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A short term study on Dengue incidence in relation to gender in some districts of Rajasthan

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Abstract - Dengue is a mosquito-borne viral disease occurring in tropical and subtropical areas which is spread by *Aedes*.Understanding the economic and disease burden of dengue in India is essential to assist policy makers and public health managers to prepare for and control outbreaks and encourage international collaboration to develop and evaluate prevention, control and management measures, and technologies to control further epidemics. The present study was therefore undertaken to document dengue and its association with gender, if any. Not much difference in overall male/female ratio was found from the three districts surveyed during the study. It was noted to be 0.94 in Bikaner, 1.04 in Sriganganagar and 0.92 in Hanumangarh District, slightly higher in Bikaner as compared to other two districts.

Keywords – Dengue, mosquito-borne viral disease, Rajasthan

I. Introduction

Dengue is a mosquito-borne viral disease occurring in tropical and subtropical areas which is spread by *Aedes*.It is believed that 50 to 100 million people worldwide in a year suffer from dengue (WHO, 2001). The incidence of dengue has increased 30 fold between 1960 and 2010. This increase is believed to be due to multiple factors like, rapid urbanization population growth, international travel from endemic areas and lastly global warming. The geographical distribution is around the equator mainly affecting Asia and Pacific regions. First outbreak was reported in Kolkata in 1963 (NVB DCP Reports, 2007). The next major outbreak of dengue fever was reported in Delhi and neighboring states in 1996. According to Srinivas&Srinivas (2015), data for the last 10 years reveal maximum number of cases (16,000) in 1996, while the next increase (12,000) was noted in 2003.

Understanding the economic and disease burden of dengue in India is essential to assist policy makers and public health managers to prepare for and control outbreaks and encourage international collaboration to develop and evaluate prevention, control and management measures, and technologies to control further epidemics (Kakkar, 2012; Chakravatiet al., 2012).

The present study was therefore undertaken to document dengue and its association with gender, if any.

II. The Study area

The present survey pertaining to dengue fever was carried out in three districts of North West Rajasthan viz. Bikaner, Sriganganagar, and Hanumangarh.

Bikaner district

Bikanerlies between $27^0$11' & $29^0$3' North and $71^0$54' & $74^0$12' East covering an area of 2744 sq. Km^2. The places/areas surveyed in this district included Bikaner city, Deshnoke, Nokha city, Nokha rural, Dungargarh and Kolayat.

Sriganganagar district

Sriganganagar lies between $28^0$4' & $30^0$6' North and $72^0$2' & $75^0$3' East covering an area of 11,15466 km^2. The places/areas surveyed in this district included Sriganganagar city, Suratgarh, Padampur, Sadulshahar, Keshrisinghpur.

Hanumangarh district

Hanumangarh lies in the extreme north of Rajasthan covering as are of 12,645 km^2. The places/areas surveyed in this district included Hanumangarh,Hanumangarh rural, Ravatsar, Pilibanga, Tibbi.

III. Methodology

The data related to dengue was collected fromChief Medical Health Office of the three districts undertaken for the study viz. Bikaner, Sriganganagar and Hanumangarh. The data was sorted out on the basis of gender (Male or Female) and the M/F ratio was also calculated.

IV. Observations and results

Dengue and gender relationship

In Bikaner district

The total number of dengue cases reported among male and female from Bikaner district showed that the number of female cases were higher in Bikaner city, Kolayat, Nokha city and Dungargarh, while, the scenario was reverse in Deshnoke and Nokha rural as presented in Table 1.

While comparing the gender ratio (M/F) of Bikaner district, it was found that except for Deshnoke and Nokha rural where the number of male patients exceeded to that of female, in rest of the places it was vice-versa. Overall, the M/F ratio was documented to be 0.94 showing not much difference as far as gender was concerned. The resultshave been presented in Figs.1,2.

In Sriganganagar district

The total number of dengue cases reported among male and female from Sriganganagar district showed that the number of male cases were higher in Sriganganagar (33%), followed by Kesrisinghpur (21%), Padampur(19%), Suratgarh(14%), as presented in Table 9.

The gender ratio in three of the five areas surveyed from Sriganganagar district was more than one (1.38 to 1.49), suggesting the number of male patients to be higher as compared to female. However, overall figures indicated the M/F ratio to be 1.04 depicting not much difference in sex and dengue as presented in and Figs.3, 4.

In Hanumangarh district

The data related to M/F ratio at Hanumangarh district shows that in three of the five areas studied, the M/F ratio was below one (0.69 to 0.82), while, it was 1.20 and 1.21 at Hanumangarh city and Pilibanga respectively. But, overall it was calculated to be 0.92 indicating in general, not much difference in number of dengue cases and gender ratio as presented in Table 3 and Figs.5, 6.

V. Discussion

The total number of dengue cases reported from Bikaner district showed that the number of female cases were higher as compared to males. From Sriganganagar district data showed that the number of male cases was higher, whil, from Hanumangarh district the result showed that there was not much difference in gender ratio.

According to Pandya (1982) the disease has usually affected malnourished persons specially males. Thunguturthi et al. (2013) documented male/female ratio to be 1.5 in age group between 13-14 years; 2.0 in age group between 41-60 years; 3.66 in age group between 61-30 years with an average M/F ratio to be 1.85. The higher proportion of male victims as compared to females among the effected patientshas also been observed by Raza (2014). Similar observations were also reported by Anker &Arima (2011), conducted for the analysis of dengue incidence in six Asian countries.

Eong (2001) also examined male and female dengue incidence from Singapore and found greater male incidence. Differences in dengue incidence have been attributed to gender related differences in exposers such as time away from home (Kaplan, 1983).

Shekhar&Huat(1992) also found the majority of dengue reported cases in Malaysia to be male. A similar observation has also been made in Singapore by Ooi et al. (2006) and Yew (2009), while, other study from South America are in contrast to the results from Asia which suggest either equal proportion of male and female dengue cases or a greater proportion of female cases (Kaplan, 1980; Trravasssos da Rosa et al. 1996-97; Gunther et al., 2009; Garcia-Ribera & Rigau- Perez, 2003). Das et al. (2005) documented 64 cases of dengue in Gwalior of which 36 were male and 28 were female with M/F ratio to be 1.28: 1.0. Gupta et al. (2006) and Chakarvati&Kumaria (2005) also suggested male preponderance in dengue cases, while, Sarkar et al. (2012) reported female preponderance.

The present observations indicate slight gender specific difference among the dengue incidence. The phenomenon of gender specificity in relation to dengue infection might have been contributed by social, cultural (women being covered) and exposure reasons.

VI. Conclusion

Not much difference in overall male/female ratio was found from the three districts. It noted to be 0.94 in Bikaner, 1.04 in Sriganganagar and 0.92 in Hanumangarh District, slightly higher in Bikaner as compared to other two districts.

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Table 1. Total number of dengue cases reported among male and female from Bikaner district (Mar - Nov, 2015)

Area	Male	Female	M/F Ratio
Bikaner city	34	49	0.69
Kolayat	28	37	0.75
Deshnoke	29	18	1.611
Nokha city	35	40	0.87
Nokha rural	68	56	1.21
Dungargarh	13	21	0.619
Total	207	221	0.94

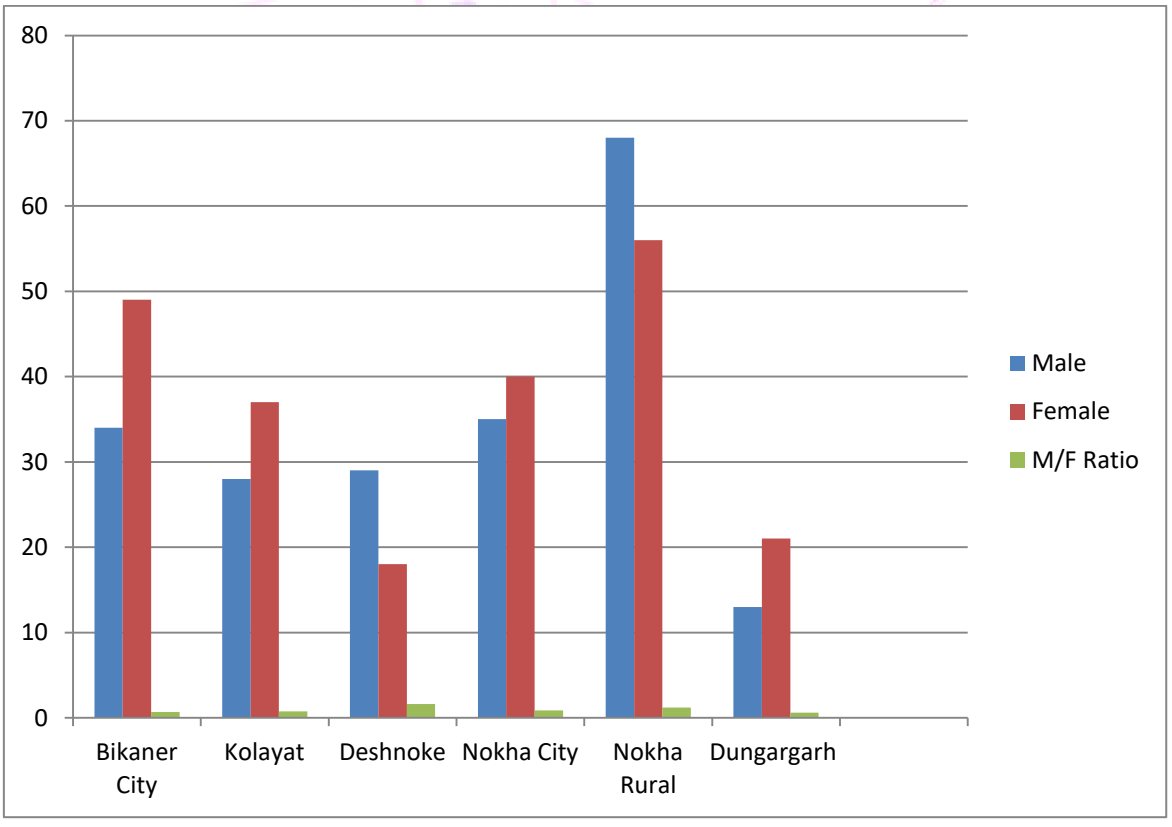
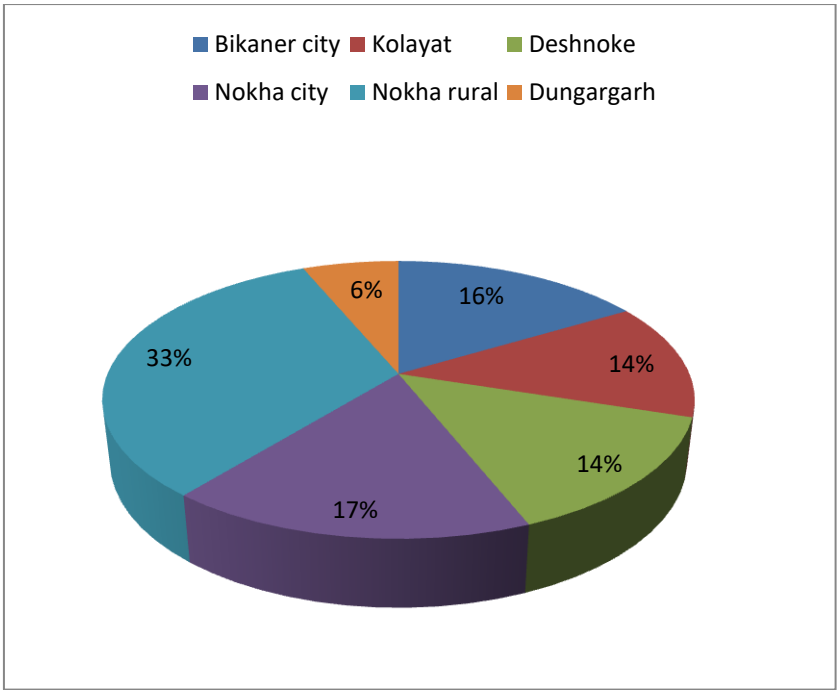


Fig. 1. Dengue cases among male and female from Bikaner district (Mar.-Nov.,2015)



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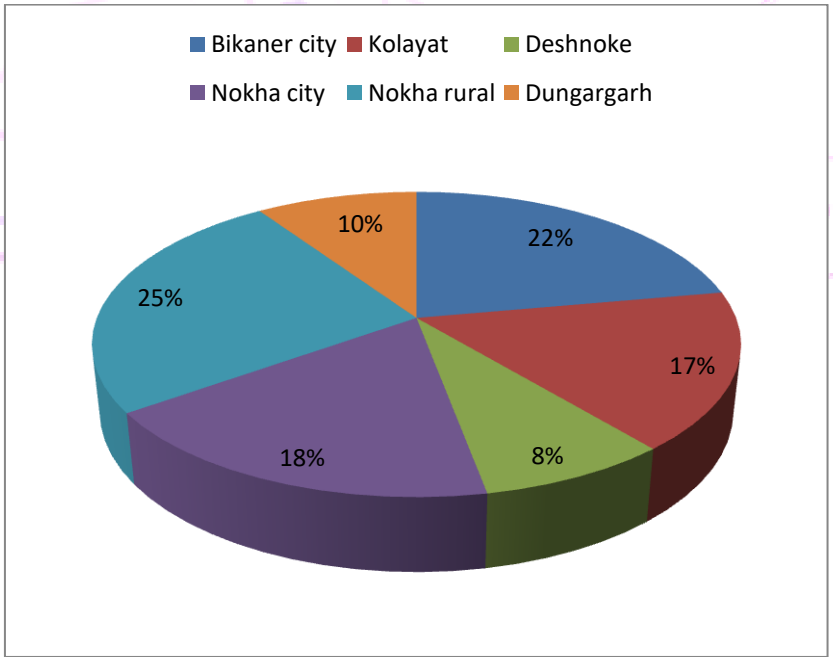


Female

Fig. 2.Per cent distribution of male and female dengue cases from Bikaner district (Mar. – Nov., 2015)

Table 2. Total number of dengue cases reported among male and female from Sriganganagar district (Mar. – Nov., 2015)

Area / Gender	Male	Female	M/F Ratio
Sri Ganganagar	79	53	1.49
Suratgarh	33	49	0.67
Sadulpur	32	62	0.51
Padampur	46	31	1.48
Kesrisinghpur	50	36	1.38
Total	240	231	1.04

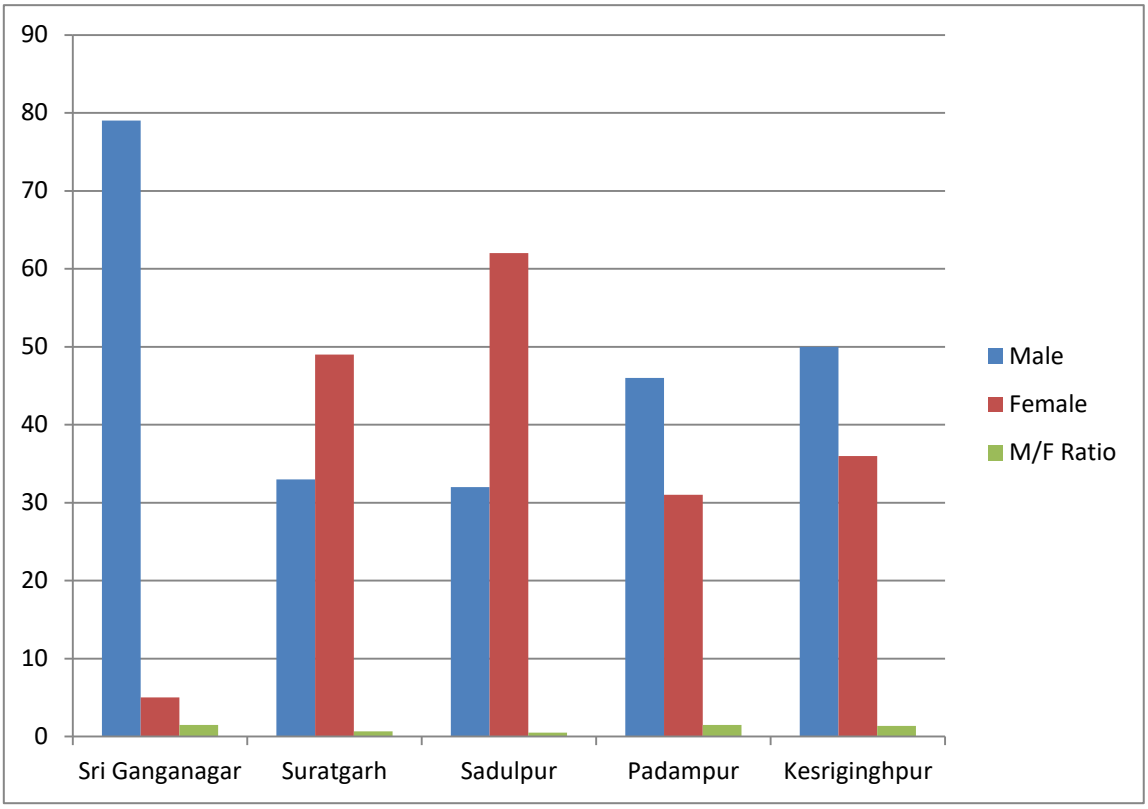
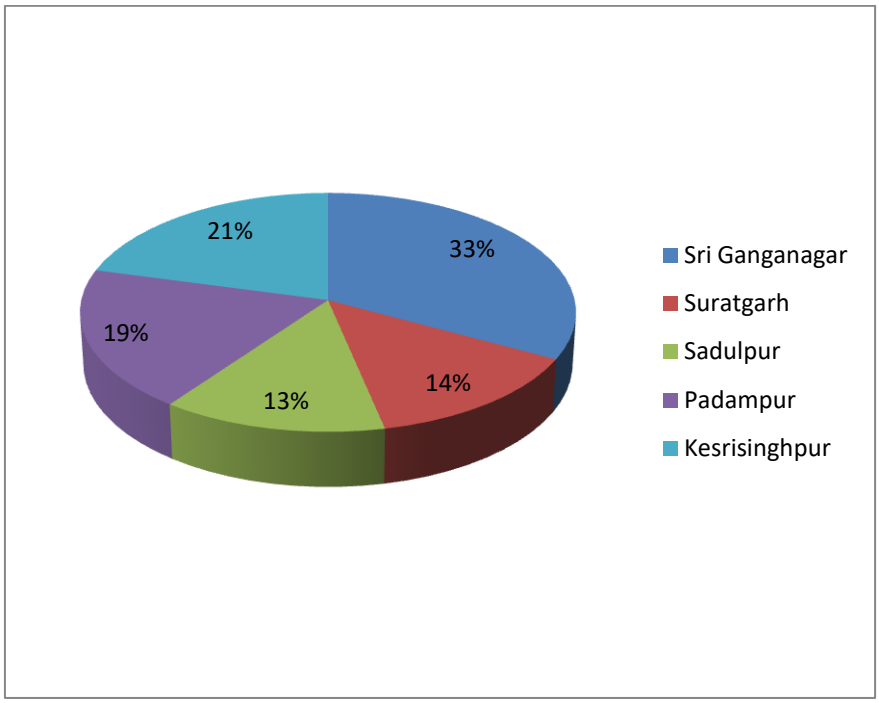
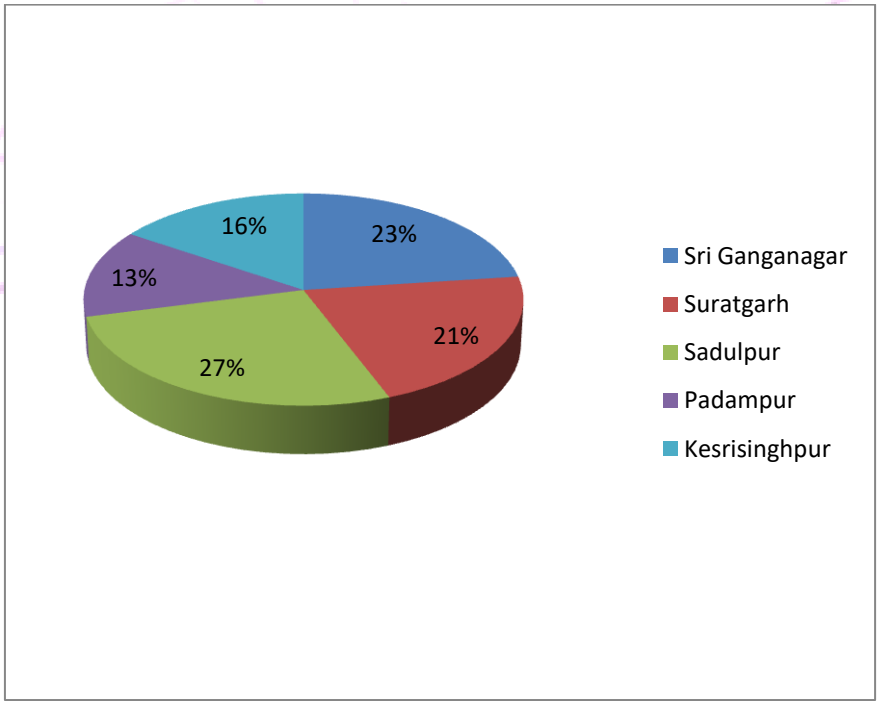


Fig. 3. Distribution of dengue cases among male and female from Sriganganagar district (Mar. – Nov., 2015)



Male



Female

Fig. 4. Per cent distribution of male and female dengue cases from Sriganganagar district (Mar. – Nov., 2015)

Table 3. Total number of dengue cases reported among male and female from Hanumangarh district (Mar. – Nov., 2015).

Age	Male	Female	M/F Ratio
Hanumangarh city	35	29	1.20
Hanumangarh rural	33	40	0.82
Rawatsar	37	53	0.69
Pilibanga	51	42	1.21
Tibbi	36	45	0.8
Total	192	209	0.92

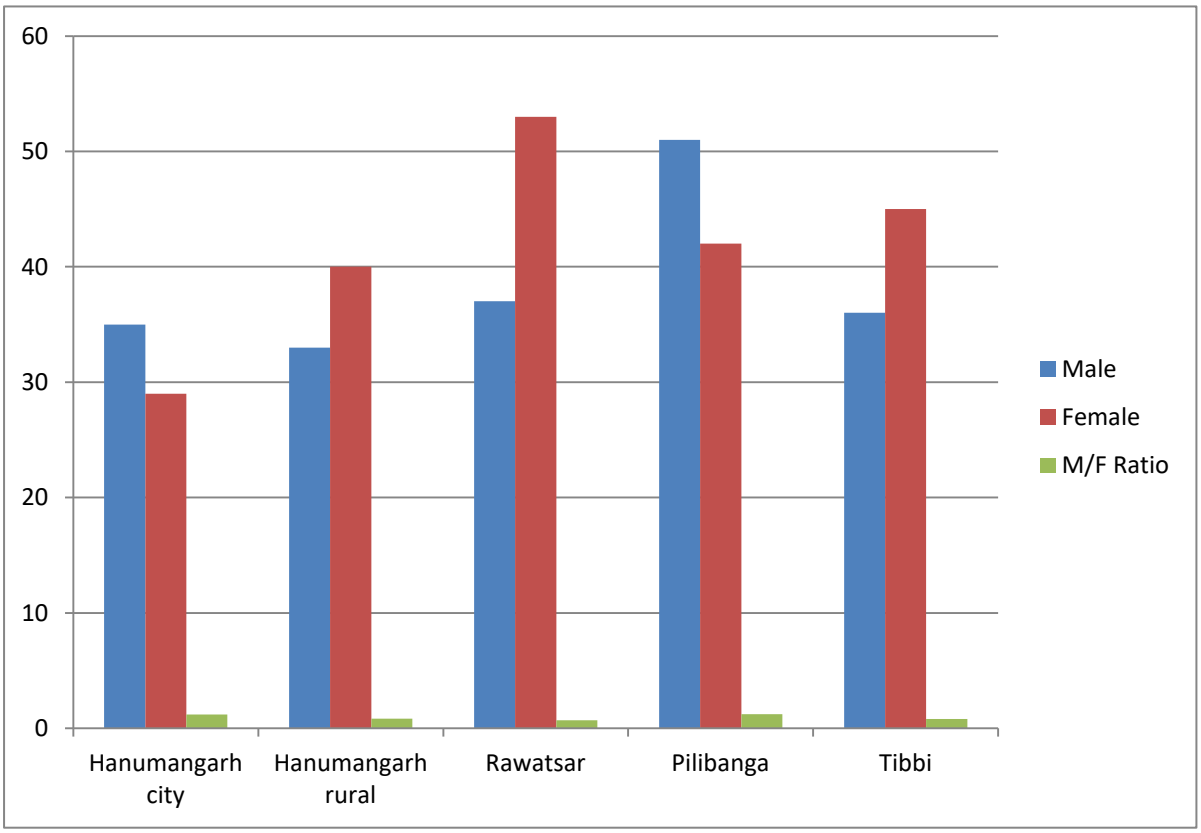
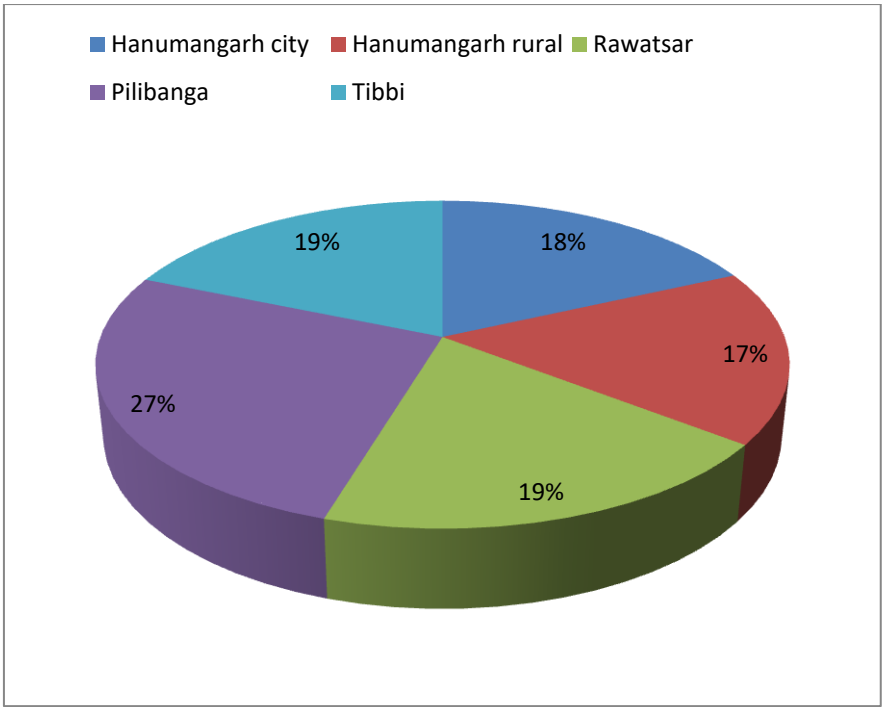
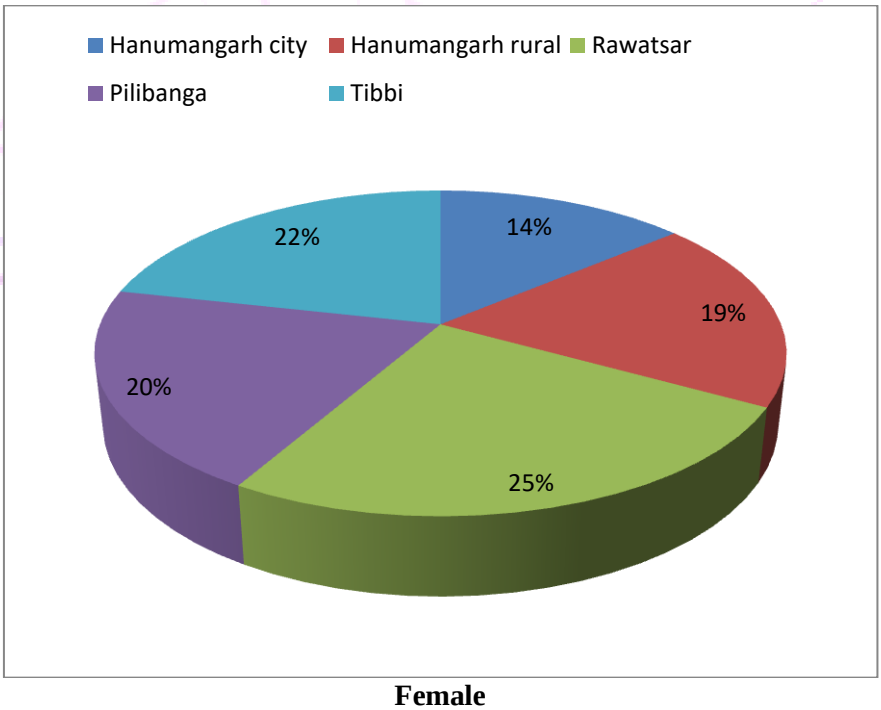


Fig. 5. Distribution of dengue cases among male and female from Hanumangarh district (Mar. – Nov., 2015)



Male



Female

Fig.6. Per cent distribution of male and female dengue cases from Hanumangarh district (Mar. – Nov., 2015).