Screening for hepatitis C virus infection by ELISA for South Valley University Students

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Abstract:
Background: Hepatitis C virus (HCV) infection is a worldwide health burden. The infection is frequently asymptomatic, leaving many infected individuals unaware of the diagnosis until complications occur. HCV infection is a major health problem in Egypt. The beginning was iatrogenic, however, other routes of transmission led to continuation of the problem up till now. Both adults and children are affected by this disease. Routes of transmission and risk factors for this infection are well established. The current study aimed at screening of the University students for the presence of HCV antibodies and assess their knowledge about the disease.
Patients and methods: All participant students were subjected to ELISA HCV antibody test, and a semi-structured questionnaire was used as a tool for data collection by personal interviewing after verbal consent, the design of which was based on the objectives of the study after a review of recent literature and similar questionnaires
Results: In this studyit was found that1% of the students were positive anti HCV. Regarding relation between risk factors and percentage of anti HCV among studied students, dental care, sharing utensils (medical or nom medical eg in barbershop) and blood transfusion were significant predictors of HCV infection ($p < 0.05$).With the decrease awareness about the disease between the student.
Conclusion: Prevalence of HCV among studied student is 1% with poor to fair knowledge about the disease.
Keywords: HCV screening students, South Valley University, hepatitis C virus, knowledge about HCV.

Introduction:

Viral hepatitis was reported to be the seventh leading cause of mortality globally ***(Stanawayet al., 2016)***, seventy one million humans were living with Hepatitis C virus (HCV) infection in the world, HCV is a leading cause of chronic liver disease, cirrhosis, and hepatocellular carcinoma, as well as the most common indication for liver transplantation in many countries***(Stephen et al., 2006)***.There are seven major genotypes of HCV. The prevalent genotype in Egypt is type 4 (73%) followed by genotype 1 (26%), whereas mixed HCV genotypes infection was found in 15.7% in cases in Egypt ***(Ameret al., 2015).***Hepatitis C viral infection is endemic in Egypt with the highest prevalence rate in the world ***(Elgharablyet al., 2017)***, It is estimated to be 14.7% among a representative sample of Egyptian population, aged 15-59 year ***(El-Zanaty et al., 2009)***, The high infection rate in Egypt was caused by HCV contamination introduced during treatment against

a trematode parasite from 1920's-1980's, but may be maintained high by low standard hospital practices ***(Hajarizadehet al., 2013)***.

Transmission of HCV can occur through sharing needles, syringes, or other drug-injection equipment; these reflect the main ways HCV is currently being transmitted. It can also be transmitted through sexual contact or from an infected mother to her baby at birth ***(National Viral Hepatitis Action Plan 2017–2020*)**. Egypt is still seeing a few new cases of hepatitis C-related liver disease, in practice, poor infection control and equipment sterilization procedures used in medical and dental settings continue to lead to iatrogenic HCV infections to the present day, which further stimulate the spread of the disease and continue to fuel the current epidemic***(Frank et al., 2000*)** All persons recommended for HCV testing should first be tested for HCV antibody (anti-HCV) using an FDA-approved test ***(Alter et al., 2003)***. A positive test result for anti-HCV indicates either current (active) HCV infection (acute or chronic), past infection that has resolved or a false positive results ***(Powlotsky, 2002)***. There is no vaccine against HCV, but studies of the virus lifecycle have led to development of increasingly efficient treatments with direct-acting antivirals (DAAs) ***(Wylde, 2012).***Drugs were approved for the treatment of HCV by the U.S. Food and Drug Administration (FDA) in late 2013, and then introduced into Egypt in late 2014. These new treatment regimens have reduced treatment duration to12–24 weeks, decreased side effects and improved outcomes, with cure rates of 85–95% across all patient populations ***(Kandeel et al., 2017).***

Patients and methods:

A Cross-sectional study design is conducted on a sample of students in South Valley University during the academic year of 2017-2018 .The duration of the study ranges from 6-12 months. Random sample (400) is taken from the first year students in South Valley University who subjected to ELISA screening test.

Study tools: Laboratory Apparatus: **Stat Fax 4700 reader** and Anti HCV Kits (**bioelisa HCV4.0kits).**

Questionnaire was used as a tool for data collection by personal interviewing, the design of which was based on the objectives of the study after a review of recent literature and similar questionnaires. It comprise the:a)Socio-demographic data as age, gender, and marital status ,residence, socioeconomic level, medical and other Risk factors of the diseases transmission(unsafe injections ,tattoo, needle stick injury, and family history of hepatitis C infection. b)Awareness of the students to the nature of disease, risk factors and methods of transmission and spread.The participant students are asked to answer the questionnaire without guidance by their own through their knowledge about the disease.

Statistical Analysis:

All patients had been analyzed using Statistical package for Social Sciences (SPSS).

Results:

Table1. Distribution of the studied cases according to demographic data and the occurrence of the diseases

Variables	HCV* status		*P*-value
	Positive *N* 4	Negative *N* 396	
Gender			
Males	3	144	0.2
Females	1	252	
Residence			
Rural	3	168	0.5
Urban	1	228	
Marital status			
Single	4	394	0.6
Married	0	2	
Social level			
Low	1	152	0.13
Moderate	3	212	
High	0	36	
Age			
mean	19.4 ± .9	19.2 ± .4	0.6

HCV*Hepatitis C virus

This case study was conducted on 400 students The Table 1. shows that 253 females (63.3%) and 147 males (36.8%),their age (mean ±SD 19.53 ± 0.98).Also the same table shows that 384 (99.25%) was Single the remaining cases was married, 169 of them resident in urban area, while 231 in rural area with medium social status as 212 (53.0%).

Table 2. Relation between HCV infection and Medical history of the students

Medical history	HCV* status		*P*-value
	Positive *N* 4	Negative *N* 396	
No medical disease	0	262	0.91
Jaundice	1	0	0.8
High blood pressure	0	4	0.9
DM*	0	7	0.91
Asthma	1	17	0.2
Kidneydiseases	0	5	0.9
Blood diseases	1	2	0.02*
Immune diseases	0	1	0.9
Fever	0	3	0.9
Others	1	95	0.7

DM*: Diabetes mellitus HCV*Hepatitis C virus

It shows that the age of the studied group with P value 0.6 3 the residence with P value 0.2 while the social level of the studied group has P value 0.13 and so the demographic data has no significant difference in upon the occurrence of the disease.
Table 2. shows that there is no significant relation between HCV infection and asthma or any other medical disease reported for the study group. Instead there is a high significant relation between HCV cases and those complaining from blood diseases.

In Table 3. Associations between HCV infection and risk factors were analyzed using logistic regression. Multivariate logistic regression analysis was used for controlling confounders and for evaluating the strength of association of risk variables with HCV infection among studied group. The variables (dental extraction, sharing utensil, blood transfusion) were found to be associated with HCV infection in the univariate analysis were entered into the multivariate logistic regression model. In the final model, the variables were found to be significant predictors of HCV infection ($p<0.05$).

Table 3. Multivariate logistic regression analysis to find Association of potential risk factors and hepatitis C virus infection among study subjects

Variables	HCV status		*P*-value
	Positive *N* 4	Negative *N* 396	
Tatto			
Yes	0	16	0.521
No	4	380	
Blood transfusion			
Yes	1	1	0.021*
No	3	276	
Piercing			
Yes	1	8	0.572
No	3	359(95.7)	
Shaving			
Yes	1	143	0.431
No	3	260	
Exposure to injection			
Yes	2	68	0.125
No	2	328	
Dental visit			
Yes	2	136	0.012*
No	2	280	
Sharing utensil			
Yes	3	314	0.01*
No	1	82	

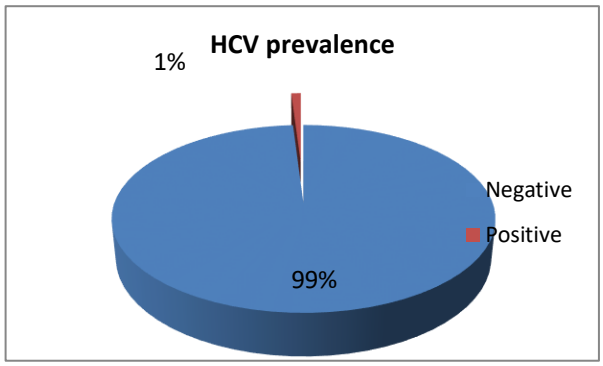

Figure 1.The prevalence of HCV among the first year student

As shown Figure 1.The prevalence of HCV among the participant students.

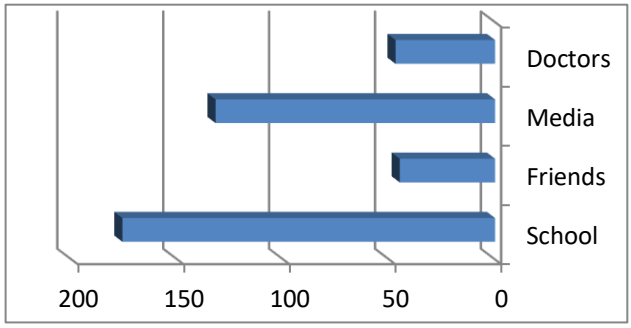

Figure 2.The percentage of the sources of information about HCV diseases

As shown all participants heard about HCV at schools were the major source of information about HCV by 44% followed by media by 33%, while medical and friends constitute a small percentage as a source of information.

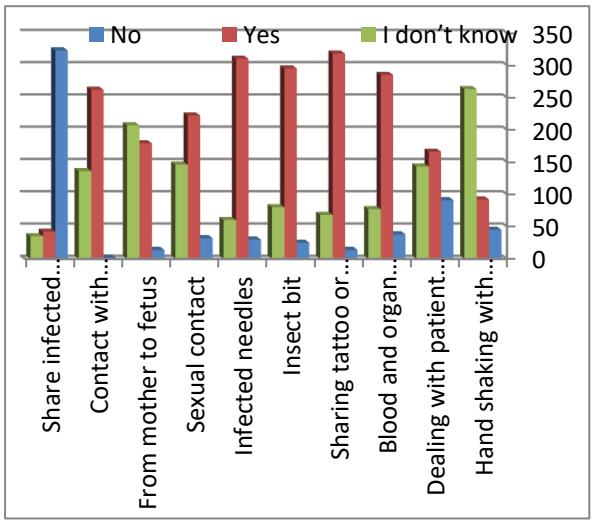

Figure 3. Distribution of the studied cases according to knowledge about risk factors of HCV

This Bar chart in Figure 3. shows that the knowledge about possible risk factors of the disease 23.0% of the students think that handshaking with HCV case one of the risk factors, While 41.5% think that dealing with infected person, blood and organ transplant 71.3%, Sharing utensils of tattoo or piercing 79.5%, Infected needles 77.5%, Sexual contact 55.5%, From mother to fetus 44.8%, Contact with bl. body fluids 65.5%, and Share infected family member utensils was 10.5% ,while 73.8% of the students think0002k that Insect bit one of the risk factors

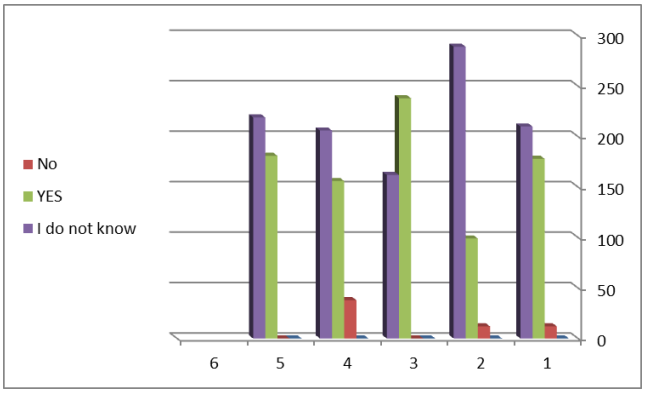

Figure 4.The student knowledge about the nature of HCV disease

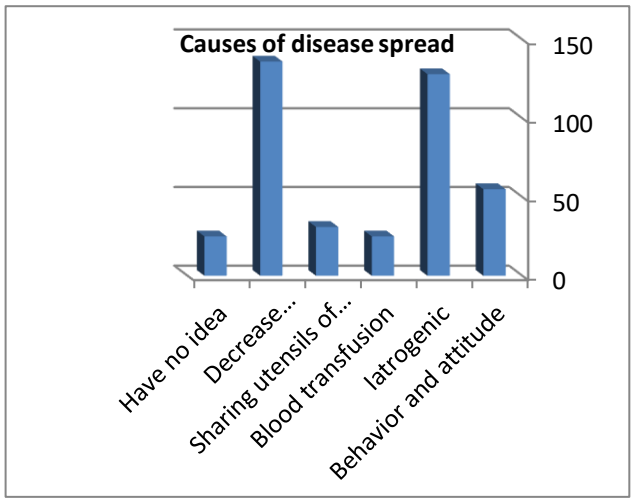

Figure 5.The student knowledge about the spread of the disease

The knowledge background of the student about the causes of spread of the disease the 34% of the student contribute it to the decrease of awareness about the disease while 32% thought that it is iatrogenic. Behavior and attitude towards the possible causes of the disease constitute only 13.8%.

Discussion:

Guidance from the World Health Organization and the UK National Screening Committee on when screening ought to be performed emphasizes the elemental significance of having a "safe, substantial, and reliable" screening test. Screening for HCV disease ordinarily depends on antibody testing. Since antibodies may endure after HCV disease is suddenly cleared (which happens in around 25% of those infected), antibody test cannot differentiate acute from resolved infections, which leads to false-positive results ***(Hajarizadehet al., 2013).***

This study was conducted on 400 patients included (63.2%) females and (36.8%) males. Their age ranged from 18.0 – 22.0 years (mean ±SD 19.53 ± 0.98). (99.25%) was Single the remaining cases was Married 169 of them in Urban, 231 in Rural with Medium Social status as (53.0%).

Our results are in contrary with study of***Abed et al.,*** reported that in this thesis included 600 children with age from 6 to 17 years (12.07 ± 3.37). Examined children incorporate 54.3% male, 73.7% lived in country zone, and 46.5% belonged to moderate socioeconomic level which was higher than that of low or high social classes (37.3% and 16.2%, respectively) ***(Abed et al., 2017).***

Furthermore, ***El-Sokkary et al.,*** found that their studied group mean age was 31.8±8.06, most of them were males (52.2%), from rural areas (71.0%), the majority of them were nurses (62.3%) ***(El-Sokkaryet al., 2017).***

Eassa et al., who mentioned that males had about 5 times significant higher risk of acquired HCV infection than females **(*Eassaet al., 2007).***

The present study shows that 65.5% of cases have no medical history of any disease , 89.5% of cases have a surgical history; 8.0% of them make it at Private hospital and 2% at Government hospital.

Our results are supported by study of ***El-Sokkary et al.,*** as they reported that most of the members included in the study were non-smokers (91.3%); they did not have any chronic infections (92.8%) ***(El-Sokkaryet al., 2017)***. Egypt is still seeing many new cases of hepatitis C-related liver infection, in practice, poor infection control (IC) and equipment sterilization strategies utilized in medical and dental settings continue to lead to iatrogenic HCV infections until the present day, which assist stimulate the spread of the infection and proceed to enhance the current epidemic ***(Frank et al., 2000)***.

The most vital transmission modes of HCV are through blood or blood-related products. Other sources of HCV transmission incorporate activities involving the potential for percutaneous exposure to blood or blood-derived body liquids, such as tattooing, acupuncture, sharing cottons, and other biologically conceivable modes of transmission, like body-piercing ,cosmetic procedures, and commercial barbering. Vertical transmission from mother to neonate is rare and intra-household and within-couples spread of HCV infections is possible ***(Lee , 2014).***

The current study shows that instead that 99.5% of cases the blood was not transferred to them the

remaining get the risk of the disease. 80.5% of them visited the dentist at them private clinic (60.0%), 41.5% of them were given dental fillings.

Our results are supported by study of ***Abed et al.,*** as they reported that those children who were exposed to hazard components such as blood transfusion, frequent intravenous infusion, history of earlier hospitalization, and exposure to blood were significantly borne to be a case of HCV whereas no significant differences were illustrated with respect to surgical intervention, nonmedical circumcision, ear penetrating, shaving in common hair stylist, utilizing common instruments such as razors and tooth brush, give birth by help of doctor or birth assistant and history of Bilharzial infection ***(Abed et al., 2017).***

Our results are supported by study of ***Abed et al.,*** as they reported that 4.7% were diagnosed as HCV Ab-seropositive. History of exposure to blood transfusion, frequent intravenous injection, history of prior hospitalization and blood exposure were significantly more likely to be among HCV seropositive***(Abed et al., 2017).***

Furthermore, ***Anjum et al.,*** found that the students received information regarding these infections from books (85%), media / Internet (85%), teachers (84%), friends and relatives (70%)***(Anjum et al., 2005).***

In the study we found that the knowledge of the student about the nature of the disease was little poor, as just 44.5% knew the causative organism as a virus, while only 24.8% who Knew the symptoms while 51% had no idea about HCV treatment , others (45.3%) think that there is a vaccine for the disease.

The majority of students had fair awareness of some modes of HCV transmission. More than half of students (approximately ±76.1%) knew that contact with contaminated blood or blood product or sharing utensils of others and infected needles is a leading cause of HCV.

On the other hand, a high percentage of students thought that insect bit or handshaking (73.8%;23%) respectively, may be a cause of disease transmission.

Medical stuff and sharing family utensils was the choice of most of students as ways for disease spread.

Our results are supported by study of ***Mansour-Ghanaei et al.***, as their data indicated that there is a positive correlation between medical students' knowledge toward Hepatitis B and C and their attitude toward the diseases in a way that higher knowledge is associated with better attitude ***(Mansour-Ghanaei et al., 2013).***

The present study shows that the main causes for disease spread was that 34.0% of cases don't have awareness about disease. The variables (dental extraction, sharing utensil and blood transfusion) were found to be associated with HCV infection with significant predictors of HCV infection ($p < 0.05$).

Conclusion:

It was concluded from the current study results that the prevalence among the first year students in South Valley University with mean age (±19.53 SD ± 0.98) years old, who are probably infected with HCV was 1%.

Regarding relation between risk factors and positivity of anti HCV among studied University students, history of frequent dental procedure, blood transfusion, sharing utensils (mainly shaving instruments especially in barbershops) are statistically significance.

History of frequent taking injectable medications, hospitalization and needle stick injury were more frequently among positive anti HCV University students than negative ones but these differences did not reach to a statistical significance.

While the gender, residence or the socioeconomic status play no role in the spread of the disease and have no significant value.

Regard the student knowledge about HCV infection, 44% of the student get their knowledge from school, the majority79.5% know that sharing tattoo or piercing utensils, infected needles ,blood or organ transplant or contact with body fluids constitute a high risk factor for disease transmission(77.5%,71.3) respectively, which considered as fair results for knowledge. On the

other hand they have a false information about the nature of the disease and the ways of disease spread as 73.8% think that insect bit is one of the ways of disease transmission and 72.3% do not know disease symptoms and others (51%) do not know that it becomes treatable nowadays.

The prevalence rate for HCV infection is lower than that previously reported in the same age group denoting a new evidence for the reduction of prevalence and a hope for successful eradication of HCV in the forthcoming years.

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