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RESEARCH ARTICLE

EPIDEMIOLOGICAL STUDY ON DENGUE FEVER AND RISK FACTORS IN GAZAN, KSA2016, 2017AND 2018

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ABSTRACT

Background: Dengue Fever DF represents a major global health challenge. It is the most important human infection. In Saudi Arabia, the first experience of virus isolation during a DF outbreak was in 1994 in Jeddah many out brakes followed in (20042005 , 2006 and 2009) the Saudi Preventive Department in the Ministry of Health (MOH) launched a comprehensive plan to control the disease In 2008. The reemergence of DF in Saudi Arabia can be explained by the growing levels of urbanization, international trade and travel in the Kingdom. **Methods:** Is a retrospective cross-sectional study used secondary data from national register of Dengue fever control program study conducted in Gazan area data collection tools was questionnaire like form, this study analysed the dengue fever cases during the During 2016,2017 and 2018. **Results:** Study revised the dengue fever cases during 2016, 2017 and 2018 a total of 1991samples were subjected to dengue IgM antibody and/or NS1 antigen test, of which 1049 (52.6%) tested positive for dengue, regards to the distribution of cases throughout the year ,the highest number of cases in May all over the three years this finding is more or less similar to report conducted in Saudi Arabia, Makkah and Jeddah region from year 2009 to 2013.Male: female ratio was 1.91. The most commonly affected age group was 14- 29 years represented (36.7%), regards to clinical features All the dengue patients had a history of fever. Other symptoms recorded were myalgia (71%), headache (23%), vomiting (35%), itching (12%), pain in abdomen (9%), and rash (4%). **Conclusion:** Along the three years a total of 1991 casese were registered, the fewest cases were in 2018, most cases occurred in May throughout the three years, moreover the Proportion of DHF cases was less than 1% all over the three years, from 2016 to 2018. further studies were need to elaborate the incidence rate of dengue fever.

INTRODUCTION

Dengue Fever DF represents a major global health challenge. It is the most important humaninfection[1]. Its a viral infection belong to *Flaviviridae* family and *Flaviviru sgenus* dengue virus (DENV) has four antigenically related, but immunologically distinct serotypes (DENV-1, DENV-2, DENV-3, and DENV-4)[2,3]. DF was first discovered in 1779 in Batavia and, a year later, a pandemic of DF occurred in Philadelphia, USA[4]. In 1998, another pandemic of DF occurred in 56 countries, where 1.2 million people were infected[5]. During the past 50 years, DF incidence has witnessed nearly a 30-fold increase. Today, there are approximately 100 countries in the Americas, South East Asia, the Eastern Mediterranean, the Western Pacific and Africa, where 50 million DF occur annually, out of which 22,000 deaths affect mostly children[6].

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Epidemic transmission occurs periodically in most virus-endemic areas, usually at3–5 year intervals Peak transmission of dengue viruses is usually associated with periods of higher rainfall in most dengue-endemic countries (Halstead, 2008). Factors influencing seasonal transmission patterns of dengue viruses are not well understood, but obviously include mosquito density, which may increase during the rainy season, especially in those areas where the water level in larval habitats is dependent on rainfall. In areas where water storage containers are not influenced by rainfall, however, other factors such as higher humidity and moderate ambient temperatures associated with the rainy season increase survival of infected mosquitoes, thus increasing the chances of secondary transmission to other persons[7] A combination of increased and unplanned urbanisation, changing life styles and lack of effective mosquito control has made most tropical cities highly permissive for efficient dengue transmission by A. aegypti. Increased air travel by humans provides the ideal mechanism for the transport of dengue viruses between population centres.

Consequently, in the past 20 years there has been a dramatic increase in the movement of dengue viruses within and between regions, resulting in increased epidemic activity, development of hyperendemicity and the increased incidence of severe dengue, including dengue shock syndrome [8] Dengue infection causes a spectrum of illness in humans, ranging from inapparent to severe disease characterised by plasma leak resulting in shock and hemorrhage. The most severe disease is observed in infants and young children. The previously used WHO disease classification categorised dengue into either 'dengue fever' or 'dengue haemorrhagic fever'. Dengue haemorrhagic fever (DHF) was further subdivided into four severity grades, with the two most severe grades referred to as 'dengue shock syndrome' (DSS) [10].In 'classical' dengue a sudden onset of fever follows a 4–7 days incubation period. This is frequently accompanied by headache, myalgia and severe retro-orbital pain[9]. The pathology of dengue virus infection is not well understood because systematic postmortem studies have not been done on patients representing all types of clinical expression. The major pathophysiological abnormality in classic DHF/DSS is an increase in vascular permeability, which leads to leakage of plasma[11].

Prevention and control: There are main component of controlling and preventing D Fare Environmental sanitation measures to reduce mosquito breeding sites, it can be Biological methods (e.g. fish, copepods – small crustaceans that feed on mosquito larvae) to kill or reduce larval mosquito populations in water containers and Chemical methods against adult mosquitoes, such as insecticide space sprays or residual applications. And personal protection through use of repellents, vaporizers, mosquito coils, and insecticide-treated screens, curtains, and bed nets (for daytime use against *Aedes*)[12]

The Global Strategy: The Global Strategy was established in 1995 to focus and coordinate national efforts to prevent and control DF/DHF.3 In 2002, the necessary political will for its implementation was formally reflected by the 55th World Health Assembly adoption of a Resolution on " Dengue fever and dengue haemorrhagic fever prevention and control[13] The Strategy consists of five main elements:

Selective, integrated mosquito control with community and intersectoral participation, in which control is directed towards geographical areas at highest risk of transmission, integrating all appropriate methods in the most cost-effective and economical manner.

Active disease surveillance based on strong health information systems, involving clinical and laboratory-based dengue surveillance for early detection of epidemics and vector surveillance for monitoring and evaluation of control programmes.

Emergency preparedness, necessitating development of emergency and contingency plans, including education of the medical community, hospitalization plans, case management, and emergency vector control.

Capacity building and training, in surveillance, laboratory diagnosis, case management, and vector control at professional, supervisory, technical, and field levels; and

Vector control research: Including studies on vector biology and control, disease relationships, design and management of control programmes, including social and economic approaches, and cost–benefit analyses.[11]

Dengue fever in KSA: In Saudi Arabia, the first experience of virus isolation during a DF outbreak was in 1994 in Jeddah, where 289 confirmed cases were recorded [14].The first documented case was caused by DENV-2. During the outbreak, DENV-2 and DENV-1 were isolated during a peak of cases in the summer and in the rainy season at the end of the year. In 1997, emergence of DF occurred with DENV-3 identified during the rainy season in Jeddah. The virus was not isolated in the next seven years until 2004 when DENV-1, DENV-2 and DENV-3 were isolated in Jeddah. During the same year (2004), the first outbreak in Makkah occurred with the isolated DENV-2 and DENV-3 [15].

The next outbreaks occurred in Jeddah in the winter seasons of 2005 and 2006 [16, 17]. After another outbreak of DF occurred in 2006, the Saudi Preventive Department in the Ministry of Health (MOH) launched a comprehensive plan to control the disease [18]. In 2008, the first cases were reported from Al-Madinah with DENV-1 and DENV-2 isolated serotypes [19]. In 2009, the Saudi MOH reported a total of 3350 cases of DF in the Kingdom and estimated the case fatality rate to be 4.6 per thousand [20]. The reemergence of DF in Saudi Arabia can be explained by the growing levels of urbanization, international trade and travel [21].

METHODOLOGY

This is study is a retrospective cross-sectional study use secondary data from national register of Dengue fever conducted in Gazan area which located in southwestern Saudi Arabia. The average temperature throughout the year is 25-23 Celsius. The province can be windy during the summer months with winds reaching an average 25 km/h. The average rainfall is 45-100mm per year, the aims of the research were to study the epidemiology and the risk factors of dengue fever in Gazan in the period and to determine the incidence rate and fatality rate of dengue fever in year (2016,2017 and 2018).it included All reported suspected dengue fever cases in 2016 - 2018. Data was collected using a Pre-constructed questionnaire-like form.

RESULTS

Table (1) shows that 2018 witnessed the least numbers of confirmed dengue fever cases in year. The above table (2)shows the number of dengue fever case(s and proportion of DHF which is less than 1% and 0% case fatality rate in year (2016,2017 and 2018). The above figure (1) shows the distribution of cases per month it revealed the cases start to increase in March and reach the peak in May and the least cases in September and August. The above table revealed the highest number of cases located western sector in 2016 and in mid sector in 2017 and western sector also in 2018.

Table1 Distribution of suspected and confirmed dengue cases (2016-2018)

Year	NO of suspected cases	NO of confimed cases	%

2016	954	555	58.2
2017	567	320	56.4
2018	470	174	37.0

Table 2. Number of reported dengue cases in Gazan, KSA in year (2016, 2017 and 2018)

Region	Number of dengue cases	Proportion of DHF cases (%)	Number of deaths	CFR (%)
2016	555	< 1%	0	0
2017	320	< 1%	0	0
2018	174	< 1%	0	0

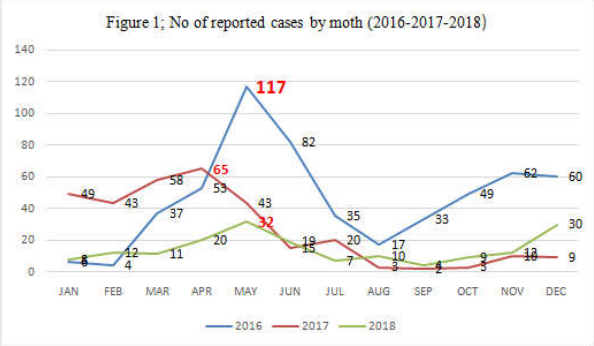

Figure 1. No of reported cases by moth (2016-2018)

Table 3. The distribution of cases per health sectors and sociodemographic characteristics

	2016	2017	2018
The sector			
Mid sector	39	89	29
Western sector	161	62	61
Southern sector	48	79	13
Northern sector	12	10	35
Central sector (Jazan)	155	75	26
Mountainous sector	21	4	10
Age			
Less 1	5	3	4
1-4	9	12	9
5-14	34	56	22
15-29	237	98	50
30-44	197	113	59
45 and more	73	38	30
Sex			
Male	384	190	115
Female	171	130	59
Nationality			
Saudi	393	241	99
Non-Saudi	162	79	75

DISCUSSION

Dengue is the fastest spreading mosquito borne disease in the world and is endemic in most tropical countries with an estimated 96 million symptomatic cases annually [22] In this retrospective crossectional study conducted in Gazan area which is witnessed numbers of dengue fever cases over years, this study will analyse the dengue fever cases during the During 2016, 2017 and 2018. A total of 1991 samples were subjected to dengue IgM antibody and/or NS1 antigen test,to confirm dengue infection in Jazan region, two samples of blood taken routinely from all suspected cases who used to present usually during the acute phase of the illness, one sample send for PCR which is not always available and preserved mainly for severely ill patients and for serotyping. The other sample send for serology and ELISA. Detection of non-structural protein 1 (NS1) and/or of specific IgM antibodies during the first few (1-9) days after the onset of fever is usually enough to confirm dengue infection. However if only dengue IgG antibody is positive in the first sample an increasing titer of four-fold or greater in another blood sample ten days after is indicative of dengue infection of which 1049 (52.6%) tested positive for dengue, Distributed through out the year (52%) of the cases in 2016 and (30.5%) in 2017 and less cases in 2018 represented (37.0%) regards to the distribution of cases through out the year ,the highest number of cases in May all over the three years this finding is more or less similar to report conducted in KSA, Makkah and Jeddah region from year 2009 to 2013 [23] and the least number of cases in September in 2017 and 2018, in A ugust in 2016, these finding more or less similar like study analysed the report of dengue fever KSA 2013 [24]

The reasons for the emergence of dengue hemorrhagic fever are complex andnot fully understood but demographic, socialand public health infrastructure changes in thepast decades have contributed greatly to thisphenomenon [25.] Male: female ratio was 1.91. The most commonly affected age group was 14 - 29 years represented (36.7%) similar to study conducted in tertiary Makkah and 30-44 year represented (35.2%) of all cases these find consistent with study conduct in tertiary hospital in Makka during period 2006-2008, KSA [26], regards to geographical distribution of reported cases in 2016 more than 40% of cases from western sector also in 2018 there abut (35.1%)of cases and finally the western sector reported about (35.1%) so there no fixed geographical areas for the cases., Saudi to non Saudi ratio is about 1.32.Proportion ofDHF cases (%) was less than 1% all over the three years, from 2016 to 2018.

Clinical features.

All the dengue patients had a history of fever. Other symptoms recorded were myalgia (71%), headache (23%), vomiting (35%), itching (12%), pain in abdomen (9%), rash(4%) these symptoms consist with study conducted and bleeding from nose and gum (1%), consistent with study [27]

Conclusion

A total of 1991DF cases were reported in the three year,1049 (52.6%) tested positive for dengueIgM antibody and/or NS1 antigen, the highest number of cases in May all over the three years and the least September.

Male: female ratio was 1.91. The most commonly affected age group was 14- 29 years. Fever present in all reported cases followed by myalgia (71%), headache (23%), vomiting (35%). Proportion of DHF cases (%) was less than 1% all over the three years.

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