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# Knowledge and attitudes towards Zika virus among medical students in King Abdulaziz University, Jeddah, Saudi Arabia

Nahla K. Ibrahim<sup>a,b,\*</sup>, Rana H. Moshref<sup>c</sup>, Leena H. Moshref<sup>c</sup>, Jawaher B. Walid<sup>c</sup>, Hadeel S. AlSatti<sup>a</sup>

<sup>a</sup> Family & Community Medicine Department, Faculty of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia

<sup>b</sup> Epidemiology Department, High Institute of Public Health, Alexandria University, Alexandria, Egypt

<sup>c</sup> Sixth year Medical students, Faculty of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia

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### ABSTRACT

Zika Virus (ZIKV) and its associated consequences remain vital public health challenge of international concerns. The current study was done to assess knowledge and attitudes towards ZIKV and the factors associated with good knowledge among medical students in King Abdulaziz University, Jeddah. A cross-sectional study was conducted among 426 students. They were selected through multistage stratified random sample method, 2016. A validated, confidential, interviewing questionnaire contained 25 knowledge and 10 attitude items was used. Descriptive and inferential statistics were done.

Results revealed that Facebook was the commonest source of ZIKV information. About half of the participants correctly identified mosquito bites and vertical route as ZIKV transmission modes. However, smaller percentages recognized the sexual and blood transmission modes. Calculations of knowledge score revealed that 77.5%, 15.0%, and 7.5% of the participants obtained poor, fair, and satisfactory scores, respectively. Age, educational year and attending ZIKV training were significantly associated with good knowledge ( $p < 0.05$ ). Concerning attitudes, about half of the participants agreed that ZIKV could add new burden on healthcare system of the affected countries. Most of participants were interested in learning more about ZIKV, emerging diseases and travel epidemiology.

In conclusion, medical students had limited knowledge about ZIKV, and good attitudes towards learning about it. Conduction of ZIKV educational programs, and development of courses about emerging disease epidemiology are required.

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### Introduction

Nowadays, the world is living in the era of eco-epidemiology. There are many emerging and re-emerging diseases which originating from animals and associated with diseases in both human and animals. These diseases cause significant morbidity, mortality and outbreaks in many countries [1–3]. Zika virus (ZIKV) is an emerging RNA arbovirus from the *Flaviviridae* family. It was isolated for the first time from the Rhesus monkey in Zika Forest of Uganda, 1947 [4,5]. The current ZIKV epidemic began in Brazil in 2015. It is then

spreading then to many other parts of the South and North America, several Pacific islands and other countries. In January 2017, The WHO reported that 75 countries around the world notified the continuing of ZIKV mosquito-borne transmission, and 46 of these countries are in the Latin American and Caribbean territories. The virus has recently spread throughout the whole Americas [6,7]. ZIKV continues to spread geographically to areas where the competent vectors and other suitable environmental factors are existing [7].

The main mode transmission of ZIKV is through bite of an infected female *Aedes* (*Ae.*) mosquitoes. The chief vector associated with ZIKV transmission is *Aedes Aegypti*. Transmission can also occur through other thirty-eight *Aedes* species as *Ae. albopictus*, *Ae. africanus*, *Ae. luteocephalus*, *Ae. vitattus*, *Ae. furcifer*, *Ae. hensilli* and *Ae. apicoargenteus*. *Ae. aegypti* mosquito lives and breeds near people and their homes. *Aedes* laying eggs in stagnant water collections in the puddles, buckets, flower pots, empty cans and other containers [4,8].

\* Corresponding author at: Family & Community Medicine Department, Faculty of Medicine, King Abdulaziz University, Jeddah, 21551, Saudi Arabia. Fax: +966 126408403.

E-mail addresses: [nahlakhamis@yahoo.com](mailto:nahlakhamis@yahoo.com) (N.K. Ibrahim), [ranahatem0987@gmail.com](mailto:ranahatem0987@gmail.com) (R.H. Moshref), [leenahatem0987@gmail.com](mailto:leenahatem0987@gmail.com) (L.H. Moshref), [j-b-w@live.com](mailto:j-b-w@live.com) (J.B. Walid), [hadeel.al.s@hotmail.com](mailto:hadeel.al.s@hotmail.com) (H.S. AlSatti).

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Vertical transmission is another ZIKV mode of infection. During 2016, a proven evidence of causal relationship (causality) was established between microcephaly and other neurological lesions in the infected newborns and the confirmed congenital ZIKV transmission [9]. In 2017, twenty-nine countries or territories have reported microcephaly and other CNS malformations potentially associated with ZIKV infection, or suggestive of congenital infection [6]. Furthermore, it was suspected that ZIKV can be also transmitted after birth through breast feeding [10]. ZIKV infection is suggested to cause abortion and miscarriage.

Sexual transmission is a third possible transmission route [11]. A recent systematic review, 2017, reported that ZIKV RNA was detected in semen as late as 188 days (range: 3–188) following onset of symptom, and infectious virus was isolated in semen up to 69 days after onset. No study reported ZIKV isolation from female genital samples, but detection occurred up to 13 days after onset of symptom [12]. The WHO, January 2017, reported that 13 countries have reported evidence of person-to-person transmission of ZIKV [6].

Blood-borne route can also transmit ZIKV. This can occur as most of the cases are asymptomatic, and the viral transmission is suggested to occur during the acute phase of infection [4]. On the other hand, additional modes of transmission as saliva are still under studies [11].

ZIKV infection is generally asymptomatic in about 80% of cases [13,14]. The main manifestations of the symptomatic cases are low grade fever, conjunctivitis, arthralgia, myalgia, and maculopapular rash. Severe cases are unusual and most of them do not need hospitalization [4].

Although ZIKV has been reported for rather a long period of time, however, its rapid resurgence, new transmission routes and its implication to microcephaly and Guillain-Barré Syndrome (GBS) made it a currently important public health problem [15,16]. Worldwide, 21 countries or territories have reported an increased incidence of GBS and/or laboratory confirmation of a Zika virus infection among GBS cases in 2017 [6]. ZIKV was suggested to be classified as “Category V Notifiable Infectious Disease” resembling other dangerous emerging diseases as Ebola and Middle East Respiratory Syndrome (MERS). Therefore, it represents a public health challenge for endemic areas and for the field of travel epidemiology [17]. Combined effort is required for reduction of ZIKV transmission in the infected countries, and for prevention of its transmission into new areas [18]. However, until now there is no licensed ZIKV medical measures (vaccines, preventive drugs or treatment) [18]. It is expected that arrival of ZIKV vaccine may take a minimum of 3–5 years after the initial year of non-human primate testing. However, experts proposed that this duration is an optimistic time for production and license of the vaccine, and it may need up to 20 years [19].

Medical students, as the future practitioners, should have sufficient information about ZIKV [20]. Such knowledge is needed as the virus is rapidly manifesting itself in a pandemic alarm [21]. Furthermore, few studies were conducted about knowledge and attitudes of health providers towards ZIKV. Such studies were mainly done in countries where ZIKA is circulating, and based only on few knowledge questions [22,23]. Knowledge and attitude ZIKV researches allow to obtain insight information to address people’s need and continuing overall response to ZIKV epidemic [6]. In addition, medical students in the Kingdom of Saudi Arabia (KSA) need to have adequate information about ZIKV as it can be transmitted to the country due to existence of the same *Ae. mosquito*, and the existence of another similar arbovirus which is Dengue Fever (DF). Three DF serotypes; Dengue virus type 1 (DENV-1), DENV-2 and DENV-3, are circulating in the Western region of KSA. There is an increasing incidence of DF over years with confirmation of endemic occurrence of the disease in Jeddah. Furthermore, *Aedes Aegypti mosquito*

is also the main vector of DF transmission (similar to ZIKV) [24]. KSA also hosts one of the largest annual mass gathering worldwide. About 7 million pilgrims are expected to visit Kingdom KSA for Umrah and Hajj yearly, and thousands of them came from Latin American where ZIKV is circulating [25,26]. Preparedness for Hajj mass gatherings is required in the current era of globalization and international travelling [27]. However, no comprehensive epidemiological studies were conducted to identify knowledge and attitudes of the medical students towards ZIKV. So, such study is needed.

#### *The objective of the study*

The objective of the study was to assess the level of knowledge and attitudes of medical students enrolled in King Abdulaziz University (KAU) towards ZIKV, and to identify factors associated with their good level knowledge about it.

#### **Material and methods**

##### *A cross-sectional study*

A cross-sectional study was conducted during 2016. The study was done among medical students who completed the freshman year (2nd–6th year) in KAU, Jeddah, Saudi Arabia

##### *Sampling*

Medical student participants were selected through a multi-stage stratified random sample technique. Stratification took into consideration the students’ educational year and gender. The sample size was calculated using the following equation [28]:

$$n = \frac{z^2 \times p \times q}{d^2}$$

where “n” is the minimal calculated sample size, “Z” is a constant equal 1.96. It was assumed the estimated prevalence of good students’ knowledge about ZIKV is 0.5 (taken as the most conservative value as there is no previous study done among medical students in Jeddah). So, “p” = 0.5, “q” = 1 – 0.5 = 0.5 and “d” was set at level of 0.048. At confidence level of 95%, the minimum sample size will be 417 students.

A validated, confidential, interviewing questionnaire was used. For preparing of the questionnaire, searching and reviewing of all previous researches done on the topics of “epidemiology of ZIKV”, and the “knowledge and attitudes towards ZIKV” were done. Electronic bibliographic of PubMed, EMBASE, the Cochrane Library, and the web sites of CDC, WHO, Google, Google Scholar, were explored for the published researches till 2016. All articles were scrutinized and the most suitable articles were selected.

The questionnaire inquired about personal and socio-demographic data of medical students. Their source of information about ZIKV was also determined. It contained 25 Multiple Choice Questions (MCQs) for evaluating participants’ knowledge about ZIKV. These questions assessed their knowledge about the time and the place of isolation of ZIKV for the first time and the commonest affected World’s region nowadays. They were also asked about the modes of ZIKV transmission, its incubation period, symptoms and the most dangerous ZIKV complication among the infected newborns. They were also asked about the other arbovirus (DFV) resembles ZIKV which is endemic in the western region of KSA. They were inquired about the possibility of ZIKV transmission to KSA, and if yes, they were asked about the reason. The questionnaire contained 2 questions asked about the other most dangerous emerging diseases present nowadays in the West-Africa (Ebola), and in the KSA (MERS).

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