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 showed that only one fifth of health professionals had a good knowledge and good diagnostic practice of dengue fever.

In the areas where malaria is endemic, HCW’s knowledge on dengue is essential because symptoms of malaria and dengue are similar 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.

In Togo, a 2017 study (not published) found that 38% of febrile syndromes had 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-
infection type                          Viral infection?                                                                                                                                          Yes (1 point)

April). Togo’s hot and humid climate is to October) and a dry season (November to September); a second zone of and two rainy seasons (March to July and November to March and July to August) into two main zones: a Guinean-type zone
levels: primary, secondary and tertiary.

population is under 25 years of age (60%), 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 design and methods

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.

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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 more 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.

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-

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

![Figure 1. Knowledge score on dengue among healthcare workers in Togo, 2020-2021.](image)

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

| Age (years), median (IQR) | Senior manager\(a\) n=77 | Lower executive\(b\) n=257 | Total N=334 | p-value |
|---------------------------|---------------------------|---------------------------|-------------|---------|
| Age categories (years), n (%) | 29 (27-32) | 33 (29-38) | 32 (28-38) | <0.001 |
| <30 | | | | <0.001 |
| 30-40 | 39 (50.6) | 79 (30.7) | 118 (35.3) | |
| 40-50 | 19 (24.7) | 42 (16.3) | 61 (18.3) | |
| 50-61 | 6 (7.8) | 72 (28.0) | 78 (23.4) | |
| 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) | |

\(a\)Medical doctor and Pharmacist; \(b\)Clinical assistant, Nursing officer, Laboratory technician, Physiotherapist, Organizational Communication Technician, Orthoprostheteur, Caregiver, Health and Development Sociologist.
HCWs in Togo had heard about dengue through education, internet and media. Similar observations were reported in in Tanzania, Tanzania, in Saudi Arabia and in Ivory Coast. All results show that awareness on dengue is being raised through communication channels, but specific training is needed for HCWs. However, knowledge about dengue in Singapore and Taiwan was related to the frequency of epidemics in those countries.

### 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.

| Have you ever heard about dengue? | Senior managera | Lower executiveb | Total | p-value |
|-----------------------------------|-----------------|------------------|-------|---------|
| Yes                               | 76 (98.7)       | 238 (92.6)       | 314 (94.0) | 0.054 |
| 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? |
|---------------------------------------|
| 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 |
| Anesthesia                                | 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? |
|---------------------------------------------|
| Yes                                         | 68 (88.3)       | 213 (82.9)      | 281 (84.1) | 0.252 |
| 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 |

*Medical doctor and Pharmacist, 1Clinical assistant, Nursing officer, Laboratory technician, Physiotherapist, Organizational Communication Technician, Orthoprosthethist, Caregiver, Health and Development Sociologist.

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

| Have you any tool for laboratory diagnosis about dengue? |
|--------------------------------------------------------|
| Yes                                                    | 5 (4.9)        | 12 (7.1)       | 12 (19.4) | 29 (8.7) | 0.003 |
| 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? |
|---------------------------------------------------------------|
| Yes                                                          | 3 (2.9)        | 7 (4.1)        | 2 (3.2)   | 12 (3.6)  | 0.925 |
| 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 result could prevent any dengue epidemic.

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