The Egyptian Journal of Hospital Medicine (April 2025) Vol. 99, Page 1402-1407

Insights into Hepatitis C Awareness and Knowledge in Egypt

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ABSTRACT

Background: Hepatitis C virus (HCV) is a major public health challenge globally, with Egypt bearing a disproportionate burden.

Objective: This study aimed to assess HCV awareness and knowledge among Egyptian adults and identify associated factors.

Patients and methods: This cross-sectional study was conducted using an online, self-administered questionnaire distributed via social media including a total of 534 respondents. The instrument, developed through literature review and expert consultation, evaluated participants' sociodemographic characteristics and knowledge of HCV features and transmission modes.

Results: About half (49%) of participants demonstrated good HCV knowledge (≥75% score). While, 91.2% correctly recognized blood borne transmission, just 29.6% identified sexual transmission. Misconceptions were prevalent, with 54.8% erroneously believing that HCV is bacterial and that vaccination could prevent the infection. Multivariate regression analysis revealed that younger age (OR = 5.79, $p < 0.001$), higher education (OR = 8.81, $p = 0.045$), and participation in the screening campaign (OR = 1.69, $p = 0.007$) were significant predictors of better knowledge.

Conclusion: Significant knowledge gaps and misconceptions about HCV persist among Egyptian adults. Enhancing public health education—particularly through digital platforms—is essential to improve awareness and support ongoing efforts to sustain HCV elimination.

Keywords: Hepatitis C Virus, Awareness, Knowledge, Egypt.

INTRODUCTION

Hepatitis C virus (HCV) infection is a significant global health challenge, affecting more than 70 million individuals worldwide with chronic infection, resulting in approximately 1.75 million new cases annually and contributing to over 340,000 deaths each year [1].

The most recent Egypt Health Issues Survey (EHIS) conducted in 2015 indicates that the national prevalence of HCV among individuals aged 1 to 59 years is 4.4%. This prevalence is markedly elevated in adults over the age of 40, as well as among individuals with lower socioeconomic status and those residing in rural regions [2].

The economic burden of HCV in Egypt exceeds $400 million each year, with total expenditures anticipated to reach $4 billion by 2030. In 2015, the United Nations General Assembly adopted the Sustainable Development Goals (SDGs), which encompass efforts to combat viral hepatitis [3]. In May 2016, the World Health Assembly established targets for the eradication of viral hepatitis, aiming for 90% diagnosis, 80% treatment coverage, and a 65% reduction in mortality related to the disease by 2030. The Egyptian government has made significant strides in controlling HCV as a public health threat, showing a strong potential to eliminate the disease by the 2030 target date [4].

Starting in October 2018, the Egyptian Ministry of Health and Population (MoHP) launched the "100 Million Healthy Lives Initiative," which focused on a nationwide campaign for the screening and testing of Hepatitis C (HCV) and non-communicable diseases (NCDs). This initiative aimed to identify and treat individuals affected by HCV and to promote overall health awareness and prevention strategies across the population. It represents a significant effort in Egypt's journey toward controlling and potentially eliminating hepatitis C as a public health issue [5].

All adult Egyptian citizens were targeted for screening. This campaign succeeded in screening more than 48 million citizens. Egypt will be closer to eliminating HCV by implementing cost-effective strategies that go beyond raising awareness, addressing perceived risks, and fostering motivation for change at an acceptable level. These efforts should also focus on encouraging the adoption of risk-reduction behaviors, dispelling misconceptions, and strengthening social support systems [6].

Therefore, in this context, it is essential to assess the population's knowledge and awareness of the disease to identify potential gaps that must be addressed, ultimately strengthening the elimination strategy. So, this study aimed to assess the knowledge regarding HCV characteristics, mode of transmission and its associated factors.

PATIENTS AND METHODS

Study design and participants: This cross-sectional study was designed to assess the level of awareness and knowledge regarding HCV including 534 Egyptian citizens. An online, self-administered questionnaire—developed through an extensive literature review and expert consultations—was used to collect data on sociodemographic characteristics and HCV-specific knowledge, including its features and modes of transmission. Distributed via social media platforms, the survey targeted all adult Egyptian citizens.

Inclusion Criteria: Individuals aged above 18 years of both sexes, accepted to participate and complete the questionnaire, with internet access, and able to read.

Exclusion criteria: Refusal to participate and workers at health care sector.

Interventions:

A structured questionnaire developed by the researchers (After intensive literature review and expert's consultation) was used. This self-administered questionnaire had 2 parts: The first included participants' data (Age, sex, education, working status, participation in the National Hepatitis C and Non-Communicable Disease Screening Initiative launched in 2018, having liver disease and source/sources of medical information). The second included questions to evaluate participants' information about HCV characteristics and mode of transmission. The questions were formatted as close ended with yes, no, and do not know options.

The questions were coded so that true answers are scored 1, while wrong answers or answers with "I do not know" are scored 0. The total raw score, assuming all answers are correct, is 20. The percentage score is calculated by dividing the raw score by 20 (The maximum possible score) and then multiplying the result by 100. We adopted questions used in this section from the literature [7-9]. Sources of knowledge about HCV included family, friends, radio and television, social media and others, including newspapers and mobile applications. We considered participants with 75% as knowledgeable, which was a modification of Bloom's cutoff point [10]. Participants' consent was implied through their completion of the questionnaire.

The entire questionnaire was in Arabic and was initially tested in a pilot study with 20 participants to assess its clarity, time requirements, and potential difficulties. Based on the findings, necessary modifications were made. The questionnaire was then distributed online via social media platforms. Its reliability was evaluated using Cronbach's alpha, resulting in a coefficient of 0.802.

Sample size: Regarding **Anwar *et al.*, [11]** a minimum sample size of 470 participants were needed to provide 95% confidence level for a single proportion and with 5% margin of Error. This sample was increased by 10% to account for expected non-responses, so the total sample needed was 517 participants. Sample size calculation was done using Epi Info 7 program.

Ethical considerations: The study was done after being accepted by The Institutional Review Board, National Cancer Institute, Cairo University. Data collection and presentation were anonymous and both privacy and confidentiality were protected to the maximum possibility. The study adhered to the ethical guidelines established in the Declaration of Helsinki by the World Medical Association for human research.

Data Management: Data management and analysis were conducted using the Statistical Package for Social Sciences (SPSS) version 23. Numerical data were summarized using means ± standard deviations. Categorical data were presented as frequencies and percentages. Comparison between knowledge levels and age was done using independent sample t test, while comparison between knowledge levels and categorical variables were performed using the Chi-square or Fisher's exact test, as appropriate. Multivariate regression analysis was done to identify predictors of good knowledge level. All tests were two-sided, with a significance threshold set at $P < 0.05$.

RESULTS

Out of 600 distributed forms, 534 participants responded (response rate = 89.0%). Their mean age was 33.24 ± 9.31 years. Males predominated this study (61.2%). About 93% had university education or higher. About 70% were working. More than half of them (52.6%) attended the nationwide campaign for screening and testing of HCV. About 1% of them were HCV positive, about 4% were hypertensive and 2% were diabetic. About 1/3 (32.4%) had positive family history of liver disease (Table 1).

Table (1): Demographic characteristics of the participant

Variables		N	%
Age/ years (Mean ± SD)		33.24 ± 9.31	
Sex	Male	327	61.2
	Female	207	38.8
Education	Read and write	10	1.9
	Secondary or technical	29	5.4
	University or high	495	92.7
Working Status	No	161	30.1
	Yes	373	69.9
Attend HCV campaign	No	253	47.4
	yes	281	52.6
HCV positive	No	529	99.1
	Yes	5	0.9
HTN	No	512	95.9
	Yes	22	4.1
DM	No	522	97.8
	Yes	12	2.2
Family History of Liver disease	No	361	67.6
	Yes	173	32.4

HTN: Hypertension, **DM:** Diabetes Mellitus, **HCV:** Hepatitis C virus.

Concerning the frequency and percentage of correct answers regarding 7 questions evaluating

knowledge about HCV features, less than half of the study participants correctly identified that HCV was not a bacterial infection and about 78% correctly identified that it is a viral infection.

About 83%, 86% and 78% of them correctly detected that HCV infection can lead to chronic liver disease, liver failure and increase risk of developing hepatocellular carcinoma (HCC). About 37% knew that HCV is not a familial disease and less than half (45.2%) correctly answered that HCV infection cannot be prevented by vaccine (Table 2).

Table (2): HCV characteristics knowledge-related questions

Variables	N (%) of correct answers
HCV is Bacterial infection?	230 (45.2)
HCV is viral infection?	408 (78.2)
HCV may lead to Chronic liver disease?	432 (82.6)
HCV may lead to liver failure?	445 (85.6)
HCV may lead to increased risk of HCC?	406 (78.1)
HCV is familial disease?	194 (37.4)
HCV can be prevented by vaccination?	236 (45.2)

Thirteen questions were used to evaluate knowledge regarding HCV transmission modes among study participants.

Only 29.6% correctly answered that HCV can be transmitted through sexual relationship with HCV infected person. About 83%, 91%, 41% and 82% correctly identified that HCV can be transmitted through: Direct contact with blood or open wound of infected person, handling or touching sharp objects contaminated with HCV infected blood, childbirth of HCV infected woman and toothbrush or blades of infected person.

More than half (50.5%) correctly answered that HCV cannot be transmitted through breastfeeding of an infected mother. The total score of each participant was calculated. About 49% achieved ≥ 75% of the total score and were considered knowledgeable (having a good level of knowledge regarding HCV infection (Table 3).

Table (3): HCV transmission knowledge-related questions and total knowledge score

Variables	Number (%) of correct answer
Do you think that the HCV can spread through touching infected person?	386 (75.4)
Do you think that the HCV can spread through air from infected person?	306 (59.3)
Do you think that the HCV can spread through sexual intercourse with the person who has the hepatitis c virus?	153(29.6)
Do you think that the hepatitis C virus can spread through direct contact with blood or open wound?	437 (83.4)
Do you think that the HCV can spread by handling or touching a needle or sharp object that contains blood infected with the hepatitis C virus, for example, razors, blades?	475 (91.2)
Do you think that HCV can spread by mouth through infected water or food?	179 (34.9)
Do you think that the HCV can spread through childbirth to a woman with viral hepatitis during childbirth?	211 (41.1)
Do you think that HCV can spread using the toothbrush or blades of an infected person?	426 (81.5)
Do you think that HCV can spread after a long period or renal dialysis?	233 (44.7)
Do you think that HCV can spread through insect bites?	180 (34.8)
Do you think that HCV can spread by sharing food with an infected person?	214 (41.3)
Do you think that HCV can spread through cough and sneezing?	287 (55.7)
Do you think that HCV can spread through breast-feeding to the baby of an infected mother?	259 (50.5)
Overall knowledge score:	
Poor	274 (51.3)
Good	260 (48.7)

Regarding the relationships between participants' knowledge level and their different characteristics, knowledgeable participants were significantly younger than those with poor knowledge ($p < 0.001$). About 54% of participating males had good level of knowledge about HCV compared to 40.6% of females ($p = 0.003$). More than half of those who had university or higher education (51.7%) had good level of knowledge ($p < 0.001$). Also, more than half of working participants (52.8%) had good knowledge level ($p = 0.005$). About 53% of those who attended HCV campaign had good knowledge level ($p = 0.024$) (Table 4).

Table (4): Relationship between knowledge level about HCV infection, sociodemographic characteristics and health perception of participants (n = 534)

Variables	Awareness	P value

		Poor		Good		
		N=274	%	N=260	%	
Age /years (Mean ± SD)		35.52 +10.06		30.88+7.80		**<0.001***
Sex	Male	151	46.2	176	53.8	**0.003***
	Female	123	59.4	84	40.6	
Education	Read and write	9	90.0	1	10.0	**<0.001***
	Secondary or technical	26	89.7	3	10.3	
	University or high	239	48.3	256	51.7	
Working Status	No	98	60.9	63	39.1	**0.005***
	Yes	176	47.2	197	52.8	
Attend HCV campaign	No	143	54.6	110	43.5	**0.024***
	yes	131	48.2	150	53.4	
HCV positive	No	270	51.0	259	49.0	0.374
	Yes	4	80.0	1	20.0	
HTN	No	256	50.0	256	50.0	**0.004***
	Yes	18	81.8	4	18.2	
DM	No	265	50.8	257	49.2	0.143
	Yes	9	75.0	3	25.0	
Family history of Liver disease	No	176	48.8	185	51.2	0.096
	Yes	98	56.6	75	43.4	

SD: standard deviation, **HTN:** Hypertension, **DM:** Diabetes Mellitus, **HCV:** Hepatitis C virus. * p ≤0.05 is statistically significant.

Multivariate regression analysis was conducted to predict good knowledge level. Predictors were younger age (B = 1.756, p < 0.001), university or higher educational level (B = 2.175, p = 0.045) and attending HCV campaign (B = 2.574, p = 0.007) (Table 5).

Table (5): Multivariate analysis to predict high-level knowledge

		B(SE)	P value	OR (95%CI)
Age	<40	1.756(0.287)	<0.001	5.790 (3.305-10.143)
	>=40	-		Reference
Sex	Male	0.364(0.247)	0.139	1.440 (0.888-2.334)
	Female	-		Reference
Education	Read and write	-		Reference
	Secondary or technical	0.159(1.247)	0.898	1.173 (0.102-13.508)
	University or high	2.175(1.085)	0.045	8.805 (1.049-73.890)
Working Status	No	-		Reference
	Yes	0.393(0.264)	0.138	1.481 (0.882-2.486)
Attend HCV campaign	No	-		Reference
	Yes	2.574(1.091)	0.007	1.695 (1.158-2.480)

B=Regression coefficients, SE=Standard error of the coefficient, OR=Odds Ratio, 95% CI = 95% confidence interval. A P value ≤0.05 is statistically significant.

About 59% of our study participants obtained their knowledge about HCV from scientific websites followed by social media (55.2%) (Figure 1).

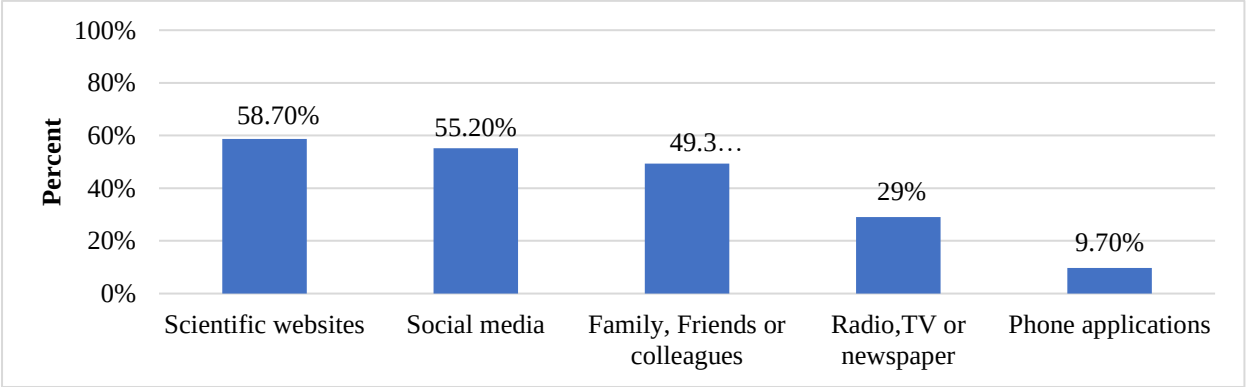

Figure (1): Percent distribution of the enrolled participants by source of knowledge.

DISCUSSION

HCV remains a critical public health challenge in Egypt, with significant gaps in awareness and persistent misconceptions about its transmission and prevention. In our study, only 49% of participants had good HCV knowledge, with major misconceptions

about its bacterial nature (54.8% confusion) and vaccine prevention (54.8% incorrect responses). While, 91.2% recognized bloodborne transmission, only 29.6% knew about sexual transmission, and 34.9% incorrectly believed in foodborne transmission. Younger age, male gender, higher education, and employment were linked to better knowledge. Participation in the HCV screening campaign significantly improved awareness ($p = 0.024$). Scientific websites (59%) and social media (55.2%) were the main sources of information, with limited reliance on traditional media. Finally, multivariate regression analysis indicated younger age (OR = 5.79, $p< 0.001$), higher education (OR = 8.8, $p = 0.045$), and screening campaign participation (OR = 1.69, $p = 0.007$) as significant predictors of knowledge.

In accordance, **Anwar *et al.*** [11] found that approximately half of the study participants (47.5%) had a good knowledge score about HCV. Most participants had a high percentage of correct answers to questions related to the transmission of HCV infection. Males had a higher percentage (51.0%) of good knowledge scores ($p = 0.029$). Individuals with a university degree scored higher (65.9%) than those with other levels of education.

Regression analysis revealed that higher education level was a significant factors in predicting a high level of knowledge. In the study conducted by **Sultan *et al.*** [12] the majority of Egyptian patients infected with HCV demonstrated inadequate knowledge regarding its modes of transmission. The accuracy of responses to knowledge-related questions varied significantly among participants, ranging from 19.5% to 87.5%. Notable gaps and misconceptions were identified, particularly concerning vertical transmission and the belief that HCV could be transmitted through handshaking, kissing, or working alongside an infected individual.

This finding aligns with the results of **Chemaitelly *et al.*** [9] who reported that a significant portion of the Egyptian population had limited knowledge about HCV transmission. Their study revealed that 61% of participants were aware of transmission through blood transfusions, while 51% recognized the risk associated with sharing unclean needles. However, the majority (94%) were unaware of mother-to-child transmission, and 14% mistakenly believed that HCV could spread through casual physical contact. In contrast, **Shalaby *et al.*** [8] reported a relatively high level of knowledge among participants, with over 80% providing correct responses to most questions, particularly regarding modes of transmission. However, approximately 25% of participants were unaware that HCV could be transmitted through sexual contact and body piercing, and some mistakenly believed that a hepatitis C vaccine could protect them from the disease.

Shalaby *et al.* [8] identified friends and relatives as the primary source of HCV-related knowledge (47.9%), followed by television (43%), newspapers (36.7%), and doctors (30%). Similarly, **Chemaitelly *et al.*** [9] found that the media served as the primary source of HCV-related knowledge. Additionally, **Saleh *et al.*** [13] reported that the majority of respondents considered physicians (82%) and television (78%) to be the most effective sources of HCV-related information. These conflicting results suggest that the public may receive inaccurate, incomplete, or misleading information depending on the source of their knowledge. To combat this, the Egyptian healthcare system requires well-structured strategies aimed at enhancing awareness, increasing knowledge, and preventing HCV transmission among the general population, while also ensuring adequate care and treatment for those already infected. In 2012, the Egyptian Ministry of Health and Population (MOHP) established 23 specialized hepatitis treatment centers to provide care for approximately 190,000 individuals with chronic HCV infection.

In 2018, Egypt launched the "100 Million Healthy Lives" campaign ("Meet Milyon Sehha"), which involved screening over 60 million individuals and providing treatment to more than 4.1 million patients. The campaign's extensive awareness efforts and outreach spanned the entire country, ensuring that even the most economically disadvantaged patients received free treatment. Within just one year of the initiative, Egypt successfully eliminated Hepatitis C, previously the third leading cause of death in the country. This remarkable achievement was the result of a well-planned and effectively executed nationwide public health campaign [14]. While, our study aligns with previous research in terms of the proportion of individuals demonstrating good overall HCV knowledge, it diverges in the specific areas of misconception, the influence of targeted public health interventions, and the evolving landscape of information sources. These variabilities highlight the dynamic nature of public awareness and suggest the need for tailored strategies to address persistent gaps in HCV knowledge as sustaining Egypt's achievement in HCV elimination requires continuous education, awareness campaigns, and proactive public health efforts to prevent resurgence and ensure long-term success.

CONCLUSIONS

Efforts are needed to sustain the Egyptian achievement reached in the battle against HCV. Egypt's health authorities must launch targeted national campaigns to address knowledge gaps and spread accurate HCV information within the community. Enhanced education by healthcare professionals is essential to deliver accurate HCV information.

Financial support and sponsorship: Nil.

Conflict of Interest: Nil.

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