

A short-term study on Dengue v/s age groups in some districts of Rajasthan, India

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Abstract

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. It is transmitted mainly by *Aedes aegypti* mosquito and by *Ae. albopictus*. Globally, the index of severity has increased with increased infectivity since the last decade and our country is contributing a large number of cases because of the high susceptibility and favorable climatic conditions. A study pertaining to the prevalence of the disease among different age groups was carried out in three districts of Rajasthan. Overall, although the maximum number of cases at Bikaner district were between 0-20 years of age group, while, at Sriganganagar and Hanumangarh districts these were more in the age group of 20-40 years, the minimum dengue cases in all three districts were in the age group of 60-80 years.

Introduction

It is believed that 50 to 100 million people worldwide in a year suffer from dengue (WHO, 2001). The mortality is 1-5% without treatment and less than 1% with treatment. Severe disease (Dengue Haemorrhagic Fever)(dengue shock syndrome) carry a mortality of 26%. The incidence of dengue has increased 30 fold between 1960 and 2010. Dengue causes severe disease in babies and children more so in healthy babies. It is transmitted mainly by *Aedes aegypti* mosquito and also by *Ae. albopictus*. After adult mosquitoes emerge, male mosquitoes feed on nectar from flowers and female mosquitoes feed on human and animals for blood to produce eggs.

Although dengue has been notifiable in India since 1996, the disease's impact has been underestimated because of insufficient information on incidence and cost of dengue illness (Halasa et al., 2011). Between 2006 and 2012 the National Vector Borne Disease

Control Program reported an annual average (SD) of 20,474 (\pm 13,760) dengue cases and 132 (\pm 57) deaths caused by dengue (<http://www.nvbdcp.gov.in/den-cd.html>). Regional comparisons suggest that these official numbers reflect only a small fraction of the full impact of the disease (Kakkar,2012; Shepard et al., 2013; Undurraga et al., 2013). Estimates of the average annual number of cases vary widely from the 20,474 officially reported cases to an annual 33 million apparent cases (Bhatt et al., 2013).

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; Chakravati et al., 2012).The present study was undertaken to document the dengue incidence in relation to different age groups in some districts of Rajasthan, India.

The Study area

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

Bikaner district

Bikaner lies between 27⁰11' & 29⁰3' North and 71⁰54' & 74⁰12' East covering an area of 2744 sq. Km². The district comprises of 926 villages with 8 Tehsils, Panchayat Samities, 4 towns and 4 municipalities. The places/areas surveyed in this district included Bikaner city, Deshnoke, Nokha city, Nokha rural, Dungargarh and Kolayat.

Sriganganagar district

Sriganganagar lies between 28⁰4' & 30⁰6' North and 72⁰2' & 75⁰3' East covering an area of 11,15466 km². The district comprises of 9 Tehsils and 18 town and small villages, 8 Panchayat Samities. 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 an area of 12,645 km². The district comprises of 7 Tehsils, 1907 villages, 7 Panchayat Samities. The places/areas surveyed in this district included Hanumangarh, Hanumangarh rural, Ravatsar, Pilibanga, Tibbi.

Methodology

The data related to dengue was collected from the three districts viz. Bikaner, Sriganganagar and Hanumangarh from March to November 2017. An overall eye-view of the data indicated that the patients infected with dengue fever belonged to age group upto 80 years. Therefore, the data was grouped into 4 major group viz., 0-20, 20-40, 40-60, 60-80 and presented accordingly.

Observations

The present study was carried out at three districts namely Bikaner, Sriganganagar and Hanumangarh. The data pertaining to age in the three districts was grouped as 0-20, 20-40, 40-60, 60-80 years and have been presented in Tables 1 to 3.

In Bikaner city and Kolayat, maximum cases documented were between 0-20 years, in Deshnok and Nokha rural most number of cases documented were between 20-40 years, while, in Nokha city and Dungargarh the maximum dengue cases reported were between 40-60 years of age (Table 1.)

Overall, of the 428 cases from Bikaner, 143 (33%) were between 0-20 years of age, 121 (28%) were between 20-40 years of age, 96 (23%) were between 40-60 years of age and 68 (16%) were between 60-80 years of age as presented in Figs. 1 & 2.

While comparing the age groups and dengue cases at Sriganganagar, it was observed that most number of cases which suffered from dengue were between 20 to 40 years of age and minimum were between 60-80 years. These results are presented in Table 2.

Overall, of the 471 cases from Sriganganagar, 129 (27%) were between 0-20 years of age, 144 (31%) were between 20-40 years of age, 113 (24%) were between 40-60 years of age, 85 (18%) were between 60-80 years of age as presented in and Figs. 3, 4.

Among different age groups at Hanumangarh district it was found that most of the dengue cases belonged to age group between 20 to 40, followed by 0 to 20, and 40-60 and 60-80 as presented in Table 3.

Overall, of the cases from Hanumangarh maximum were between 20-40 (35%) year of age group, 26% were between 0-20 year of age group, 23% were between 40-60 year of age, 16% were between 60-80 year of age as presented in Figs. 5, 6.

Discussion

The present survey of dengue cases was carried out by three district of NW Rajasthan viz., Bikaner, Sriganganagar and Hanumangarh.

Overall, although the maximum number of cases at Bikaner district were between 0-20 years of age group, while, at Sriganganagar and Hanumangarh districts these were more in the age group of 20-40 years, the minimum dengue cases in all three districts were in the age group of 60-80 years.

In general persons of all age groups sustain dengue infection in India has been suggested by Pandya (1982). However, according to the author, except Calcutta epidemic, children below ten years were not usually affected during dengue outbreaks in India. But the fatality rate was reported to be relatively higher among children below this age especially on account of severe syndromes. Lack of immunity among children could be the possible reason for the high fatality rate. Dengue hemorrhagic fever is primarily a disease of children under the age of fifteen years although also occur in adults has been earlier suggested by Anonymous (1986) and Gubler & Meltzer (1999).

Pandya (1982) suggested that since children are the vulnerable target of the severity of dengue, it would be pertinent to survey them for immunity levels periodically.

Earlier studies show that old age, grownups are predominantly affected by dengue (Strickman& Kittayapong, 2002; Khalid, 2009; Ahmad et al., 2008; Joao, 2005). Kumar (2015) stated that dengue fever mostly occurred in age groups between 15-44 years also corroborate the present results.

Das et al. (2005) documented 64 cases of dengue from Gwalior in 2003 of which 17 cases were between 0-5 years of age, 20 were between 6-10 years of age, 20 were between 11-15 years of age, 2 were between 16-20 years of age, 5 were above 20 year of age. Children and adolescents below the age of 15 years were found to be the most affected (89%). Monath (1994) has earlier hypothesized that children below 15 years of age belong to the primary risk group for dengue infection in South east Asia. Dengue is primarily concerned as a pediatric disease, and fatal dengue cases have mostly been reported among children in South East Asia (Nimmannitya, 1987; Kabilan et al., 2003). Chungue et al. (1989) and Vajpayee et al. (1999) suggested higher susceptibility of primary dengue in children, while the number of secondary

dengue cases were maximum in adult population because most individuals in endemic areas are already exposed to previous dengue infection.

In general, all age groups are affected by dengue infections in India has been suggested by Singh et al. (2015) and Pandya (1982). Younger age group is more commonly affected by DF while children of age under 15 years are more prone to DHF (Chakravarti et al., 2012). The study by Dinkar & Singh (2020) revealed that the age group of 20–30 years was more affected. Different studies supporting young adults as predominantly affected are during epidemics in Delhi of period 1999–2006, Chandigarh, Haryana, Maharashtra, Punjab, and Uttar Pradesh are those carried out by Chakravarti et al. (2012), Singh et al. (2017) and Kumar et al. (2001). On the other hand, the highest numbers of cases in the 5–12-year-old age group were reported from epidemic in Delhi in 1996, West Bengal in 1990 and 2005, Tamil Nadu in 1998 and 2003, Madhya Pradesh in 2001 and 2003, Uttar Pradesh in 2003–2006, and Puducherry in 2003–2004 by Gupta et al. (2012), Chakravarti et al. (2012), Bhattacharjee et al. (1993) and Paramasivan et al. (2006).

Durbin et al. (2011) recorded highest number of cases in the age group of 11-30 years. Gupta et al. 2006) and Chakravarti & Kumar (2005) also reported maximum cases in the age group between 21-30 years, However Sarkar et al. (2010) reported maximum cases in the age group of 0-10 years. But, Egger & Coleman (2007) suggested people ≤ 50 to be more susceptible to dengue infection.

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Table 3.Total number of dengue cases reported among different age groups from Bikaner district

Area. / Age group	0-20	20-40	40-60	60-80	Total
Bikaner city	47	8	16	12	83
Kolayat	32	19	3	11	65
Deshnoke	12	23	7	5	47
Nokha city	18	13	26	18	75
Nokha rural	25	48*	29	22	75
Dungargarh	9	10	15	-	34
Total	143	121	96	68	428

* One report from the region where mother had suffered from dengue fever during pregnancy.

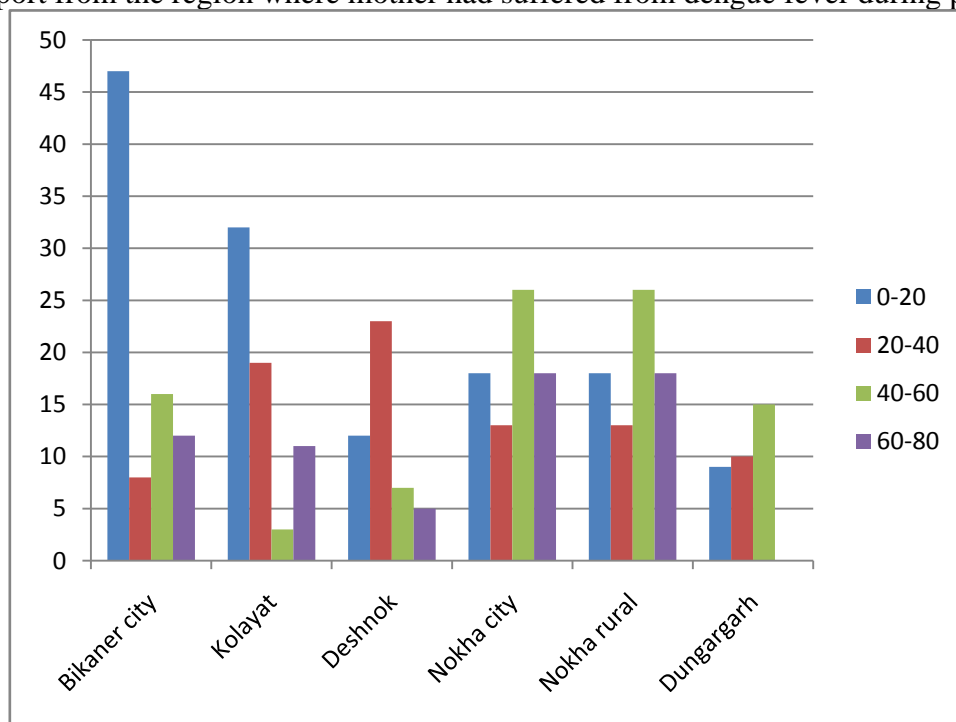


Fig. 1 Distribution of dengue cases among different age groups from Bikaner district

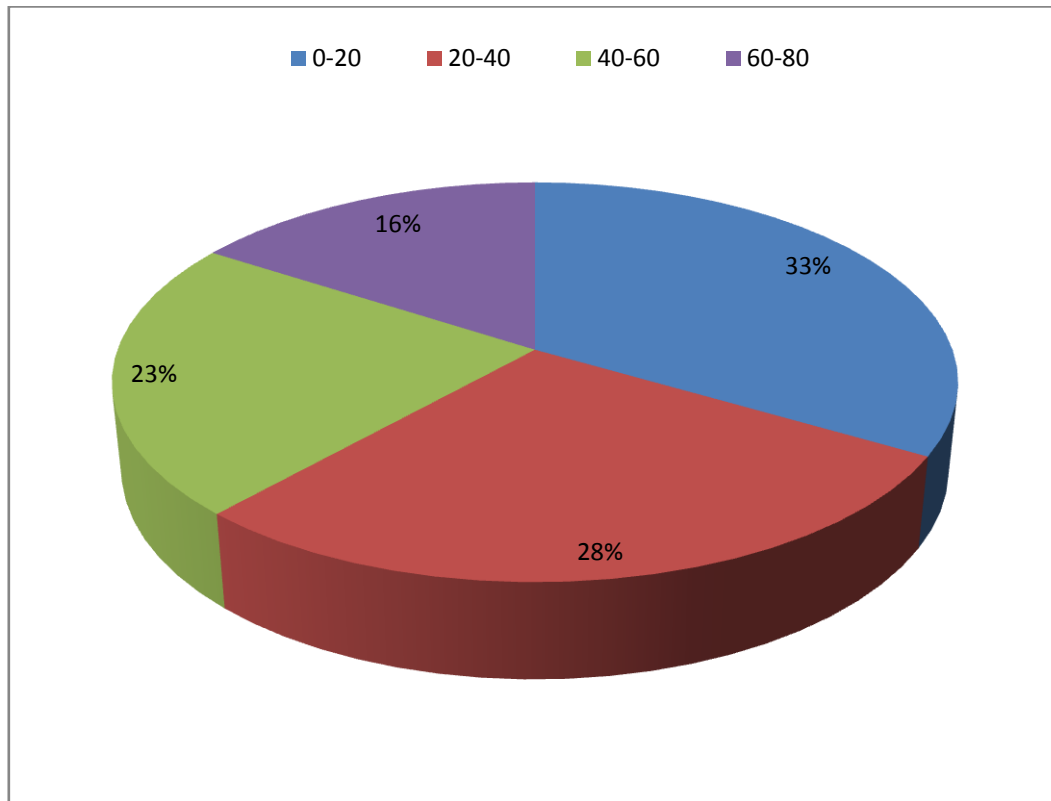
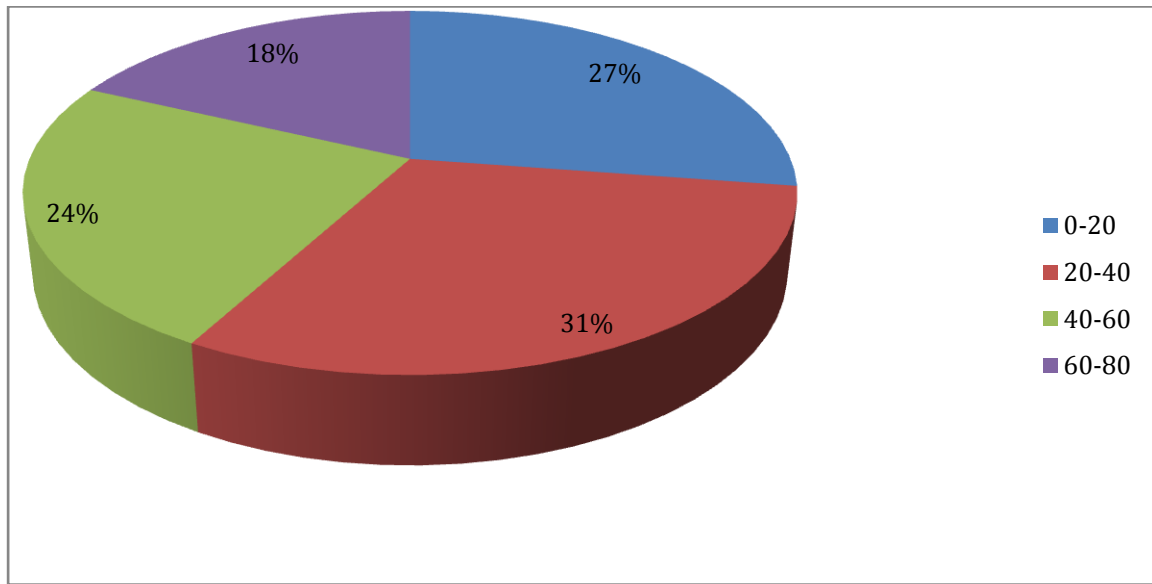


Fig. 2 Per cent distribution of dengue cases among different age groups from Bikaner district
Table 2. Total number of dengue cases reported among different age groups from Sriganganagar district

Age Group/ Area	0-20	20-40	40-60	60-80	Total
Sri Ganganagar	53	37	15	27	132
Suratgarh	11	26	28	17	82
Sadulpur	15	32	22	8	77
Padampur	37	28	16	13	94
Kesrisinghpur	13	21	32*	20	86
Total	129	144	113	85	471



*Earlier report of dengue fever in the family / neighborhood

Fig. 3. Distribution of dengue cases among different age groups from Sriganaganar district

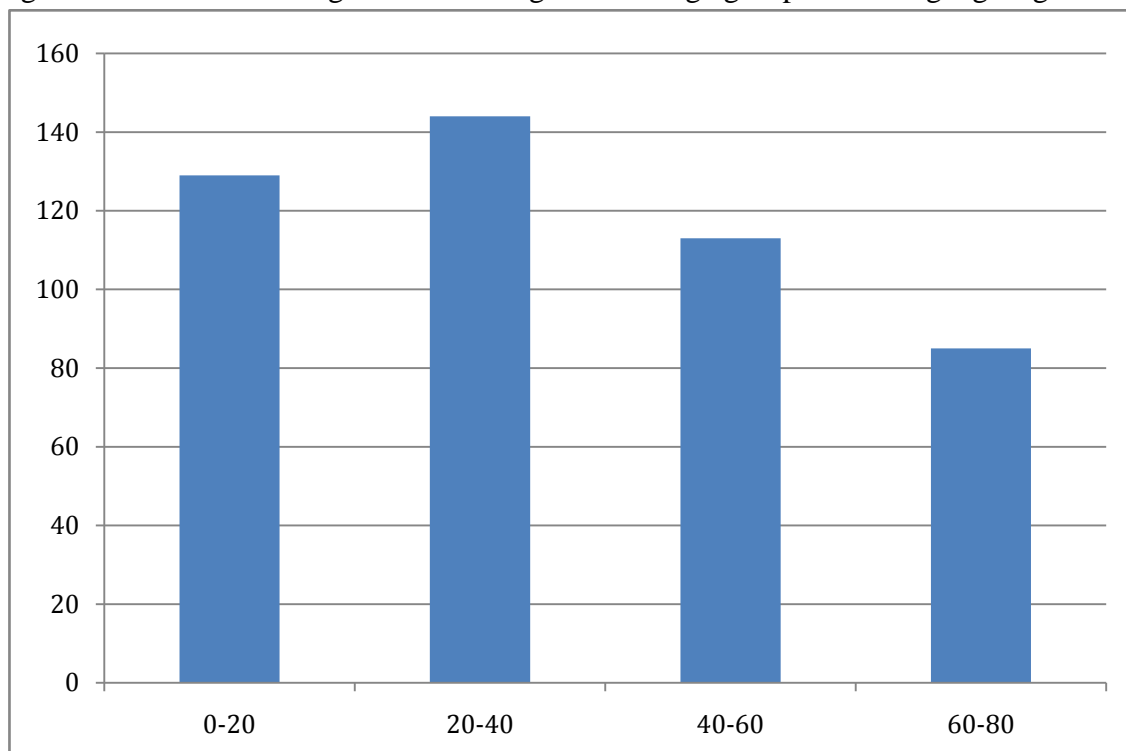


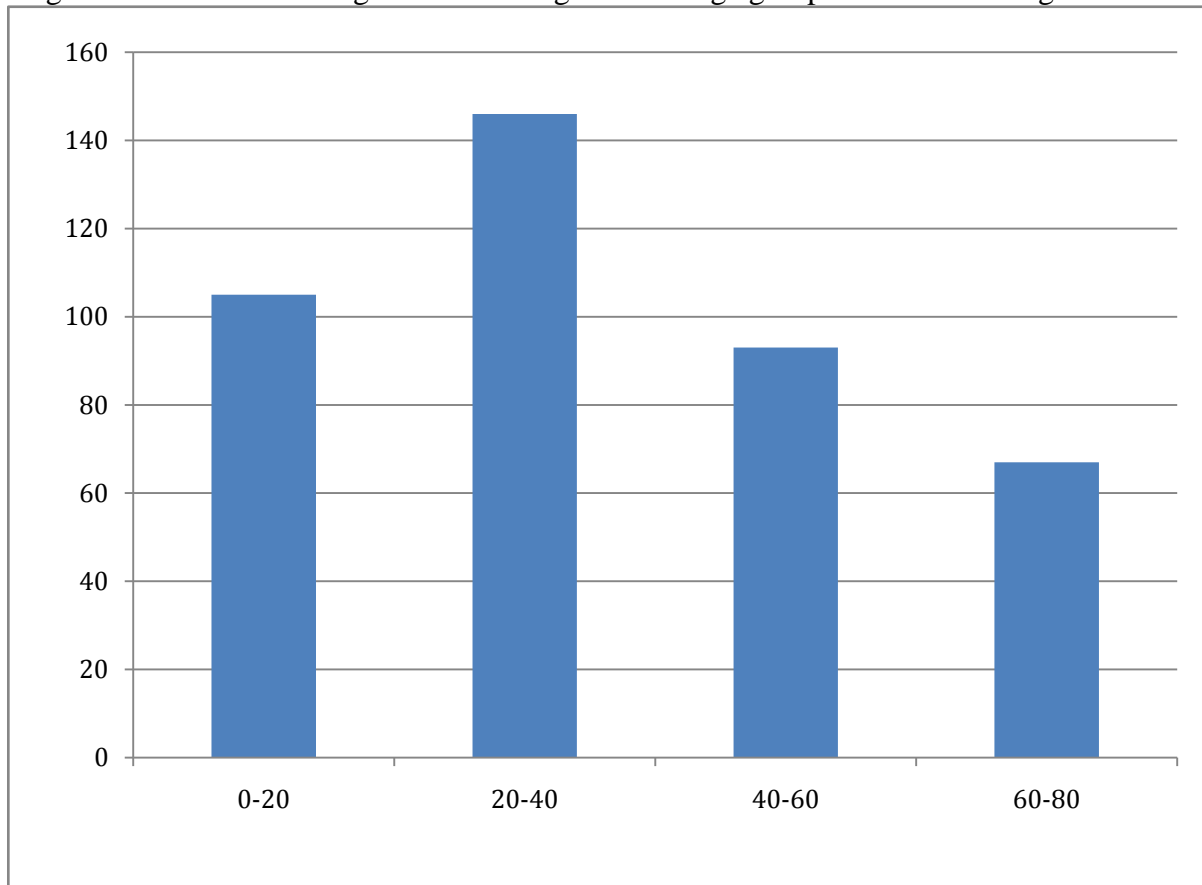
Fig. 4. Per cent distribution dengue cases observed among different age groups from Sriganaganar district

Table 3. Total number of dengue cases reported among different age groups from Hanumangarh district

Age Group/ Area	0-20	20-40	40-60	60-80	Total
Hanumangarh city	14	22	28	10	74
Hanumangarh rural	21 [*]	26	18	08	73
Rawatsar	26	38	14	12	90
Pilibanga	21	31	15	26	93
Tibbi	23	29	18	11	81
Total	105	146	93	67	411

*Visiting Guest suffering from dengue.

Fig. 5. Distribution of dengue cases among different age groups from Hanumangarh district



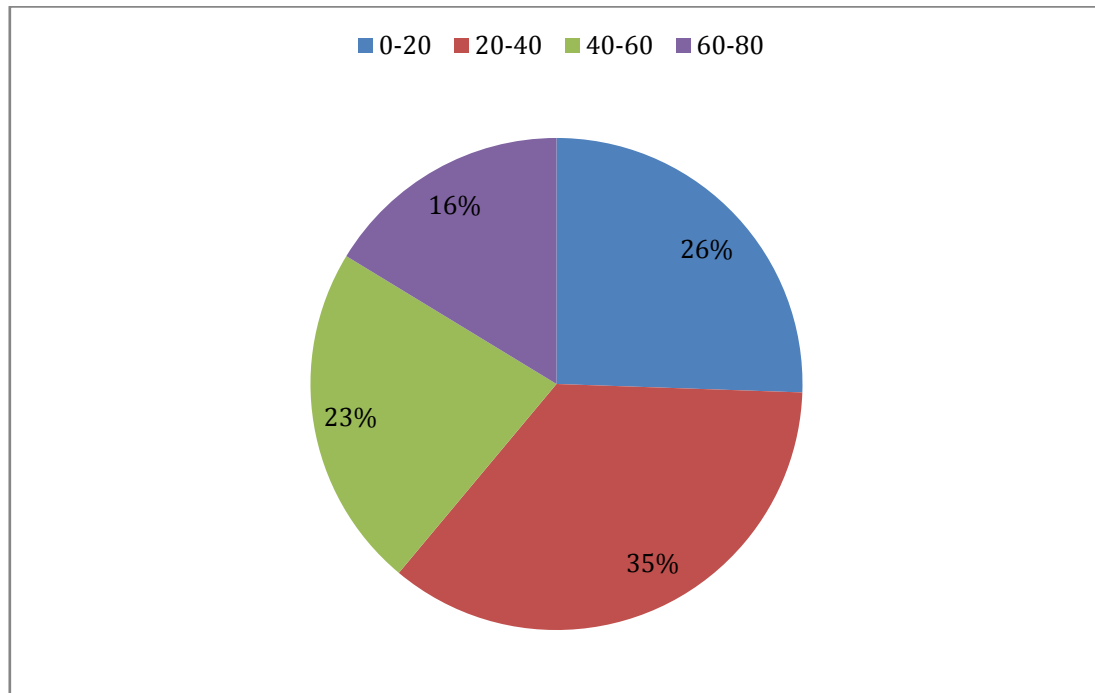


Fig.6. Per cent distribution of dengue cases observed among different age groups from Hanumangarh district