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IS DENGUE A SEX DEPENDENT DISEASE – A DEMOGRAPHIC REPORT AT JHARGRAM BELT, WEST BENGAL IN 2017-18

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ABSTRACT

Dengue fever is a viral infection and is serious health problem worldwide particularly in Asian countries including India. It is an autoimmune disease which is caused by the vector *Aedes aegypti* giving NS-1 and IgM positive test. Besides this, other environmental factors and many host factors are also involved in its rapid transmission. A demographic study report on dengue fever at Jhargram belt in West Bengal, India, in 2017 – 18, revealed the predominance of suffering in male than female. It was also severe in age group between 20-40 years. In the second stage the other victimized group was 0- 10 years. The biochemical reports in males also showed higher level of SGPT, IgG and IgM level. The ESR level was higher in female but total leucocyte count was higher in male. The collected reports favour the possible assumption on dengue as an male dominant autoimmune disease. But the exact mechanism is still obscure. In future we should find out whether it is truly sex dependent like few other diseases i.e. diabetes mellitus, grave's disease, systemic lupus erythematosus etc. and how is genetically interrelated.

KEYWORDS: Dengue, India, Male, IgG, IgM, SGPT.

INTRODUCTION

In the second half of twentieth century, Dengue is a major public health concern in many tropical and subtropical countries in the world. It is a mosquito - born viral disease. It is now a major global threat as claimed by WHO.[1] The dengue virus (DENV) infection causes a broad spectrum of clinical presentations, with asymptomatic, mild or nonspecific fever. The severe presentation cases with haemorrhagic fever (DHF) or dengue shock syndrome (DSS). The survey reports at different times, encourage the prevalence of male gender and the specific age groups.[2,3,4]

There are four closely related DENV serotypes (DENV – 1 TO 4). DENV-1 was first isolated by Ren Kimura and Susumu Hotta in Japan in 1943.[5] An epidemic of Dengue Fever involving at least 200,000 cases had occurred between 1942 and 1944 during World War II in Japanese port cities such as Nagasaki, Kobe, and Osaka.[6] The infections originated from persons returning from the tropics, in particular Southeast Asia and the Pacific islands. A few months after the first isolation of DENV-1 in Japan, Albert Bruce Sabin and Walter Schlesinger isolated DENV-1 from Hawaiian and shortly thereafter, DENV-2 from Papua New Guinean samples by Sabin and Schlesinger, 1945.[7] They demonstrated that these viruses were antigenically related, yet distinct, and they could be distinguished by the hemagglutination inhibition (HI) assay. In the late 1960s, dengue haemorrhagic fever (DHF) fatality has been reported by Sumarmo et al.,1987 to be as high as 41.3% when healthcare providers understandably were still unfamiliar with the disease.[8] Today, DHF fatality rates can exceed 20% without proper treatment, but can be brought down to 1% with proper medical care according to WHO report, 1997.[9] Although there were various speculations about the earliest description of dengue-like diseases in historical accounts.[10,11] The disease now known as DHF was first recognised in Manila, the capital of Philippines in 1953.[12] Viruses similar to DENV-1 and DENV-2 were isolated from Manila patients in 1956 by William Hammond and were called DENV-3 and DENV-4.[13] Dengue viruses of multiple serotypes were subsequently isolated by Hammond et. al, 1960, from patients of another DHF epidemic in Bangkok and Thailand in 1958.[14] It is now reported that all four serotypes of dengue virus can cause DHF. Halstead in 1980, reported that DHF/DSS outbreaks were mainly restricted to Southeast Asia until the early 1980s.[10] Since then, dengue transmission has intensified and DHF/DSS outbreaks are now frequent in

most tropical countries. To this day, DHF/DSS remains a leading cause of hospitalisation and death among children in Southeast Asia. Outside the region, the disease burden of dengue is most acutely felt in Central and South America where 24 countries have reported laboratory-confirmed DHF between 1981 and 1997.[15-17] Recently in 2003, Messer and others have shown that the emergence of DHF in Sri Lanka in 1989 coincided with the appearance there of a new DENV-3, genotype III variant, which spread from the Indian subcontinent into Africa and then from Africa into Latin America.[18]

From the reviews of earlier studies, it is reported that different diseases are sex dependent, somewhere males are more susceptible than female and it is reverse somewhere. Again, somewhere is independent. Somewhere children are most susceptible than adults or the reverse, as are also reviewed in the present study. Commonly, most of the autoimmune diseases are sex dependent.

In the present study, we tried again to report the sex dependence of dengue fever like diabetes mellitus and other such autoimmune diseases, which are more prevalence in males. Genetically, PTPN 22 - gene is expressed in male causing expression of insulin resistant diabetes. Similarly, Hypothyroidism, is also an other autoimmune disease where females are more susceptible. It is also IL2RA- gene dependent, expressed in females.

So our most welcome intension is to report through survey work that dengue is whether sex dependent, considering different physiological parameters. And finally to give through the question of gene interrelation with Dengue and sex variation for future studies, as there is no such report till date like sex dependence of Diabetes Mellitus, Hypothyroidism and such other diseases.

MATERIALS AND METHODS

We selected the Jhargram area, West Bengal, India, for data collection. We randomly collected the data from different Laboratories, Hospitals and pathological centres. Data were investigated for the year 2017 – 2018 on male and female, age groups and on few vital biochemical parameters. Data were calculated statistically and represented through statistical diagram.

DATA ANALYSIS AND RESULTS

1. Percentage of male and female affected by dengue -
Total affected 89
Males 60
Females 29

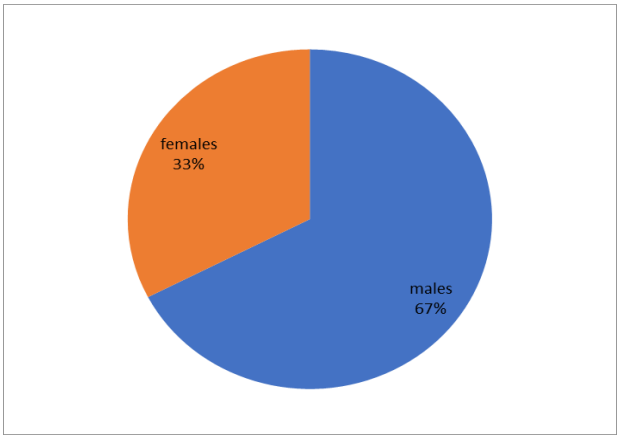

Figure 1: Pie diagram showing % of male and female affected by dengue.

2. Age group (years)

Class interval (years)	Frequency
0-10	11
10-20	6
20-30	28
30-40	20
40-50	8
50-60	5
60-70	4
70-80	1
80-90	2

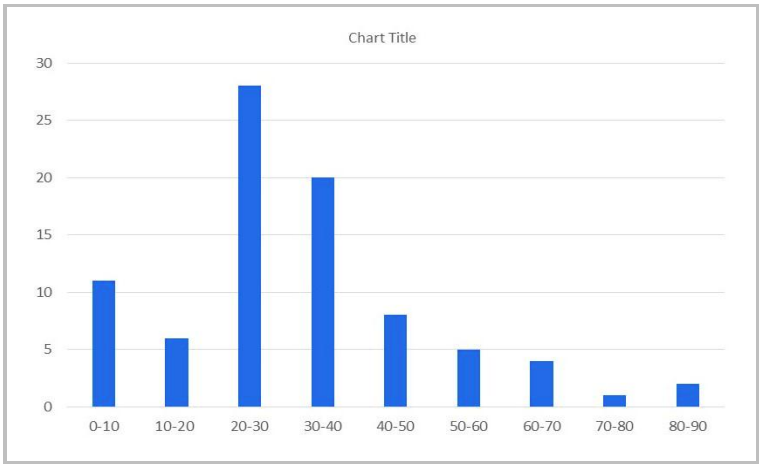

Figure 2: Bar diagram showing number of patients affected by dengue at different age groups. (Bars represent the frequency of class intervals).

3. Serological data – (average value).

Gender	IgG (mg/dl)	IgM (mg/dl)	SGOT (U/L)	SGPT (U/L)	ESR (mm/hour)	WBC (Cu.mm)	Platelet (Cu.mm)
Male	45	39	175	286	25	3066	80500
Female	32	28	148	190	39.5	2550	92300

Remarks

The survey result shows that males are more affected by dengue than females. Particularly the age group between 20-40 years are more sufferer. The IgG, IgM, SGOT, SGPT and total WBC count were higher in affected male than female. The ESR level and platelet count were higher in affected female.

DISCUSSION

The Dengue is an autoimmune disease caused by the development of antibody against DEV toxins. It is also reported that, most autoimmune diseases are gender dependent.[19] As systemic lupus Erythematosus, Sjogren's syndrome, multiple sclerosis, Grave's disease, Hashimoto's thyroiditis, Rheumatoid arthritis, Primary biliary cirrhosis etc. are predominant in female, where Guillain - barre syndrome, Ankylosing spondylitis, Diabetes etc. are more incident in male. From the present finding, it is clear that Dengue also may be sex dependent, where males are more sufferer than female.[20,21] The exact mechanism is still obscure. Possibly the prevalence in female is due hormonal factors. Generally, oestrogen and prolactin act as enhancer of humoral immunity, where testosterone and progesterone are immune suppressive.[21] Again, in female, X-linked genes FOXP3, TNF and TLR are more associated with systemic lupus erythematosus. So, females are more sufferer by systemic lupus erythematosus than male due to over expression of these genes. In Rheumatoid arthritis, TIMP1 gene is encoded in female X-chromosome and so, females are more sufferer.[22] In multiple sclerosis males are affected fast than females.[23] But the genetic correlation is yet unknown. In 2011, Anker and Arima reported that males are more affected by dengue due to external exposure.[24] Again, Surendra Kumar et.al in 2017, reported that more metabolites i.e. SGOT, SGPT etc. are produced in male than female due to dengue, which supported our findings.[25]

So, in the present study it is mostly speculated that dengue may be sex dependent as supported by the survey results at Jhargram belt in respect to age, sex variation and biochemical reports. In future, this study report may highlight the clue of separation and or identification of such specific gene/s in sex chromosome, related with dengue.

CONCLUSION

Dengue is a male dominant autoimmune disease. So it may have specific gene expression in respect to gender differences. In this survey work, our aim is to focus about the study and isolation of such specific gene further. The study needs many more data and parameters further to establish our expectation in future.

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