Al-Azhar Med. J . (Medicine). *Vol. 51(3), July, 2022, 1679 – 1692*
DOI: 10.21608/amj.2022.240699
https://amj.journals.ekb.eg/article_240699.html

HEPATITIS C VIRUS INFECTION RATES AMONG EGYPTIAN BLOOD DONORS AFTER IMPLEMENTATION OF THE NATIONAL TREATMENT PROGRAM

By

Ahmed Mohamed Abd El-Wahed, Helmy Ahmed Shalaby, Mohamed Saad El-Deen Radwan*, Ashraf Mohamed El-Bahrawy

Department of Internal Medicine and Clinical Pathology*, Faculty of Medicine, Al-Azhar University, Egypt

Corresponding author: Ahmed Mohamed Abd El-Wahed,

E-mail: docahmed907@gmail.com

ABSTRACT

Background: Hepatitis C virus (HCV) infection is a worldwide public health problem where its seroprevalence had an estimated 2.8% increase over the last decade.

Objective: To assess the changes in HCV infection rates among Egyptian blood donors, 12 years after implementation of anti-HCV treatment program.

Patients and methods: This was a prospective cross-sectional study conducted at Al-Azhar University Hospitals, and Mansoura New General Hospital. A total of 2000 consecutive blood donors were tested for anti-HCV antibodies. All donors filled blood donor questionnaire. Anti-hcv positive donors were subjected to hepatitis C ribonucleic acid (HCVRNA) testing by real-time polymerase chain reaction (PCR).

Results: The majority of donors (n=1992; 99.6%) were males. A total of 1515 (75.75%) donors were living in rural areas, while 485 (24.25%) were living in urban areas. In addition, 862 (43.1%), 620 (31%) and 466 (23.3%) graduated from secondary, high and primary schools, respectively. Blood donors whom graduated from higher education were less likely to be anti-HCV-positive ($P \leq 0.05$). Among 35 anti-HCV positive blood donors, 6 (17.15%) were HCVRNA positive. Blood donors with positive viremia were older (34.0± 5.29 years) than those with negative (29.66± 6.75 years) viremia. Intravenous drug user, previous needle stick injury, previous surgery, family history of viral hepatitis, previous hospitalization and history of anti-HCV treatment were identified as risk factors for anti-HCV positivity ($P < 0.01$). Out of the 2000 blood donors, only 5 (0.25 %) males with mean age of 30.6± 3.29 years were positive for HBs Ag. Lower education levels ($P \leq 0.05$), marriage ($P \leq 0.05$) and previous surgery, ($P \leq 0.01$) were identified as risk factors for HBV infection.

Conclusion: A significant reduction of HCV prevalence among Egyptian blood donors was detected in our survey. In addition, a lower rate of HBsAg among blood donors was also detected. Notably, the iatrogenic transmission of HBV and HCV still ongoing in Egypt.

Keywords: Hepatitis C virus, Hepatitis B, virus PCR, Blood donors.

INTRODUCTION

Hepatitis C virus infection is a worldwide public health issue where its seroprevalence had an estimated 2.8% increases over the past 10 years, corresponding to more than 185 million infections (3% of the world's population). Nearly 75% of infected persons are living

in middle income countries *(Mohd Hanafiah et al., 2013* and *Petruzziello et al., 2016)*.

China, Pakistan, Nigeria, Egypt, India, and Russia together accounted for more than 50% of total infections. A recent estimation demonstrated that 119 million adult individuals worldwide have chronic HCV infection, with 3-4 million new infections and 350000 - 500000 mortalities occurring yearly as a result of HCV-related adverse events *(Petruzziello et al., 2016)*.

Egypt had the largest iatrogenic transmission of blood-borne pathogens in the general population globally. The use of parenteral anti-schistosomiasis treatment in Egypt, extensively practiced with poor sterile techniques since the 1920s, is considered to be the main etiology of dramatic increase in the human HCV reservoir *(Kandeel et al., 2017)*. In Egypt, HCV antibody (anti-) prevalence was estimated to be 15% in 2008 *(El-Zanaty and Way, 2014)*. The prevalence of anti-HCV in Egyptian blood donors ranged from 1.7%-16.8% on the period between 2006 and 2009 *(Kandeel et al., 2017)*.

In 2008, the Egyptian national program of anti-HCV treatment was implemented, resulting in treatment of millions of HCV cases. This ongoing program is expected to reduce the burden of HCV infection in different Egyptian population groups *(Aboushady et al., 2019)*. Accordingly, the current work aimed to assess the changes in HCV infection rates in Egyptian blood donors, 12 years after implementation of anti-HCV treatment program.

The present work aimed to assess the changes in HCV infection rates among Egyptian blood donors, 12 years after implementation of anti-HCV treatment program.

PATIENTS AND METHODS

This was a prospective cross-sectional study carried out at Al-Azhar University Hospitals and Mansoura New General hospital. A total of 2000 consecutive blood donors were tested for anti-HCV antibodies. All donors filled blood donor questionnaire. Anti-hcv positive donors were subjected to hepatitis C ribonucleic acid (HCVRNA) testing by PCR. This study was conducted after being approved of Al-Azhar University, Faculty of Medicine Research Ethics Committee.

To be eligible to donate blood, an individual must have been in good health and must have been between 18–60 years of age. Generally, donors must have weighted at least 50 kg. All donors must pass general as well as medical examinations before donation. Exclusion criteria included: younger or older ages, past history of jaundice, HIV, hypotension, anaemia and severe chronic illnesses.

An informed consent was obtained from every participant.

All eligible donors fulfilled a blood donor questionnaire including age, sex, socioeconomic and educational standers. In addition, they were asked about jaundice, history of hepatitis, household contact with hepatic patient, previous hospitalization, previous surgery, and parenteral drug administration and previous anti HCV treatment. Moreover, all doners were asked for history for blood donation or blood transfusion. Sexual and occupational hazards of HCV infection,

intravenous drug use, tattooing, and acupuncture were also documented.

An enzyme linked immunoassay (4th generation ELISA) was used to determine HCV antibodies in serum or plasma. Anti-HCV positive samples were then tested to HCV-RNA by real time PCR *(Al-Tahish et al., 2013)*.

Statistical analysis:

The data wereanalysed by Statistical Package for the Social Sciences software version 26.0. Descriptive statistics were performed for numerical parametric data as mean±SD, minimum and maximum of the range, while they were done for categorical data as numbers and %.

Inferential analyses were performed for quantitative variables utilizing independent t-test in cases of two independent groups with parametric data. Inferential analyses were done for qualitative data using Chi square test for independent groups. The level of significance at P value <0.05 was considered significant.

RESULTS

Among 2000 consecutive blood donors enrolled, the age ranged from 18 to 49 years with a mean age ± SD, 29.67± 6.75 years. The majority of donors (n=1992; 99.6%) were males. A number of 1515 (75.75%) donors were living in rural areas while 485 (24.25%) were living in urban areas.862 (43.1%), 620 (31%) and 466 (23.3%) graduated from secondary, high and primary schools, respectively. Indeed 52 (2.6%) blood donors were illiterate **(Table 1)**.

Table (1): Demographic characteristics of included blood donors

Items	Included blood donors (n=2000)	
	n	%
Age (year)		
Range	18-49	
Mean ± SD	29.67± 6.75	
Sex		
Male	1992	99.6%
Female	8	0.4%
Residency		
Rural	1515	75.75%
Urban	485	24.25%
Education level		
Illiterate	52	2.6%
Primary education	466	23.3%
Secondary education	862	43.1%
High education	620	31.0%

Among 2000 blood donors, 12 (0.6%) had a history of curative anti-HCV treatment. Thirty-five (1.75%) donors tested positive for anti-HCV antibodies. In addition, 5 (0.25%), and one (0.05%) donor were positive for HBsAg and HIV antibodies, respectively. Among anti-HCV positive donors (n=35), 6 (17.15%) were positive for HCVRNA by PCR **(Table 2)**.

Table (2): Viral infection of blood donors

Parameters	Included blood donors (n=2000)	
	n	%
Previous anti-HCV treatment		
Positive	12	0.6%
Negative	1988	99.4%
Anti-HCV		
Positive	35	1.75%
Negative	1965	98.25%
HBsAg		
Positive	5	0.25%
Negative	1995	99.75%
HIV Ab		
Positive	1	0.05%
Negative	1999	99.95%
HCVRNA (*n*=35)		
Positive	6	17.14%
Negative	29	82.86%

N=number; Anti-HCV= Antibody to hepatitis C virus; HCV=Hepatitis C virus; HCVRNA=Hepatitis C virus ribonucleic acid

Among 35 blood donors positive for anti-HCV, their mean age was 30.23±6.65 years. All of them were males, and a small proportion of them graduated from higher education. Indeed, blood donors whom graduated from higher education were less likely to be anti-HCV-positive, ($P \leq 0.05$) **(Table 3)**.

Table (3): Demographic characteristics of anti-HCV positive blood donors

Included blood donors / Parameters	Anti-HCV positive *n*= (35)	Anti-HCV negative *n*= (1965)	P value
Age			
Mean ± SD	30.23±6.65	29.66±6.76	0.62
Sex			
Male	35 (100%)	1957 (99.6%)	0.705
Female	0 (0%)	8 (0.4%)	
Residency			
Rural	29 (42.9%)	1486 (75.6%)	0.322
Urban	6 (17.1%)	479 (24.4%)	
Education level			
Illiterate	3 (8.6%)	49 (2.5%)	
Primary education	9 (25.7%)	457 (23.3%)	**0.015**
Secondary education	19 (54.3%)	843 (42.9%)	
High education	4 (11.4%)	616 (31.3%)	
Marital status			
Single	13 (37.1%)	874 (44.5%)	0.387
Married	22 (62.9%)	1091 (55.5%)	

Intravenous drug user (P<0.01), previous needle stick injury (P<0.01), previous surgery (P<0.01), family history of viral hepatitis (P <0.01), previous hospitalization (P<0.01) and history of anti-HCV treatment (P< 0.01), were identified as risk factors for anti-HCV positivity. On the other hand, the history of blood donation, health care work, positive HBsAg and HIV positivity were not recognized as risk factors for anti-HCV positivity **(Table 4)**.

Table (4): Risk factors of anti-HCV positive serology

Included blood donors / Parameters	Anti-HCV positive *n*= (35)	Anti-HCV negative *n*= (1965)	P value
History of Blood donation			
Yes	26 (74.3%)	1217 (61.9%)	0.135
No	9 (25.7%)	748 (38.1%)	
Health care worker			
Yes	0 (0%)	10 (0.5%)	0.672
No	35 (100%)	1955 (99.5)	
I.V drug user			
Yes	1 (2.9%)	1 (0.1%)	**<0.001**
No	34 (97.1%)	1964 (99.9%)	
Tattooing			
Yes	0 (0)	0 (0)	-
No	35 (100%)	1965 (100%)	
Acupuncture			
Yes	0 (0)	0 (0)	-
No	35 (100%)	1965 (100%)	
Previous needle stick injury			
Yes	2 (5.7%)	1 (0.1%)	**<0.001**
No	33 (94.3%)	1964 (99.9%)	
Previous surgery			
Yes	14 (40%)	20 (1.0%)	**<0.001**
No	21 (60%)	1945 (99.0%)	
Family history of hepatitis			
Yes	19 (54.3%)	557 (28.3%)	**0.001**
No	16 (45.7%)	1408 (71.7%)	
Previous hospitalization			
Yes	24 (68.6%)	202 (10.3%)	**<0.001**
No	11 (31.4%)	1763 (89.7%)	
History of anti-HCV treatment			
Yes	12 (34.3%)	0 (0%)	**<0.001**
No	23 (65.7%)	1965 (100%)	
HBsAg			
Positive	0 (0)	5 (0.3%)	0.77
Negative	35 (100%)	1960 (99.7%)	
Anti-HIV			
Positive	0 (0)	1 (0.1%)	0.894
Negative	35 (100%)	1964 (99.9%)	

Anti-HCV=Antibody to hepatitis C virus, HBsAg=Hepatitis B surface antigen, Anti-HIV=Antibody to human immune deficiency virus

Among 35 anti-HCV positive blood donors, 6 (17.15%) were HCVRNA positive. Blood donors with positive viremia were older (34.0± 5.29 years) than those with negative (29.66± 6.75 years) viremia, and all of them graduated from primary (n=2) and secondary education (n=4), (P≤0.05), (table 3). Among different risk factors only IV drug use, identified as risk factor for HCV viremia (P ≤ 0.05) **(Table 5)**.

Table (5): Characteristics of HCV infected blood donors

Included blood donors / Parameters	HCVRNA positive (*n*= 6)	HCVRNA negative (*n*= 29)	P value
Age			
Mean ± SD	34.0± 5.29	29.66± 6.75	0.1
Sex			
Male	6 (100%)	29 (100%)	-
Female	0 (0)	0 (0.0)	
Residency			
Rural	4 (66.7%)	25 (86.2%)	0.248
Urban	2 (33.3%)	4 (13.8%)	
Education level			
Illiterate	0 (0%)	3 (10.3%)	
Primary education	2 (33.3%)	7 (24.1%)	**0.04**
Secondary education	4 (66.7%)	15 (51.7%)	
High education	0 (0%)	4 (13.8%)	
Marital status			
Single	3 (50%)	10 (34.5%)	0.474
Married	3 (50%)	19 (65.5%)	

HCVRNA=Hepatitis C ribonucleic acid, SD=Standard deviation

Among 2000 blood donors, 5 (0.25 %) were positive for HBsAg. Their mean age was 30.6± 3.29 years, and all were males. Lower education levels (P ≤0.05), marriage (P ≤0.05) and previous surgery, (P ≤0.01), **(Table 6)**, identified as risk factors for HBV infection **(Table 7)**.

Table (6): Risk factors for HCV infection among blood donors

Included blood donors / Parameters	HCVRNA positive (*n*= 6)	HCVRNA negative (*n*= 29)	P-value
History of Blood donation			
Yes	4 (66.7%)	22 (75.9%)	0.639
No	2 (33.3%)	7 (24.1%)	
Health care worker			
Yes	0 (0)	0 (0.0%)	1
No	6 (100.0%)	29 (100%)	
Intravenous drug user			
Yes	1(16.7%)	0 (0.0%)	0.026
No	5 (83.3%)	29 (100%)	
Tattooing			
Yes	0 (0)	0 (0.0%)	1
No	6 (100%)	29 (100%)	
Acupuncture			
Yes	0 (0)	0 (0.0%)	1
No	6 (100%)	29 (100%)	
Previous needle stick injury			
Yes	1(16.7%)	1 (3.4%)	0.204
No	5 (83.3%)	28 (96.6%)	
Previous surgery			
Yes	3 (50%)	11 (37.9%)	0.583
No	3 (50%)	18 (62.1%)	
Family history of hepatitis			
Yes	3 (50%)	16 (55.2%)	0.817
No	3 (50%)	13 (44.8%)	
Previous hospitalization			
Yes	5 (83.3%)	19 (65.5%)	0.392
No	1 (16.7%)	10 (34.5%)	
History of anti-HCV treatment			
Yes	0 (0)	12 (41.4%)	0.052
No	6 (100%)	17 (58.6%)	
HBsAg			
Positive	0 (0)	0 (0.0%)	1
Negative	6 (100%)	29 (100%)	
Anti-HIV			
Positive	0 (0)	0 (0.0%)	1
Negative	6 (100%)	29 (100%)	

Anti-HCV=Antibody to hepatitis C virus, HBsAg=Hepatitis B surface antigen, Anti-HIV=Antibody to human immune deficiency virus, HCVRNA=Hepatitis C virus ribonucleic acid

Table (7): Demographic characteristics hepatitis B infected blood donors

Included blood donors / Parameters	HBsAg positive (*n*= 5)	HBsAg negative (*n*= 1995)	P value
Age Mean ± SD	30.6± 3.29	29.67± 6.76	0.759
Sex Male Female	5 (100%) 0 (0.0%)	1987 (99.6%) 8 (0.4%)	0.887
Residency Rural Urban	5 (100%) 0 (0.0%)	1510 (75.7%) 485 (24.3%)	0.205
Education level Illiterate Primary education Secondary education High education	0 (0%) 4 (80%) 1 (20%) 0 (0%)	52 (2.6%) 462 (23.2%) 861 (43.2%) 620 (31%)	0.026
Marital status Single Married	0 (0%) 5 (100%)	887 (44.5%) 1108 (55.5%)	0.046

HBsAg=Hepatitis B surface antigen, SD=Standard deviation

DISCUSSION

In this study, we found that the prevalence of anti-HCV among Egyptian blood donors after direct antiviral agent (DAA) treatment was 1.75 %. The frequency of HCV viremia among anti-HCV positive blood donors was 17.15 %. The prevalence of HBsAg among Egyptian blood donors was 0.25 %. Intravenous drug user, previous needle stick injury, previous surgery, and previous hospitalization, were identified as a significant risk factors for anti-HCV and HBsAg positivity in the current survey.

HCV prevalence in Egyptian blood donors (1.6%–34%; median = 9.2%) was relatively high when compared with the corresponding global rates *(Kouyoumjian et al., 2018)*. It ranged from 2.7% to 24.8% during 1992–2008 *(Axley et al., 2018* and *Ebeid et al. 2019)*. In addition, a rate of 3.18% *(El-Adly et al., 2020)* was reported by a study conducted during 2013–2014 in the Upper Egypt. 35 (1.75%) donors tested positive for anti-HCV in the current survey. Of them 12 donors received anti-HCV treatment and gained SVR, and only 6 (17.15%) donors had positive viremia. taken together these data infer a significant reduction of HCV prevalence among blood donors after the national intervention programs.

In Egypt, only little is known regarding the clinical follow-up and outcomes of blood donors diagnosed with HCV-infection. Several studies have implicated that a significant percent of patients with confirmed HCV diagnosis do not receive adequate treatment or follow-up care. In US, the major barrier to care is the fact that majority of persons with HCV ignore the fact that they are infected. Conversely, in Europe, the lack of financial resources, illegal drug use, and alcohol abuse are the major barriers to patient's self-care attitude. Moreover, the risk group most

associated with the lack of loss to follow-up includes individuals who inject illegal drugs *(Bruggmann, 2012, Treloar et al., 2013, Linas et al., 2014* and *Papatheodoridis et al., 2014)*. The major reasons for the loss to follow-up among a Brazilian cohort were the lack of understanding of patients about the necessity for clinical care (71%) and healthcare access difficulties (14%) *(Machado et al., 2017)*. These data highlight the necessity for strategies to improve the HCV cascade of care among blood donors diagnosed with HCV infection. Such strategies should include national registration, follow-up examinations, an understanding of the need for clinical care, designing of steps to overcome health-care difficulties, and ensuring steps toward infection eradication.

The prevention and control of HCV in a community with a high burden of exposure is complex and challenging in terms of describing and detecting the driving factors and risk factors of HCV exposure. Before 2008, a commonly reported risk factor of HCV transmission in Egypt was related to the iatrogenic transmission at health care facilities. Indeed, factors such as old age, rural residence, unsafe injection practices, a history of operations, dental procedures, hospitalization, blood transfusion, and PAT were significantly associated with HCV transmission in several studies conducted since 2008 *(Soliman et al., 2019, Elhendawy et al., 2020* and *El-Adly et al., 2020)*. These observations supported the notion that healthcare exposures act as driving factors of HCV transmission in Egypt. Intravenous drug user, previous needle stick injury, previous surgery, and previous hospitalization, were recognized as risk factors for anti-HCV positivity in the current study. These data hints that the iatrogenic transmission of HCV is ongoing in Egypt. Data on continuous iatrogenic HCV exposure are fundamental for rational allocation of resources toward intervention through decrease of the exposure to HCV infection in health care facilities *(Miller et al., 2015)*. Hence, successful intervention is expected to control the HCV exposure to reduce the incidence of infection in the future.

Based on the last WHO estimates, the rate of incidence of HBV among the blood donors has been recorded as 0.02, 0.64, and 3.59% for high, middle, and low economic countries, respectively *(Hennessey et al., 2013)*. In Egypt, HBsAg sero positivity among blood donors, was recently decreased from 1.1% in 2015 to reach 0.91% in 2018 *(Nada and Atwa, 2013)*. Going with this decreasing trend, a lower HBsAg rate (0.25%) was detected in our study. Indeed, these improvements may be related to the national infantile immunization programs and blood donors screening programs.

HBV screening in most Egyptian blood banks relies only on HBsAg test. Nonetheless, depending on HBsAg as the sole screening test can increase the risk of transfusion -transmitted infection for several reasons: its limited sensitivity (sensitivity <0.1 to 0.62 ng/mL of HBsAg. Therefore, in the presence of extremely low viral load, this test can develop false-negative outcomes). The host serological response involves a phase (the window period) at which the HBsAg cannot be detected despite the presence of HBV

infection) HBsAg is not detected in case of infection with a mutant strain. More importantly, this test cannot detect the occult hepatitis B infection (OBI) *(Hollinger and Sood, 2010)*. Anti-HBc screening *(Makroo et al., 2012* and *Abdou et al., 2020)* and nucleic acid test (NAT) are reliable tests to detect OBI in order to ensure safer blood transfusion *(Nemr et al., 2018)*. However, these markers are not included in the Egyptian blood bank screening, which reflects that such screening system in Egypt miss OBI. Recent data collected from the blood bank of the Zagazig University hospital demonstrated that 34,671 blood donors were non-reactive to HBsAg, while 0.04% of the donors were tested positive for HBV DNA by NAT, confirming the presence of OBI among blood donors as well as the importance of using NAT as a screening tool *(Ebeid et al., 2019)*. Recently, some blood centers in Egypt had already started to implement NAT, including the blood banks of National Cancer Institute, Nasser Institute, EL-Shabrwishy Hospital, and the Egyptian organization for biological products and vaccines *(Madihi et al., 2020)*. However, the high cost of NAT limits its implementation in all blood banks *(Ebeid et al., 2019)*.

CONCLUSION

A significant reduction of HCV prevalence among Egyptian blood donors was detected in addition to a lower rated of HBsAg among blood donors. The iatrogenic transmission of HBV and HCV still ongoing in Egypt.

REFERENCES

1. **Abdou AE, Hasssan MI, El Gamal SA, Dewi E and Mahmoud D. (2020):** The role of detection of anti-HBcIgM in HBs Ag negative blood donors. Journal of Recent Advances in Medicine, 1: 67-74.
2. **Al-Tahish G, El-Barrawy MA, Hashish MH and Heddaya Z. (2013):** Effectiveness of three types of rapid tests for the detection of hepatitis C virus antibodies among blood donors in Alexandria, Egypt. Journal of Virological Methods, 189(2): 370–374.
3. **Axley P, Ahmed Z, Ravi S and Singal AK. (2018):** Hepatitis C Virus and Hepatocellular Carcinoma: A Narrative Review. Journal of Clinical and Translational Hepatology, 6(1): 79–84.
4. **Bruggmann P. (2012):** Accessing Hepatitis C patients who are difficult to reach: it is time to overcome barriers. Journal of Viral Hepatitis, 19: 829-835.
5. **Ebeid EY, Kholeif HAE and Hussein NH. (2019):** Role of Nucleic Acid Test (NAT) in Detection of Transfusion Transmitted Viruses in Comparison to Other Methods. The Egyptian Journal of Hospital Medicine, 76: 3542-3549.
6. **El-Adly A, Wardany A andMorsy M. (2020):** Prevalence and risk factors for hepatitis c virus infection among general population in Luxor governorate, Egypt. Al-Azhar Medical Journal, 49: 33-44.
7. **Elhendawy M, Abo-Ali L, Abd-Elsalam S, Hagras MM, Kabbash I, Mansour L, Atia S, Esmat G, Abo-ElAzm AR and El-Kalla F. (2020):** HCV and HEV: two players in an Egyptian village, a study of prevalence, incidence, and co-infection. Environmental Science and Pollution Research, 27: 33659-33667.
8. **El-Zanaty F and Way A. (2015):** Egypt Demographic and Health Survey 2008. Cairo: Ministry of Health, El-Zanaty and Associates and Macro International, p. 431.
9. **Hennessey K, Mendoza-Aldana J, Bayutas B, Lorenzo-Mariano KM and Diorditsa S. (2013):** Hepatitis B control in the World Health Organization's Western Pacific Region: targets, strategies, status. Vaccine, 31 (9): 85–92.

10. **Hollinger FB and Sood G. (2010):** Occult hepatitis B virus infection: a covert operation. J Viral Hepat., 17:1–15.
11. **Kandeel A, Genedy M, El-Refai S, Funk AL, Fontanet A and Talaat M. (2017):** The prevalence of hepatitis C virus infection in Egypt 2015: implications for future policy on prevention and treatment. Liver International, 37(1): 45-53.
12. **Kouyoumjian S, Chemaitelly H and Abu-Raddad A. (2018):** Characterizing hepatitis C virus epidemiology in Egypt: Systematic reviews, meta-analyses, and meta-regressions.Scientific Reports 8(1): 36-43.
13. **Linas BP, Barter DM, Leff JA, Assoumou SA, Salomon JA, Weinstein MC, Kim AY andSchackman BR. (2014):** The hepatitis C cascade of care: identifying priorities to improve clinical outcomes. PloS One, 9: 973-978.
14. **Machado SM, Almeida N, Malta J, Capuani L, Campos AF, Abreu FR, Nastri, AC, Santana RA and Sabino EC. (2017):** Hepatitis C among blood donors: cascade of care and predictors of loss to follow-up. Revista de saudepublica., 51: 40-46.
15. **Madihi S, Syed H, Lazar F, Zyad A and Benani A. (2020):** A Systematic Review of the current hepatitis B viral infection and hepatocellular carcinoma situation in Mediterranean countries. Biomed Research International, 20:702-711.
16. **Makroo R, Chowdhry M, Bhatia A, Arora B and Rosamma N. (2012):** Hepatitis B core antibody testing in Indian blood donors: A double-edged sword! Asian Journal of Transfusion Science, 6: 10-15.
17. **Miller FD, Elzalabany MS, Hassani S andCuadros DF. (2015):** Epidemiology of hepatitis C virus exposure in Egypt: Opportunities for prevention and evaluation. World Journal of Hepatology, 7: 28-32.
18. **MohdHanafiah K, Groeger J, Flaxman AD and Wiersma ST. (2013):** Global epidemiology of hepatitis C virus infection: new estimates of age-specific antibody to HCV seroprevalence. Hepatology, 57: 1333-1342.
19. **Nada H and Atwa M. (2013):** Seroprevalence of HBV, HCV, HIV and syphilis markers among blood donors at Suez Canal University Hospital Blood Bank. Blood DisordTransfus., 5: 177-183.
20. **Nemr N, Kishk R, Mandour MA and Ragheb M. (2018):** Occupational Risk of Hepatitis B Virus Exposure: Overview and Recommendations. Suez Canal University Medical Journal, 21: 59-70.
21. **Papatheodoridis GV, Tsochatzis E, Hardtke S and Wedemeyer H. (2014):** Barriers to care and treatment for patients with chronic viral hepatitis in Europe: a systematic review. Liver International, 34: 1452-1463.
22. **Petruzziello A, Marigliano S, Loquercio G, Cozzolino A andCacciapuoti C. (2016):** Global epidemiology of hepatitis C virus infection: An up-date of the distribution and circulation of hepatitis C virus genotypes. World Journal of Gastroenterology, 22: 7824-7829.
23. **Soliman G, Elzalabany MS, Hassanein T and Miller FD. (2019):** Mass screening for hepatitis B and C in Southern Upper Egypt. BMC Public Health, 19: 1-7.
24. **Treloar C, Rance J and Backmund M. (2013):** Understanding barriers to hepatitis C virus care and stigmatization from a social perspective. Clinical Infectious Diseases, 57: 51-55.

معدلات العدوى بالفيروس الكبدى جبين المصريين المتبرعين بدمائهم فى ضوء البرنامج القومى للعلاج

احمد محمد عبد الواحد عبد الحميد ديوان, حلمى أحمد شلبى،محمد سعد الدين رضوان*، اشرف محمد البحراوى

قسمي الأمراض الباطنة و الباثولوجيا الاكلينيكية*، كلية الطب، جامعة الأزهر

E-mail: docahmed907@gmail.com

خلفيــة البحــث: تعــد عــدوى فيــروس التهــاب الكبــد الوبــائي ج مــن أكثــر مشــاكل الصحة العامة تحديًا في مصر حيثأنإنتشارها يعد الأعلى بالعالم.

الهــدف مــن البحــث: تقيــيم التغيــرات فــي معــدلات الإصــابة بفيــروس التهــاب الكبــد الوبــائي بــين المتبــرعين بالــدم المصــريين، بعــد إثنــى عشــر عامًــا مــن برنــامج العلاج بمضادات إلتهاب الكبد الفيروسي.

المرضــي وطــرق البحــث: أجريــت هــذه الدراســة فــي مستشــفيات جامعــة الأزهــر ومستشــفى المنصــورة العــام الجديــد. وقــد تــم إختبــار الأجســام المضــادة لفيــروس التهــاب الكبــد الوبــائي (ج) فــي ألفــي متبــرع بالــدم. كمــا تــم مــلء إســتبيان المتبــرعين بالــدم مــن جميــع المتبــرعين. وتــم عمــل إختبــار حمــض الريبونوكلييــك عــن طريــق تفاعــل البــوليميراز المتسلســل لجميــع المتبــرعين المــوجبين لمضــاد لفيروس التهاب الكبد الوبائي (ج).

نتــائج البحــث: كــان متوســط عمــر المتبــرعين بالــدم 29.67 ± 6.75 ســنة. وكــان غالبيــة المتبــرعين بالــدم مــن الــذكور ومــن منــاطق ريفيــة. كمــا كــان معظــم المتبــرعين بالــدم متعلمــين بينمــا 2.5٪ فقــط مــنهم أميــين. ومــن بــين ألفــي متبــرع بالــدم، كــان 0.6٪ لــديهم تــاريخ مــن العــلاج المضــاد لفيــروس التهــاب الكبــد (ج)، و 1.75٪ إيجابيًــا للأجســام المضــادة لفيــروس التهــاب الكبــد الوبــائي (ج)، و 0.25٪, وكــان أحــد المتبــرعين 0.05٪ إيجابيًــا للأجســام المضــادة لفيــروس (بــي) و فيــروس نقــص المناعــة. كــذلك كــان 35 متبرعًــا بالــدم إيجــابيين

لمضادات فيروس التهاب الكبد الوبائي سي, و كان متوسط أعمارهم 30.23 ± 6.65 سنة وجميعهم من الذكور، من بينهم 17.1% اظهروا ايجابية لـ HCVRNA بواسطة تفاعل البوليميراز المتسلسل. وتم تحديد متعاطي المخدرات عن طريق الحقن الوريدي، والإصابة السابقة بوخز الإبرة، والجراحة السابقة، والتاريخ المرضي العائلي للاتهاب الكبد الوبائي، والاستشفاء السابق وتاريخ العلاج المضاد لفيروس التهاب الكبد الوبائي كعوامل خطر للإيجابية المضادة لفيروس التهاب الكبد الوبائي بينما تم تحديد مستويات التعليم المنخفضة والزواج وكذلك الجراحة السابقة كعوامل خطر للإصابة بفيروس إلتهاب الكبد الوبائي (بي).

الإستنتاج: هنا كإنخفاض كبير في إنتشار إلتهاب الكبد (ج) بين المتبرعين بالدم المصريين في المسحات. بالإضافة إلى ذلك، تم الكشف عن إنخفاض تصنيف Ag فيروس بي بين المتبرعين بالدم.

الكلمات الدالة: فيروس التهاب الكبد ج، التهاب الكبد بي، المتبرعين بالدم.