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Sero-epidemiology and risk factors of Hepatitis E among pregnant women in Tabriz, Iran

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ABSTRACT

Hepatitis E Virus (HEV) in pregnant women is more severe, often leading to fulminates hepatic failure, death in mother, abortion and death of infants. The aim of this study was to determine the Sero-epidemiology and risk factors of anti-HEV IgG antibodies in pregnant women in East Azerbaijan of Iran because the prevalence in Iranian pregnant women is almost unclear. We performed a descriptive, Cross-Sectional study to determine the frequency of anti-HEV IgG antibodies was evaluated using enzyme-linked immunosorbent assay (ELISA) on 321 pregnant women referred to Alzahra health centers of Tabriz for pursuing pregnancy. Only ten (3.1%) of 321 cases had positive results for anti-HEV IgG. Multivariate analysis of socio-demographic and behavioral characteristics of the pregnant women showed that HEV was associated with availability of potable water at home (p=0.007). The Sero-prevalence anti-HEV IgG is low in the pregnant women; maybe it is related to the availability of potable water at home or high level of higen.

Key words: pregnancy; Hepatitis E; women

INTRODUCTION

Hepatitis E is a viral-infection of hepatovirid group which is transferred through contaminated water and nutrition and alternates from self-limited up to fulminate hepatitis .The disease was first recognized in the Indian subcontinent in the 1950s [1]. In developing countries, prevalent of hepatitis E has been reported 10-35%. In Asia, Hepatitis E has been identified as the most widespread agent in the Middle East after hepatitis B, as the second agent of acute hepatitis in adult [2]. Although the most common transmission way is fecal -oral, the importance of contaminated water has been reported more than food [3]. In Hamadan (2006) prevalent of serologic HEV has been reported 12.9% and in Tabriz it was 7.8%. Also according to a study, in Nahavand, it has been 9.6% in 1381[4].In a recent large prospective study from Northern India on the maternal and fetal outcomes of Hepatitis E infection, close to 60%of viral hepatitis in pregnant women was attributed to Hepatitis E infection. Fulminate hepatic failure was more common among HEV-infected women (55%) who were 2.7 times higher risk than non-HEV infected women (20%); maternal mortality was also higher secondary to fulminate hepatic failure in the HEV infected group (41%) vs.7%in

the non-HEV group [5]. The high risk of vertical transmission of HEV infection from mother to infant was investigated in a study of 469 pregnant women and reported a mother-to-infant transmission of 100%.Nontheless the high transmission rate significant the importance of vertical transmission of HEV infection. A small percentage of the babies born to mothers with active disease were either pre-tem, or had severed hepatic. Two of the babies died within 48 hours, while the remaining alive 24 infants had full recovery [6]. We sought to determine the sero-prevalence of anti-HEV IgG antibodies in pregnant women because prevalence of anti-HEV IgG has not been studied in the pregnant women of East Azerbaijan in Iran.

MATERIALS AND METHODS

During a sectional-descriptive study for one year, pregnant women referred Tabriz Alzahra medical and educational center, were checked serologically for hepatitis E if they were in the second and last trimester of pregnancy and without jaundice, pervious hepatitis infection and diabetes and in the case of their satisfaction.

We obtained the socio-demographic, behavioral and clinical data of the participants with questionnaire. Socio-demographic data included age, educational level, economic status, employment, availability of potable water (with in the house, out of the house) and form of elimination of excretes (flush toilet, open field). Behavioral data included animal contacts, having pets and clinical data including history of blood transfusion or transplants, pregnancy times, gestational ages, abortion.

We analyzed the serum samples of the pregnant women for anti-HEV IgG antibodies by an enzyme-linked immunosorbent assay (ELISA). The assays were performed following the instructions of the manufacturer (DIA.PRO, Milano-Italy). According to the information included in the kits insert, Blood test results were interpreted to 3 groups, lower than 0.9% negative, between 0.9-1.1 equivocal and more than 1.1 positive. Blood serum samples until testing for anti-HEV IgG antibodies were stored at -20c.

Sample size was calculated at least 260 case with considering confidence level 95% and acceptable error 20% .Considering P=0.27, obtained from Begun and college study (initial information). We select cases with random simple sampling. We used MS-Excel for performing random number for choosing cases. In this study, information was gathered from 321 pregnant women referred to Alzahra health center of Tabriz. The statistical analysis was performed with the aid of the Spss software ver.16. Descriptive statistics were obtained as the mean for continuous variables and as the frequency for others variables. Also we used multi-variable of logistic regression analysis backward strategy for finding relationship between different factors.

RESULTS

Results show that the mean age of 321 pregnant women was 29.08 (SD, 6.21) years (ranging from 15 to 45). In this study 96% had drinkable water in the house and 4% water out of the house .We found 4.4% of them had history of blood transfusion, 35.5%have had surgery and 8.7% of them keep pets at home. Our results show that 76.6% live in city and 23.3% live in urban. Finally, blood test results show that 96% have sero-negative, 0.9% equivocal and 3.1 %(10 of 321) sero-positive. Results of K2 test show that there is significantly relationship between HEV sero-positive and access to potable water (P=0.007).

DISCUSSION

In this study, we found only 3.1 %(10 of 321) of pregnant women had positive results for anti-HEV IgG using ELISA method. Such HEV sero-prevalance is similar to developed countries. Lindemann et al. in a study on 1040 pregnant women in Spain reported the rate of anti-HEV IgG as 3.6% [7] and also Rostamzadeh et al. in their study on 136 case in Urmia (Iran) reported the rate of anti-HEV IgG as 3.6% [8].The prevalence of anti-HEV IgG in southern Asia is 30% [9] and in Africa from 30% to 84.3% [10].

The findings from this study show the prevalence rate of HEV infection in pregnant women in East Azerbaijan in Tabriz is low. It may be due to efficient health system and better availability of potable water in comparison with other regions of Iran.

In our study, most of the HEV sero-positive cases (9 of 10) were from urban areas. Rostamzadeh et al. from Urmia found a similar finding [8] and also Alvarado-Esquivel et al. in Mexico reported 100 cases (36.6%) of the 273 rural adults had anti-HEV IgG antibodies [11]. Also Cevrioglu et al. from Turkey found a significant correlation between rural residence and higher anti-HEV positive values [12].

In this study there is a significant statistical relationship between HEV sero-positive and availability of potable water (P=0.007), also a research carried on 300 pregnant women in the North of India in 2008, shows a similar results (correlation between HEV sero-positive and drinking water) (p=0.05) [11]. On the other hand, the association of HEV infection with consumption of untreated water found in the present study is similar to Kumar et al. (2013) and Alavian 2007[6, 13].

However, such factors (low socio-economic status, blood transfusion and low educational level) in other studies were associated with HEV infection [11] but we found no relationship between HEV sero-positive with socio-economic status, blood transfusion and educational level. (table1)

In Egypt it has been reported transmission HEV from pregnant women infected with HEV to fetal were 100 %.On the other hand HEV infection in pregnant women cause abortion, premature infant, low birth weight [5]. In any case there are probability of abortion, mortality of mother and death of infants after several days of birth [1].

Table 1 Bivariate Analysis of Exposure Variables and Sero-prevalence and risk factors of Hepatitis E among pregnant women in Tabriz, Iran

Characteristics	Number of subjects tested	Positive ELISA results	Odds ratio	95% Confidence interval	P Value
Place of Residence					
city	246	1	1*	-------	-------
Urban	75	9	1.49	0.33-20.6	0.252
Educational level					
Primary, Secondary	179	7	1	---------	-------
Diploma and higher	142	3	0.53	0.135-2.08	0.364
Pregnancy times					
0	132	2	1	---------	-------
1	101	5	3.385	0.643-17.82	0.15
2	67	1	0.985	0.088-11.061	0.99
≥ 3	21	2	6.842	0.909-51.486	0.62
Abortion					
yes	300	10	1	---------	-------
No	21	0	0.000	0.000	0.99
Occupation					
Unemployed	301	10	1	---------	-------
Employed	20	0	0.000	0.000	0.99
Keeping pets					
Yes	28	1	1	---------	-------
No	293	9	1.169	0.143-9.576	0.884
Excreta disposal					
Toilet	300	9	1	---------	-------
open field	21	1	0.619	0.075-5.128	0.65

**ref category*

CONCLUSION

However the Sero-prevalence anti-HEV IgG is low in the pregnant women; maybe it is related to the availability of potable water at home or high level of higen, but regarding 3% to 9% prevalence of HEV in different parts of Iran, it is necessary physicians consider HEV in clarifying different types of acute hepatitis in their diagnosis.

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Footnotes
Implication for health policy/practice/research/medical education: Hepatitis E alone contributed to approximately 50% of patient with acute viral hepatitis. Fulminate liver failure was significantly higher in pregnant

women with HEV infections supposed to other causes of acute viral hepatitis. Also maternal mortality was higher secondary to fulminate hepatic failure in the HEV infected group (41%) vs.7%in the non-HEV group. The high risk of vertical transmission of HEV infection from mother to infant was investigated in a study of 469 pregnant women and reported a mother-to-infant transmission of 100% .Therefore, it is of importance to evaluate sero-prevalence of anti-HEV IgG antibodies in pregnant women.

Authors' Contribution:
Conception and design, Mandana Rafeey and Maedeh Alizadeh, **Collection and assembly of data,** Maedeh Alizadeh, **Analysis of blood,** Heydarali Esmaili, **Statistical expertise of data,** Mohammad Asghari Jafarabadi, **Drafting the manuscript,** Maedeh Alizadeh, **Final approval of the article:** Mandana Rafeey, Simin Taghavi, Manizheh Sayyah-Melli

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