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ORIGINAL ARTICLE

HCV Prevalence and Pregnancy Outcome, Risk Factors in Pregnancy

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Abstract

Background: **Despite having the highest HCV incidence in the world, only risk-based screening is done in Egypt during pregnancy. Women who are infected with HCV may not show any symptoms and may not have a history of exposure to risk factors. This means that the long-term effects of HCV on infected mothers and their offspring may not become apparent until much later in life.**

Aim of the work: **The study's goal is to determine how common HCV infection is, how it is spread, and what kind of an impact it has on pregnant women.**

Patient and methods: **This study is a cross-sectional, observational, hospital-based study that was conducted in EL Hussein University Hospital in Cairo, Egypt. Included all pregnant women who attend the hospital for antenatal care (ANC) and delivery during a one-year period.**

Results: **Analysis of one thousand pregnant women's blood samples only 7.1% (71 cases) were considered positive, while 92% (929 cases) are considered negative. History of surgery (84.5%) and blood transfusion (62.6%) were the most frequent prior risk factors. Postpartum hemorrhage was the most prevalent complication of HCV during pregnancy, accounting for 58.3% of all problems.**

Conclusion: **Out of one thousand blood samples drawn from pregnant women, only seven point one percent (7.1%) tested positive for HCV. Past surgery and blood transfusion were the most common associated risk factors, postpartum hemorrhage proved the most common complication associated with pregnancy, all the neonates whom mothers HCV-positive were normal.**

Keywords: Hepatitis C virus, Neonatal infection, Pregnancy, Prevalence, Risk factors

1. Introduction

The Hepatitis C virus (HCV) is a blood-borne viral infection that belongs to the family Flaviviridae. It is only found in humans and it is a significant public health concern. According to a study by Miller and Abu-Raddad in 2010,[1] an estimated 71 million people worldwide have been affected by HCV. The infection rate varies across countries, with Egypt having the highest rate.[2]

Although Egypt has one of the highest rates of Hepatitis C (HCV) in the world, the country does not have a universal screening program for pregnant women. Instead, only women who are considered to be at risk are screened for the virus. This approach may miss a significant number of women who are infected with HCV but are asymptomatic, do not know they are infected, or have no known risk factors. As a result, mothers and their children may not be diagnosed until later in life, when complications from HCV have already developed. This highlights a potential gap in the healthcare system of Egypt and how the screening could be more effective if it is mandatory and universal.[3]

Hepatitis C Virus (HCV) is primarily transmitted via blood-to-blood contact. This can occur in a number of ways, including Transfusion of infected

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blood products (now rare in industrialized countries), Sharing of needles among infected intravenous drug users, Piercings and tattoos, Intranasal drug use, Sexual contact, Unsterile medical injections and surgical procedures, Mother-to-child transmission (i.e., vertical transmission).[4]

Pregnant patients primarily acquire hepatitis C by either intravenous drug use or history of blood transfusions. During pregnancy, the virus can be transmitted from an infected mother to the fetus via intrauterine, intrapartum, or postnatal routes. Vertical transmission can occur during all three trimesters of pregnancy, and it's more likely to occur if the mother is also infected with HIV. The rate of vertical transmission of HCV infection ranges between 2 and 10%.[4]

If a woman is found to have active HCV infection during pregnancy, it is important to link her to follow-up care and treatment after delivery. This can help to reduce the risk of complications and transmission of the virus to the baby. Exposed infants should also be screened for HCV so that any infected children can be treated as soon as possible.[5]

2. Patients and method

This study is a cross-sectional, observational, hospital-based study that was conducted in the Obstetrics and Gynecology Departments of EL Hussein University Hospital in Cairo, Egypt. The study aimed to include all pregnant women who attend the hospital for antenatal care (ANC) and delivery during a one-year period (from May 2021 to May 2022). There were no exclusion criteria for participants.

The study protocol included obtaining informed written consent from all participants and taking a full history, including personal information, complaints, age, parity, last menstrual period, and any symptoms of HCV such as fatigue, muscle aches, nausea, loss of appetite, aversion to smoking, fever, swelling of lower limbs, or yellowing of the skin and eyes (jaundice). The study also includes past medical history of surgery or blood transfusion, dialysis, family history of HCV, and husband history.

General examination had also been conducted, including measuring body weight and height, blood pressure, and both limb examination for extra hepatic manifestation of HCV. Abdominal examination had also been conducted, including examination for para umbilical hernia, ascites, and skin lesion in the abdomen as caput medusa, hepatosplenomegaly, abdominal bruit, and auscultation of fetal heart sound.

A set of procedures used to evaluate the health and development of a fetus during pregnancy:

A- Clinical assessment of fetal growth includes monitoring maternal weight gain, blood pressure, measuring the size of the uterus, and assessing the height of the fundus. Additional assessment may include clinical assessment of excess amniotic fluid.

B- Fetal biophysical profile (BPP), which is a combination of several tests that evaluate different aspects of fetal well-being, such as fetal breathing, movement, tone, and amniotic fluid volume. The biophysical profile includes several tests, such as: Fetal movement count, Cardiotocography (CTG), Non-stress test (NST), Doppler ultrasound, which is used to assess blood flow in the fetal umbilical cord and placenta.

Additionally, there was a diagnostic part of the assessment which was looking for cases that are positive in regards to hepatitis C (HCV) by using human SS-A (Ro) ELISA kit. The blood samples taken from the pregnant woman was sent to the laboratory where the serum was separated and tested for HCV antibodies. If the test was positive and confirmed by PCR, then the patient is considered to have a positive case of the disease.

For pregnant women with positive HCV cases, the following had been done during their regular ANC clinic visits:

Visit every 4 weeks until 32 weeks, then every 2 weeks until 36 weeks; taking a history of any new symptoms; general and abdominal examinations; maternal laboratory and biological liver function tests (hemoglobin, Rh, random blood sugar and coagulation profile, ALT, AST, ALK, TB, TP, bile acid, and serum albumin).

Biophysical profiles, Doppler ultrasound, and fetal movement count with follow-up of baseline investigations to assess the effect of HCV and fetal well-being; follow-up ultrasounds to check for organomegaly and ascites.

Assessments for the possibility of antepartum or postpartum complications due to HCV (abruption, preterm labor, risk of developing ROM, cholestasis of pregnancy, onset of appearance or risk of severe postpartum hemorrhage).

Admission of patients at 36 weeks gestation until delivery and study of the newborn's weight, APGAR score, incidence of IUGR, congenital anomalies, need for incubation, and effect of HCV on the newborn.

Data analysis was conducted by an IBM computer with Statistical Package for Social Sciences (SPSS) for Windows version 19. Graphs were created with Excel. Frequency and percentage ratings were calculated for qualitative (categorical) data, and the

Table 1. This table shows the seroprevalence rate of HCV antibodies among all the tested pregnant females. The table reports the number of positive cases (71) and negative cases (929) among the total number of tested individuals, as well as the corresponding percentages.

No	*N* (%)
Positive	71 (7.1%)
Negative	929 (92.9%)

chi square or Fisher exact test was used to make comparisons between groups. For quantitative data, the mean, standard deviation (SD), and range (min-max) were calculated, and an unpaired (t) test was used to make comparisons between means. Results were considered statistically significant if the *P* value was £0.05.

3. Results

Tables 1–7.

4. Discussion

The study aimed to assess the prevalence of hepatitis C infection among pregnant women in the El Hussein University hospital region and to identify the factors associated with infection. The seroprevalence rate of HCV- antibodies among all pregnant women examined in this investigation was 7.1%.

The overall rate (per 1000 live births) of HCV in pregnant individuals rose from 1.8 to 5.1 between 2009 and 2019, according to research conducted in the United States.[6] Several participants in the present research also concur that they had blood transfusions before standard screening for HCV among blood donors. There were additional

Table 2. This table analyzed the demographic criteria of HCV-positive and -negative mothers, showing a comparison between the two groups. Age, body mass index (BMI), residence, gravidity, parity, and educational level were assessed. There was no significant difference between HCV-positive and -negative mothers with regards to age and BMI, with a p value of 0.352 and 0.4665, respectively. However, HCV-positive mothers were more likely to live in an urban residence and have higher levels of gravidity, parity, and educational level (P < 0.00001 for all).

	Positive cases (n = 929)	Negative cases (n = 71)	*P* value
Age			
Range	(18–35)	(22–32)	0.352
Mean ± SD	26.18 ± 2.45	26.29 ± 2.28	
BMI			
Range	(17.6–34.6)	(18.3–34.9)	0.4665
Mean ± SD	26.42 ± 2.62	26.46 ± 2.99	
Residence			
Rural	394 (42.4%)	41 (57.7%)	0.0119
Urban	535 (57.6%)	30 (42.3%)	
Gravidity			
Range	(1–6)	(1–7)	*<0.00001
Mean ± SD	2.69 ± 1.05	3.9 ± 1.6	
Parity			
Range	(0–4)	(0–5)	0.00677
Mean ± SD	1.444 ± 0.96	1.87 ± 1.4	
Abortions			
Range	(0–2)	(0–3)	*< .00001
Mean ± SD	0.23 ± 0.46	1.03 ± 0.7	
Educational level			
Illiterate	108 (11.63%)	23 (32.39%)	*< 0.00001
Educated	821 (88.64%)	48 (67.61%)	

Table 3. Shows the different symptoms of HCV in the positive group (Positive = 71).

No symptom	41 (57.8%)
Fatigue	26 (36.8%)
Muscle aches	11 (15.7%)
Nausea	9 (12.6%)
Loss of appetite	5 (7.3%)
Fever	12 (16.8%)
Swelling of lower limbs	12 (16.8%)
Jaundice	9 (12.6%)

Table 4. The risk factor regard positive cases. These percentages appear to represent the risk factors for positive cases of an unspecified condition. The data suggests that past history of surgery and past history of blood transfusion are the most significant risk factors, with 84.5% and 67.6% of positive cases having those histories respectively.

Past history for surgery	60 (84.5%)
Past history for blood transfusion	48 (67.6%)
Dialysis	0 (0%)
Mode of delivery:	
NVD	29 (40.8%)
CS	42 (59.2%)
Family history:	
-Ve	30 (42.1%)
1st degree	26 (36.8%)
Husband	15 (21.0%)

Table 5. Comparison between the studied groups as regard Laboratory investigations.

Lab test	Elevated	Range	Mean ± SD
AST (U/L)	33 (46.48%)	(11–55)	36.2 ± 9.39
ALT (U/L)	9 (12.7%)	(5–56)	28.9 ± 10.6
Total bilirubin (mg/dL)	34 (47.9%)	(0.2–1.8)	1.2 ± 0.36
Serum albumin (g/dl)	(0%)	(3.1–3.8)	3.4 ± 0.14
INR	63 (88.7%)	(0.8–1.8)	1.4 ± 0.19
PT (s)	53 (74.6%)	(8.8–20.8)	15.2 ± 2.7
HB (g/dl)	(0%)	(7–14)	10.17 ± 1.5
Platelet ($x10^3/ml^3$)	(0%)	(150–208)	184.6 ± 11.2

Table 6. Table showing the progress of positive cases of hepatitis C virus (HCV) during pregnancy and the corresponding rates of certain pregnancy outcomes.

	Cholestasis	5 (6.3%)
Antepartum	Preterm labor	4 (5.2%)
	PROM	13 (18.9%)
	Abruptio placenta	7 (10.5%)
postpartum	Postpartum hemorrhage	42 (58.3%)

Table 7. Table showing the neonatal outcomes of positive cases of hepatitis C virus (HCV) in 71 newborns.

Neonatal outcome	HCV + Ve ($n = 71$)
Gestational age	
Preterm	5 (7%)
Full term	66 (92.9%)
Neonatal weight	
Range	(2–3.8)
Mean ± SD	2.9 ± 0.5
APGR score	
Range	(6–8)
Mean ± SD	7.5 ± 0.65
Congenital malformation	
-Ve	71 (100%)
+Ve	0 (0%)

dangers for these individuals, such as hospitalization and extensive surgery. While blood transfusion is less of a concern than it formerly was, it is nevertheless necessary to think about it carefully in a nation where the illness is so common.[7]

A second investigation was conducted in the obstetrics and gynaecology prenatal clinic at Cairo University's School of Medicine. Approximately 1250 women were solicited for participation in the research between December 2012 and May 2013. The recent research only found a 4.2% prevalence, hence this assertion is at odds with those findings.[3]

A total of 1135 pregnant women were surveyed in this cross-sectional prospective research from the Obstetrics and Gynecology Department at Al-Ahrar Teaching Hospital in Zagazig. Women who were between 28 and 42 weeks along in their pregnancies were allowed admission. The Rapid Test Technique was used to check for the presence of HCV + antibodies. Their greater prevalence than ours (7.7%) is consistent with the present study's findings.[8] This study confirms previous research showing an increased risk of HCV infection among pregnant women with a history of blood transfusions, prior HCV treatment, a history of HCV in their family, or a history of surgical procedures.[8]

The majority of patients in our research had a history of surgical operations, which is in line with the results of a study from Pakistan that identified a patient's surgical history to be the single most significant risk factor for the spread of H.C.V.[9]

Among the 48 HCV Abs + ve moms in our research, 67.6% had had at least one blood transfusion or blood product. Consistent with the findings of Baliashvil et al., the current study shows that a history of blood transfusion increases the risk of contracting HCV.[10]

This research found that there was a statistically significant correlation between the mode of delivery experienced before and HCV infection. Women who had undergone a caesarean section in the past were more likely to be HCV-positive, according to research by Arshad et al. Only 26 of the 52 infected women had a history of caesarean section, out of a total of 1250 pregnant women screened.[11]

In addition, cholestasis of pregnancy is more common in HCV antibody-positive women (20.33%) and manifests earlier in pregnancy as compared to HCV-negative women. This may be higher than reported in current research, which puts the prevalence of cholestasis at 6.3%.[12]

Premature membrane rupture is more common among the 506 pregnant women in the United States who were reported to have HCV infection.[13] However, our research shows that only 18.9% of patients had PROM.

Different findings had been found between our study and this study which was conducted by Safir et al., and involved 749 HCV seropositive women, found significantly higher rates of preterm delivery, premature rupture of membranes, placental abruption, low birth weight, low Apgar scores at 1 min, congenital malformations, and overall perinatal mortality compared to the general population. Our study, however, found no effect of HCV on infant weight or Apgar scores, no congenital fetal malformations, and only a small percentage (5.2%) of women developing preterm labor.[14]

Among the pregnant women in this research, there was no correlation between HCV and the baby's prognosis. When comparing the study group to the control group, Tagny et al. observed no statistically significant differences in birth weight, newborn jaundice, birth asphyxia, or small for gestational age.[15,16]

4.1. Conclusion

Out of one thousand blood samples drawn from pregnant women, only seven point one percent (7.1%) tested positive for HCV. Past surgery and blood transfusion were the most common associated risk factors, postpartum hemorrhage proved the most common complication associated with pregnancy, all the neonates whom mothers HCV-positive were normal.

Disclosure

The authors have no financial interest to declare in relation to the content of this article.

Authorship

All authors have a substantial contribution to the article.

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Conflicts of interest

The authors declared that there were NO conflicts of Interest.

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