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KNOWLEDGE AND PRACTICE TOWARD HEPATITIS C VIRUS SCREENING AMONG FAMILY MEDICINE JOINT PROGRAM RESIDENTS AT MAKKAH, 2020

Abrar Abdulmohsen A Almajnooni[1] and Ghanem Hamed ghanem Alharbe[2]
[1]Family Medicine Resident R4, Makkah, Saudi Arabia
[2] Preventive Medicine and Public Health Consultant, Makkah, Saudi Arabia

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Abstract:
Aim: *This study aimed to explore the knowledge and practice of the joint program of family medicine (JPFM) candidates in Makkah regarding HCV screening.*
Materials and methods: *This is a cross-sectional study conducted among family medicine residents in Makkah, Saudi Arabia, during 2020. A self-administered questionnaire was used to collect the information. Data were tabulated in MS Excel and all statistical analyses were performed using SPSS version 21.*
Results: *There were 114 family medicine who were enrolled. The overall mean knowledge score was 18.8 (SD 4.17) out of 35 points with 56.1%, 36% and 7.9% were classified into moderate, poor and good level of knowledge. With regards to practices, the overall mean practices score was 21.8 (SD 7.32) out of 40 points with moderate, poor and good practices level were identified among 53.5%, 36.8% and 9.6%, respectively. Statistical test revealed that the level of training was the significant factor associated with both knowledge and practices toward HCV screening.*
Conclusion: *Although the knowledge and practices of family medicine residents toward Hepatitis C virus screening were deemed moderate however, there are still room for improvement. The education about Hepatitis C virus screening should be more focused for those residents in their first year level of training.*
Keywords: *Hepatitis C virus, Family medicine residents, Knowledge, practices*
Words: *Percutaneous Nephrolithotomy (PCNL), Stone free rate, large Renal Stones, pneumatic lithotripsy, ultrasonic lithotripsy.*

Corresponding author:
Dr. Abrar Abdulmohsen A Almajnooni,
Family medicine resident,
Makkah Almukaramh, Saudi Arabia
Mobile:00966555183253
Email: dr-aaaam@hotmail.com

QR code

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INTRODUCTION:

Hepatitis C virus (HCV) infection is the leading source of liver cirrhosis, chronic hepatitis, and hepatocellular carcinoma (HCC). Worldwide prevalence of hepatitis C infection fluctuates broadly, and accurate global estimates are impeded due to lack of appropriate data collection and high rates of undiagnosed disease. More recent epidemiological estimates revealed that 1.0% of the world population is infected with Hepatitis C along with 71 million active cases (1). The Middle East and North Africa (MENA) region appears to have the highest prevalence of HCV infection worldwide where Egypt has highest prevalence rate of 14% in the region (2). A study conducted in Saudi Arabia about epidemiology of HCV found that he prevalence of HCV among Saudi nationals was estimated to be 0.7% (0.6%–0.9%). It is projected that HCV prevalence will increase by 2% at the end of 2030 (3). A recent study has identified that HCV prevalence in Saudi Arabia in the range of 0.4 to 1.1% based on previous researchers and WHO reports. It means that according to WHO classification the rate of HCV infection in Saudi Arabia is lowest in the region (4).

HCV affects millions worldwide annually and caused 399,000 deaths in 2016. It is the second major killer infectious disease after tuberculosis, and 9 times more people are infected with hepatitis than HIV. Hepatitis is preventable, treatable, and in the case of hepatitis C, curable. However, over 80% of people living with hepatitis are lacking prevention, testing and treatment services (5).

HCV is an infectious, hepatotropic virus belonging to the Flavivirus own family. infection may additionally present as acute illness in approximately one- third of sufferers; however, the general public of sufferers are asymptomatic. Chronic infection causes liver inflammation and fibrosis, and a significant range of those patient s will broaden cirrhosis and liver failure or liver cancer for approximately 20 to 50 years. The contamination rarely resolves spontaneously in patients with persistent infection (5).

HCV can lead into both acute and chronic infection. Patients who are newly infected with HCV are usually asymptomatic, whereas some patients with acute hepatitis do not develop to a life-threatening disease. It is estimated that 30% (15–45%) of infected persons may spontaneously clear out the virus within 6 months of infection without getting any treatment. The remaining 70% (55–85%) of patients may develop chronic HCV infection. A significant number of chronically infected patients will develop cirrhosis or liver cancer. World Health Organization (WHO) identified that deaths from Hepatitis C are mostly because of cirrhosis and HCC. Antiviral medicines can cure more than 95% of persons with HCV infection, thereby reducing the risk of death from cirrhosis and liver cancer, but access to diagnosis and treatment is low. (5).

Family medicine physicians play an essential role in the screening, prevention, and management of diseases. Primary care physicians are expected to contribute in HCV patient care by dealing actively and engaging in continuity of care. They can perform appropriate radiological and laboratory investigations and guide the HCV-infected patient to make an informed decision about when and how to get treatment and establish contact with appropriate resource (6). It is important to give them the proper knowledge and skills to provide better care of HCV patients.

A primary benefit of screening for hepatitis C is that it identifies people who are infected with the virus so they can be treated before the infection causes serious damage to the liver and other negative health outcomes, including death. Screening is important because many people who are infected with the HCV do not know it because they do not look or feel sick (7).

The Saudi Ministry of Health (MOH) seeks to obtain the worldwide goal to eliminate or eradicate HCV through included approach of prevention, detection, and treatment of chronic HCV patients. MOH has started implementing the National Program for HCV detection and treatment. This ambitious program is part of MOH's efforts to maintain both the health and safety of all community members, to enhance health lifestyles and alleviate disease burden. The vision 2030 program of screening and elimination of HCV disease may result in approximately 90% reduction in HCV new cases, 260 fewer cases of hepatocellular carcinoma, 440 fewer cases of decompensated cirrhosis, avoiding at least about 3000 deaths, 7800 fewer cases of HCV-associated cirrhosis until 2030 (8).

The study aimed to explore the knowledge and practice of the joint program of family medicine (JPFM) candidates in Makkah regarding HCV screening during 2020, in order to improve physician performance and achieve a better outcome in HCV management.

MATERIALS AND METHODS:

This is a cross-sectional study conducted among family medicine residents in Makkah, Saudi Arabia, during 2020-2021. The total number of JPFM Candidates in Makkah, as provided officially by the program administration is 161 resident doctors. Based on that, the sample size is 114 resident doctors, calculated by using Raosoft sample size calculator with a margin error of 5%, and a confidence level 95%. A self-administered questionnaire was distributed among the candidate residents during the half-day release course (HDRC) which was held every Tuesday in the center of the program for a period of one month. All ethical approvals were collected. The questionnaire was consisted of 3 separate parts which includes; socio demographic characteristics, assessment of knowledge and practices toward HCV screening.

Questionnaire criteria

The assessment of knowledge toward Hepatitis C virus screening comprised of 12 questions including 5-point Likert scale questions (Figure 1) and 7 questions (Table 2). The 5-point Liker scale questions were coded into “less than average” as 1, “average” as 2, “adequate” as 3, “good” as 4 and “excellent” as 5. The rest of the knowledge questionnaire (Table 2), were summarized by identifying the correct answer for each and were coded as 1 and the wrong answer were coded with 0. The total knowledge score has a range from 5 to 35 and by using 50% and 75% as a cutoff point to determine the level of knowledge, participants were considered as poor knowledge by the score range of 5 to 17 points, 18 to 26 were considered as moderate knowledge and 27 – 35 were considered as good knowledge.

The evaluation of practices toward Hepatitis C virus screening comprised of 8 questions was given at figure 2 where a 5-point Likert scale ranging from “never” coded as 1 to “always” coded as 5 were the answer options. The total score has a range from 8 up to 40 years old and by using 50% to 75% to determine the level of practices. Participants were classified as poor practices by the score range of 8 to 20 points, 21 to 30 points were classified as moderate level while 31 to 40 points were classified as good practices.

Statistical analysis

Descriptive statistics are presented using numbers, percentages, mean and standard deviation, whenever appropriate. Between comparisons, Mann Whitney U test and Kruskal Wallis test were applied. Normality tests were conducted using Shapiro Wilk, Kolmogorov and Smirnov tests. Data follows abnormal distribution. Thus, non-parametric tests were applied. Correlation procedure was also performed to determine the linear agreement between knowledge and practices score. Two-tailed analysis with $p < 0.05$ was used as the cutoff for statistical significance. All data analyses were performed using the statistical package for social sciences, version 21 (SPSS, Armonk, NY: IBM Corp, USA).

RESULTS:

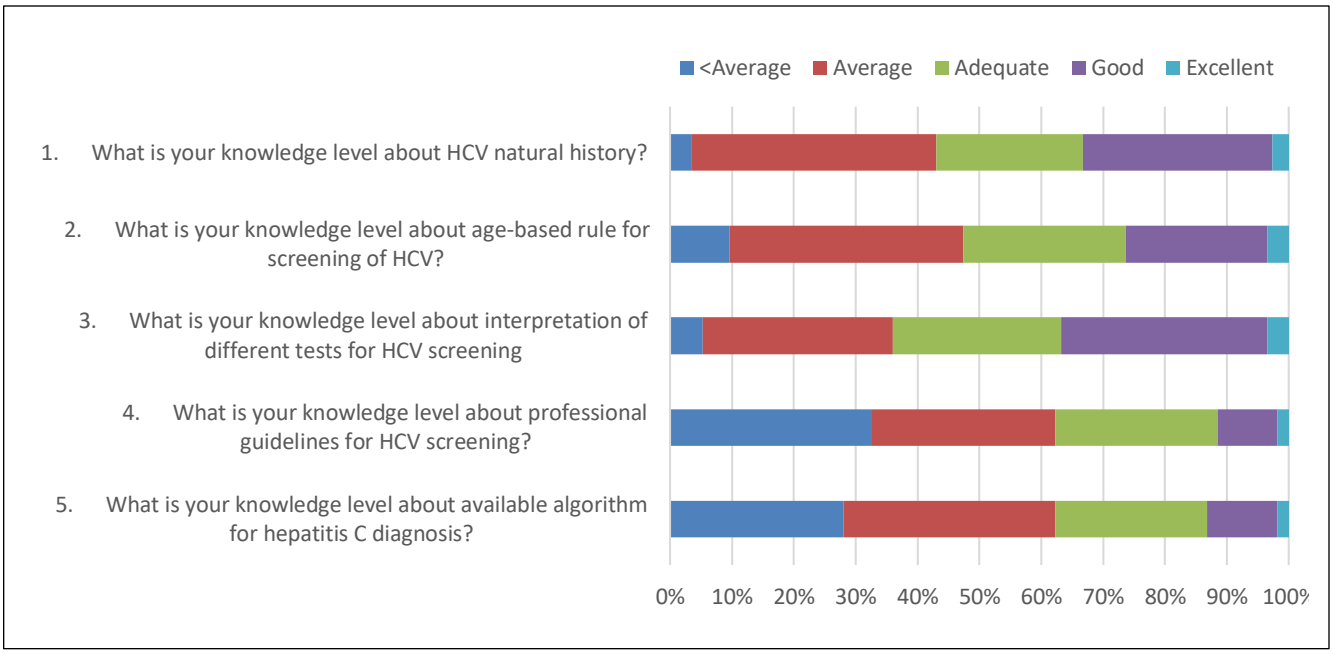
We enrolled 114 residents to measure their knowledge and practices toward Hepatitis C virus screening. Table 1 presented the socio demographic characteristics of the residents. The most common age group was 26 – 30 years (81.6%) with slightly more were males (50.9%) and majority were single (70.2%). Furthermore, approximately three quarters (72.8%) had 1 – 5 years of work experience. Likewise, approximately one-third (31.6%) were resident PGY2 and 24.6% were resident PGY1. The proportion of resident who attended any course or workshop related to HCV screening was 20.2% while the proportion of residents who handled patients diagnosed with HCV, screened patient for HCV and ordered a test with an intention to screen for HCV during the last year were 21.1%, 14.9% and 14.9%, respectively.

Table 1: Basic demographic characteristics of the residents (n=114)

Study Data	N (%)
Age group	
• 20 – 25 years	04 (03.5%)
• 26 – 30 years	93 (81.6%)
• 31 – 35 years	15 (13.2%)
• >35 years	02 (01.8%)
Gender	
• Male	58 (50.9%)
• Female	56 (49.1%)
Marital status	
• Single	80 (70.2%)
• Married	34 (29.8%)
Work experience	
• <1 year	19 (16.7%)
• 1 – 5 years	83 (72.8%)
• 5 – 10 years	10 (08.8%)
• >10 years	02 (01.8%)
Level of training	
• Resident PGY1	28 (24.6%)
• Resident PGY2	36 (31.6%)
• Resident PGY3	25 (21.9%)
• Resident PGY4	25 (21.9%)
Attended any course or workshop for HCV screening	
• Yes	23 (20.2%)
• No	91 (79.8%)
Handled patients diagnosed with HCV	
• Yes	24 (21.1%)
• No	90 (78.9%)
Have you screened any patient for HCV during last one year?	
• Yes	17 (14.9%)
• No	97 (85.1%)
Have you ordered a test with an intention to screen for HCV during the past year?	
• Yes	17 (14.9%)
• No	97 (85.1%)

Figure 1 showed the assessment of knowledge toward Hepatitis C virus screening where a 5-point Likert scale were the answer options, ranging from less than average to excellent. Based on the results, it was found that the residents showed good knowledge in the statement of "What is your knowledge level about interpretation of different tests for HCV screening" while it was poor since many of them rated less than average in the statement of "What is your knowledge level about professional guidelines for HCV screening" and "What is your knowledge level about available algorithm for hepatitis C diagnosis".

Figure 1: Assessment of knowledge toward Hepatitis C virus screening



The continuation of the knowledge assessment toward Hepatitis C virus screening has been described at table 2. It was revealed that 54.4% residents were correct that HCV antibody was a category for HCV antibody. It was also found that 64.9% were correct that HCV RNA by PCR was a category for confirmation of HCV. Furthermore, the most commonly mentioned knowledge about segments of population who were at risk to be screened for HCV was injection of drug users (91.2%), followed by patients with HBV or HIV (71.9%) and all healthcare workers (54.4%).

Table 2: Assessment of knowledge toward Hepatitis C virus screening (cont'd.) (n=114)

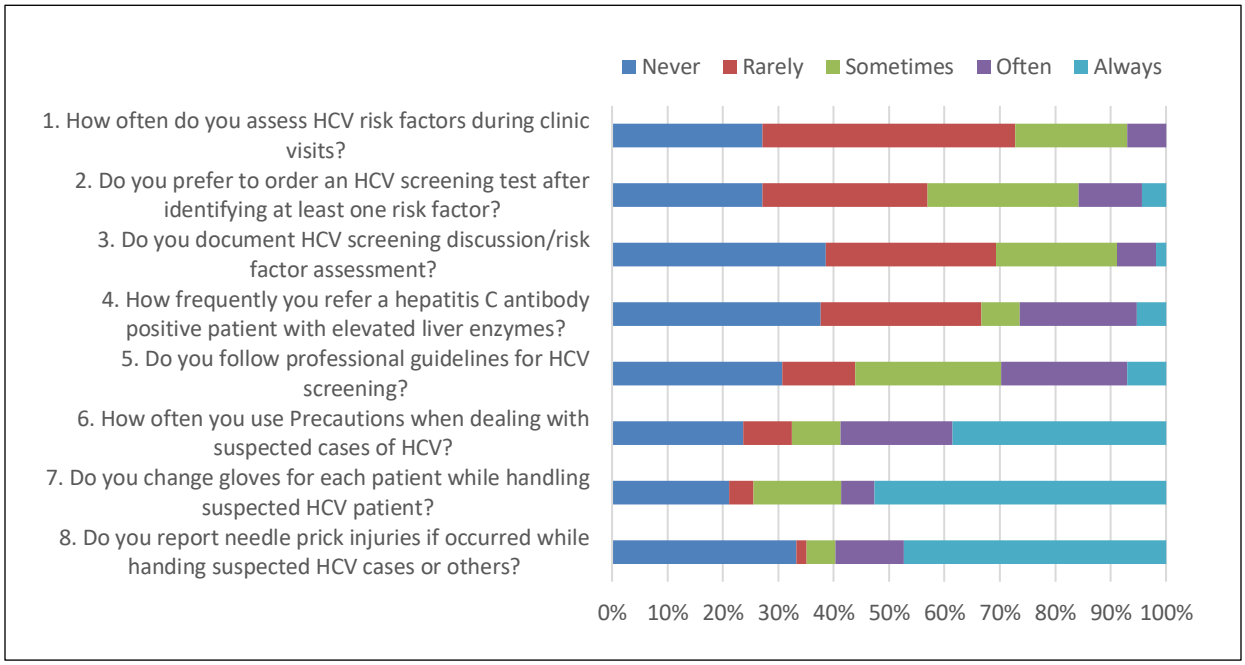
Knowledge statement	N (%)
1. Which of the following are categories for screening of HCV?	
• HCV antibody *	62 (54.4%)
• HCV RNA by PCR	25 (21.9%)
• Genotyping	02 (01.8%)
• All of the above	25 (21.9%)
2. Which of the following are categories for confirmation of HCV?	
• HCV antibody	29 (25.4%)
• HCV RNA by PCR *	74 (64.9%)
• Genotyping	02 (01.8%)
• All of the above	09 (07.9%)
3. What is your knowledge level about segments of population at risk to be screened for HCV? †	
• Injection drug users *	104 (91.2%)
• Patients with elevated liver enzymes *	35 (30.7%)
• All healthcare workers *	62 (54.4%)
• History of blood transfusion in 1995	60 (52.6%)
• Patients with HBV or HIV *	82 (71.9%)
4. Do you think HCV antibody (anti-HCV) test is sufficient to diagnose current HCV infection?	
• Yes	30 (26.3%)
• No *	84 (73.7%)
5. Do you know how soon after exposure to HCV can HCV antibodies be detected?	
• Within 1st week	10 (08.8%)

• 1 – 3 weeks	44 (38.6%)
• 4 – 7 weeks	36 (31.6%)
• 8 – 11 weeks *	24 (21.1%)
6. Do you know how soon after exposure to HCV can HCV RNA be detected?	
• Within 1st week	35 (30.7%)
• 1 – 2 weeks *	33 (28.9%)
• 3 – 4 weeks	40 (35.1%)
• 5 – 6 weeks	06 (05.3%)
7. Do you know that a patient with normal liver enzymes (e.g., ALT) still can have chronic hepatitis C?	
• Yes *	98 (86.0%)
• No	16 (14.0%)

* Indicates correct answer.
† Variable with multiple answers.

Figure 2 depicted the assessment of practices toward HCV screening. Based on the results, residents showed good rating for the following statements as majority of them rated always that includes; "Do you change gloves for each patient while handling suspected HCV patient?", "Do you report needle prick injuries if occurred while handing suspected HCV cases or others?" and "How often you use precautions when dealing with suspected cases of HCV?" while residents showed poor rating in the statement as majority rated either never or rarely including "How often do you assess HCV risk factors during clinic visits?", "Do you document HCV screening discussion/risk factor assessment?" and "Do you prefer to order an HCV screening test after identifying at least one risk factor?".

Figure 2: Assessment of practices toward Hepatitis C virus screening



The descriptive statistics for the knowledge and practices toward HCV screening was given at table 3. Following the results, the total mean knowledge was 18.8 (SD 4.17) out of 35 points with poor, moderate and good knowledge were identified among 36%, 56.1% and 7.9%, respectively. For practices, the overall mean practices score was 21.8 (SD 7.32) out of 40 points. Based on the given criteria, 36.8% were classified as poor practices, 53.5% were moderate while 9.6% were classified as good level of practices.

Table 3: Descriptive statistics for the knowledge and practices toward HCV screening (n=114)

Variables	N (%)
Knowledge score (mean ± SD)	18.8 ± 4.17
Level of knowledge	
• Poor	41 (36.0%)
• Moderate	64 (56.1%)
• Good	09 (07.9%)
Practices Score (mean ± SD)	21.8 ± 7.32
Level of practices	
• Poor	42 (36.8%)
• Moderate	61 (53.5%)
• Good	11 (09.6%)

When measuring the association between the knowledge and practices in relation to the socio demographic characteristics of residents, we have learned that residents who attended course or workshop related to HCV screening showed significantly better knowledge score (F=4.143; p=0.001) while those who handled patients diagnosed HCV (T=2.132; p=0.017) and those who have ordered a test with an intention to screen for HCV during the last year (T=1.943; p=0.044) were observed to have significantly better practices. On the other hand, residents in the first level of residents showed significantly lower knowledge score (F=2.465; p=0.025) and practices score (F=3.348; p=0.015) whereas those with less than 1-year work experience also exhibited lower practices score (F=3.380; p=0.039).

Table 4: Statistical Association between knowledge and practices toward HCV screening in relation to the basic demographic characteristics of the residents (n=114)

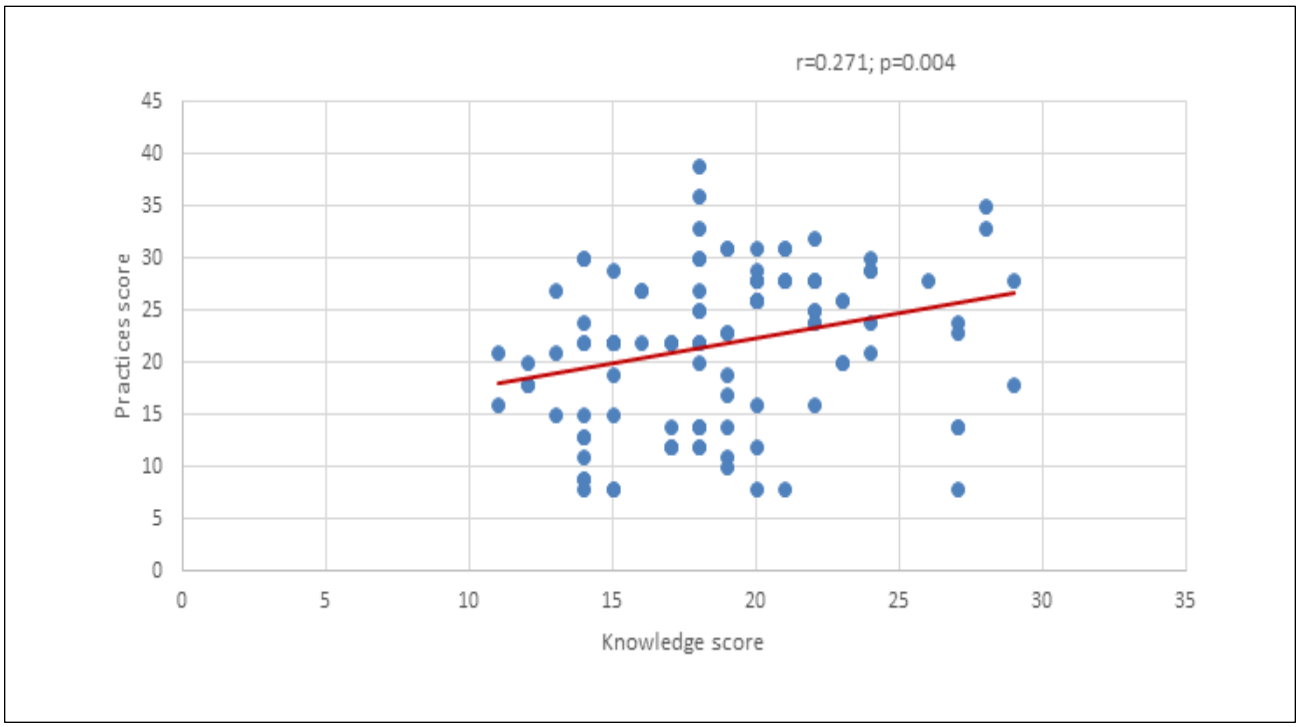
Factor	Knowledge Score		Practices Score	
	Total (35) Mean ± SD	T/F test; P-value	Total (40) Mean ± SD	T/F test; P-value
Age group [a]				
• ≤30 years	18.7 ± 4.20	T=-0.637; 0.490	22.4 ± 6.88	T=1.986; 0.104
• >35 years	19.4 ± 4.05		18.6 ± 9.03	
Gender [a]				
• Male	18.2 ± 3.84	T=-1.690; 0.101	21.8 ± 7.15	T=-0.008; 0.894
• Female	19.5 ± 4.42		21.8 ± 7.56	
Marital status [a]				
• Single	19.0 ± 4.05	T=0.722; 0.544	21.9 ± 7.06	T=0.282; 0.756
• Married	18.4 ± 4.47		21.5 ± 8.01	
Work experience [b]				
• <1 year	18.6 ± 4.07	F=0.194; 0.562	17.9 ± 8.05	F=3.380; **0.039 ****
• 1 – 5 years	18.8 ± 4.33		22.6 ± 6.68	
• >5 years	19.5 ± 3.37		22.7 ± 8.96	
Level of training [b]				
• Resident PGY1	17.0 ± 3.15	F=2.465; **0.025 ****	18.4 ± 6.38	F=3.348; **0.015 ****
• Resident PGY2	19.4 ± 4.33		22.2 ± 7.37	
• Resident PGY3	19.6 ± 4.79		24.3 ± 5.79	
• Resident PGY4	19.3 ± 3.90		22.6 ± 8.52	
Attended any course of workshop for HCV screening [a]				
• Yes	21.8 ± 4.86	T=4.143; **0.001 ****	21.1 ± 9.53	T=-0.520; 0.882
• No	18.1 ± 3.63		21.9 ± 6.70	
Handled patients diagnosed with HCV [a]				
• Yes	19.5 ± 4.23	T=0.848;	24.9 ± 6.48	T=2.432;

• No	18.6 ± 4.16	0.311	20.9 ± 7.33	**0.017 ****
Have you screened any patient for HCV during last one year? [a]				
• Yes	19.4 ± 4.44	T=0.637;	24.1 ± 6.21	T=1.386;
• No	18.7 ± 4.14	0.562	21.4 ± 7.46	0.177
Have you ordered a test with an intention to screen for HCV during the past year? [a]				
• Yes	18.4 ± 4.99	T=-0.431;	24.9 ± 6.51	T=1.943;
• No	18.9 ± 4.04	0.465	21.3 ± 7.35	**0.044 ****

[a] P-value has been calculated using Mann Whitney U test.
[b] P-value has been calculated using Kruskal Wallis test.
** Significant at p<0.05 level.

In figure 3, the correlation between the knowledge and practices score was positively highly statistically significant (r=0.271; p=0.004).

Figure 3: Correlation (Pearson-r) between knowledge and practices score



DISCUSSION:

The present study highlights the knowledge and practices of family medicine residents regarding HCV screening. Current investigative reports indicated that due to gaps in knowledge, the training program directors have great concerns surrounding family physicians that HCV should be included in their training modules (9). As there were limited studies that measured the knowledge and practices of family medicine physicians in relation to HCV screening, thus, we conducted this study with an aim to determine family medicine resident level of knowledge and practice toward HCV screening and understand the factors associated with it. In this study, we measured the knowledge of residents by means of 12 statements which generated a total score of 35 points. Our results revealed that, the total mean knowledge score was 18.8 (SD 4.17) with more than a half (56.1%) exhibited moderate knowledge, 36% were classified as poor and only 7.9% were classified into good level of knowledge. These findings are comparable from the paper of Samuel et al.(10) They

reported that most primary care physicians (PCPs) had moderate knowledge scores. In contrast, Falade-Nwulia et al. (11) as well as Coppola and colleagues (12) reported low knowledge level. Furthermore, we also noted that better knowledge score was widely prevalent among residents who attended any course or workshop for HCV screening while residents in their first year exhibited poor knowledge toward the subject, On the other hand, our study revealed that age was not a factor of knowledge which was similar from the paper of Clark et al.(13) However, Cox et al.(14) documented that age was a factor in family physicians providing basic-advance HCV knowledge and care. In another reports, Samuel et al.(10) provided conflicting reports, for example, they documented that the awareness of age-based screening recommendations was associated with HCV treatment knowledge. They also implied that PCP with knowledge of HCV treatment was also knowledgeable about HCV natural history denoting that, PCP with higher knowledge of HCV treatment tended to have higher knowledge of HCV natural history.

For the specific assessment of knowledge, our study accounted that more than a half (54.4%) of residents were aware that HCV antibody was the category for screening of HCV and 64.9% believe that HCV RNA by PCR was the confirmation of the test which was in accordance from the previous reports (10,11,13). Similarly, 71.9% considered injection drug users should be screened for HCV which was consistent from the paper of Clark et al.(13) as well as Boaz and colleagues (12). Conversely, 30.7% noted that patients with elevated enzymes were at higher risk to be screened for HCV which was in accordance from the reports published in United States (10,13).

HCV-related practices were assessed using 8 statements in 5-point Likert scale format with a total score of 40 points. According to the results, the total mean practices score was 21.8 (SD 7.32) and just like the knowledge, more than a half (53.5%) were categorized as moderate level of practices, 36.8% were categorized as poor and the rest were good practices level. Furthermore, we also identified the factors associated with practices and these includes; working experience, level of training, handled patients diagnosed with HCV and ordered a test with an intention to screen for HCV during the past year. To our knowledge, this is the first paper in Saudi Arabia that determined the level of practices and its associated factors, which was one of the hallmarks of this study. Moreover, it is important to note that there was a positive significant correlation between knowledge and practices score. Indicating that the increase of knowledge score is also the increase of practices score.

In the specific assessment of practices, we noted that residents exhibited poor practices in relation to the assessment of HCV risk factors during clinic visits as they never or rarely asked about it. Also, residents were never or rarely documented HCV screening discussion/risk factor assessment which did not differ from the paper published in the United States (10). We also noticed a similar poor results when asked, “How frequently you refer a hepatitis C antibody positive patient with elevated liver enzymes” as majority of the residents were never or rarely referred the patients. Furthermore, many of the residents do not follow professional guidelines for HCV screening which was consistent from the paper of Samuel and associates (10). However, Falade-Nwulia et al.(11) accounted better results as 78% of the primary care providers were aware of CDC defined ‘birth cohort” based HCV screening recommendations and 60% implemented it at the current practice settings.

Moreover, it is important to note that the perception of residents to attend any course or workshop related to HCV screening was poor, as only 20.2% were able to attend it while the perception to screen patients with suspected HCV was also poor, as only 14.9% were able to screen suspected HCV patients during the previous year. These reports were comparable from the study of Falade-Nwulia et al. (11). They accounted that 13% reported rarely screening of HCV whereas they also noted that one-third of primary care providers were having no prior hepatitis C training-care experience. Similarly, we have known that, only 21.1% were able to handle patients diagnosed with HCV whereas 14.9% were able to screen patients suspected with HCV and ordered a test with an intention to screen for HCV during the previous year. In the study of Coppola and associates (12), there were 44% of the primary care residents reported to have seen HCV patients in the past year which was higher than our reports.

CONCLUSION:

Although the knowledge and practices of family medicine residents toward Hepatitis C virus screening were deemed moderate however, there are still room for improvement. The knowledge and practices were relatively poor among freshman’s resident. The education about hepatitis C virus screening should be more focused for those residents who were in their younger years of working experience, specifically those in their first year level of training. Family medicine residents adept knowledge toward HCV screening is important to

increase HCV personnel that could strengthen opportunities for HCV screening and participating into management and care among these group of patients. Since family medicine residents is vital in the outcome intervention and management implementation, our investigations underscore topics necessary for provider-based didactic interventions intended to enhance HCV screening in medical practice.

REFERENCES:

1. Blach S, Zeuzem S, Manns M, Altraif I, Duberg A-S, Muljono DH, et al. Global prevalence and genotype distribution of hepatitis C virus infection in 2015: a modelling study. The Lancet Gastroenterology & Hepatology. 2017;2(3):161-76.
2. Mohd Hanafiah K, Groeger J, Flaxman AD, Wiersma ST. Global epidemiology of hepatitis C virus infection: new estimates of age-specific antibody to HCV seroprevalence. Hepatology. 2013;57(4):1333-42.
3. Aljumah AA, Abaalkhail F, Al-Ashgar H, Assiri A, Babatin M, Al Faleh F, et al. Epidemiology, disease burden, and treatment strategies of chronic hepatitis C virus infections in Saudi Arabia in the new treatment paradigm shift. Saudi journal of gastroenterology: official journal of the Saudi Gastroenterology Association. 2016;22(4):269.
4. Bawazir A, AlGusheri F, Jradi H, AlBalwi M, Abdel-Gader A-G. Hepatitis C virus genotypes in Saudi Arabia: a future prediction and laboratory profile. Virology journal. 2017;14(1):208.
5. Hepatitis C 2019 [Available from: https://www.who.int/news-room/fact-sheets/detail/hepatitis-c.
6. Stoove M, Gifford SM, Dore G. The impact of injecting drug use status on hepatitis C-related referral and treatment. Drug and alcohol dependence. 2005;77(1):81-6.
7. Joshi SN. Hepatitis C screening. Ochsner Journal. 2014;14(4):664-8.
8. Altraif I. Can hepatitis C virus be eliminated by 2030? Saudi Arabia as an example. Saudi medical journal. 2018;39(8):842.
9. Camminati CW, Simha A, Kolb NR, Prasad R. Intent to Build Hepatitis C Treatment Capacity Within Family Medicine Residencies: A Nationwide Survey of Program Directors: A CERA Study. Fam Med 2016; 48: 631-634 [PMID: 27655196].
10. Samuel ST, Martinez AD, Chen Y, Markatou M, Talal AH. Hepatitis C virus knowledge improves hepatitis C virus screening practices among primary care physicians. World journal of hepatology. 2018;10(2):319.
11. Falade-Nwulia O, McAdams-Mahmoud A, Irvin R, Niculescu A, Page K, Mix M, et al. Primary care providers knowledge, attitude and practices related to hepatitis C screening and treatment in the oral direct acting antiviral agents era. Journal of community medicine & health education. 2016;6(5).
12. Coppola AG, Karakousis PC, Metz DC, Go MF, Mhokashi M, Howden CW, et al. Hepatitis C knowledge among primary care residents: is our teaching adequate for the times? American Journal of Gastroenterology. 2004;99(9):1720-5.
13. Clark EC, Yawn BP, Galliher JM, Temte JL, Hickner J. Hepatitis C identification and management by family physicians. FAMILY MEDICINE-KANSAS CITY-. 2005;37(9):644.
14. Cox J, Graves L, Marks E, Tremblay C, Stephenson R, Lambert-Lanning A, Steben M. Knowledge, attitudes and behaviours associated with the provision of hepatitis C care by Canadian family physicians. Journal of viral hepatitis. 2011 Jul;18(7):e332-40.