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Dress cultureis one of themain factors for difference in sex ratio with regards to dengue incidence in Bhutan

KEYWORDS: Aedesaegypti, Dengue virus, Bhutan, Male, Female, mosquito.

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ABSTRACT *Dengue is emerging as a serious public health problem globally, with 2.5 billion people at risk and 50 million dengue infections occurring annually. This disease is one of the most significant public health problems in tropical and subtropical countries, and is increasingly being detected in traditionally non-endemic areas. Bhutan was also among non-endemic area for dengue but after 2004 this diseases came in predominance. The initial study on the limited acute-phase blood samples in and around Phuntsholing [urban town bordering India] during 2004 to 2006, showed DENV-2 (Cosmopolitan genotype) predominated in 2004, and DENV-3 (genotype III) predominated in 2005–2006. The study revealed the probable entry of these viruses from India and primary dengue infections suggested recent emergence and establishment of local transmission. Dengue infections affect all age groups and produce a spectrum of clinical manifestations, with varied clinical evolutions and outcomes that range from asymptomatic to a mild or non-specific viral syndrome and to a severe and occasionally fatal disease characterized by hemorrhage and shock.*

Herewith we report a Social/cultural factor in Bhutan that suggests that the males getting vector bites is probably higher than females. The Bhutanese men wear a long knee length gown, raised and fastened at the waist using the belt 'kera' similar to that used by the women but with less length. This difference in dress causes about 5% lower limbs more exposed then females and being lower limbs provides more opportunity to female Aedes mosquitoes to bite. Aedesaegypti predominantly feed on human blood and being day biter their process of probing to take blood to full satiation is often interrupted. Availability of exposed lower extremities of the body provides them full opportunity to ingest blood with less interruption.

INTRODUCTION

Dengue is emerging as a serious public health problem globally, with 2.5 billion people at risk and 50 million dengue infections occurring annually (1). This disease is one of the most significant public health problems in tropical and subtropical countries, and is increasingly being detected in traditionally non-endemic areas. Bhutan was also among non-endemic area for dengue but after 2004 this diseases came in predominance2 [TandinDorji, 2009]. The initial study on the limited acute-phase blood samples in and around Phuntsholing[urban town bordering India] during 2004 to 2006, showed DENV-2 (Cosmopolitan genotype) predominated in 2004, and DENV-3 (genotype III) predominated in 2005–2006. The study revealed the probable entry of these viruses from India and primary dengue infections suggested recent emergence and establishment of local transmission [TandinDorji, 2009]. Dengue infections affect all age groups and produce a spectrum of clinical manifestations, with varied clinical evolutions and outcomes that range from asymptomatic to a mild or non-specific viral syndrome and to a severe and occasionally fatal disease characterized by hemorrhage and shock (3).

Worldwide increase in dengue cases, one of the research priority has been put forwards is to understand the dynamics of virus transmission keeping Social, economic, and biological factors in the view so that better interventions can be implemented.

Herewith we report a Social/cultural factor in Bhutan that suggests that the males getting vector bites is probably higher then females. The tradition for females dress consist of a 2.5 meter long cloth (kira) draped around the body in layers. It is held in place by a long woven belt called 'kera'(simple or with intricate designs) about 1.5-2 meters long. Underneath the kira a long sleeved top called wonju is worn. The long sleeves are then folded over the outer long sleeve of tego, the jacket worn over the kira.

The Bhutanese men wear a long knee length gown, raised and fastened at the waist using the belt 'kera' similar to that used by the women but with less sophisticated designs. The lower hem-line of the gown is raised just above the knee. A long stocking is pulled right below the knee. A formal shoe, a clean white removable sleeve and a white collar complete the traditional attire for men.

MATERIALS AND METHODS

Study area and its criteria:For this study the OPD human samples which was referred to PHL, laboratory for dengue diagnosis was taken for analysis to understand the sex ratio and relation of dengue incidences. The data is

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referring to five year of referred suspected dengue cases during the period of 2007-2011 on the dengue cases that affected percentage of males and females (Figure 1).

RESULTS

The retrospective data (2007-2011) on the dengue cases showed that affected percentage of males (196/332),is significantly (P=0.0011, binomial test) higher than females (Figure 1).

Figure 1: Retrospective OPD hospital data of dengue cases from 2007-2011 in Bhutan.

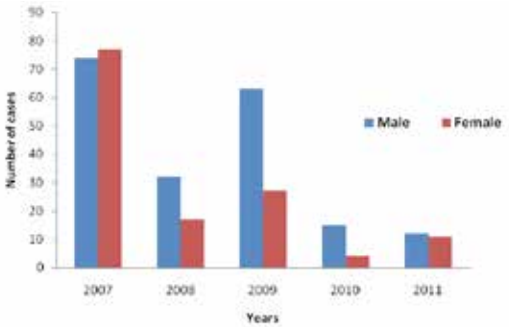
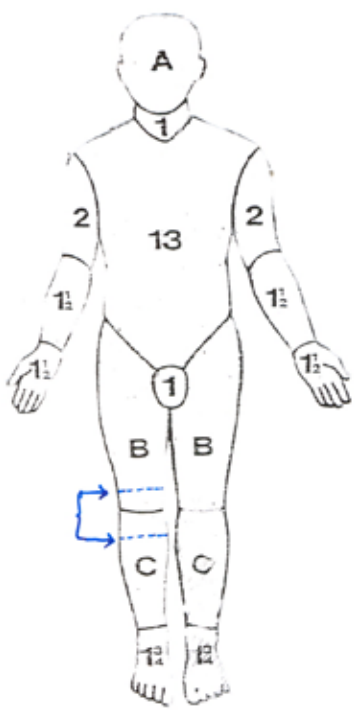


Fig 2: Diagrammatic depiction of percent male body area exposed more than female.



This difference in dress causes about 5% lower limbs more exposed then females and being lower limbs provides more opportunity to female *Aedes* mosquitoes to bite. *Aedesaegypti* predominantly feed on human blood and being day biter their process of probing to take blood to full satiation is often interrupted. Availability of exposed lower extremities of the body provides them full opportunity to ingest blood with less interruption.

DISCUSSION

The emergence of dengue threat is striking in its persistence and magnitude. Southeast Asia whendengue was first recognized it was considered as only a clinical entity, but todaywhole continent is facing this as major health problem.

The main vector *Aedesaegypti* breeds in and around the houses. The major breeding places are the domestic containers, however, human activities have led to enhancemosquito-breeding capacity. Among these are discarded plastic bottles, tin canes, coconut shells and automobile tyres. Besides these human habitats, the cultural practices are also playing important role. In Bhutan besides this difference of cultural dresses, these are 7 metal pots are used for worshiping. These are always filled with water and many times these remain unattended due to travel or various other reasons thus provide good breeding place for the vector mosquito species.

Poorly planned development has been a major factor, especially in urban centers of the developing world. In Bhutan such planned urban development is not possible. The topographical situation of Bhutan shows percentage of forest of the available land is about 72% (4). However, the urban towns are situated in the valleys and houses are made on any possible plain/less slop area available. This is the reason many of the houses are almost very close to forestlands and surrounded by trees. Thus large number trees provide opportunity of getting filled with water during rainy season and water filled axils and tree holesprovide opportunity for breeding of other *Aedes* species specially *Ae. albopictus*. The changing global climatological situation and global warming, in future may become major factor for increase in vector species thus providingincreased interaction between mosquitoes and humans, as well as increased dispersal of viruses in both mosquito and human hosts.

At present, there is no specific antiviralsand successful vaccine available for dengue. Mosquito control, though costly, remains the sole method of preventing this disease. Community participation and mass education is supposed to be very effective way for interventions but above mentioned cultural practices may not find any impact on these strategies, since national dress code can never be changed.

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