostic tools for dengue was reported by HCW from primary and secondary level health structures. RDT and ELISA were reported as the diagnostic methods available. Thus, it is important to

Table 3. Knowledge and prevention practices regarding dengue infection among healthcare workers in Togo, 2020-2021.

	Senior manager ^a n=77	Lower executive ^b n=257	Total N=334	p-value
Have you ever heard about dengue?				0.054
Yes	76 (98.7)	238 (92.6)	314 (94.0)	
No	1 (1.3)	19 (7.4)	20 (6.0)	
Where did you hear about dengue? (n=314)				
Media	30 (39.0)	81 (31.5)	111 (35.3)	0.388
Internet	32 (41.5)	95 (37.0)	127 (40.4)	0.735
Training	65 (84.4)	180 (70.0)	245 (78.0)	0.118
Word of mouth	2 (2.6)	0 (0)	2 (0.6)	0.058
What is the causative agent of dengue?				<0.001
Bacteria	0 (0.0)	7 (2.7)	7 (2.1)	
Virus	59 (76.6)	120 (46.7)	179 (53.6)	
Parasite	16 (20.8)	98 (38.1)	114 (34.1)	
Fungi	0 (0.0)	3 (1.2)	3 (0.9)	
Don't know	2 (2.6)	29 (11.1)	31 (9.3)	
What are the symptoms of dengue infection?				
Fever	62 (80.5)	152 (59.1)	214 (64.1)	<0.001
Headache	58 (75.3)	133 (51.7)	191 (57.2)	<0.001
Joint pain	51 (66.2)	112 (43.6)	163 (48.8)	<0.001
Cough	7 (9.1)	11 (4.3)	18 (5.4)	<0.001
Nausea and vomit	31 (40.3)	65 (25.3)	96 (28.7)	<0.001
Conjunctivitis	10 (13.0)	6 (2.3)	16 (4.8)	<0.001
Asthenia	48 (62.3)	96 (37.3)	144 (43.1)	<0.001
Sore throat	9 (11.7)	10 (3.9)	19 (5.7)	<0.001
Rash	29 (37.7)	64 (24.9)	93 (27.8)	0.002
Bleeding	34 (44.2)	46 (17.9)	80 (23.9)	<0.001
Don't know	14 (18.2)	103 (40.1)	117 (35.0)	<0.001
Can dengue be transmitted by the mosquitoes?				0.252
Yes	68 (88.3)	213 (82.9)	281 (84.1)	
No	9 (11.7)	44 (17.1)	53 (15.9)	
Methods known to prevent dengue				
Used bed net	54 (70.1)	186 (72.4)	240 (71.9)	0.160
Environmental sanitation	65 (84.4)	223 (86.8)	288 (86.2)	0.160
Used repellents	52 (67.5)	143 (55.6)	195 (58.4)	0.008
Others*	63 (81.8)	205 (79.8)	268 (80.2)	0.076
Don't know	7 (9.1)	10 (3.9)	17 (5.1)	0.160

^aMedical doctor and Pharmacist, ^bClinical assistant, Nursing officer, Laboratory technician, Physiotherapist, Organizational Communication Technician, Orthoprosthesis, Caregiver, Health and Development Sociologist.

*Healthy diet, hand hygiene.

Table 4. Diagnostic practices regarding dengue by health facility according to HCW in Togo, 2020-2021.

	Primary level	Secondary level	Tertiary level	Total	p value
Have you any tool for laboratory diagnosis about dengue?					0.003
Yes	5 (4.9)	12 (7.1)	12 (19.4)	29 (8.7)	
No	97 (95.1)	158 (92.9)	50 (80.6)	305 (91.3)	
What are the diagnostic methods for dengue?					
Rapid test	18 (17.6)	32 (18.8)	21 (33.9)	71 (21.3)	0.026
ELISA	72 (70.6)	132 (77.6)	48 (77.4)	252 (75.4)	0.392
Other	41 (40.2)	58 (34.1)	17 (27.4)	116 (34.7)	0.242
Have you received any advice dengue or sensitization about dengue?					0.925
Yes	3 (2.9)	7 (4.1)	2 (3.2)	12 (3.6)	
No	99 (97.1)	163 (95.9)	60 (96.8)	322 (96.4)	

provide health structures with necessary tools for the diagnosis of febrile diseases in order to minimize diagnostic errors and consequently offer good care to patients. This will allow to reduce the use of inappropriate medications.

Limitations

This study has some limitations. First, only 3.3% of registered HCW in Togo (10,911 HCW in 2018 according to data of *Ministère de la Santé et de la Protection Sociale*) have participated in this survey despite a representative of all professional categories. The reason is probably the use of an online questionnaire to collect data. HCW are not familiar with this method.

Second, there is no validated tools available for the description of the knowledge of dengue.

Despite these limitations, results of this study should contribute greatly to the knowledge, understanding and prevention of dengue in Togo.

Conclusions

In general practice, dengue is not included in the presumptive diagnosis in cases of fever, especially in cases of negative tests for malaria and typhoid fever. Providing health structures with dengue diagnostic tests and training HCW in their use in febrile patient with a negative or positive malaria test could prevent any dengue epidemic.

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