

Household Contacts of HCV Patients at Beltag Village, Egypt; Seropositivity and Habits

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Received: December 30, 2015 Revised: March 1, 2016

Accepted: March 3, 2016

Published online: April 21, 2016

ABSTRACT

BACKGROUND: Hepatitis C virus (HCV) is a major cause of chronic hepatitis and is considered as a worldwide problem. Egypt has the highest HCV prevalence in the world. The Centers for Disease Control and Prevention (CDC) recommend HCV screening for all adults at high risk of infection.

AIM: To determine the prevalence of HCV seropositivity among household contacts of HCV positive patients and study their habits.

METHODS: A cross sectional study was conducted in Beltag; a rural village affiliated to Nile Delta. Interviewed questionnaire was used including sociodemographic data and HCV risk factors information. All household contacts were assessed for HCV infection by testing for anti-HCV antibody using a commercial ELISA.

RESULTS: 102 of HCV hepatitis patients and 360 of their household contacts were included in the study. The prevalence of HCV seropositivity among household contacts was 35%. 78 (61.9%) of seropositive contacts were over forty years old, 42 (33.3%) received parenteral anti-schistosomal therapy, 72 (57.1%) helped family HCV patients during bleeding episodes. Logistical regression showed that the most significant variable associated independently to HCV seropositivity in patients' contacts was helping HCV patients during bleeding episodes (OR = 7.262; 95% CI: 3.588– 14.698, $p = 0.000$).

CONCLUSION: This study approximates the findings of other studies which reported a high prevalence seropositivity among HCV patient's contacts. Helping HCV patients during bleeding episodes is the most significant risk factor for intrafamilial HCV transmission.

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Key Words: HCV Patients; Seropositivity; Household Contacts

Goweda RA, Rady AS. Household Contacts of HCV Patients at Beltag Village, Egypt; Seropositivity and Habits. *Journal of Gastroenterology and Hepatology Research* 2016; 5(2): 2005-2009 Available from: URL: <http://www.ghrnet.org/index.php/joghr/article/view/1549>

INTRODUCTION

Hepatitis C virus (HCV) infection is a main cause of chronic disease of the liver and cirrhosis. There are at least 185 million personnel worldwide with the infection, causing 350,000 deaths yearly^[1].

The most recent global estimates indicate that the prevalence of HCV infection is <2% in many developed countries, including the United States^[2].

In Egypt, just about every family in Egypt is touched by hepatitis C. The bloodborne virus, which is highly infectious, kills an estimated 40 000 Egyptians a year and at least 1 in 10 of the population aged 15 to 59 is infected^[3]. In 1992, when HCV antibody testing became widely available, the prevalence of HCV in Egypt was 10.8% among first-time blood donors^[4].

HCV is considered the greatest significant community health problem in Egypt. For more than a decade, Egypt has been widely regarded as having an epidemic, with the highest recorded prevalence of HCV worldwide^[5].

The Egyptian Demographic Health Survey (EDHS) by a cross sectional survey including hepatitis C virus (HCV) biomarkers, was

conducted in 2008 on a large nationally representative sample. It estimated HCV prevalence among the 15–59 years age group to be 14.7%^[6].

Chronic HCV infection leads to decreased efficiency, increased health care budgets, and loss days of work^[7].

The U.S. Preventive Services Task Force and the Centers for Disease Control and Prevention recommend periodic HCV screening for all adults at high risk of infection and one-time screening in adults born between 1945 and 1965^[8].

An anti-HCV antibody test is recommended to screen for HCV infection (sensitivity of 95%, specificity of 99%, positive likelihood ratio of 95, and negative likelihood ratio of 0.05)^[9].

However, the contribution of vertical transmission to HCV incidence and its public health consequences remain unknown^[10]. In the developed countries the primary route of transmission is intravenous drug use (IDU), while in the developing countries the main routes are blood transfusions and hazardous medical procedures^[11]. Tattooing is associated with two to threefold increased risk of hepatitis C and it is estimated that nearly half of prison inmates share unsterilized tattooing equipment^[12]. The cause of transmission remains unknown in 20% of cases. Sexual transmission of hepatitis C is controversial^[13].

Personal-care items such as toothbrushes, razors, and manicuring or pedicuring equipment can be contaminated with blood. Sharing such items can potentially lead to exposure to HCV^[14]. HCV is not spread through casual contact, such as hugging, kissing, or sharing eating or cooking utensils^[15]. The hepatitis C virus' household contacts have been shown to have an elevated risk of HCV infection more than others^[16].

All patients with HCV infection should be considered for management based on extent of fibrosis or cirrhosis genotype, comorbidities, prior treatment, and adverse effects. The aim of therapy is to decrease all-cause mortality and liver associated complications^[17].

METHODS

The aim of this study to determine the prevalence of HCV seropositivity among household contacts of HCV positive patients and study their habits.

This was a cross sectional study was carried on the period between June to October 2015 in Beltag, a rural village affiliated to Gharbiah governorate in the Nile delta, 110 km north of Cairo and 25 km from Tanta. Out of eight districts affiliated to Gharbya Governorate, Kotor district was randomly selected and out of 30 villages affiliated to Kotor, Beltage village was randomly selected. Most of the estimated 14,000 residents of Beltag work in agriculture. The village is characterized by irrigated farmland and canals.

After discovery of new medical regimens against HCV, most of Beltag's citizens were eager to screen for HCV infection due to the availability of the drugs. The study was performed on a sample of 102 known HCV cases (the index cases) and their 360 household family contacts.

It is known in this rural area that most of the patients have a copy of their medical files on their home. Initially questionnaire-based screening for index cases was done. Only index cases with known positive PCR for HCV were included, with exclusion of HCV seropositive patients without known PCR results as well as those who don't have their files. According to the files' information; index cases were classified as either without or with chronic liver disease (Findings on physical examination include a contracted, nodular liver; sple-

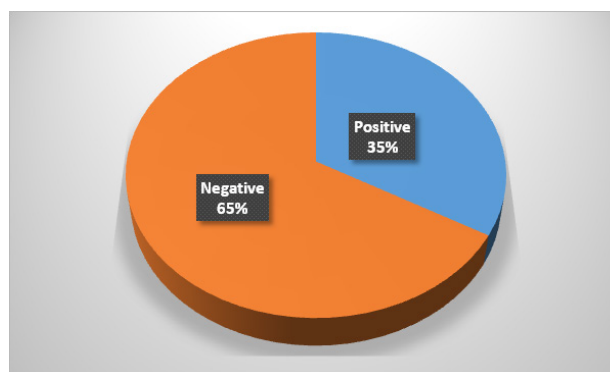


Figure 1: Percentage of HCV seropositivity among familial contacts of HCV positive patients.

Table 1 Sociodemographic characteristics of HCV patient and their contacts.

Index cases characteristics		No.	%
Gender	Male	60	58.8
	Female	42	41.2
Age	20-40	13	12.7
	>40	89	87.3
Chronic liver disease	Yes	71	69.6
	No	31	30.3
History of hematemesis	Yes	36	35.2
	No	66	64.8
Household contact's characteristics		NO.	%
Gender	Male	192	53.3
	Female	168	46.7
Age	3-18	120	33.3
	19-40	102	28.3
	>40	138	38.4
Occupation	Employee	30	8.2
	Farmer	78	21.7
	Housewife	60	16.7
	Handworker	24	6.7
	Out of work and students	168	46.7
Education level	High (University)	30	8.3
	Secondary	114	31.7
	Studying	90	25
	Read and write	30	8.3
	Illiterates	78	21.7
	Preschool	18	5

nomegaly; ascites; dilated abdominal wall veins; spider angiomata; palmar erythema; peripheral edema; and asterixis).

Written informed consent to participate in the study was obtained from the heads of the 102 selected households as well as verbal and written consent was taken from all household members older than three years of age, contact to index cases. Of 392 household contacts of index cases, 360 agreed to participate in this study. Exclusion of children younger than three years old was due to refuse of the parents to test for their young children at this age.

The baseline questionnaire solicited sociodemographic information and information about medical and behavioral risk factors for liver disease. The structured interview consisted of sociodemographic information (age, gender, education and occupation); participants were asked about history of surgical operations, dental and other possible risky procedures, blood transfusions, hemodialysis, skin tattoos and piercing, IV drug use, parenteral anti-schistosomal therapy, as well as assisting index cases during bleeding attacks. Participants were asked whether they shared with the index cases in the use of personal hygienic items such as combs, nail cutters, or towels. Pilot study was done before starting to ensure the validity, standardization and highlight problems associated with the data collection. All household

contacts were assessed for HCV infection by testing for anti-HCV antibody using a commercial ELISA.

Data was analyzed using IBM advanced SPSS statistical package version 20. Chi-square test (Fisher's exact test) was used to examine the relation between qualitative variables. Multivariate analysis was done to determine which of the characteristics were independently associated with HCV infection. P- value less than 0.05 was considered significant.

RESULTS

Of the 360 household contacts which agreed to participate in this study, 126 of them (35%) tested positive for anti-HCV (Figure 1). Of the 102 index cases 58.8% were male, 87.3% were older than forty years of age, 69.6% had chronic liver disease, and 35.2% had attacks of hematemesis. The 360 household contacts consisted of 192 males and 168 females, with a mean age of 32 ± 18 years; 38.4% were older than forty (Table 1).

A statistically significant difference was found in prevalence of anti-HCV antibody between different age groups, with the age group ≥ 40 years showing the highest prevalence of 39 (65.0%) among seropositives. When the relationship between HCV status and history of operations, blood transfusion, parenteral anti-bilharzial, dental procedures, barber's instruments, assisting familial HCV patients during bleeding episodes, or sharing the same comb of familial HCV patients were studied, findings were significant. In contrast, no significance was detected in contacts' HCV status and sharing use of the same towels and nail cutters of index cases (Table 2).

Among the risk factors that were analyzed with multivariate analysis, those significantly associated with HCV positivity in household contacts were being assistants of familial HCV patients during bleeding episodes and educational level (Table 3). In the participants of this study no one has tattooing or IV drug user and most of them don't use toothbrush.

DISCUSSION

In Egypt, the prevalence of HCV infection among adults averages 15% - 25% in rural communities, which is considered the highest prevalence in the world^[18].

In the present study the prevalence of HCV seropositivity in household contacts was 35%, which approximates the findings of a study conducted in Kalama, a village in the Nile Delta of Egypt, which reported a HCV prevalence of 40% among village residents^[19]. Consistently, many HCV studies conducted among different general population subgroups report a very high HCV prevalence^[20].

Our prevalence is found to be higher than some others, for example the studies done by Mahmoud *et al*, Tibbs *et al*, La Torre *et al* and Sood *et al*, where the prevalence was 13.7%, 16%, 8.9% and 16%, respectively^[21-24]. This noted difference may be attributed to the non-similar cultures and behavioral patterns of the studied populations, as well as from translocation from rural to urban areas.

Regarding the age of this study's participants, the prevalence within seropositive cases was 4.8% in ages 0-18, 33.3% in ages 19-40 and 61.9% among those older than 40 years. This is in agreement with a study conducted in 1997, among 3,993 residents of a village in the Nile Delta region, which reported prevalence rates of 7-9.9%, 27.6% and 56.7% among ages 0-19, 20-39 years and greater than 40 years, respectively^[25]. Additionally, the findings coincide with a study done by Mahmoud *et al* which reported a prevalence of anti-HCV Ab positivity of 44.45% among subjects aged 40 years or

Table 2 Relation between HCV seropositivity status and risk factors.

Variables	Contacts		P value	
	Positive HCV No. (%)	Negative HCV No. (%)		
Gender	Male	78(61.9%)	114(48.7%)	0.017
	Female	48(38.1%)	120(51.3%)	
Age (Years)	3-18	6(4.8%)	114(48.8%)	0.000
	19-40	42(33.3%)	60(25.6%)	
	>40	78(61.9%)	60(25.6%)	
History of operations	Yes	24(19.0%)	18(7.7%)	0.001
	No	102(81.0%)	216(92.3%)	
Blood transfusion	Yes	6(4.8%)	0(0.0%)	0.002
	No	120(95.2%)	234(100.0%)	
Parenteral anti-schistosomal therapy	Yes	42(33.3%)	6(2.6%)	0.000
	No	84(66.7%)	228(97.4%)	
History of dental procedure	Yes	84(66.7%)	54(23.1%)	0.000
	No	42(33.3%)	180(76.9%)	
Use barber's instrument (males only)	Yes	80(93.0%)	91(85.8%)	0.113
	No	6(7.0%)	15(14.2%)	
Use the same towels of index cases	Yes	72(57.1%)	126(53.8%)	0.549
	No	54(42.9%)	108(46.2%)	
Help index cases during bleeding episodes	Yes	72(57.1%)	24(10.3%)	0.000
	No	48(42.9%)	216(89.7%)	
Use the same comb of index cases	Yes	114(90.5%)	102(43.6%)	0.000
	No	6(9.5%)	138(56.4%)	
Use the same nail cutter of index cases	Yes	72(57.1%)	150(64.1%)	0.195
	No	48(42.9%)	90(35.9%)	

Table 3 Results of the logistic regression analysis.

	OR	95% C.I	p
Occupation	2.068	1.357 3.151	0.001
Educational level	2.026	1.498 2.739	0.000
Blood transfusion			0.999
Parenteral anti-schistosomal	6.664	2.287 19.418	0.001
Help index cases during bleeding episodes	7.262	3.588 14.698	0.000
Use the same comb of familial HCV patients	3.303	1.366 7.989	0.008

older^[21]. Similarly, other studies found that anti-HCV Ab positivity increased with the length of the household contact relationship^[26,27].

Arafa *et al* stated that the prevalence of HCV antibodies in rural area of Egypt increased from 2.7% in those less than 20 years of age to more than 40% in males whose age ranged from 40 - 54 years^[28]. The higher prevalence among older contacts may be due to the duration of the relationship with index cases.

The low prevalence of seropositivity in children and those of younger age groups is in agreement with studies conducted among rural school children, which reported an average prevalence of about 7%^[29] and with study done by Khalifa *et al* who reported that the average prevalence in children attending outpatient clinics was found to be approximately 4%^[30].

In disagreement with the current study, and most other Egyptian studies, regarding the higher prevalence of HCV among older contacts, a Brazilian study concluded that the risk of transmission of HCV did not increase with long periods of living together and of sharing of personal items^[31].

Furthermore, we note there is a highly significant association between HCV seropositivity and caring for the index cases during acute bleeding attacks, similar with dental care by professional dentists. Mahmoud *et al* describe living and caring for index cases with histories of haematemesis was considered a significant risk factor for household contacts of acquiring HCV infection^[21].

In our study 61.9% of seropositive cases were males, consistent with the study done by Arafa *et al* who reported that residents were shown to have a higher prevalence among males compared to females^[28].

An unfortunate historical trend has been acquiring HCV infections

through either sharing invasive medical instruments or through personal hygienic items. 33.3% of seropositive cases in the present study received parenteral anti-schistosomal therapy in the past. A recent study by Sabah *et al* reported a prevalence of 84.0% among schistosomiasis patients treated with parenteral anti-schistosomal therapy 20 to 30 years ago^[32]. Among seropositive cases in the present study, 90.5% used the same hair-comb as index cases, consistent with Cavalheiro *et al* who reported marriage risks did not only include sexual relationships but additionally other kinds of bodily contact and exposure (i.e. sharing the same personal tools such as combs, toothbrushes, or exposure to blood of the index case by any other means)^[33]. Lastly, 93.0% of anti-HCV positive male contacts reported the use of barber's instruments which was quite similar to 85.8% of anti-HCV negative household contacts, with no statistical difference. Additionally there was significant difference between educational level regarding HCV seropositivity status with low incidence of high educational level.

CONCLUSION

There is a high prevalence of HCV seropositivity which appears to significantly increase with age, with the highest rates detected among populations aged more than 40 years. Anti-HCV positive household contacts were seen to adopt more risky habits than anti-HCV negative household contacts. The predominant risk factor discovered was aiding index cases during bleeding episodes.

RECOMMENDATIONS

All seropositive cases should undergo quantitative PCR for HCV. Further studies are needed to study HCV prevalence over time among both the general and high risk populations.

Health education programs regarding modes of transmission, especially how to safely aid index cases during bleeding attacks, should be conducted.

ACKNOWLEDGEMENTS

Dr. Abdurahman Hassan-Hussein, MD, AAFP, of the Department of Community Medicine and Public Health, Faculty of Medicine, Umm Al-Qura University, Makkah, Saudi Arabia.

LIMITATION OF THE STUDY

Given the cross-sectional nature of this study the authors cannot determine that the index cases were definitely the source of infection.

CONFLICT OF INTERESTS

The authors declare that they do not have conflict of interests.

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