

A Study of Seroprevalence of Hepatitis B, Hepatitis C and Human Immunodeficiency Virus among Pregnant Women Attending Antenatal Care Clinic of a Tertiary Care Hospital in Jaipur, Rajasthan

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Conflict of interest: Nil

Abstract

Introduction: Hepatitis B Virus, Hepatitis C Virus and Human Immune -Deficiency Virus by vertical transmission are major public health problem during pregnancy as associated with high risk of maternal complications. This study aimed to estimate the seroprevalence of HBV, HCV and HIV infection and their co-occurrence in antenatal screening at tertiary care hospital, Jaipur

Material and methods: This study was conducted in Department of Microbiology, Sawai Man Singh Medical College, Jaipur. 364 Pregnant females attending ANC in Obstetrics and Gynecology Department of SMS Medical College, Jaipur over a period of one year from May 2020 to April 2021 . All the serum samples were screened for HBV, HCV and HIV.

Results: In this one year study a total 364 serum samples were analysed for HBV, HCV and HIV. Seroprevalence were observed that 7 positives for HBV (1.92%), 1 was positive HCV (0.27%) and 1 was positive for HIV (0.27%).

Conclusion: Pregnant women visiting ANC clinic of SMS Hospital should be screened for HBV, HCV and HIV treated necessary to reduce their viral loads and their children vaccinated at birth with the single dose hepatitis B vaccine to break the cycle of mother to child transmission.

Key words: HBV, HCV, HIV, Pregnant women.

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Introduction

Hepatitis B Virus (HBV), Hepatitis C virus (HCV) and Human Immune-deficiency Virus (HIV) can be transmitted from mother to baby by vertical route and

are major public health problem during pregnancy and associated with high risk of maternal complications. [1] The risk of HBV transmission is as high as 90% if the

mother is positive for the Hepatitis B envelope Antigen (HBeAg) but is between 10 to 20% if negative. [2] Transmission of Hepatitis C virus (HCV) during the perinatal period can also occur but is generally much lower. [3]

Testing for hepatitis B surface antigen (HBsAg) and human immune-deficiency virus (HIV) in pregnancy and labour is medically indicated. The significance of HBV infection during pregnancy derives through its potential to be transmitted vertically. Ten percent of infants born to women with acute HBV infection during the first trimester of pregnancy are HBsAg-positive at birth and 80 to 90% of neonates become HBsAg-positive without prophylactic therapy if acute maternal infection develops during the third trimester of pregnancy. [4]

There is very few information available about hepatitis C virus (HCV) infection in pregnant women in India. The seroprevalence of anti-HCV antibody in the healthy general population of India was found to be 1-1.5%. [5]

HIV infection can be transmitted from an infected mother to her foetus during pregnancy, during delivery or by breastfeeding. This is a highly potent form of HIV transmission in developing countries, where the proportion of infected women to infected men is 1:1. People at high risk for HIV are also likely to be at risk for HBV or HCV enabling co-infection with these viruses. [6] Co-infections of HBV and HCV in HIV positive patients are associated with reduced survival and an increased risk of progression to severe liver diseases. [7] World Health Organization (WHO) has called for integrated and standardized prevention of mother-to-child transmission (PMTCT) for HIV, syphilis and HBV. [8]

Aim and Objectives:

1. To screen antenatal cases of Hepatitis B virus, Hepatitis C virus and Human

Immune Deficiency virus at tertiary care hospital, Jaipur.

2. To estimate the seroprevalence of HBV, HCV and HIV infection in antenatal screening.

3. To screen co-occurrence of various infections includes HBV, HCV and HIV in antenatal cases.

Material and Methods:

This was a cross sectional observational study, conducted over a period of one year from May 2020 to April 2021 in department of microbiology of SMS Medical college, Jaipur. The study was conducted on 364 pregnant females of any trimester attending Anti-natal clinic in Obstetrics and Gynecology Department of SMS Medical College, Jaipur. At the time of enrollment, informed consent was obtained from participants and a pre tested semi-structured proforma was filled, which consisted of socio-demographic characteristics and personal details. Antenatal women who previously recorded to be reactive for HBV or HCV or HIV infections excluded from the study. The study was approved from Institute Ethics Committee (IEC) of SMS Medical College, Jaipur. All the participants were included only after taking written informed consent from them.

Sample Collection & Processing.

3-5 ml of venous blood sample of pregnant females collected in plain vial with aseptic precautions. The blood was allowed to clot. Serum was separated by centrifugation at 3000 rpm for 10 minutes. Serum samples were stored in small screw capped plain vials at 2 to 8 degrees Centigrade until processed.

Method of testing:

- i) Test for Hepatitis B surface antigen by Rapid test & ELISA. (Meriscreen HBsAg and HEPALISA ULTRA)
- ii) Test for antibody against HCV by Rapid test (HCV TRI DOT)

- iii) Test for antibody against HIV as per the NACO guidelines. (TRUST LINE ,COMBAIDS and TREDROTM HIV 1 -2 ANTIBODY)

All the tests were performed in accordance with manufactures instructions. Interpretations of tests were done according to kit insert.

Statistical analysis

Data was entered in Ms-Excel and analyzed using statistical package for the social sciences (SPSS) version 20.0. The qualitative data were expressed in proportion and percentages and the quantitative data expressed as mean and standard deviations. The difference in proportion was analyzed by using chi square test. Significance level for test was determined as 95% ($P < 0.05$).

Results:

Table 1: Socio-demographic profile of pregnant females

Socio Demographic profile						
		Total, N	HBV N(%)	HCV N(%)	HIV N(%)	p value
Age (in years)	18-25	132	3(2.27)	0(0)	0(0)	>0.05
	26-30	160	2(1.25)	1(0.62)	1(0.62)	
	>30	72	2(2.78)	0(0)	0(0)	
Locality	Rural	195	2(1.03)	1(0.51)	1(0.51)	>0.05
	Urban	169	5(2.96)	0(0)	0(0)	
Religion	Hindu	308	6(1.95)	1(0.32)	1(0.32)	>0.05
	Muslim	56	1(1.79)	0	0	
Socioeconomic Status	Lower	183	2(1.09)	0(0)	1(0.55)	>0.05
	Middle	166	5(3.01)	1(0.60)	0(0)	
	High	15	0(0)	0(0)	0(0)	
Occupations	House wife	302	6(1.99)	1(0.33)	1(0.33)	>0.05
	Service class	18	0(0)	0(0)	0(0)	
	Laborer	40	1(2.5)	0(0)	0(0)	
	Student	04	0(0)	0(0)	0(0)	
Monthly income(In rupees)	0-3000	305	6(1.97)	1(0.33)	1(0.33)	>0.05
	3001-10,000	34	0(0)	0(0)	0(0)	
	>10,000	25	1(4)	0(0)	0(0)	
Education level	Illiterate	105	1(0.95)	0(0)	0(0)	>0.05
	Primary	77	1(0.95)	1(1.30)	0(0)	
	Secondary	114	3(2.63)	0(0)	1(0.88)	
	Higher sec or above	68	2(2.94)	0(0)	0(0)	
Family size (Number of Family Member)	2-3	51	2(3.92)	1(1.96)	0(0)	>0.05
	4-5	187	3(1.60)	0(0)	1(0.53)	
	>5	129	2(1.55)	0(0)	0(0)	

A total number of 364 pregnant women visiting ANC at Sawai Man Singh Medical College and Attached group of Hospitals,

Jaipur, were included in study. Out of total 364 females 7 females (1,92%) were tested positive for HBV, 1 female (0.27%) tested

positive for HCV and 1 female (0.27%) tested positive for HIV.

In present study it was observed that majority of pregnant females screened for these infections belonged to age group 26-30 years. Only single female found positive for HIV was of 28-year age and female positive for HCV was of 29 year of age. HBV was positive in 3 females of 18-25 years age group, other 2 were of 26-30 years and rest 2 female were >30 years of

age. Majority of females were below 30 years. Coinfection of HBV, HCV, and HIV was not reported in our study. In our study majority, 308(84.61%), of females were of Hindu religion and there was no statistically significant difference in the number of HBV, HCV or HIV positive female between Hindu and other religion ($p>0.05$).

Table 2: Antenatal profile of pregnant females

Antenatal profile						
		Total, N	HBV N(%)	HCV N(%)	HIV N(%)	p value
Trimester	1 st trimester	80	2(2.5)	0(0)	0(0)	>0.05
	2 nd trimester	96	1(1.04)	0(0)	1(1.04)	
	3 rd trimester	188	4(2.12)	1(0.53)	0(0)	
Gravida (G)	G1		3(2.32)	0(0)	0(0)	>0.05
	G2		4(2.30)	1(0.57)	0(0)	
	≥G3		0(0)	0(0)	1(1.64)	
Parity	Nulliparity	121	3(2.48)	0(0)	0(0)	>0.05
	Uniparity	184	4(2.17)	1(0.54)	0(0)	
	Multiparity	59	0(0)	0(0)	1(1.69)	
Haemoglobin level (g/dl)	0-7	0	0 (0)	0(0)	0(0)	>0.05
	7-10	133	1(0.75)	1(0.75)	0(0)	
	>10	231	6(2.60)	0 (0)	1(0.43)	

In our study majority of females were multigravida 64.55% and 35.43% females were primigravida. The mean hemoglobin of these females was 11.05 ± 1.52 gm/dl. In our study majority of females

188(51.64%) came in 3rd trimester, followed by 96(26.37%) in 2nd trimester and rest 80(21.97%) came during 1st trimester.

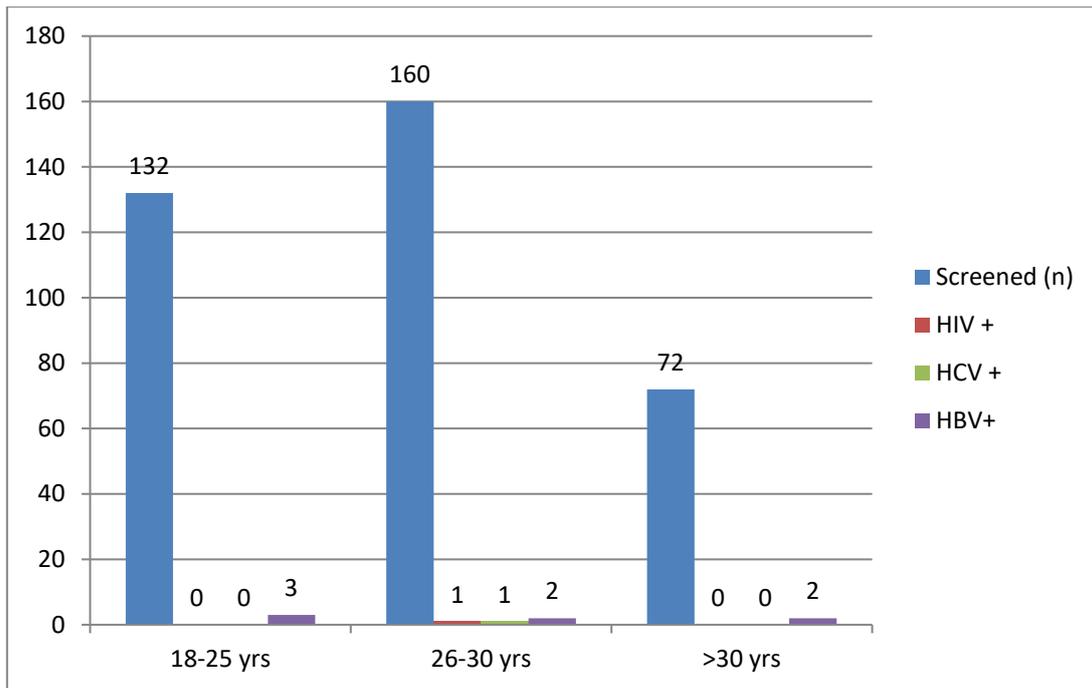


Figure 1: Seroprevalence of HBV, HCV & HIV among antenatal women according to age

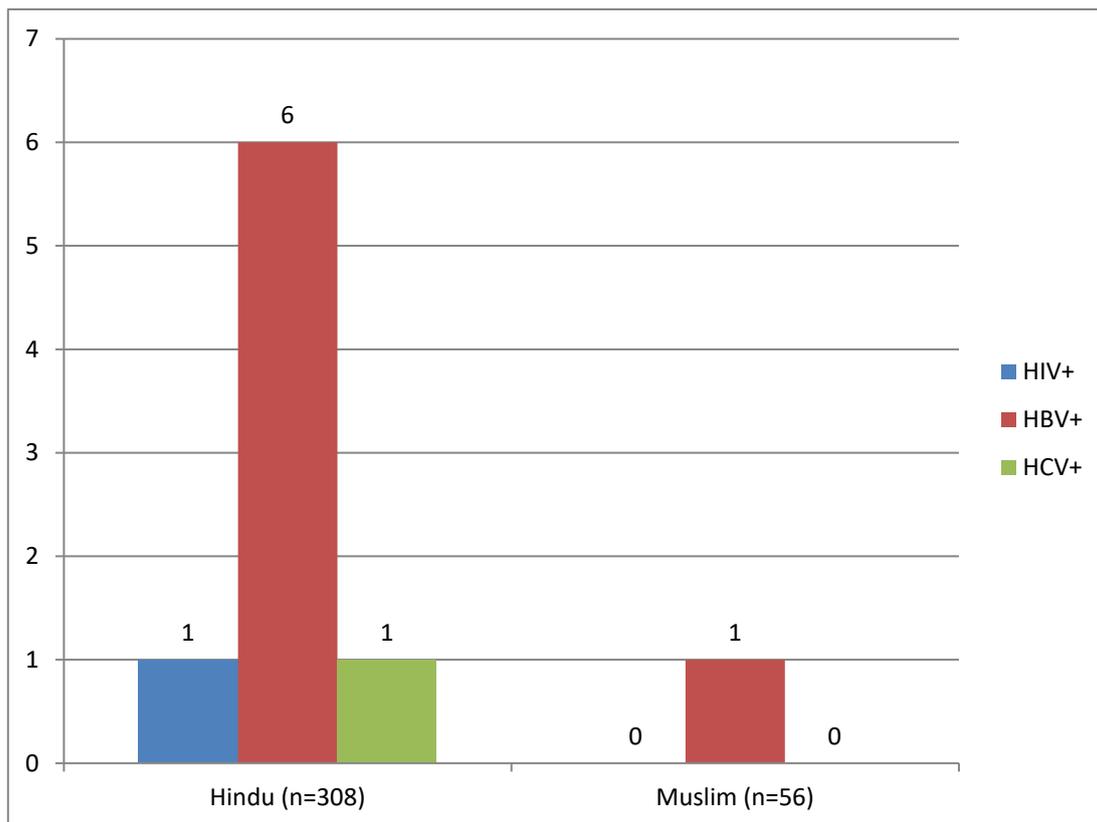


Figure 2: Seroprevalence of HBV, HCV & HIV among antenatal women in various religions.

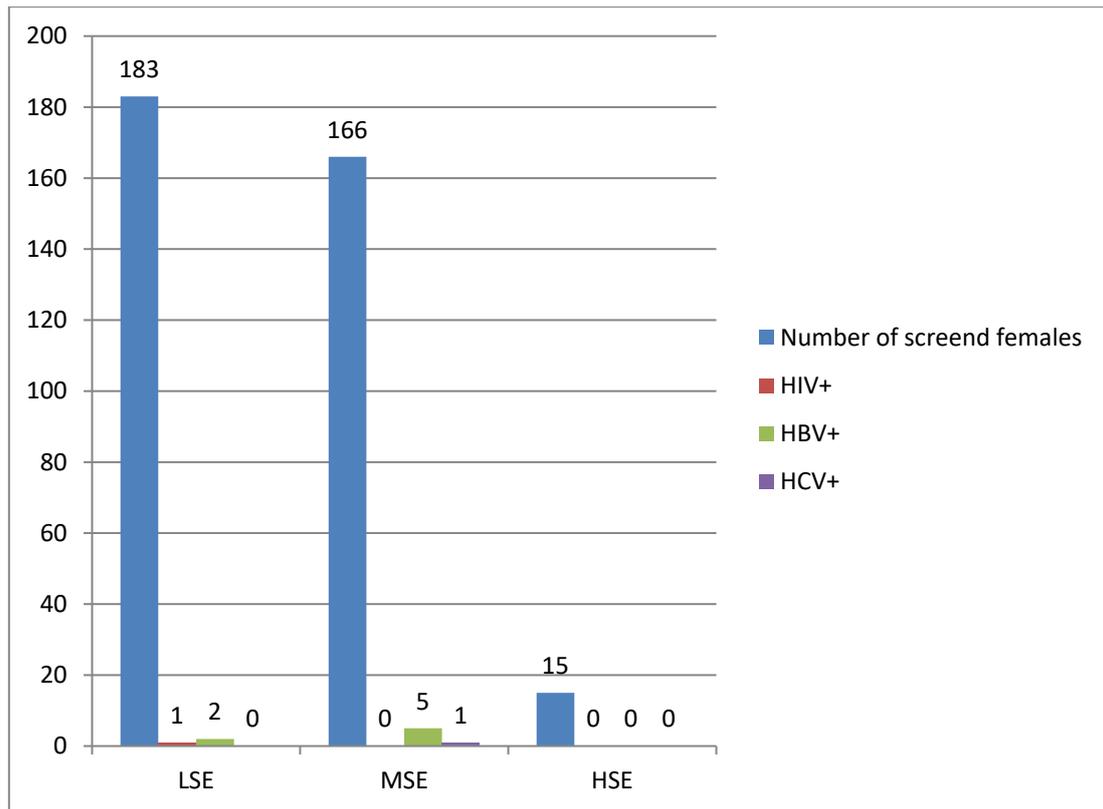


Figure 3: Seroprevalence of HBV, HCV and HIV among antenatal women according to socioeconomic status

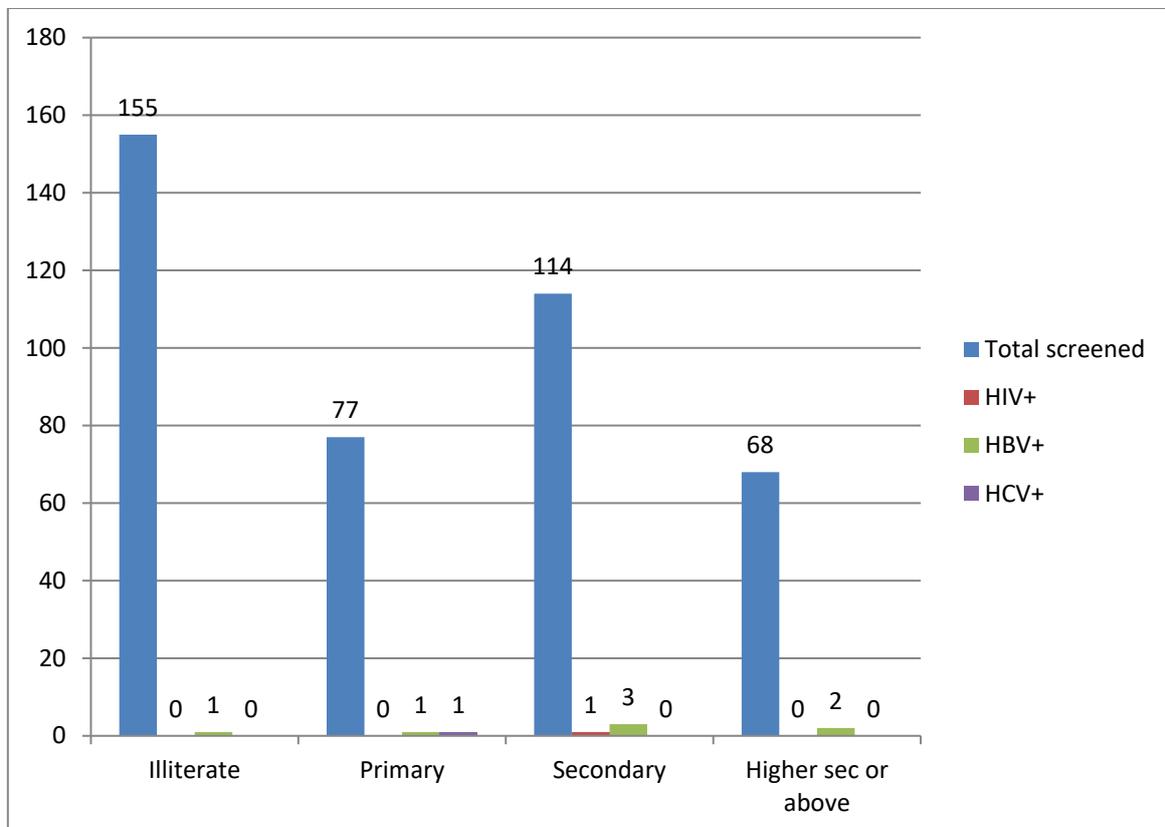


Figure 4: Seroprevalence of HBV, HCV & HIV among antenatal women according to education level

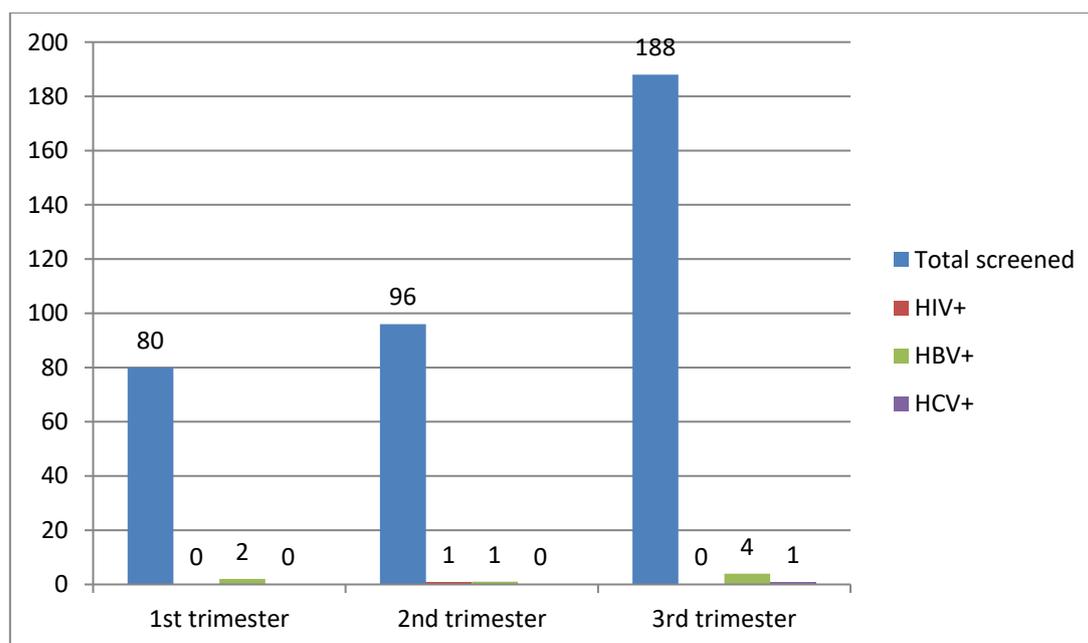


Figure 5: Seroprevalence of HBV, HCV & HIV among antenatal women according to gestational stage

Discussion

In this study the prevalence of HBV was 1.92%, HCV was 0.27% and HIV was 0.27%. Bafa TA et al [19] found seroprevalence of hepatitis B, hepatitis C and HIV infections as 4.5%, 1.8% and 2.7% respectively. Kabinda JM et al [9] enrolled a total of 581 pregnant women and found seroprevalence of hepatitis B, hepatitis C and HIV infections as 5.9%, 4.1% and 4.1% respectively. Harshita JR et al [14] in Amritsar, India studied 3408 patients and reported 1.17% and 1.26% sero-positivity for HBV and HCV respectively and 4.6% seropositivity for HIV. Mehta et al [10] found sero-positivity of hepatitis B 2.9%, hepatitis C 0.19% and HIV 0.38%. Our results are consistent with Mehta et al [10] and Harshita JR et al [14] who also reported the similar seroprevalence of HBV, HCV and HIV in their studies. HCV seroprevalence in our study was 0.27% as it is consistent with previous reports among pregnant women in Sudan (0.6%), [22] Nigeria (0.8%) [23] and Iran (0.2%). [24] In contrast, higher prevalence of HCV was reported from Yemen (8.5%). [25] HIV seroprevalence of our study was 0.27% is similar with

previous reports among pregnant women in Southern Ethiopia and Kenya, [20] 1.8% each and 0.4% reported in South Africa. [21] Variations in seroprevalence in India and elsewhere might be due to differences in sampling method, geographical variation, differences in cultural practices, sexual behaviour and practices.

In present study it was observed that majority of pregnant females screened for these infections belonged to age group 26-30 years. Majority of females were below 30 years. Similar findings were reported in studies done by Kabinda JM et al [13] and SeidM et al [11]. The mean age of these antenatal females was 27 ± 3.75 years.

In our study majority 195(53.57%) of females were from rural area, whereas rest 169(46.43%) were from urban area. Similar observation was seen in study conducted by Kabinda JM et al. [13] Whereas Dabsu R et al [17], SeidM et al [11] and Zenebe Y et al [12] found majority of females from urban locality. Both females who have been found positive for HCV and HIV were of rural background. On the other hand HBV positivity was found in 5(71.42%) females

of urban background. There was no statistically significant difference in the number of HBV, HCV or HIV positive females between rural and urban locality ($p>0.05$).

Co-infection of HBV, HCV, and HIV was not reported in our study. Similar results were reported from the studies conducted in abroad like Lagos Nigeria [26] and Tunisia [27], whereas Bafa TA et al [19] found HIV co-infection was present in 40% and 100% of hepatitis B virus and hepatitis C virus positive pregnant women, respectively. HIV/HBV co-infection was found among pregnant women in other sub-Saharan African countries: 4.2% in Nigeria [26] 4.9% in Uganda [20] and 5.3% in South Africa. [21] The similarity in the HBV and HIV co-infection rate is due to the shared mode of transmission, while the differences are because of the prevalence rates of HBV and HIV co-infection varies worldwide depending on the geographic regions and risk groups.[28]

In our study majority of females were of lower socioeconomic status, 183(50.27%) followed by 166(45.60%) middle socioeconomic status and 15(04.12%) were of higher socioeconomic status.

In our study majority of females were house wives, 302(82.96%), followed by 40(10.99%) labourer, 18(4.95%) service class and rest 4(1.09%) females were student. Our study coincide with Dabsu R et al [17], Bafa TA et al [19] and Zenebe Y et al [12] reported house wives from 83.60%, 79.27% and 56.90% respectively. The change in the number of HBV, HCV or HIV positive among house wives and other working or occupational females was not statistically significant ($p>0.05$). [29]

In this study out of total 364 screened females, 259(71.15%) were literate and 105(28.84%) were illiterate. Among literate females 114(55.02%) studied up to 10th standard, 77(29.72%) studied up to primary level, and rest 68 (26.25%) have

higher education. In studies conducted by Kabinda JM et al [13] and Dabsu R et al [17] illiteracy was reported from 25.4% and 24% cases respectively. Our results are consistent with their findings. The change in the number of HBV, HCV or HIV positive females between literate and illiterate was not statistically significant ($p>0.05$).

In our study majority of females 188(51.64%) came in 3rd trimester, followed by 96(26.37%) in 2nd trimester and rest 80(21.97%) came during 1st trimester. Similar observation was seen in study by Bafa TA et al [19] who reported cases from 3rd, 2nd and 1st trimester 66.66%, 26.57% and 6.75% respectively. On the other hand, studies conducted by Zenebe Y et al [12], Odom J et al [15], Manyahi J et al [16], and Omatola CA et al [18] the findings were different from ours. The change in the number of HBV, HCV or HIV positive females among these trimesters was not statistically significant ($p>0.05$).

In our study majority of females were multigravida 64.55% and 35.43% females were primigravida. Similar findings were seen in study conducted by Oladeinde et al [9] (73.33% multigravida & 26.66% primigravida) and SeidM et al [11] (62.60% multigravida & 37.40% primigravida). On the other hand, study conducted by Bafa TA et al [19] the finding was different than ours, (98% multigravida and 2% primigravida). The difference in the number of HBV, HCV or HIV positive females in parity and number of gravida was not statistically significant ($p>0.05$).

In our study majority of females had uniparity 184(50.54%) and mean parity was 0.81 ± 0.71 . On the other hand, in study conducted by Bafa TA et al [19] 98.64% of females had multiparity.

In this study 231(63.46%) females had haemoglobin of >10 g/dl and 133(36.53%) had haemoglobin of 7-10 g/dl. The mean haemoglobin of these females was

11.05±1.52 gm/dl. A study conducted by Oladeinde et al [9] found anaemia in 41.9% females.

Conclusion

In this study the prevalence of HBV was 1.92%, HCV was 0.27% and HIV was 0.27%. The difference in the number of HBV, HCV and HIV positive females in various religion, socioeconomic status, locality, educational status, trimesters, gravida and occupations was not statistically significant ($p>0.05$). A strengthening of routine screening must be done and a health education of the population on the mode of transmission should be conducted.

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