

ORIGINAL ARTICLE

Screening Program for Hepatitis C Virus and Its' Risk Factors in Ismailia Governorate Egypt

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ABSTRACT

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Background: Hepatitis C virus is now recognized as a major world public health problem. Egypt has a very high prevalence of HCV and a high morbidity and mortality from chronic liver disease, cirrhosis, and hepatocellular carcinoma. **Objective:** Screening for HCV in Ismailia and identifying possible risk factors for its spread among infected patients in Ismailia governorate in Egypt. **Methodology:** A cross-sectional study was conducted for screening of HCV in three areas in Ismailia governorate, in the period from December 2016 till July 2018. On the basis of a specially designed protocol, standard commercially available tests and physical examinations were performed. Enzyme-linked immunosorbent assay and recombinant immunoblot assay anti HCV tests were performed for the screened persons. Risk factors were evaluated using special questionnaire administered by trained interviewers. Reported risk factors among infected subjects were compared to those subjects negative to HCV. Odds ratio based on multivariate logistic-regression model was used to identify risk factors. **Results:** A total of 1183 subjects were screened for HCV, of which 152 were HCV-positive and 88 of them (57.9%) were males. Mean age of the patients was 54.41 ± 12.21 years. HCV patients were more likely than controls to be illiterate, unemployed and of low economic status. Furthermore, it was more common among persons sharing razors or tooth brush with other family members. Multivariate analysis showed that HCV patients were more likely than controls receiving multiple injections for treatment of chronic diseases such as diabetes mellitus or chronic renal diseases (OR= 2.11, CI=1.42-3.02), or having history of schistosomiasis (OR=1.74, CI=1.29-2.35). Furthermore, patients who received blood transfusion are having high risk of HCV (OR=3.5, CI=2.30-5.34). Meanwhile HCV was more common among women having history of delivery, whether surgical intervention was done or not. **Conclusion:** Our data indicate that a history of blood transfusion, women having history of delivery, or persons that received multiple injections are at high risk for HCV infection in Ismailia governorate. Therefore, focusing on medical practices and infection control in health facilities is essential for HCV transmission prevention. Furthermore, improvements in certain lifestyle patterns and customs in this region are essential to limit transmission of the disease.

INTRODUCTION

Infection by Hepatitis C virus (HCV) is a worldwide major problem. From the years 1990 to 2005, the prevalence of anti HCV is increasing till reaching 2.8%¹. Egypt is one of the countries where HCV is of high prevalence with an increased risk of chronic liver disease, cirrhosis, and hepatocellular carcinoma (HCC). The widest distribution of HCV is contributed to the rural communities according to The Egyptian Demographic Health Survey (DHS) 2009 who estimated

that the overall prevalence of positive patients for antibody to HCV to be 14.7%,².

The most common Egyptian governorates with high prevalence of HCV are Beni Suef, Fayoum, Dakahlia,, Kafr el Sheikh, Menoufia, and Minia³. The methods of transmission was the anti-schistosomal therapy (PAT) ,the intravenous injection , the contaminated surgical or dental equipment, and the blood transfusions⁴.

Contrary to this historical view, several studies were conducted and revealed that there is no significant association between HCV prevalence and previous parenteral anti-schistosomal therapy. In Suez, despite

there was neither reported PAT exposures nor a history of PAT campaigns, HCV prevalence was nearly as high as the national HCV prevalence³. On the other hand, it was found that few data are available concerning the risk factors of HCV infection in the Suez Canal area in Egypt.

Also, the need of good program to eliminate the spread of the disease and to alleviate the suffering of the people is increasing. It is mandatory to know the way of HCV transmission in order to guide the screening procedures as well as the ways to combat and prevent the occurrence of the disease. Moreover, there is need to identify the risk factors of continued endemic transmission of HCV in Egypt.

This work studied the prevalence of HCV in Ismailia through screening program that started on the year 2016 after the national campaign to treat infected patients in the governorate. Also, it aimed to study the behavioral aspects and life style of HCV patients in Ismailia governorate compared to controls from the same region. It also aimed to study other risk factors related to medical care practices in the region.

METHODOLOGY

A cross-sectional study was conducted for screening of HCV in three areas in Ismailia Governorate, in the period from December 2016 till July 2018 at Clinical Pathology Department Suez Canal University Hospital ;Ismailia, Egypt. On the basis of a specially designed protocol, standard commercially available tests and physical examinations were performed. Enzyme-linked immunosorbent assay and recombinant immunoblot assay anti- HCV tests were performed for the screened persons (Organon/Teknica UB/HCV EIA).

Risk factors were evaluated using special questionnaire administered by trained interviewers. Reported risk factors among infected subjects were compared to those subjects negative to HCV. Odds ratio (OR) based on multivariate logistic-regression model was used to identify risk factors.

All screened subjects were evaluated using a face-to-face questionnaire about demographic and socioeconomic aspects, social behavior, parenteral exposure to blood or blood products, previous hospitalization and parenteral administration of drugs, surgery and personal history of chronic diseases. The control group consisted of HCV negative persons from the cross-sectional study.

None of the control group subjects were HBsAg positive or having signs or symptoms of viral hepatitis . We followed the methods of Kovacs et al⁵.

Ethical consideration:

Consent for an interview was taken from each participant, who was assured about the confidentiality of his/her information. The National and Institutional Ethics Review Committees approved the study protocol.

Statistical analysis:

Collected data were coded, analyzed and computed, using the Statistical Package for Social Sciences (SPSS) version 10 (SPSS Inc., Chicago, IL, USA). Simple statistics such as frequency, and standard deviation were used. Chi-square and Student's t-tests were used for comparison. We conducted a multivariate logistic regression analysis to identify factors associated with HCV infection.

RESULTS

A total of 1183 subjects were screened for HCV, of which 152 were HCV-positive (12.85%) (table 1), and 88 of them (57.9%) were males. Mean age of the patients was 54.41 ± 12.21 years. Demographic factors significantly affected the risk of HCV transmission; as we found that illiteracy, unemployment, and low economic status increased the HCV risk more than 3 folds. Furthermore, HCV risk was more common among persons sharing razors or tooth brush with other family members, while shaving at a barber didn't increase the risk of HCV infection. (table 2)

Table 1: Frequencies of HCV in the screened areas:

Study Area	Number Screened Persons	HCV Positive Cases	Percentage (%)
Kilo-2 area in Ismailia	467	65	13.9%
Kantara Shark villages (Eleboor, Elamal, Elsalam)	439	61	13.9%
Elmostakbal city	277	26	9.4%
Total	1183	152	12.85%

Table 2: Demographic and behavioral risk factors associated with HCV transmission

Variable	OR	95% CI	P value
Illiteracy	3.20	2.12-4.55	*0.000
Unemployment	3.11	2.21-4.22	0.000
Low economic status (<600 LE/mo.)	3.54	2.33-4.56	0.000
Shaving at barber	0.87	0.72-1.04	0.129
Sharing razors	2.71	1.52-4.84	0.001
Sharing tooth brush	2.77	1.12-3.65	0.000

P value<0.05 significant

*P value 0.000 highly statistically significant

Multivariate analysis showed that HCV patients were more likely than controls receiving multiple injections for treatment of chronic diseases such as diabetes mellitus or chronic renal diseases. HCV was slightly more common among persons having history of Schistosomiasis infection (OR=1.74, CI=1.29-2.35). While receiving blood transfusion increased the risk of

HCV more than 3 folds (OR=3.50, CI=2.30-5.34). Meanwhile HCV risk was more common among women having history of delivery. While admission to hospitals, and having surgical procedures didn't increase the risk of HCV. Furthermore, dental care did not increase the risk of HCV infection (table 3)

Table 3: Health care risk factors associated with HCV infection

Variable	OR	95% CI	P value
Hospital and clinic exposures			
i. Admission to hospital	1.03	0.77-1.36	0.061
ii. Major surgical procedures	1.09	0.82-1.44	0.556
iii. Blood transfusion	3.50	2.30-5.34	*0.000
Obstetric exposures (women)			
i. Any delivery	2.21	1.25-4.42	0.031
ii. Surgical delivery (CS or episiotomy)	2.50	1.42-3.98	0.001
Dental treatment	1.33	0.90-2.00	0.072
Chronic medical diseases			
i. History of Schistosomiasis	1.74	1.29- 2.35	0.040
ii. Receiving frequent injections for chronic diseases	2.11	1.42-3.02	0.002

P value<0.05 significant

*P value 0.000 highly statistically significant

DISCUSSION

HCV infection is an escalating worldwide problem with major long term complications such as like cirrhosis and HCC⁶. Route of transmission varies between developed and developing countries. After the World War II and up until 1980s, the most common way of transmission in the developing countries was the contaminated injections and unsafe blood transmission⁷.

In order to eliminate such risk factor, the routine screening of HCV in the donated blood rise up leaving the illicit use of injectable drugs the most common route of transmission⁸. For the e developing countries, the view was completely different as the route of transmission was due to the usage of unsterile medical equipment's⁹⁻¹¹.

Illiteracy, unemployment, and low economic status increased the risk more than 3 folds in our patients¹². Several researches reported that there is strong relationship between the level of education and the spread of the infection as HCV is very common among low educated patients as they tend to share their personal tools¹³. Sharing tools is one of the most risk factor of HCV transmission^{11, 13}. It increased the risk in more than 2 folds. In our study, sharing razors and tooth brushes, shaving at a barber was not a significant predictor of HCV infection.

Eassa and his colleagues¹³ found that barber shaving is considered a risk factor while the other researches didn't¹¹. Our results revealed that major surgical procedures didn't significantly increase the risk of

HCV, but risk increased more than 3 folds after blood transfusion. As mentioned before, the unsafe blood transfusion is a current risk factor among the developing countries. Interestingly, when the donor anti HCV screening started in blood banks Egypt in 1991, blood transfusion was not a risk of HCV infection and this is was very obvious when Upper Egypt and The Nile Delta were compared, as blood transfusion was not a risk of HCV infection¹⁴.

Several invasive procedures were in good correlation with HCV transmission even in the developed countries¹⁵⁻¹⁷. Our finding went with what repeatedly found by other studies regarding the parenteral anti -Schistosomiasis therapy risk of causing HCV infection¹⁸⁻²³ as we found that history of schistosomiasis increased HCV risk by less than 2 folds. In our study ,there is a significant relationship between the delivery whether surgical or not and HCV infection risk by more than 2 folds, while other studies found that it is was a significant factor^{11, 13}.

In Ismailia governorate, dental care was not considered as a significant risk of HCV transmission. This is the same in Upper Egypt and Zagazig governorates as it wasn't a risk factor of HCV transmission^{11, 13}. While in Alexandria, the view was completely different as dental care was identified risky²⁴. Among our study population, diabetics receiving frequent injections or having history of kidney disease were at increased risk of HCV due to the increase exposure of HCV infection through needles.

CONCLUSION

HCV screening study showed that the prevalence of HCV in Ismailia governorate is high among those seeking care in the Primary Health Care (PHC) Centers. Therefore, there is need for community-based screening program for HCV to confirm these results. Furthermore, our study results confirmed that health care exposure was the most important risk factor of the ongoing HCV transmission, probably due to the lack of decontamination techniques before minor and some major procedures. Therefore, focusing on medical practices and infection control (IC) in health facilities is essential for HCV transmission prevention in our region. Furthermore, improvements in certain lifestyle patterns and customs in this region are essential to limit transmission of the disease. Therefore, there is need to conduct educational program to improve knowledge and practices of the community members to prevent spread of the infection.

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Conflicts of interest:

- The authors declare that they have no financial or non financial conflicts of interest related to the work done in the manuscript.
- Each author listed in the manuscript had seen and approved the submission of this version of the manuscript and takes full responsibility for it.
- This article had not been published anywhere and is not currently under consideration by another journal or a publisher.

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Data Availability: We confirm that data is available

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