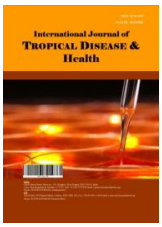

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Knowledge of Chikungunya Disease among Academic Population in Private Universities, Khartoum State, Sudan - 2019

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Authors' contributions

This work was carried out in collaboration between both authors. Author GNEH drafted the research paper and made substantial contributions to the concept and the design of the study. Author GNEH collected and analyzed the data. Authors GNEH and SAB managed the literature, finalized the research paper and revised it. Both authors read and approved the final manuscript.

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ABSTRACT

Introduction: Chikungunya is a viral disease that could lead to chronic symptoms. It has no approved treatment or vaccine to date.
Objective: To assess the level of knowledge about Chikungunya viral disease following an outbreak in Kassala Sudan among the academic population in private universities in Khartoum State.
Methods: A cross-sectional study was carried out in three private universities in Khartoum State during April-August 2019. A sample of 376 individuals (346 medical students and 30 teaching staff) was determined. A self-administered questionnaire was distributed to the target population. It included eleven variables about the information regarding Chikungunya disease. Data was imported into SPSS program version 20 and descriptive statistics were presented. Knowledge variables were categorized into scores as adequate, moderate and poor. Chi square test was used to test the knowledge levels among the study population at the confidence level of 95%.

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Results: Out of 376 study population, 66 (17.6%) had never heard about the Chikungunya disease. Therefore, the knowledge variables were analyzed among 310 individuals who heard about the disease. Out of 310 individuals, 235 (75.8%) knew that the disease is viral and 245 (79.0%) knew that fever is the common symptom. Individuals who did not know the mode of transmission were 200 (64.5%). Individuals who did not know the diagnostic methods of the disease and management methods accounted for 228 (73.5%) and 174 (56.1%) respectively. One hundred seventy-five individuals (56.5%) did not know the prevention by vector control and 174 (56.1%) did not know if a vaccine is available or not. Out of 310 individuals, 60 (19.4%) had adequate knowledge about Chikungunya disease. Moderate to poor knowledge were significantly high among the study population, p value = 0.0002.

Conclusion: Most of the study population heard about Chikungunya disease but the majority had moderate to poor knowledge about the disease. Private universities should open channels with Ministries of Health to facilitate field training of students during outbreaks.

Keywords: Chikungunya; medical students; knowledge.

1. INTRODUCTION

Chikungunya viral disease (CHIKV) is an arthropod-borne Arbovirus of the Alphavirus genus in the family Togaviridae. The acute phase of the disease could last up to weeks with fever >38.5°C, headache, back pain, skin rash and polyarthralgia. The most indicative clinical symptoms are fever and bilateral, painful and debilitating polyarthralgia that affects mainly small peripheral joints of ankles, wrists and phalanges as well as large joints of the knees and the elbows beside inability to walk occasionally. In the absence of defined antiviral drugs and vaccine, treatment focuses only on alleviating the symptoms [1]. CHIKV infection in outbreaks had shown significant morbidity with severe incapacitation and low mortality. Even though, the mortality of CHIKV infection could not be known if the crude mortality rates in outbreaks are high giving up to poor inferential causal relationship [2].

The chronic phase of the disease may last up to years with a 30-40% recurrence of polyarthralgia caused by an immune-mediated reaction in the joints [3]. Atypical forms of Chikungunya disease are rare. However, it could cause neonatal encephalitis by vertical transmission of the virus [4,5], uveitis, retinitis and other neurological and cardiovascular symptoms [6-8].

The disease is transmitted mainly by the vector-mosquito (*Aedes aegypti* and *Aedes albopictus*) [1,9]. It was first discovered in the 1950s in Tanzania. Since then, it re-emerged and spread to various geographical areas in Asia, Europe, the Americas, the central and southern region of Africa [1,9]. The most recent diagnosed outbreak of Chikungunya disease occurred in May 2018 in Sudan in the eastern part of the country at Red Sea State and moved to Kassala State in August 2018 and spread to seven states at October 2018 that affected 13,978 cases of which 95% were from Kassala State [10].

The diagnosis and differentiations of the disease are extremely difficult; it needs specific serology, polymerase chain reaction (PCR), ELISA and viral isolation. The cause is that it shares similar clinical manifestations of Dengue and Zeka viruses such as skin rash, fever and polyarthralgia and sometimes it co-exist as co-infection, both having high positive IgM [11,12]. However, diagnosis of Chikungunya is time consuming and expensive to be carried out in developing countries including Sudan.

The overspreading of the Aedes mosquitoes, overpopulation, lack of sanitation and public awareness in developing countries sensitize the emergence of outbreaks of arthropod-borne viral infections in the existence of overburden health system with other communicable diseases [13]. Different Arbovirus infections commonly exist in sub-Saharan Africa, where the Chikungunya virus was the main infectious agent in the eastern part of Sudan [14]. The CHIKV disease occurs in sporadic as well as flared as epidemics. The knowledge about Chikungunya disease in communities as well as among university health related students in some developing countries was found to be inadequate and insufficient [15-18].

In the context of unknown timing of Chikungunya virus epidemics, the knowledge of the population and particularly the health related students should be identified to bridge the gap by effective knowledge strategies and to makes the

preventable measures most effective against a potential outbreak.

The objective of this study was to assess the level of knowledge about Chikungunya viral disease among the academic population in three private universities in Khartoum State during April-August 2019.

2. METHODOLOGY

A descriptive cross-sectional study was carried out during April-August 2019 in medical and health campuses of three private universities in Khartoum State, Sudan; Ibn Sina University, International University of Africa and National University of Sudan. The selected private universities were chosen purposively. It shares high to moderate social contexts and recruited both Sudanese and non-Sudanese students commonly from African countries. The eligible population for the study was medical students and academic teaching staff. The students at the preliminary first medical year were excluded from the study since they are studying general science. Students in the campuses from other related medical disciplines were also excluded from the study; e.g. dentistry, health science, nursing science, pharmacy and physiotherapy. A sample of 383 medical students was calculated using an estimated prevalence of knowledge about CHIKV disease at 0.5 and 95 confidence level with an estimated error of 0.05. A convenient sample of 38 academic staff was selected from the three campuses to assess their knowledge about CHIKV disease. A total of 376 study population responded to participate in the study which included, 346 medical students and 30 teaching staff. A weighed systematic random sampling was carried out according to the number of students at each academic year. A self-administered questionnaire was distributed to the eligible study population; it composed of two parts; the first part was the characteristics of the study population. The second part included eleven variables about the information of CHIKV disease; causative agent, mode of transmission, method of diagnosis, methods of management, symptoms of fever, skin rash and arthralgia and other symptoms, vaccination, control of the disease and knowledge about its morbidity and mortality. Ethical consideration was maintained by a letter of approval from the universities and written consent of the study population.

2.1 Data Management and Analyses

Data was revised, cleaned and imported into SPSS program version 20. Descriptive statistics were presented into tables and figures. Regarding the eleven knowledge variables; the correct answer was coded at 1 and the wrong answer or don't know at 0. The scores were computed by percentiles and categorized into knowledge levels. The scores above 75^{th} centile were recoded as adequate knowledge, between 50^{th} to 75^{th} centiles were recoded as moderate knowledge and below 50^{th} centile were recoded as poor knowledge.

Chi square test was used to test the knowledge levels between students and teaching staff at the confidence level of 95%.

3. RESULTS

Most of the study population was in the age group 16-25 years, 315 (83.8%) [Table 1]. Female and males accounted to 220 (58.5%) and 156 (41.5%) respectively [Table 1]. The majority of the medical students, 258 (68.6%) were of Sudanese nationality [Table 1]. Out of 376 study population, 66 (17.6%) had never heard about the CHIKV disease and 186 (49.5%) of those heard about the CHIKV disease had the information from the newspapers, Social media, lectures or friends and 84 (22.3%) from the recent outbreak [Fig. 1]. Most of those who heard about CHIKV disease, 235 (75.8%) were aware about the viral cause of the disease [Table 2]. Those who did not know the mode of transmission, diagnostic methods and methods of management accounted for 200 (64.5%), 228 (73.5%) and 174 (56.1%) respectively [Table 2]. Only fever was known by the study population as the symptom of CHIKV disease, 245 (79%) [Table 3]. Regarding control and prevention of the disease, 175 (56.5%), did not know that the control of the disease is by controlling the vector and 174 (56.1%) did not know if the vaccine is available or not [Table 4]. The study population, who did not know if morbidity is high while mortality is low, accounted for 244 (78.7%) [Fig. 2]. Only 60 (19.4%) of the study population was having adequate knowledge about CHIKV disease [Fig. 3]. Most of the study population were significantly having moderate to poor knowledge about CHIKV disease, p value = 0.0002 [Table 5].

4. DISCUSSION

A total of 376 individuals participated in this study from the medical and health science campuses in three private universities in Khartoum state. More than 80% of the study population heard about the CHIKV disease from different sources and this could be due to the experience of

Table 1. Characteristics of the population in the study of knowledge about Chikungunya in private medical schools- Khartoum–Sudan 2019

Characteristics (n=376)		N (%)
Age	16-25 Years	315 (83.8%)
	26-35 Years	37 (9.8%)
	More than 35 Years	24 (6.4%)
Gender	Male	156 (41.5%)
	Female	220 (58.5%)
Academic status	Medical Student	346 (92.0%)
	Teaching Staff	30 (8.0%)
Nationality	Sudanese	258 (68.6%)
	Non-Sudanese	118 (31.4%)

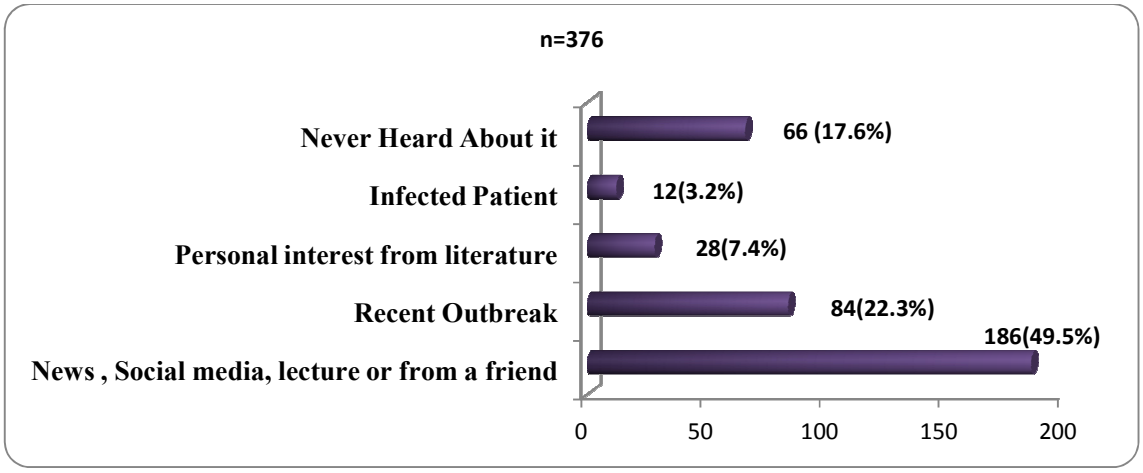

Fig. 1. Hearing from different sources about Chikungunya among the population in private universities- Khartoum–Sudan 2019

Table 2. Knowledge of the population in private universities about Chikungunya disease, Khartoum–Sudan 2019

Knowledge about the disease (n=310)		N (%)
Causative agent	Viral	235(75.8%)
	Don't know	75 (24.2%)
Transmission	Mosquito	110 (35.5%)
	Don't know	200 (64.5%)
Method of diagnosis	Serology and molecular assay	82 (26.5%)
	Don't know	228 (73.5%)
Method of management	Supportive	136 (43.9 %)
	Don't know	174 (56.1%)

the disseminated information during epidemics in developing countries as well as the spread of one year outbreak in the eastern part of Sudan that led to health consciousness [17-19]. Not hearing about CHIKV disease among medical students and teaching staff in this study is not acceptable since the medical and health curricula in Sudan included courses about infectious and tropical diseases [20]. The teaching of infectious diseases in the classroom only is of low value. The detachment of medical and health faculties from ministries of health presented this weakness in knowledge of medical students [20]. Handing over the knowledge and skills of control of infectious and communicable diseases to medical students would be augmented if it is carried out at field level under the supervision of health care professionals.

Table 3. Knowledge of the population in private universities about Chikungunya disease, symptoms and signs, Khartoum –Sudan 2019

Knowledge about the symptoms and signs of the disease (n=310)		N (%)
Fever	Yes	245 (79.0%)
	No	65 (21.0%)
Skin Rash	Yes	70 (22.6%)
	No	240 (77.4%)
Arthralgia	Yes	100 (32.3%)
	No	210 (67.7%)
*Other Symptom	Yes	9 (2.9%)
	No	301 (97.1 %)

**(Chills, headache, nausea, vomiting, muscle pain)*

Table 4. Knowledge of the population in private universities about Chikungunya disease prevention and control, Khartoum–Sudan 2019

Knowledge about the prevention and control of the disease (n=310)		N (%)
Vaccination	No vaccine	136 (43.9 %)
	Don't know	174 (56.1%)
Control of disease	Vector Control	135 (43.5%)
	Don't know	175 (56.5%)

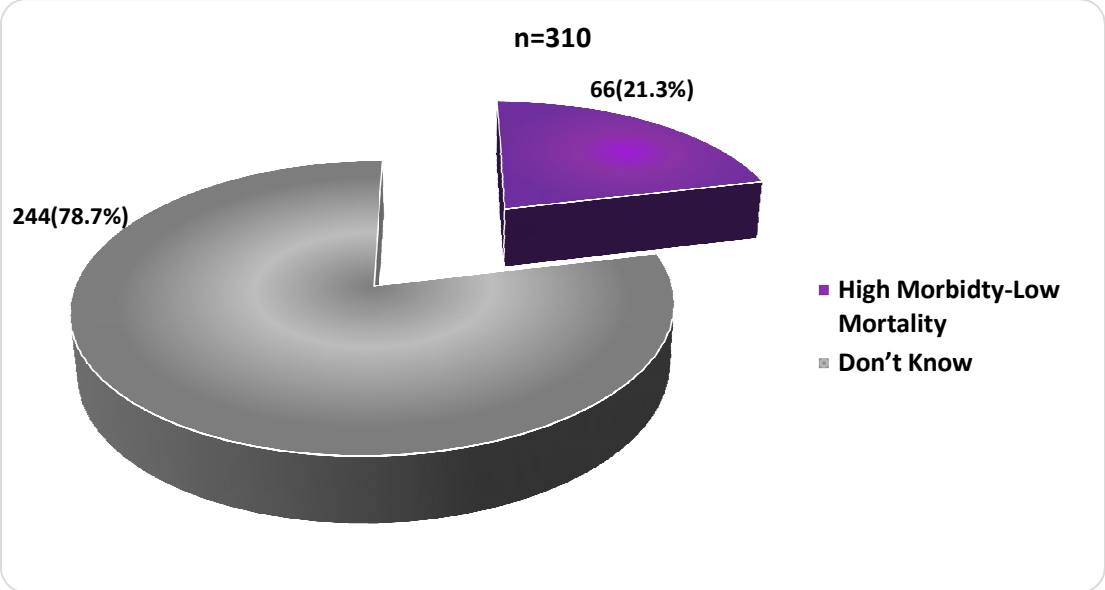

Fig. 2. Knowledge of the population in private universities about Chikungunya disease morbidity and mortality, Khartoum–Sudan 2019

Table 5. Relationship between knowledge levels about Chikungunya disease and academic status of the population in private Universities, Khartoum –Sudan 2019

Knowledge score	Medical student (n=280)	Teaching staff (n=30)	p
Good Knowledge	46(16.4%)	14(46.7%)	0.0002
Moderate Knowledge	114(40.7%)	11(36.7%)	
Poor Knowledge	120(42.9%)	5(16.7%)	

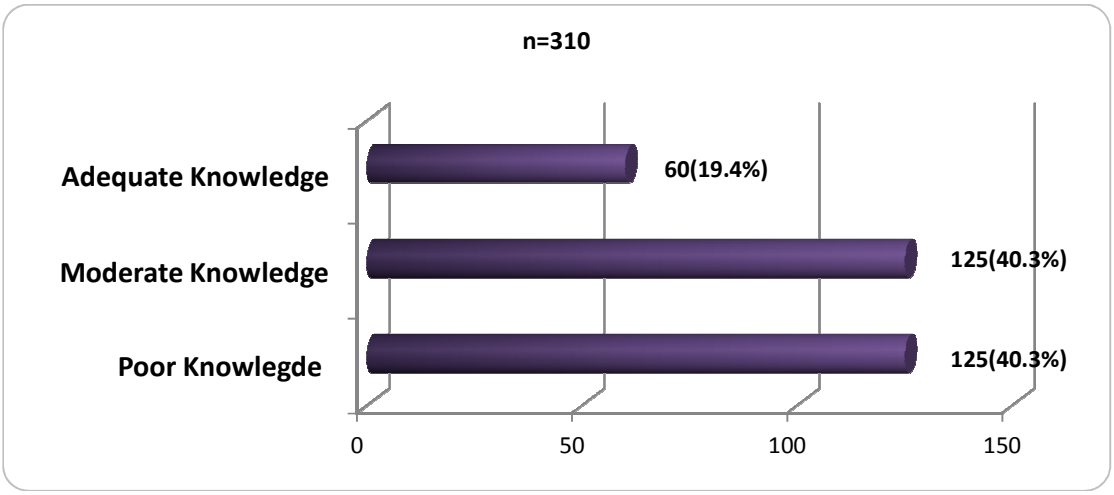

Fig. 3. Knowledge levels about the Chikungunya disease population in private Universities, Khartoum–Sudan 2019

The majority of the study population in this study knew that the cause of CHIKV disease is viral and the common symptom is fever. However, most of them did not know the mode of transmission, the diagnostic methods, management of the disease and the control measures in terms of vector control and supportive management in the absence of any vaccine. CHIKV disease has symptoms that simulate common symptoms of malaria disease which is the most endemic communicable disease in Sudan and it might mask the presence of Chikungunya [21]. Chikungunya shares with malaria the symptoms of fever, body pain, headache and arthralgia and it should be distinguished by further serological tests [21]. Knowing detailed information about the disease and its mode of transmission would facilitate the control and management strategies particularly among medical students and health related professionals [22]. Most of the study population did not know the morbidity and mortality characteristics of CHIKV disease where the disease has low mortality, high morbidity and economic loss [23]. Although it is a self-limiting disease, but it can leave prolonged persistent joint pain that might develop symptoms related to cardiovascular, pulmonary, renal and neurological systems [1,6-8,24]. Generally; the study population, both medical students and academic staff, were significantly having moderate to poor knowledge. Measurement of the levels of knowledge varied among the different studies targeting assessment of awareness about Chikungunya. It was found that healthcare related students and medical students were having ranges of knowledge levels based on different cutoff points and number of variables that were determined by the different authors. Therefore, comparison with such studies is not amenable for identifying which is sufficient or insufficient knowledge about CHIKV disease [15-19,25].

5. CONCLUSION

Almost most of the medical students and teaching staff heard about CHIKV disease but were having moderate to poor knowledge about the general information of the disease. Medical and health faculties should open the channels with Ministries of Health to facilitate field training of the medical students during outbreaks and control of communicable diseases. Raising students' awareness through attendance of conferences and social media about Chikungunya disease is recommended.

CONSENT AND ETHICAL APPROVAL

Ethical consideration was maintained by a letter of approval from the universities and written consent of the study population.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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