academicJournals

Vol. 9(8), pp. 212-218, August 2017
DOI: 10.5897/JPHE2017.0933
Article Number: BC3443C65331
ISSN 2141-2316

http://www.academicjournals.org/JPHE

Journal of Public Health and Epidemiology

Full Length Research Paper

Determinants of practices for dengue diagnosis among healthcare professionals working in public hospitals of Abidjan, Cote d'Ivoire

Kouadio Daniel Ekra[1], Djibril Cherif[2]*, Damus Paquin Kouassi[3,4], Yao Lucien Konan[5], Daouda Coulibaly[2], Youssouf Traore[1,2] and Simplice N'cho Dagnan[1]

[1]University of Félix Houphouët Boigny, Abidjan, Côte d'Ivoire.
[2]Epidemiological Surveillance Department, National Institute of Public Hygiene, Abidjan, Côte d'Ivoire.
[3]Epidemiological Surveillance Department, National Institute of Public Hygiene, Bouaké, Cote d'Ivoire.
[4] Université Alassane Ouattara, Bouaké, Abidjan, Cote d'Ivoire.
[5]Vector Control Department, National Institute of Public Hygiene, Abidjan, Côte d'Ivoire.

Received 12 March, 2017; Accepted 14 July, 2017

Dengue has become a major public health concern in Cote d'Ivoire since 2010. In malaria endemic countries, such as Cote d'Ivoire, healthcare workers often confuse dengue with other tropical fevers, such as malaria. However, to control dengue fever, healthcare workers must be knowledgeable about this disease. A cross-sectional study was conducted on 400 healthcare workers' knowledge, attitude, and practices in relation to dengue from 3rd September, 2014 to 20th March, 2015 in Abidjan and its suburbs. Logistic analyses with stepwise selection were performed to explain the relationship between the dependent variable (practices) and the main explicative variable (knowledge). The distribution of participant healthcare workers by health facility showed that 55% worked in reference health facilities. Among the 340 participants, 70 (21%) had a good knowledge of dengue fever, while 71 (21%) had good diagnostic practices. The logistical analysis with stepwise selection showed that practices were explained by knowledge (adjusted OR (aOR) = 2.69; p = 0.004), gender (aOR = 1.88; p = 0.036), occupation (aOR = 0.37; p = 0.003) and epidemic risk perception (aOR = 2.59; p = 0.001). The study shows that nurses had better practices in term of dengue diagnosis compared with medical doctors. Similarly, healthcare workers who had good knowledge of dengue fever also had good practices. However, there is a great need for healthcare workers to be trained on how to detect dengue disease.

Key words: Dengue, practice, knowledge, healthcare workers, Cote d'Ivoire.

INTRODUCTION

Dengue is the most important mosquito-transmitted viral infection (World Health Organization (WHO), 2012;

*Corresponding author. E-mail: bekansy_1@yahoo.fr.

Fredericks and Fernandez-Sesma, 2014) with four serotypes in circulation among human (Fredericks and Fernandez-Sesma, 2014; Messina et al., 2014). In Africa, the epidemiology and public health impact of dengue are not well understood or are poorly documented (Amarasinghe et al., 2011; Durand et al., 2000). In Cote d'Ivoire the first human infected case was reported in 1999 (Durand et al., 2000). Prior to that, dengue viral circulation has not been documented in Cote d'Ivoire since the early 1980s (Cordellier, 1984).

In 2008, two dengue cases were confirmed among travelers returning to their home countries from Cote d'Ivoire (a Japanese and a French tourists) (Durand et al., 2000; Moi et al., 2010; Ninove et al., 2009). The strengthening of the epidemiological surveillance led to the detection of a dengue outbreak in 2010 with 23 cases resulting in one death in Abidjan. These events confirmed the existence of the dengue virus in the country and its capacity to culminate in an outbreak.

However, in Cote d'Ivoire as in many African countries, dengue is likely to be overlooked and underreported because of a low awareness among health care providers, the pervasiveness of other febrile illnesses, and lack of diagnostic testing and systematic surveillance (Amarasinghe et al., 2011). This fact is conductive to antimalarial drugs misuse, therapeutic failures and subsequent malaria treatment resistance (Foumane et al., 2015; Shayo et al., 2015; Golassa et al., 2015).

In Cote d'Ivoire, it appears that there is a necessity to put in place a surveillance system for data gathering and the early detection of outbreaks. However, establishing epidemiological surveillance framework for dengue which may enhance its diagnosis and its prevention, required understanding the weakness and strength through capacity assessment, which is, based on the capacities knowledge, practices and behavior of healthcare workers in Abidjan and its suburbs.

The present study is aimed at identifying the determinants of good practices in the diagnosis of dengue among healthcare workers in Abidjan and its suburbs.

METHODS

This cross-sectional study was conducted from 3rd September, 2014 to 20th March, 2015 2015 in public health facilities of Abidjan and its suburbs. It assessed the knowledge, attitudes and practices of healthcare workers. Abidjan is the economic capital city of Cote d'Ivoire, with 4,707,000 inhabitants according the 2014 census (Institut National de la Statistique (INS), 2014). Abidjan has ten townships and two suburbs divided into ten health districts.

The study population was composed of 400 health professionals who worked within the services of general medicine, infectious disease, pediatric and medical emergencies in the public sanitation network of Abidjan and its suburbs. The sample size was calculated with Epitable software version 6.0 (CDC Atlanta) by taking into account the following parameters:

1. Expected prevalence of good practice: 37% (Dhimal et al., 2014)
2. Required accuracy: 5%;
3. Confidence level: 95%;
4. Non-response rate: 10%

The calculated sample size was 397 healthcare workers. A simple allocation scheme was applied. 40 health professionals were interviewed in each health district.

A proportional allocation method was applied for the number of staff from each occupation to take into account sample's representability. Hence, the designed sample included 120 doctors (30%) and 280 nurses (70%). The healthcare facilities were randomly investigated.

The dependent variable was the practices referred to dengue diagnostic among healthcare professionals. Good practice was defined as the capacity of healthcare workers to make differential diagnoses of fever cases, to demand blood samples for laboratory analyses, to research primary or secondary cases in the immediate environment of non-malarial patients, and to identify these cases as a dengue-like disease. The independent variables were socio-demographic status, occupation, knowledge, and attitudes toward dengue.

The data were collected by face to face interviews with a questionnaire developed using the World Health Organization (WHO) guidelines on dengue disease (World Health Organization, WHO, 2009), the Integrated Diseases Surveillance and Response guidelines (World Health Organization, WHO, 2010) and the studies published by Dhimal et al. (2014) in Nepal and Shuaib et al. (2010) in Jamaica. Quantitative questionnaire were administered to each interviewee.

The data analysis was performed with R software version 3.1.2 (2014-10-31). The knowledge and practices variables were scored according to the number and weight of related items included in the questionnaire. Thus, good practices and good knowledge required a minimum score of 60% and worse practices and worse knowledge were scored under 60%. The threshold of 60% to scale knowledge and practices about dengue disease was determined by consensual agreement from national expects in Public health and epidemiology.

With regard to "Attitude", two variables were identified to describe it. Yes/no questions were applied to collect healthcare workers' impressions about their perception of the seriousness of the disease and their perception on the fact that Cote d'Ivoire can be at risk of dengue.

The relationship between the dependent variable and the explicative variables was determined by multiple logistic regressions with stepwise selection. All of the variables with a significance level less than 0.2 (Freitas et al., 2012) in the bivariate analysis were selected for multiple regression. Knowledge was defined as a main variable. The final model contained variables with a significance level of less than or equal to 0.05 after adjustment on other variables. Variables that had a matching strength were kept less than or equal to 0.05. The robustness of the final model was tested by a Hosmer-Lemeshow test with a significance threshold of 0.05.

Ethical considerations

Before the study, the objectives and the methodology of the study was sent in writing to each health facility directorate to obtain their consent. The anonymity of the subjects' data was ensured by using deidentification codes. The data were compiled, and the results presented so as to avoid identification of individual through their answers.

This study did not include any treatments or unpleasant procedures. If a participant refused to answer, there were no negative consequences. There was no risk associated with participation in this study. This was voluntary, and participants did not receive remuneration. Each participant was permitted to end the interview at time without reason and without fear of persecution.

Table 1. Description of the study sample (knowledge, attitude and practice study on dengue among healthcare professionals).

Variable		N (%)	Median (IQR)
Age	23 - 33	98 (29)	37 (33 - 44)
	33 - 37	74 (22)	
	37 - 44	89 (26)	
	44 - 65	79 (23)	
Gender	Female	141 (41)	
	Male	199 (59)	
Experience	0 - 2	70 (21)	6 (2 - 14)
	2 - 10	166 (49)	
	10 - 34	104 (30)	
Occupation	Nurses	224 (66)	
	Doctors	116 (34)	
Specialty	No	294 (86)	
	Yes	46 (14)	
Service	Medicine	251 (74)	
	Pediatrics	89 (26)	
Type of health facility	First contact	154 (45)	
	Reference	186 (55)	
Health zone	West	171 (50)	
	East	169 (50)	
Knowledge	Good	70 (21)	
	Worse	270 (79)	
Practice			
	Good	71 (21)	
	Worse	269 (79)	

RESULTS

Description of the study sample

Out of the 400 health professionals, 340 were effectively investigated, with a participation rate of 85%. The participation rate was 97% among doctors and 80% among nurses. Four doctors (3 males and 1 female) and 37 nurses (20 males and 17 females) abstained from answering the questions, either arguing that their participation had not been approved by their superiors or they were very busy. Nineteen nurses were not investigated because of their work schedule and limited number of staff.

The median age of investigated healthcare workers was 37 years old with an interquartile range of 33 to 44. The age ranged from 23 years old (minimum) to 65 years old (maximum). The respondents were composed of 199 males and 141 females, with a sex ratio (M/F) of 1.41. The median number of years of experience was 6 with an interquartile range of 2 to 14 years (Table 1). Of the 340 respondents, 46 were specialists (14%), of whom 41 (89%) were medical doctors. 56% of the specialists were noted to be pediatricians.

The distribution of healthcare workers by type of health facility showed that 55% of them came from reference facilities, namely general hospitals (GH) and university hospital centers (UHC) (Table 1).

Knowledge, attitudes and practices (KAP)

Seventy (21%) health professionals showed good knowledge score (Table 1). Regarding attitudes, 253 (74%) health professionals knew that dengue was a serious illness (96% doctors and 66% nurses). There were 146

Table 2. Univariate logistic regression (KAP study on dengue among healthcare workers in Abidjan and its suburbs).

Variable	Worse practice	Good practice	OR	CI 95%	p-value*
Age (years)					
23 -33	82	16	1		
33 - 37	59	15	1.30	0.59 - 2.85)	0.063
37 - 44	68	21	1.58	0.77 - 3.31)	
44 - 65	57	22	1.98	0.96 - 4.15)	
Gender					
Female	120	21	1		0.011
Male	146	53	2.07	1.20 - 3.70)	
Service					
Medicine	191	60	1		0.111
Pediatrics	75	14	0.59	0.30 - 1.10)	
Perception of seriousness					
DNK**	77	10	1		0.009
Yes	189	64	2.61	1.34 - 5.64)	
Perception of risk					
DNK**	168	26	1		$2.74\ 10^{-5}$
Yes	98	48	3.16	1.86 - 5.48)	
Source of information					
Other	62	5	1		
Training	115	55	1.19	0.59 - 2.54)	0.107
Press	93	10	1.63	0.77 - 3.60)	
Knowledge					
No	222	48	1		0.001
Yes	44	26	2.73	1.53 - 4.85)	

***,** Only variables with a p-value ≤ 0.2. The variables with a p-value > 0.2 were health zone, years of professional experience and specialty. **Do not know.

health workers who perceived the risk of dengue outbreak in Cote d'Ivoire. In fact, 59% of nurses and 53% of doctors asserted that Cote d'Ivoire was at risk of a dengue outbreak. From a practice's standpoint, 21% of the participants provided answers linked to good practices.

Relationships between the dependent variable and independent variables

It was observed that gender was significantly associated with practices; males had better practices compared with females [OR = 2.07; CI 95% = (1.20 - 3.70)] (Table 2). Additionally, variables measuring attitude, such as perception of disease seriousness [OR = 2.61 (1.34 - 5.64)] and the perception of the risk of dengue outbreak in Cote d'Ivoire [OR = 3.16 (1.86 - 5.48)], were significantly linked to practices.

From the perception of knowledge, health professionals in Abidjan and suburbs who had good knowledge of dengue fever, had also good practices for dengue diagnosis [OR = 2.73; CI 95% = (1.53 - 4.85)].

The following variables were not significantly related to practices: Age (p = 0.063), type of health facility (p = 0.350), service (p = 0.111), occupation (p = 0.350), specialty (p = 0.700), experience (p = 0.260), and source of information (p = 0.107).

Multivariate logistic models design

Table 3 presents the final results of the logistic regression after stepwise selection. After adjustment on other variables, the health professionals who had good knowledge about dengue had also good practices for dengue diagnosis [aOR = 2.69; CI 95% = (1.37 -5.32)].

Ceteris paribus, male healthcare workers had better

Table 3. Multiple logistic regression final model (KAP study on dengue among healthcare professionals in Abidjan).

Variable	Final model			
	Effective (n = 340)	Adjusted OR (aOR)	95% CI	p- value
Knowledge				
No	270	1		0.004
Yes	70	2.69	1.37 - 5.32	
Gender				
Female	141	1		0.036
Male	199	1.88	1.05 - 3.46	
Occupation				
Nurses	224	1		0.003
Doctors	116	0.37	0.18 - 0.70	
Perception of risk				
DNK	194	1		0.001
Yes	146	2.59	1.47 - 4.62	

practices than their female counterparts [aOR = 1.88; CI 95% = (1.05-3.46)]. Medical doctors were found to have worse practices as compared to nurses after model adjustment on other variables [aOR = 0.37; CI 95% = (0.17 - 0.70)]. Likewise, healthcare professionals who asserted that Cote d'Ivoire was at risk of a dengue outbreak had better practices than those who did not [aOR = 2.59; CI 95% = (1.47 - 4.62)].

DISCUSSION

This study was performed to sustain the establishment of a specific surveillance system for dengue. Since the early 2000s, Cote d'Ivoire has declared several dengue outbreaks located in Abidjan and suburbs. Unfortunately, the outbreaks were discovered *a posteriori*. Therefore, it appeared necessary to assess the knowledge and practices of dengue fever among healthcare professionals in Abidjan and its suburbs. The results from this study led us to establish the following findings.

Demographic and professional characteristics

Of the 340 healthcare professionals interviewed, 34% were doctors whereas the majority was nurses (66%). Ho et al. (2013) evaluated a sample in which 51% were doctors and 49% were nurses. Dubé et al. (2011) assessed a sample in which 57% were doctors and 43% were nurses. In Cote d'Ivoire, medical doctors represent 30% of healthcare professionals (SIDA, 2012). Therefore, this study was designed to have representative data from both healthcare occupations.

The distribution by age highlighted that 50% of the health professionals interviewed in Abidjan and its suburbs aged less than 37 years, ranging from 23 to 65 years old. The study population was relatively younger than that of Lee et al. (2011), who performed a study in which 69% of medical doctors were 41 years old. Lee et al. (2011) evaluated a sample with age distribution similar to Tan et al. (2009), who performed a KAP study in Taiwan among doctors on communicable diseases in the private sector. The study found that 83% of the surveyed doctors were more than 40 years old. Jain et al. (2015) found that their sample of healthcare professionals was relatively younger than that of the present study. The difference between the formally cited and the study finding can be ascribed to the fact that this study took into account nurses and medical doctors simultaneously.

The distribution by gender showed that male healthcare professionals were significantly older than female healthcare professionals ($p < 0.0001$). Similarly, doctors were significantly older than nurses ($p = 0.023$). This finding could be explained by the fact that doctors enter the workforce at a relatively higher age, have a longer university curriculum (eight years of study *vs.* three years of study) and receive their pension later than nurses (65 years *vs*. 57 years).

The study found a sex ratio (M/F) of 1.11 among nurses, that is, 53% were men while 47% were women. Among medical doctors, the sex ratio (M/F) was 2.31, with 70% men and 30% women. Ho et al. (2013) found far more males (87%) than females among medical doctors, whereas among nurses, female represented an overwhelming majority (97%).

The results from Ho et al. (2013) study in Taiwan suggest that among healthcare providers there may have been an association between occupation and gender. This result was also corroborated by Tan et al. (2009) study which was conducted in Taiwan among private doctors. Tan et al. (2009) found in their sample that males were predominant (87%). However, the results from Dubé et al. (2011)'s study in Quebec highlighted a

predominance of females in medical professions.

The study found that 31% of health professionals had more than 10 years of experience. In the study published by Ho et al. (2013), 51% of surveyed healthcare professionals had more than 10 years of experience. The respondents in this study also had fewer years of experience than those investigated by Dubé et al. (2011) in Quebec. In fact, 65% of health professionals investigated by Dubé et al. (2011) had at least 15 years of experience.

Three sources were identified from which participants acquired information on dengue. Shuaib et al. (2010) and Dhimal et al. (2014) identified televisions and radios as major sources of information on dengue fever, followed by school. However, the study found that trainings (50%) were the main source of dengue information, followed by other form of press (30%). Furthermore, 25% of the respondents reported getting information on dengue via radio and television. The difference between the study results and those of Shuaib et al. (2010) and Dhimal et al. (2014) might be due to the fact that they conducted surveys on the general population in Jamaica (Shuaib et al., 2010) and Nepal (Dhimal et al., 2014), respectively.

Practice referred to dengue diagnosis among healthcare workers

It was found that good knowledge of dengue was associated with good practices for dengue diagnosis [adjusted OR (aOR) = 2.69; 95% CI: (1.37 to 5.32); p = 0.0041]. Study conducted in general population in Nepal about dengue's knowledge, attitude and practices found a positive correlation between knowledge and practices (Dhimal et al., 2014) A study conducted by Ntambwe on multidrug-resistant tuberculosis among healthcare workers in Maseru (Malangu and Adebanjo, 2015) achieved the same result. This result leads to the belief that education plays an important role in practices enhancement (Merga and Alemayehu, 2015; Saaka, 2014). However in this study, medical doctors had worse practices than nurses [aOR = 0.37; 95% CI: (0.18 to 0.70); p = 0.0030]. This confirms Ho et al. (2013)'s findings in Taiwan. Unlike Ho et al. (2013), Shuaib et al. (2010), found that education cannot always be correlated with knowledge. The explanation of this difference in this study can be found in the fact that in Cote d'Ivoire, nurses are more involved in the epidemic-prone diseases surveillance than medical doctors. Males from this study were found to have significantly better practices than females [aOR = 1.88; 95% CI: (1.05 to 3.46); p = 0.0357]. In Tawain, Tan et al. (2009) reported similar findings but with no significant correlation. The perception that Cote d'Ivoire can be at risk of dengue epidemic was positively associated with good practices [aOR = 2.59; 95% CI: (1.47 to 4.62); p = 0.0011]. Some studies conducted on other epidemic diseases such as influenza demonstrated that the perception to be at risk of a threat strengthen the practices (Lau et al., 2010; Hollmeyer et al., 2009).

LIMITATIONS

The investigation used a sampling method that allotted an equal number of participants for each investigated district. This may have induced an increased non-response rate because some districts had lack of healthcare professionals, leading the study to have a possible limiting ability to detect certain associations or an overestimation of certain relationships. However, the selection of institutions was essentially randomly-based, and the 85% participation rate may have limited potential bias.

Conclusion

Dengue fever remains a misunderstood disease in sub-Saharan Africa, particularly in Cote d'Ivoire. The study was mainly descriptive in nature and the design allowed the identification of healthcare professionals from Abidjan and its suburbs who were able to diagnose dengue as part of the surveillance of epidemic-prone diseases. The results of the multiple logistic regression model have established that the practices of healthcare professionals in Abidjan and its suburbs are linked to occupation. Therefore, nurses had better practices for dengue diagnosis than medical doctors. This study shows that there is a need to train healthcare workers in Cote d'Ivoire in terms of diagnostic capacities for fever diseases. Also for the better accomplishment of this screening, in all level of health facilities some rapid tests must be applied to triage patients.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

ACKNOWLEDGEMENTS

Mr. Jean-Pierre Kouame, Biostatistician in the Epidemiological Surveillance Office in Abidjan, National Institute of Public Hygiene, Cote d'Ivoire is acknowledged for his help with data collection. Dr. Amadou Traore, National Agency of Sanitary Security, Guinea, is acknowledged for his great and remarkable contribution to the enhancement of this article. Mr. Dominique Yao N'gonian is acknowledged for his help in correcting the last draft of this article.

REFERENCES

Amarasinghe A, Kuritsky JN, Letson GW, Margolis HS (2011). Dengue Virus Infection in Africa. Emerg. Infect. Dis. 17(8):1349-1354.

Cordellier R (1984). Dengue in Africa: History, current situation, and orientations for researchers [in French]. Accessed 24 June, 2017. Available at: http://horizon.documentation.ird.fr/exl-doc/pleins_textes/pleins_textes_5/b_fdi_12-13/16293.pdf

Dhimal M, Aryal KK, Dhimal ML, Gautam I, Singh SP, Bhusal CL, Bhusal CL, Kuch U (2014). Knowledge, Attitude and Practice

Regarding Dengue Fever among the Healthy Population of Highland and Lowland Communities in Central Nepal. PLoS One. 2014; 9(7): e102028
Dubé E, Defay F, Kiely M (2011). Connaissances, attitudes et pratiques d'infirmiers, d'infirmières, de pédiatres et d'omnipraticiens québécois sur la grippe A(H1N1) et la grippe saisonnière. Institut national de santé publique du Québec (INSPQ) [Internet]. [cited 19 Aug 2016]. Available at: https://www.inspq.qc.ca/publications/1312
Durand JP, Vallée L, de Pina JJ, Tolou H (2000). Isolation of a dengue type 1 virus from a soldier in West Africa (Côte d'Ivoire). Emerg. Infect. Dis. 6(1):83.
Foumane Ngane V, Allico Djaman J, Culeux C, Piette N, Carnevale P, Besnard P, Fortes F, Basco LK, Tahar R (2015). Molecular epidemiology of drug-resistant *Plasmodium falciparum* in Benguela province, Angola. Malar. J. 14(113):1-6.
Fredericks AC, Fernandez-Sesma A (2014). The burden of dengue and chikungunya worldwide: Implication for the Southern United State and California. Ann. Glob. Health 80(6):466-475.
Freitas MCM, Ribeiro LC, Vieira MT, Teixeira MTB, Bastos RR, Leite ICG (2012). Factors associated with the use of the Papanicolaou smear screening among older women in the interior of Brazil [in Portuguese]. Rev. Bras. Gynecol. E Obstet. Rev. Fed. Bras. Soc. Gynecol. E Obstet. 34(9):432-437.
Golassa L, Erko B, Baliraine FN, Aseffa A, Swedberg G (2015). Polymorphisms in chloroquine resistance-associated genes in *Plasmodium vivax* in Ethiopia. Malar. J. 14(164):1-5.
Ho TS, Huang MC, Wang SM, Hsu HC, Liu CC (2013). Knowledge, attitude, and practice of dengue disease among healthcare professionals in southern Taiwan. J Formos. Med. Assoc. Taiwan Yi Zhi. 112(1):18-23.
Hollmeyer HG, Hayden F, Poland G, Buchholz U (2009). Influenza vaccination of health care workers in hospitals--a review of studies on attitudes and predictors. Vaccine 27(30):3935-3944.
Institut National de la Statistique (INS) de Côte d'Ivoire (2014). Résultats du Recensement Général de la Population et de l'Habitat [Internet]. [cited 4 june 2015]. Available at: http://www.ins.ci/n/
Jain M, Dogra V, Mishra B, Thakur A, Loomba PS (2015). Knowledge and attitude of doctors and nurses regarding indication for catheterization and prevention of catheter-associated urinary tract infection in a tertiary care hospital. Indian J. Crit. Care Med. Peer-Rev. Off. Publ. Indian Soc. Crit. Care Med. 19(2):76-81.
Lau JTF, Yeung NCY, Choi KC, Cheng MYM, Tsui HY, Griffiths S (2010). Factors in association with acceptability of A/H1N1 vaccination during the influenza A/H1N1 pandemic phase in the Hong Kong general population. Vaccine 28(29):4632-4637.
Lee LK, Thein TL, Kurukularatne C, Gan VC, Lye DC, Leo YS (2011). Dengue knowledge, attitudes, and practices among primary care physicians in Singapore. Ann. Acad. Med. Singapore 40(12):533-538.
Malangu N, Adebanjo OD (2015). Knowledge and practices about multidrug-resistant tuberculosis amongst healthcare workers in Maseru. Afr. J. Prim. Health Care Fam. Med. 7(1):1-5.
Merga N, Alemayehu T (2015). Knowledge, perception, and management skills of mothers with under-five children about diarrhoeal disease in indigenous and resettlement communities in Assosa District, Western Ethiopia. J. Health Popul. Nutr. 33(1):20-30.
Messina JP, Brady OJ, Scott TW, Zou C, Pigott DM, Duda KA, Bhatt S, Katzelnick L, Howes RE, Battle KE, Simmons CP (2014). Global spread of dengue virus types: mapping the 70 year history. Trends Microbiol. 22(3):138-146.
Ministère de la Santé et de la lutte contre le SIDA (2012). Plan National de Développement Sanitaire 2013 - 2015. 88p.
Moi ML, Takasaki T, Kotaki A, Tajima S, Lim C-K, Sakamoto M, Iwagoe H, Kobayashi K, Kurane I (2010). Importation of dengue virus type 3 to Japan from Tanzania and Cote d'Ivoire. Emerg. Infect. Dis. 16(11):1770-1772.
Ninove L, Parola P, Baronti C, De Lamballerie X, Gautret P, Doudier B, Charrel RN (2009). Dengue virus type 3 infection in traveler returning from West Africa. Emerg. Infect. Dis. 15(11):1871-1872.
Saaka M (2014). Relationship between Mothers' Nutritional Knowledge in Childcare Practices and the Growth of Children Living in Impoverished Rural Communities. J. Health Popul. Nutr. 32(2):237-248.
Shayo A, Buza J, Ishengoma DS (2015). Monitoring of efficacy and safety of artemisinin-based anti-malarials for treatment of uncomplicated malaria: a review of evidence of implementation of anti-malarial therapeutic efficacy trials in Tanzania. Malar. J. 14(135):1-12.
Shuaib F, Todd D, Campbell-Stennett D, Ehiri J, Jolly PE (2010). Knowledge, attitudes and practices regarding dengue infection in Westmoreland, Jamaica. West Indian Med. J. 59(2):139-146.
Tan HF, Yeh CY, Chang HW, Chang CK, Tseng HF (2009). Private doctors' practices, knowledge, and attitude to reporting of communicable diseases: a national survey in Taiwan. BMC Infect. Dis. 9(11):1-8.
World Health Organization (WHO) (2012). Global strategy for dengue prevention and control 2012 - 2020. 43p.
World Health Organization (WHO) 2009. Dengue guidelines for diagnosis, treatment, prevention and control. New edition. 160p.
World Health Organization (WHO) 2010. Technical Guidelines for Integrated Disease Surveillance and Response in the African Region, 2nd ed. 416p.