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RESEARCH ARTICLE

SEROEPIDEMIOLOGICAL STUDY OF HEPATITIS A VIRUS IN A TERITIARY CARE HOSPITAL.

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Abstract

Hepatitis A Virus is enterically transmitted virus and major cause of acute hepatitis affecting young children and adults and it is worldwide in distribution. As per the clinical perspective of HAV infections, the disease is self-limiting, with mild to moderate hepato-splenomegaly and without any serious complications or chronicity. A shift in the age of acquiring HAV infection has been seen from childhood to older age groups in India and globally; this shift is known as epidemiological shift. Several studies from different parts of India have reported a change in the age pattern of HAV infection that indicates an evolving epidemiological shift. In this study a total of 165 cases were studied in Virology Research and Diagnostic Laboratory (VRDL), DHR/ICMR, SMC, Vijayawada for anti-HAV Ig M antibodies and its seroprevalence of HAV is found to be 12.12%. Showing highest number of seropositive cases in the age group of 0-30 years i.e., 16 (9.69%) [Chi-square- calculated, P value- 0.001, statistically significant]. Male predominance was observed with Male: Female ratio of 5:1. Urban distribution showed higher sero-prevalence than rural areas 17 (85%). Socioeconomically, middle class 9(45%) and lower class 8(40%) showed high sero-prevalence rate than upper class 3(15%) indicating less accessibility of safe drinking water supplies to the former groups. The peak incidence is observed during monsoon reflecting the possibility of contamination of drinking water supplies. This study defined the low endemicity of HAV infections in this area.

Introduction:-

Hepatitis A Virus has a worldwide distribution and affects infant and young children in developing countries and it is estimated that approximately 1.4 million new cases occur each year and accounts for 60-80% cases of clinical hepatitis in the developing countries. The clinical course may vary from asymptomatic, acute self-limiting viral hepatitis to life threating acute liver failure. In 90% of children, the infection is subclinical followed by seroconversion leading to a lifelong immunity.HAV constitutes a large single serotype and are divided into six genotypes (I-VI). Genotypes I-III are most commonly associated with human infection and have available geographical distribution .Majority of human strains (80%) belong to genotype I , predominantly circulating genotype in India is genotype IIIA. It is shed in the faeces of both symptomatic and asymptomatic cases and as well

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during the convalescence phase. It is able to survive in the environment for months which increases the chances of spread in the community. Immunity to HAV can be determined from IgG anti- HAV antibodies in blood samples. In developing countries with poor sanitary conditions and hygienic practices, most children (90%) have been infected with the hepatitis A virus before the age of 10 years. Those infected in childhood do not experience any noticeable symptoms. Epidemics are uncommon because older children and adults are generally immune. Symptomatic disease rates in these areas are low and outbreaks are rare. Decline in population sero-prevalence level particularly in children is an indication for reduced HAV prevalence.

Materials AndMethods:-

A total of 165 samples from clinically diagnosed acute hepatitis cases were subjected to sero-epidemiological study from October 2015- October 2017 in Viral Research and Diagnostic laboratory (VRDL), sponsored by DHR/ICMR located at Department of Microbiology SMC, Vijayawada.

Both in-patients and outpatients with clinical presentation of jaundice with raised serum Bilirubin and irrespective of ALT & AST levels were included. Patients with alcoholic hepatitis, cirrhosis of liver and known seropositive cases of hepatitis B or Hepatitis C were excluded. An informed consent was obtained from all the study subjects prior to testing and ethical approval was obtained from institutional ethics committee.

Sample of 5 ml whole blood was collected using sterile disposable syringes under aseptic precautions and transported in cold chain to VRDL for detection of acute HAV IgM antibodies. Serum was separated and stored at −20°C until tested. IgM antibodies of Hepatitis A virus was detected by using ELISA Kit HEPAVASE MA-96 (TMB) manufactured by GENERAL BIOLOGICALS CORPORATION, TAIWAN. Test results were interpreted as a ratio of the sample OD at 450 nm and the cut-off value accordingly. Results were analyzed statistically by performing chi-square test using the Epi Info software 3.5.4 version (2017) [Center for disease control and prevention (CDC), Atlanta, Georgia, USA]. The differences were regarded as significant when $P < 0.05$.

Results:-

A total of 165 serum samples collected were tested for acute hepatitis A infection by detecting serum anti- HAV IgM antibody. Out of the 165 samples tested, the prevalence rate of HAV was found to be 12.12 % (Table 1). The table-2 highlights that the samples comprised 138 (83.58%) males and 27 (16.4%) females showing male predominance. The highest percentages of acute hepatitis cases (23%) were from 31-40 years age group, followed by 21-30 (20%), and least from 71-80 (1.8%) years age group (Table 2). Among 20 HAV positive cases, highest number of seropositive cases in the age group of 0-30 years i.e., 16 (9.69%) (table3). And 17(85%) were from urban, and other 3 (15%) are from rural areas (Table 4). The subjects were categorized into one of the following groups based on socioeconomic status as per B G Prasad scale, against which their seropositivity is shown for Hepatitis A infection. The highest prevalence rate was found in the middle and lower class (table-5). This study showed a high prevalence of HAV during the months of post-monsoon i.e. June, July and August (75%), followed by the months of March, April, May (table-6). Statistical analysis of results was analyzed by the chi-square test using the Epi Info software (2017) [Center for disease control and prevention (CDC), Atlanta, Georgia, USA]. The differences were regarded as significant when $P < 0.05$.

Discussion:-

The prevalence rate of HAV was found to be 12.12 %, which is in correlation with the studies of Shivanisatia et al and Deepak Arora et al., who reported 12.3% and 13.63 % respectively. Male predominance in the study is in relevance with studies of A Joon et al., (male: female= 68%:31%). Regarding the distribution of HAV infection in age group an epidemiological shift has been observed in our study, such epidemiological shift leads to an increased incidence of symptomatic HAV infection, including heightened risk of Liver failure. The changing environmental, socio-economic conditions and the availability of commercial vaccines have markedly affected the epidemiology of the disease causing gradual shift in the age distribution to 1^{st} and 2^{nd} decade of lifewhich indicates that there is impact of vaccination. Most of the cases were found to be from urban area which is in line with Begum et al and Raja et al who reported sero-positivity of 40% and 66.67% respectively in urban areas. . Regarding the socioeconomic status, the highest prevalence rate was found in the middle class for anti-HAV IgM which is in relevance with Raja et al. This is a reflection of fact that higher socio economic groups have better access and affordability to food, hygiene and sanitation water, this finding emphasizes the fact that food and water sanitation is still very far off in lower socio economic status. The increased prevalence in post monsoon period reflects the

possibility of contamination of drinking water with sewage which indicates the need for the safe water supply to the community to reduce feco-oral transmission rates.

Analysis of current and historical information about Hepatitis A infection patterns and risk factors shows a strong association between socioeconomic improvement, increased water coverage and decreasing HAV infection rates. Hence, Increasing socio-economic levels, including improvement in household income, education, housing and water supply, will lead to continued decrease in HAV prevalence.

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Table 1:-sero-positivity of hav in the study group . (n=165)

No. of cases	**Anti HAV IgM**
165	20
% Out of total cases	12.12%

Table 2:-Comparison Of Age And Sex Distribution In Study Cases**.**

Age(years)	**Sex**		**Total no. of cases %**
	Male	**Female**	
0-10	10	9	11.51%
11-20	12	5	10.30%
21-30	24	9	20%
31-40	36	2	23%
41-50	29	0	17.57%
51-60	16	2	10.9%
61-70	8	0	4.8%
71-80	3	0	1.8%
81-90	0	0	0%
91-100	0	0	0%
Total	**138 (83.58%)**	**27 (16.4%)**	**100%**

Chi-square- 49.506, P value- 0.001, Statistically significant

Table 3:-SeropositivityOfHav According To Age

Age (years)	**Anti HAV IgM**	
	Positive	**%**
0-10	11	6.66%
11-20	5	3.03%
21-30	0	0%
31-40	1	0.60%
41-50	2	1.21%
51-60	1	0.60%
Above 60	0	0%
Total	20	12.12%

Chi-square- 49.506, P value- 0.001, Statistically significant

Table 4:-Area Wise Distribution OfHav

Area	HAV positive	%	HAV negative	%
URBAN	17	85%	99	68.2%
RURAL	3	15%	46	31.7%
Total	20	100%	145	100%

Table 5:-Socioeconomic Status In Relation To SeroprevalanceOfHav Infection

Socio economic classes	HAV			
	Positive	%	Negative	%
Upper class	3	15%	32	22.06%
Middleclass	9	45%	57	39.31%
Lower class	8	40%	56	38.6%
Total	20	100%	145	99.97%

Table 6:-Seasonal Distribution OfHav And Hev

Season	HAV	%
Winter (dec-feb)	0	0%
Spring & summer (mar-may)	4	20%
Post monsoon (jun-aug)	15	75%
Autumn (sep-nov)	1	5%

Fig 1:-Diagram Showing SeropositivityIn The Study Group

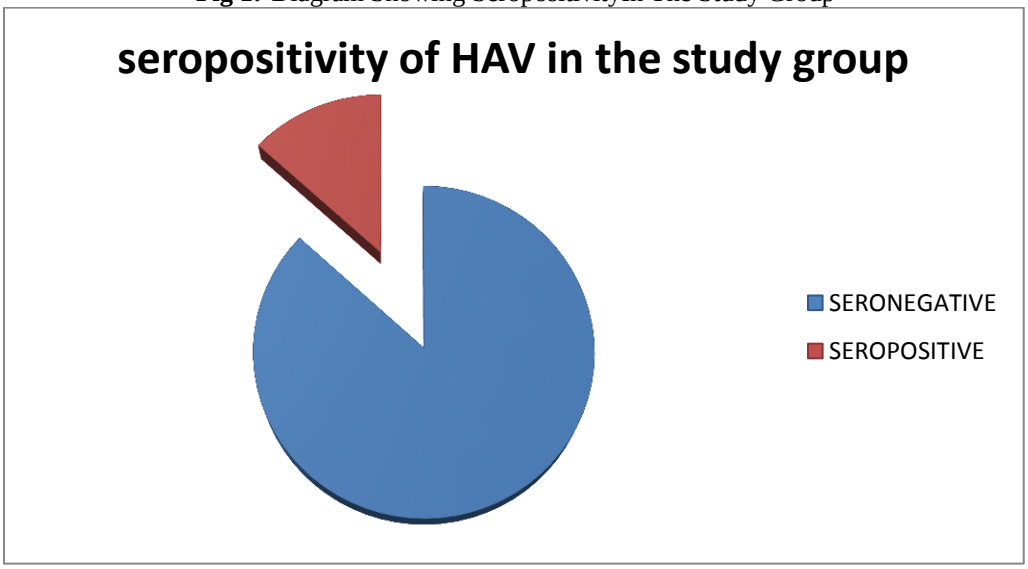


Fig 2:-Showing Genderwise Distribution InHavSeropositiv

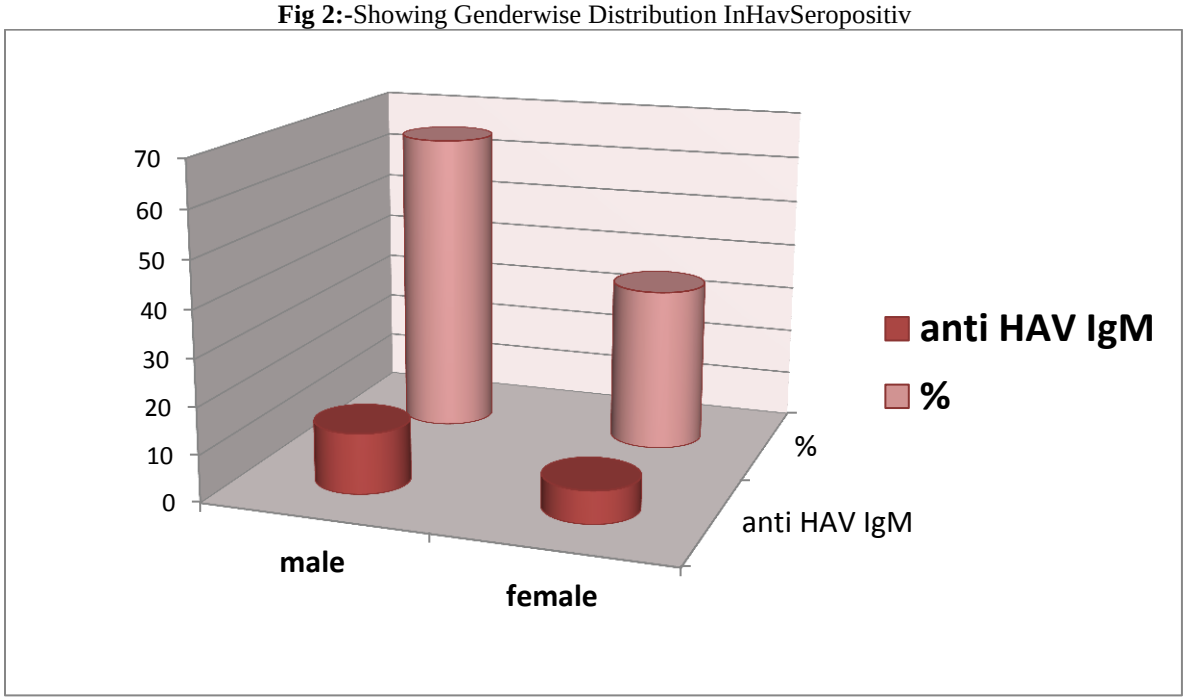
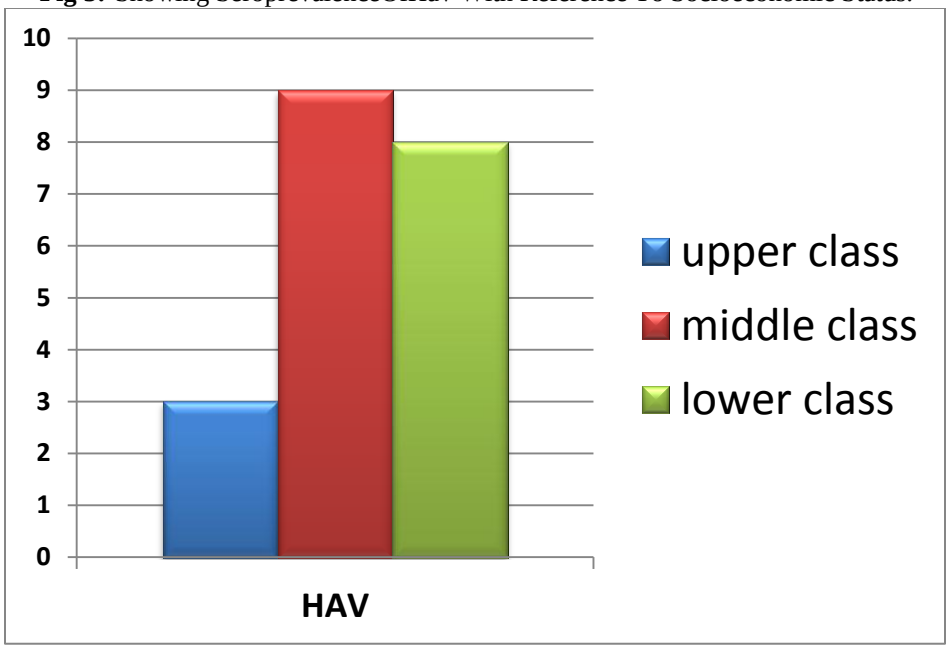


Fig 3:-Showing SeroprevalenceOfHav With Reference To Socioeconomic Status.



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