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Frequency of Hepatitis C Virus in Pregnancy and Pregnancy Outcome at Al-Ahrar Teaching Hospital, Zagazig, Egypt

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ABSTRACT

Background: hepatitis C virus (HCV) has infected an estimated 170 million people. Pregnancy may worse the liver function in a case of severe liver disease.

Objective: The aim of the current work was to assess the frequency of HCV in parturient women and their pregnancy outcome at Al-Ahrar Teaching Hospital.

Patients and Methods: This cross-sectional prospective study included a total of 1,135 pregnant women, attending at Obstetrics and Gynecology Department, Al-Ahrar Teaching Hospital, Zagazig. Pregnant women were admitted between 28- and 42-weeks' gestation. They were tested for HCV+ antibodies using the Rapid Test Technique.

Results: The frequency of HCV in pregnant women tested was 7.7%. There were statistically high significant relationships between HCV and occupation, history of blood transfusion, history of HCV treatment, type of previous delivery and laboratory findings among the study cases.

Conclusion: It could be concluded that history of HCV treatment, previous operations, risky occupations, blood transfusion and family history of HCV are risk factors for HCV infection.

Keywords: Hepatitis C Virus, Pregnancy Outcome, Frequency.

INTRODUCTION

There are an estimated 170 million persons worldwide who have been infected with hepatitis C virus (HCV). Chronic liver disease, cirrhosis, and hepatocellular carcinoma (HCC) are all possible outcomes for HCV-infected individuals. They also serve as reservoirs for transmission to others [(1)].

It is believed that 2.2% of the world's population is infected with hepatitis C. A weighted average for regions rather than individual countries was used because of the absence of data in many nations. There are estimates ranging from 1% in Northern Europe to 2.9 % in Northern Africa for each region. Countries in the United Kingdom have recorded a prevalence of just 0.1 percent. There are other reports from Scandinavia, with the highest prevalence of 8.6 percent coming from Egypt. 27 percent of cirrhosis and 25 percent of hepatocellular carcinoma (HCC) worldwide are caused by HCV infection [(2)].

In affluent countries, the majority of hepatitis C virus-related disease has been caused by injecting drugs, receiving blood transfusions prior to donor screening, and high-risk sexual activities. Egypt has the world's highest rate of HCV infection, and that rate rises steadily with age. Because most acute HCV infections are asymptomatic, it is difficult to estimate the prevalence of the disease [(3, 4)].

Hepatitis C virus is a major cause of chronic liver disease in children in developed nations. During the intrapartum phase, the mother and fetus are both exposed to viruses. While the mother's breast milk contains HCV RNA, it does not transmit the disease to her baby [(5)].

Transfusions of blood and blood products and organ transplants from infected donors, drug use, improper therapeutic injections, occupational contact to blood, and delivery to an infected mother are all risk factors for HCV infection. There have been several, but the most significant have been transfusions from unscreened donors, medication injections, and hazardous therapeutic injections [(6)].

Many tests are used to diagnose hepatitis C virus infection. Screening test by detection of the viral antibody is not diagnostic but it indicates the possibility of infection. Enzyme linked immunoassay (ELISA) is a diagnostic test approved by FDA by detection of viral antibodies. PCR indicates antigen infection by detection the genotypes of virus and counting the virus to detect the prognosis of the disease and follow up the mode of therapy [(2)].

Raid test is a screening test used to aid in diagnosis of HCV infection and based on chromatographic immunoassay for detection of antibodies [(6)]. Pregnancy may worse the liver functions in a case of severe liver disease or HCC. In presence of liver cirrhosis, FibroScan is useful to give the patient approval to get pregnant as it determines stages of liver fibrosis [(3)].

The aim of the current work was to assess the frequency of HCV in parturient women and their pregnancy outcome at Al-Ahrar Teaching Hospital.

PATIENTS AND METHODS

This cross-sectional prospective study included a total of 1,135 pregnant women, attending at Obstetrics and Gynecology Department, Al-Ahrar

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Teaching Hospital, Zagazig. This study was conducted for one year between May 2016 to Jun 2017.

***Ethical Consideration*:**

This study was ethically approved by Al-Ahrar Teaching Hospital Research Ethics Committee (ZU-IRB #5062).

Written informed consent of all the participants was obtained. The study protocol conformed to the Helsinki Declaration, the ethical norm of the World Medical Association for human testing.

Inclusion criteria:

The research included all women in labor who were admitted to the hospital between 28 and 42 weeks of pregnancy.

Exclusion criteria:

Any medical disorders with pregnancy (HTN, DM, bleeding disorders and cardiac problems), multiple pregnancy, gestational age less than 28week and patients refuse to participate.

All participants were subjected to:

1. **A thorough review of the patient's medical history: menstrual, obstetric and** contraceptive history were taken

2. **Complete general examination.**

3. **Gynecological Examination: Including abdomen, pelvic examination (external genitalia,** vagina, cervix, bimanual examination. Abdominal examination was done to detect fundal level and is it correlated to gestational age or not, to detect presence of hepato-splenomegaly or not.

4. **Transvaginal ultrasound: Examination was performed with endovaginal transducer of 5-**7.5 MHz frequency.

5. **Laboratory investigations including:**
   a. HCV Ab by using rapid test. It is a fast immunoassay test for the quantitative detection of antibodies (IgG, IgM, IgA) against the hepatitis C virus (HCV) in human serum or plasma. It is used as a screening test and a diagnostic tool to detect HCV infection.
   b. Liver function tests (LFT), CBC, PT, INR, and PTT.

6. **The following was recorded after delivery:**
   a. Gestational age (GA) at delivery by pediatrician to detect term or preterm baby clinically.
   b. Neonatal birth weight.
   c. Occurrence of Primary PPH at 1st 24 hour of delivery.
   d. Apgar Score of newborns. It is done in 1st and 5th minute of birth. It is done to evaluate the newborn on five simple criteria on a scale from 0 to 2, it includes appearance, pulse, grimace, respiratory effort and activity.

Statistical analysis

In order to analyze the data acquired, Statistical Package of Social Services version 20 was used to execute it on a computer (SPSS). In order to convey the findings, tables and graphs were employed.

The quantitative data was presented in the form of the mean, median, standard deviation, and confidence intervals. The information was presented using qualitative statistics such as frequency and percentage. The student's t test (T) is used to assess the data while dealing with quantitative independent variables. Pearson Chi-Square and Chi-Square for Linear Trend (X^2) were used to assess qualitatively independent data. The significance of a P value of 0.05 or less was determined.

RESULTS

Table 1: shows the patients' clinical characteristic data and demographic as regard to age, BMI, occupations, residence, socioeconomic status and special habits, obstetric and medical history.

Table (1): Demographic data, obstetric and medical history of the studied patients:

			Mean±SD no	Range %
Age (y)			27.9±8.4	19-35%
BMI (kg/m^2)			28.6±9.1	20.4-36%
Occupation	**Not work**	Housewife	690	60.8%
	Work	Risky	105	9.3%
		Not risky	340	29.9%
Residence	Urban		420	37.1%
	Rural		715	62.9%
Special habit	Smoker		35	3.1%
	Alcohol		0	0%
	Others		11	0.97%
	No		0	0%
			no	**%**
Type of previous delivery				
NVD			503	60.9%
CS			323	39.1%
Abortion			176	15.5%
Place of previous delivery				
Home			217	26.3%
Hospital			180	21.8%
Private clinic			429	51.9%
Person in charge of delivery				
Doctor			559	49.3%
Nurse			179	21.7%
Midwife			88	10.7%
History of medical disease				
HTN			0	0%
DM			0	0%
AIDS			0	0%
OTHERS			211	18.6%
NO			924	81.4%

Number of HCV positive and negative cases done by Rapid test among the whole studied cases **(Fig. 1).**

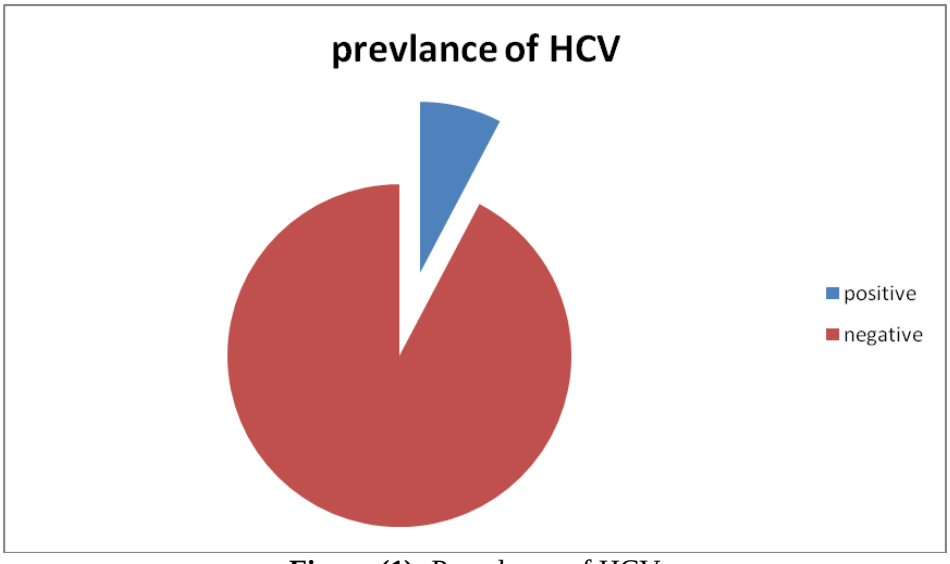

Figure (1): Prevalence of HCV

HCV infection (+ve rapid test) significantly increased among pregnant females who had a risky occupation for HCV transmission when compared to patients who were housewifes or had no risky occupation **(Table 2).**

Table (2): Relationship between HCV and the demographic data among studied cases.

No.	(+ve) 87	(-ve) 1048	P
Age (y)	28.1±7.9	27.4±7.7	.79
BMI	27.4±10.3	28.9±7.3	.81
Occupation			
Housewife	19 (21.8%)	671 (64.02%)	.00*
Risky	57 (65.5%)	48 (4.58%)	
Not risky	11 (12.6%)	329 (31.4%)	
Residence			
Urban	34(39.1%)	386(36.8%)	.81
Rural	53(60.9%)	680(64.9%)	
Special habit			
Smoker	7 (8.04%)	28(2.7%)	
Alcohol	0 (0%)	0%	0.83
Others	3 (3.4%)	8(7.6%)	
No	0 (0%)	0%	

HCV infection (+ve rapid test) significantly increased among pregnant females who had a past history of blood transfusion, history of HCV treatment, family history of HCV and past history of dilatation and curettage (**Table: 3)**

Table (3): Relationship between HCV and the past history among studied cases.

	HCV(+ve) 87	HCV(-ve) 1048	p
History of blood transfusion	40(46%)	65 (6.2%)	0.00*
History of HCV TTT	26 (29.9%)	8 (7.6%)	0.00*
Family history of HCV	43(49.5%)	561(53.5%)	0.01*
History of surgical intervention			
Dilatation and curretage	47 (54.7%)	68(6.5%)	0.01*
Circumcision	11 (12.6%)	97(9.3%)	0.47
Episiotomy	19 (21.8%)	93(8.9%)	0.11
Appendicectomy	16 (18.3%)	385(36.7%)	0.69
Tonsillectomy	10 (11.5%)	78(7.4%)	0.55
Dentist	73 (83.9%)	737(70.5%)	0.24
Cholecystectomy	5 (5.7%)	48(4.6%)	0.78
Others	3 (3.4%)	15(14.3%)	0.17

HCV infection (+ve rapid test) increased significantly among patients who previously delivered by C.S. **(Table 4).**

Table (4): Relationship between HCV and the past obsetatric history among studied cases.:

	HCV(+ve) 87	HCV(-ve) 1048	p
Type of previous delivery			
NVD	18 (20.6%)	485(46.3%)	.00*
CS	45(51.7%)	278(26.5%)	
Nullipara	24(27.6)	285(27.2)	
Abortion	15(23.8%)	161(21.1%)	.81
Place of previous delivery			
Home	14 (22.2%)	302(26.6%)	
Hospital	13 (20.6%)	167(21.8%)	.38
Private clinic	38 (60.3%)	391(51.2%)	

There was no significant difference between both positive and negative HCV infection cases as regard HSM either by US or by clinical abdominal examination **(Table 5).**

Table (5): Relationship between HCV and the clinical abdominal examination finding among studied cases.

	HCV(+ve) 87	HCV(-ve) 1048	p
Hepatospleenomegaly (US)	15(17.2%)	85 (8.1%)	.22
Hepatospleenomegaly(exam)	9 (10.1%)	67 (6.4%)	.31

The abnormal PT, PTT, INR and abnormal liver function test significantly increased among the pregnant female with (+ve) Rapid test **(Table 6)**.

Table (6): Relationship between HCV and the laboratory finding among studied cases.

	HCV(+ve) 87	HCV(-ve) 1048	p
PT-PTT			
Normal	54 (62.1%)	1028(98.1%)	.00*
Abnormal	33(37.9%)	20(1.9%)	
LFT			
Normal	36(41.4%)	1033(98.6%)	.00*
Abnormal	51(58.6%)	16(1.4%)	

There was no significant differences were found between both sero-positive and sero-negative studied cases by Rapid test as regard to neonatal Apgar score **(Table 7).**

Table (7): Relationship between HCV and the fetal outcome among studied cases.

	Apgar score at 1st min.			Apgar score at 5th min.		
	HCV(+ve) 87	HCV(-ve) 1048	p	HCV(+ve) 87	HCV(-ve) 1048	p
Apgar –score						
Normal	56(64.3)	730(69.6)	0.8	61 (70.1%)	742(70.8%)	0.89
Abnormal	31(35.6)	318(30.3)		26(29.9%)	306(29.2%)	

DISCUSSION

Hepatitis C is present in around 170 million persons around the world (HCV). HCV-related liver disease kills an estimated 350,000 individuals worldwide each year [(7)].

In Egypt, Seroprevalence was determined to be 24 percent and 15 percent, respectively, in a comprehensive investigation in the Nile Delta in 1996. Those aged 15 to 59 had a countrywide seroprevalence of 14.7% in 2012, with a viremic prevalence of 9.7% in this age range [(7)].

This study findings found a 7.7 percent prevalence of HCV in all the pregnant women tested. **Miller *et al.*** [(8)] found that Prevalence of HCV in pregnant women ranged from 0.7% to 4.4%, according to the study.

In a study done at Cairo University from December 2012 through May 2013, the HCV antibodies was detected using a third-generation ELISA test on 1250 pregnant women who had completed a questionnaire about possible risk factors for HCV acquisition and mother-to-infant transmission. Polymerase chain reaction was used to detect HCV-RNA in women who had tested positive for HCV antibodies. At 1 and 6 months of age, peripheral blood was analyzed for HCV antibody and HCV-RNA in babies of HIV-positive mothers. Out of the 1250 women that were tested, 52 (4.2 percent) had HCV antibody positivity [(8)].

This study showed that there were statistically high significant relationships between HCV and occupation, history of blood transfusion, history of intake HCV treatment, type of previous delivery and laboratory findings among the studied cases. **Arshad *et al.*** [(9)] showed that no cases (0%) with history of blood transfusion of HCV Ab +ve mothers at Cairo University.

This study showed that there were statistically significant relationships between HCV and family history of HCV and D&C but there was no significant relationship between HCV and dentist surgical interventions. In a study done by **Claude *et al.*** [(10)], 16 of the patients and four of the controls had a history of major surgery, which was statistically significant. (p value 0.002) at $p<0.05$, but found Dilatation & curettage (6cases and 5 control) and Dental extraction (5cases and 4control) with no significant difference.

In contrast, **Khamis *et al.*** [(11)] found that women had dental maneuvers was higher than those who denied such a history (6cases/9) (66.7%) but general surgery as risk factor found in 4 cases (44.4%) with no significant difference.

In this study, there was a significant relationship between previous type of delivery and HCV infection. **Arshad *et al.*** [(9)] found that, there was a significant relationship between HCV infected women and past

history of caesarean birth. Out of 1250 pregnant tested women, 26 cases of 52 infected cases had past history caesarean section.

This study showed that, there was no significance between HCV infected pregnant women and Hepatosplenomegaly. **Le Compaion *et al.* [(12)]** showed that, there was no significant relationship between infected pregnant female and Hepatomegaly. The study also found that, Hepatosplenomegaly is a late sign in viral hepatitis, and it was preceded liver cirrhosis, it also associated with disturbed liver function test.

The result of this study revealed that, there was significant relationship between HCV infected pregnant women and abnormal liver function test and abnormal coagulation profile. **Le Compaion *et al.* [(12)]** also found that, there was significant relationship between disturbed liver enzymes and viremic hepatitis C virus pregnant female above 30 years old.

In this study, there was no significant relationship between HCV and the fetal outcome among the studied cases. **Claude *et al.* [(10)]** found that there was no significant difference in birth weight, neonatal jaundice, birth asphyxia, small for gestational age babies among the study, and control group. **Jhaveri *et al.* [(13)]** found that of the 14 infant of infected mothers comparing to 328 of non- infected had abnormal Apgar score with no significant relationship and 51 infants born to 49 mothers, 7 of 49 infants (14.3%) were HCV RNA-positive with PCR testing.

CONCLUSION

In view of the results of the current work, and upon the literature on the epidemiology of HCV infection, the following could be concluded.

- The prevalence rate of HCV among all the tested pregnant women was 7.7%
- History of HCV treatment, previous operations, risky occupations, blood transfusion and family history of HCV were statistically significant as a risk factors for HCV infection.
- There was a significant relationship between HCV infected women and abnormal LFT and Coagulation profile.
- There was no significant relationship between HCV infected pregnant women and fetal outcome (Wt., Apgar score).
- There was no significant relationship between HCV infected pregnant women and Hepatosplenomegaly.
- There was no significant relationship between HCV and post partum complications as PPH.

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Author contribution: Authors contributed equally in the study.

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