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A PROSPECTIVE OBSERVATIONAL STUDY-ANALYSIS ON VIRAL DISEASES IN A TERTIARY CARE HOSPITAL

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Abstract:

This study had been undertaken to analyse the number of people affected with viral infection. The data further was analysed based upon age and gender affected.

Background:

Viral disease or infection is the proliferation of a harmful virus inside the body. An organism's body is invaded by pathogenic viruses and infectious virus particles (virions) attach to and enter the susceptible cells. With an active viral infection, a virus makes its own copies and bursts the host cell (killing it) to set the newly- formed virus particles free. A viral infection is contagious as a virus has the ability to be transmitted from one person (or host) to another. Assessment of viral infection has become significant nowadays due to its rapid spreading amongst the people. Most of the people are suffering from viral infections such as rhinovirus, meningitis, adenovirus, dengue fever etc. Also, there are few emerging viral infections such as Nipah virus, zika virus, dengue fever etc. Viral epidemiology is the scientific discipline concerned with the study of the incidence and spread of viruses in populations over time.

This study has been undertaken to analyse the number of people affected with viral infection. The data further analysed based upon age and gender of affected.

Methods and Material:

A prospective observational study on viral infections was carried out among patients who were between 05-60 years of age with 5 year age interval and inpatients in the tertiary care corporate hospital. Majorly six types of viral infections are included; chikungunya, viral pyrexia, common cold, dengue, viral pneumonia, viral hepatitis A total 200 patients are included in study. The collected data was sorted and analyzed based on infection type, age and gender.

Results:

It is a prospective observational study in which 200 patients were included. Mean age of viral infections is 18.18. Males are more infected than females contributed 43.5 and 53.5 percentages respectively. Prevalence rate is high in Dengue(42.5%) and low in Viral hepatitis(5%).

Conclusion:

In a study on 200 patients males are more infected than females. Prevalence rate in ascending order is viral hepatitis, chikungunya, common cold, viral pyrexia, viral pneumonia and viral hepatitis. Majorly patients between 46-50 age interval are virus infected..

Index Terms **- Chikungunya, viral pyrexia, common cold, dengue, viral pneumonia, viral hepatitis, prevalence, age interval**

I. INTRODUCTION

Viral disease or infection is the proliferation of a harmful virus inside the body. An organism's body is invaded by pathogenic viruses and infectious virus particles (virions) attach to and enter the susceptible cells. With an active viral infection, a virus makes its own copies and bursts the host cell (killing it) to set the newly- formed virus particles free. A viral infection is contagious as a virus has the ability to be transmitted from one person (or host) to another. Some viruses even alter the host's DNA cells and thus cancer develops in a few cases. Viruses are very tiny germs. They are made of genetic material inside of a protein coating. Viruses cause familiar infectious diseases such as the common cold, flu, and warts. Pneumonia caused 1.4 million deaths in 2010 common cold is occurs most commonly among the age groups of 19 to 70 years of age. Dengue is a mosquito-borne via via Aedes mosquitoes viral infection that causes Sudden, high fever. Severe headaches, Pain behind the eyes, Severe joint and muscle pain, Fatigue, Nausea, Vomiting, Skin rash, which appears two to five days after the onset of fever and sometimes causes a potentially lethal complication called severe dengue. Dengue is a fast emerging pandemic-prone viral disease in many parts of the world. Laboratory diagnosis methods for confirming dengue virus infection may involve detection of the virus, viral nucleic acid, antigens or antibodies, or a combination of these techniques.

Viral pneumonia is defined as a disease entity wherein there is the viral causation of oxygen and carbon dioxide gas exchange abnormalities at the level of the alveoli, secondary to viral-mediated and/or immune response-mediated inflammation. Symptoms are Fever, a cough that is likely to be dry initially but may produce yellow or green mucus, after 1 to 2 days, shortness of breath, shaking, chills, muscle aches, fatigue, malaise.

Common cold is self-limiting viral infection of the upper respiratory tract involving the nose, sinuses, pharynx, and larynx which is an acute infection. Common cold can be caused by many viruses and majorly includes rhinovirus. On average, adults get 4 to 6 colds per year, while children get 6 to 8 of them. Common cold can be transmitted by direct contact, indirect contact and inhaling viral particles. Symptoms majorly includes cough, sore throat, runny or stuffy nose, congestion, slight body aches or a mild headache, sneezing, low-grade fever, generally feeling unwell.

Chikungunya is a severe and debilitating viral disease (genus Alphavirus), which is transmitted to humans by infected mosquitoes – including Aedes aegypti and Aedes albopictus. Symptoms appear between 4 and 7 days after the patient has been bitten by the infected mosquito and these include: high fever (40°c/ 104°f), joint pain (lower back, ankle, knees, wrists or phalanges), joint swelling, rash, headache, muscle pain, nausea, fatigue. Several methods can be used for diagnosis. Serological tests, such as enzyme-linked immunosorbent assays (ELISA), may confirm the presence of IgM and IgG anti-chikungunya antibodies.

There are 5 main hepatitis viruses, referred to as types A, B, C, D and E. These 5 types are of greatest concern because of the burden of illness and death they cause and the potential for outbreaks and epidemic spread. In particular, types B and C lead to chronic disease in hundreds of millions of people and, together, are the most common cause of liver cirrhosis and cancer. Hepatitis is termed as inflammation to the liver. The condition can be self-limiting or can progress to fibrosis (scarring), cirrhosis or liver cancer. Hepatitis viruses are the most common cause of hepatitis in the world but other infections, toxic substances (e.g. alcohol, certain drugs), and autoimmune diseases can also cause hepatitis.

Viral pyrexia is caused by variety of viruses and includes symptoms like chills, sweating, dehydration, headache, muscle aches and pains, a feeling of weakness, loss of appetite. Infection is transmitted by inhalation, ingestion, bites and bodily fluids.

II. Objectives:

To conduct a prospective observational study on prevalence of viral disease[common cold, chikungunya, dengue fever, viral hepatitis, viral pneumonia]. To identify the variables like age and gender.

III. Methodology:

The study was conducted in the Sunshine hospitals, Paradise, Secunderabad**,** for a period of 6 months. Both males and females between 05-60 years are included in study.

IV. Study Procedure:

This is a prospective observational and a study analysis where patients are willing for enrolement into the study after obtaining the consent. The data collection form will be prepared and used. This form mainly contains the demographic details of the patient. After data collection, it will be analysed for statistical significance. Over 600 prescriptions were studied out of which 200 patients are identified with various viral infections.

Sample size: The study was comprised with 200 patients admitted in a tertiary care hospital.

V. Methods used for statistical analysis:

To analyse the data, Mean, Percentage, Standard Deviation and P-value were used.

Mean of data represents the average of the data in data set. Mean is calculated by adding all data and number of data present in data-set.

$$\bar{x} = \frac{\sum x}{n}$$

Where: $\bar{x}$ = Mean
$\sum x$= Sum of data
n= number of data

A Percentage is a number or ratio expressed as a fraction of 100.

$$\textbf{Percentage Formula(\%)} : \frac{\textbf{Obtained value}}{\textbf{Maximum value}} \times 100$$

Standard deviation is a number used to tell how measurements for a group are spread out from the average (mean), or expected value.

$$S=\frac{\sqrt{\sum(x_i-\bar{x})}}{n-1}$$

Where: S= Standard Deviation
$\bar{x}$=Mean
n= number of observations

P-value is the probability of obtaining results as extreme as the observed results of a statistical hypothesis test, assuming that the null hypothesis is correct.

$$Z=\frac{p\hat{}-p0}{\sqrt{p0(1-p0)n}}$$

p^ = Sample Proportion

P0 = assumed population proportion in the null hypothesis

N = sample size

VI. Results:

Table 1: Baseline characteristics of the study population

S.No	Parameter	Mean± SD,(%)*
1.	Age(years)	18.18 ± 4.40
2.	Gender Male Female	 93(46.5%) 107(53.5%)

(%) percentage from 200 patients.*

A study was conducted around 200 patient data has been obtained in a hospital. In that data mean of overall patient age is 18.18 and the standard deviation is 4.40.

93 male data has been collected which is 46.5% of total sample size whereas females was 107 which is about 53.5% of overall sample size.

Table 2: Age wise distribution of patients

Age intervals	No. of patients	Percentage of Patients(%)
05-10	14	7
11 – 15	19	9.5
16 – 20	21	10.5
21 – 25	13	6.5
26 – 30	24	12
31 – 35	21	10.5
36 – 40	14	7
41 – 45	11	5.5
46 – 50	22	11
51 – 55	19	9.5
56 – 60	22	11
Total	200	
Mean	18.18	
Standard deviation	4.40	

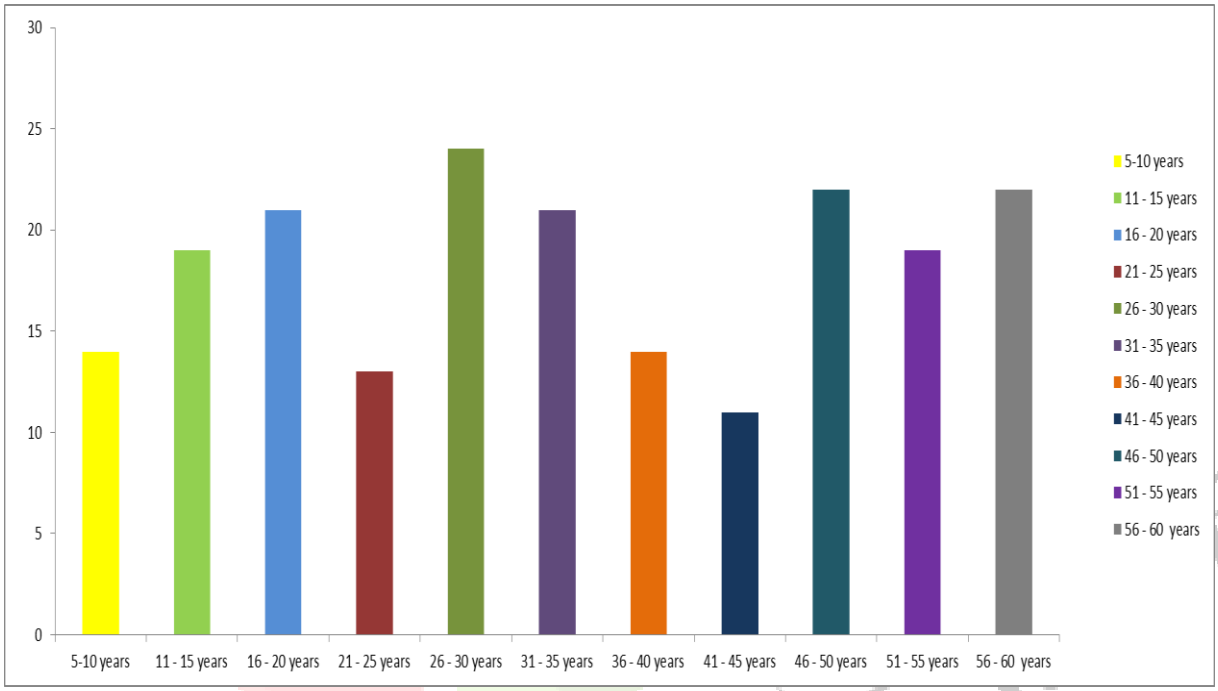

Fig 2.1 Bar diagram of age wise distribution of patients

From the above table patient age group, 5-60 has participated in the study in that age group from 26 – 30 has the highest number of samples that is around 12% of total samples and next is 31 – 35 and 16 -20 which is around 21 people that is 10.5% of total population.

Mean to the age wise distribution of patients is found to be 18.18 and standard deviation to the age wise distribution of patients is 4.40.

Table 3: Number of patients effected with type of viral disease**.**

S.No.	Type of viral disease	Number of patients	Prevalence(%)
1	Chikungunya	14	7
2	Common Cold	25	12.5
3	Dengue	85	42.5
4	Viral Pyrexia	31	15.5
5	Viral Pneumonia	35	17.5
6	Viral Hepatitis	10	5
	Total	200	
	Mean	33.3	
	Standard deviation	27.07	

(%)* *percentage from200 patients.*

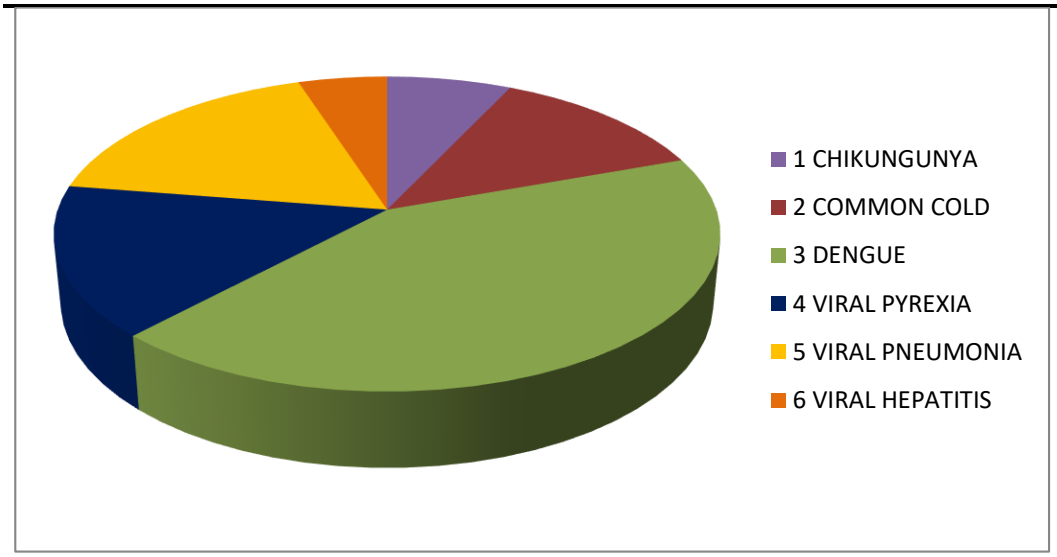

Fig:3.1 Pie chart number of patients effected with type of viral disease**.**

Above table sample collection of various viral diseases from hospital and in that data dengue cases are more, it is about 85 patients(42.5%) of total sample collected and remaining viral diseases are viral pneumonia 35(17.5), viral pyrexia 31(15.5), common cold 25(12.5), chikungunya 14(7) and least cases are collected on chikungunya that is around 14(7) of total samples.

Table 4: Gender wise distribution of disease type.

S.No.	Type Of Disease	Male(%)*	Female(%)*	*P-Value
1	Chikungunya	6(3)	8(4)	0.02447
2	Common Cold	10(5)	15(7.5)	
3	Dengue	45(22.5)	40(20)	
4	Viral Pyrexia	10(5)	21(10.5)	
5	Viral Pneumonia	16(8)	19(9.5)	
6	Viral Hepatitis	6(3)	4(2)	
	Total	93(46.5)	107(53.5)	

(%) percentage from 200 patients.*

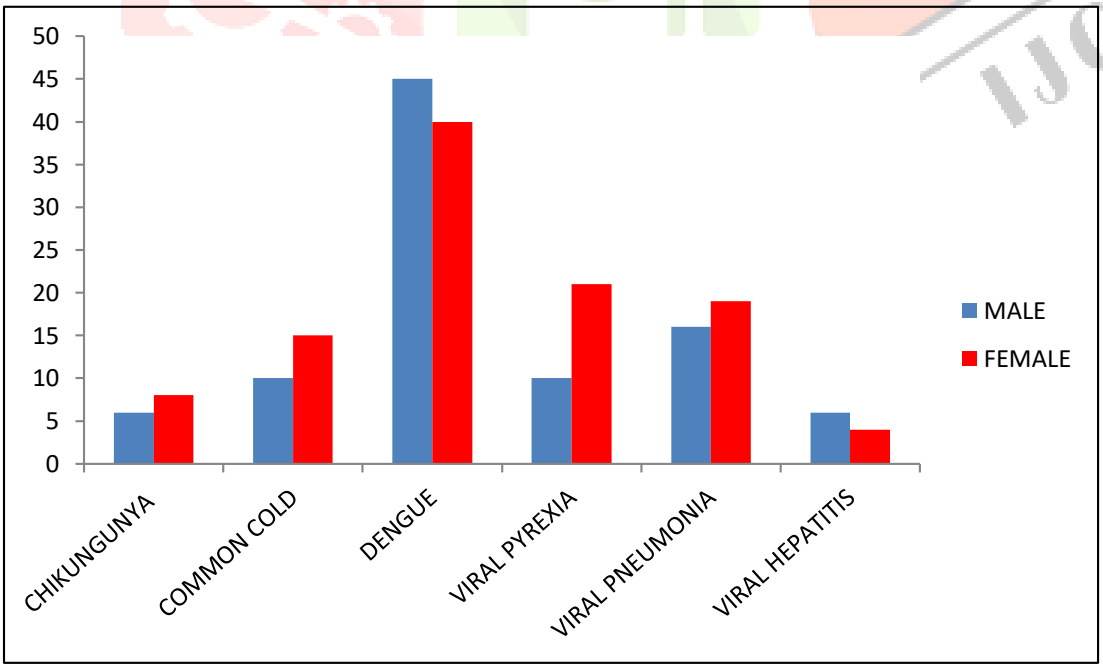

Fig 4.1: Bar diagram of gender wise distribution of patients.

From the above table, 200 male and female patients are participated in study of age group between 5-60 years. From 200 sample female has highest number 107(53.5) of 200 sample and male are 93(46.5).P value is < 0.05 which shows the significance.

Table 5: Gender wise distribution of patients.

S. No	Patient Gender	No.Of Patients	Prevalence
1	Male	93	46.5
2	Female	107	53.5
	Total	200	

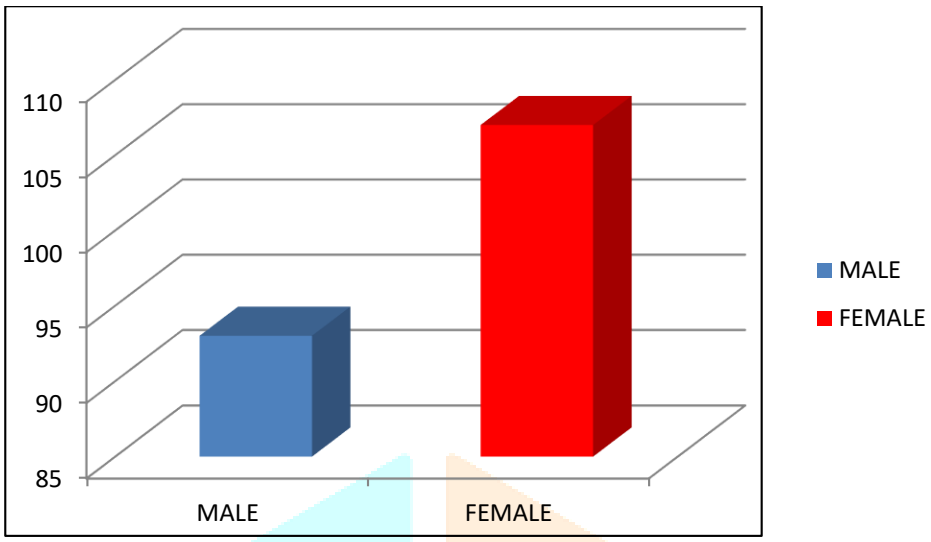

Fig 5.1: Gender distribution patients

From the above table 93 male data has been collected, prevalence is 46.5% of total sample size whereas females was 57 prevalence is 53.5% of overall sample size.

Table 6: Distribution Of Disease With Age Interval

Age Interval	Dengue (%)*	Common Cold(%)*	Viral Pyrexia (%)*	Viral Pneumonia (%)*	Viral Hepatitis (%)*	Chikungunya (%)*
[5-10]	4(2)	3(1.5)	1(0.5)		4(2)	
[11-15]	7(3.5)	4(2)	1(0.5)	1(0.5)	3(1.5)	1(0.5)
[16-20]	13(6.5)	1(0.5)	3(1.5)	3(1.5)	1(0.5)	
[21-25]	6(3)	4(2)	2(1)		1(0.5)	
[26-30]	12(6)	2(1)	6(3)	5(2.5)	1(0.5)	1(0.5)
[31-35]	8(4)	3(1.5)	7(3.5)	5(2.5)		
[36-40]	7(3.5)	1(0.5)		3(1.5)		3(1.5)
[41-45]	7(3.5)		2(1)	1(0.5)		1(0.5)
[46-50]	5(2.5)	1(0.5)	4(2)	6(3)		6(3)
[51-55]	6(3)	5(2.5)	3(1.5)	4(2)		1(0.5)
[56-60]	10(5)	1(0.5)	2(2)	7(3.5)		1(0.5)
Total	85(42.5)	25(12.5)	31(15.5)	35(17.5)	10(5)	14(7)

(%) percentage from 200 patients*

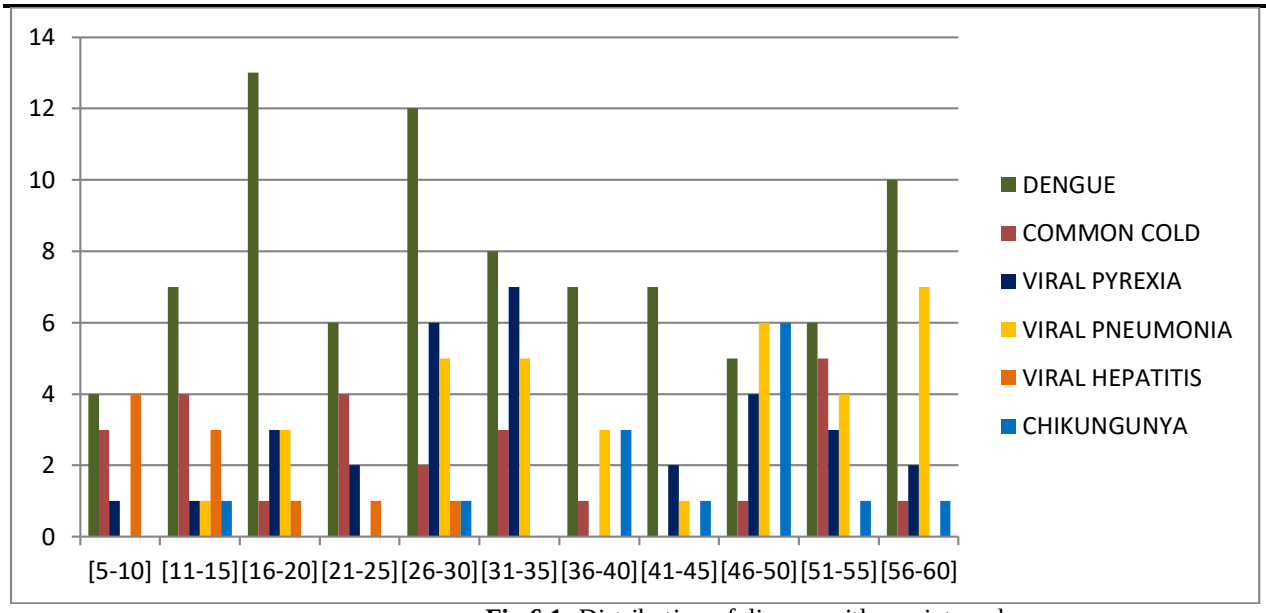

Fig 6.1: Distribution of disease with age interval

From the above table prevalence of dengue 6.5% is high in age interval 16 – 20 of 200 patients. Highest common cold prevalence is 2.5% between 51 – 55 years. Viral pyrexia prevalence is high in 31 – 35 years and is about 3.5 %. Prevalence of viral pneumonia is high in 56 – 60 years and is about 3.5%. high prevalence of viral hepatitis is seen in 5 – 10 years is about 2%. Chikungunya prevalence is high in 46 – 50 years is about 3%

.

Table 07: Distribution of disease with age interval and gender

Age Interval	Chikun Gunya		Common Cold		Dengue		Viral Pyrexia		Viral Pneumonia		Viral Hepatitis	
	M	F	M	F	M	F	M	F	M	F	M	F
05-10	0	0	1	2	2	2	0	1	0	0	2	2
11-15	0	1	1	3	4	3	1	0	0	1	2	1
16-20	0	0	1	0	8	5	2	1	1	2	0	1
21-25	0	0	1	3	3	3	0	2	0	0	1	0
26-30	0	1	1	1	7	5	2	4	2	3	1	0
31-35	0	0	1	2	5	3	3	4	2	3	0	0
36-40	2	1	1	0	4	3	0	0	1	2	0	0
41-45	0	1	0	0	3	4	0	2	0	1	0	0
46-50	4	2	1	0	2	3	1	3	3	3	0	0
51-55	0	1	2	3	2	4	0	3	2	2	0	0
56-60	0	1	0	1	5	5	1	1	5	2	0	0
Total	6	8	10	15	45	40	10	21	16	19	6	4

From the above table, out of 200 patients number of male and female patients with chikungunya is high in age interval of 46-50 accounting 4 and 2 respectively. High number of male patient are 2 between 51-55 and female patients are high with 3 in age intervals 11-15, 21-25 and 51-55 with common cold. Dengue is high in male patients between age interval 16-20 with 8 patients and in female patients 16-20, 26-30, 26-30, 56-60 with 5 patients each. Viral pyrexia in male patients with 3 in 31-35 and in female patients with 4 in 26-30, 31-35. Viral pneumonia in male patients is high in 56-60 and in female patients in 26-30, 31-35, 46-50. Viral hepatitis is high in both male and female patients in age interval 5-10.

VII. Discussion:

A total of 600 prescriptions were studied and analysed in a super speciality hospital during 6 months of the study period. Among 600 patients, 200 patients were suffering from a various type of viral diseases. The study conducted in the prospective observational study-analysis of viral diseases. The study is conducted in both male and female of age group between 5-60 years and mean age 18.18 and the standard deviation is 4.40. In 200 patients 93 are male and their prevalence is 46.5% and female are 107 and prevalence percentage of the female is 53.5 %, which is similar to the study done by *DebaratiGuha-Sapir et al.* Ratio of male and female as per our data is 1:1.5. Around 85 of all the patients who are into the study have reported with Dengue disease which is the highest prevalence of about 42.5% in 200 patients. Among 85, 45 are male whose prevalence is 22.5% and female is 40, whose prevalence is 20%, which is similar to study done by *Smita T. Deskhar et al.*

Out of 200 cases 14 patients are reported with chikungunya, prevalence percentage of chikungunya is high in 46 – 50 years and is about 3%, which is similar to study done by *Supriyasatishpatil et al.* which states active age group of chikungunya is 11 – 50. Out of 14, the female is 8 whose prevalence is 4% and males are 6 whose prevalence is 3% of 200 patients and their ratio is 1.3:1. Prevalence of common cold in 200 patients is 12.5% i.e., 25 members are affected with the common cold. Ratio of male and female affected with the common cold is 1:1.5, i.e., prevalence percentage of the male is 5%(n=10) and female is 7.5%(n=15). Age group between 51 – 55, have a high prevalence of common cold 2.5% (n=5). 35 members are reported with viral pneumonia whose prevalence is 17.5%. Among 35 members 7 members are between the age group 56 – 60 whose prevalence is high which is about 3.5%. Male patients are around 16(8%) and female patients are 19(9.5%).As per our data ratio between male and female affected with viral pneumonia is 1:1.18.

As per our research, a number of patients with viral pyrexia are 31 and their prevalence is 15.5% of 200 patients. Females(10.5%, n=21) are majorly effected with viral pyrexia than males(5%, n=10), as per our research and 7(3.5%) cases are reported between 31 – 35 years of age. The ratio of male and female affected with viral pyrexia in our study is 1:2.1, of 200 reported cases in a tertiary care hospital.

As per the data, a number of patients affected with viral hepatitis is 10(5%). Out of 10, male patients are 6(3%), and females are 4(2%), which shows the ratio between males and females is 1.5:1. Prevalence percentage of viral hepatitis is high between age interval 5 – 10, i.e.,2%(n=4).

VIII. Conclusion:

This study analysis revealed the prevalence of Dengue was high followed by viral pneumonia, viral pyrexia, common cold, chikungunya and viral hepatitis. Females were more affected to viral infections than males. High prevalence of viral infections were seen in age interval of 26-30 followed by 46-50, 56-60, 16-20, 31-35, 11-15, 51-55, 05-10, 36-40, 21-25, and 41-45. Mean age of viral infection was 18.18.

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