

Melissa Palmer, M.D., Series Editor

Knowledge Gaps About Hepatitis C Prognosis and Treatment Among Non-Gastroenterologists and Medical Students



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What is Current Knowledge?

- New all oral regimens for chronic hepatitis C promise greater sustained viral response (SVR) rates.
- Underreporting of hepatitis C (HCV) infection has been well documented in the literature.

What is New Here?

- There is a lack of knowledge about HCV treatments and cure outside of hepatologists and specially trained gastroenterologists.
- Primary care physicians (PCPs) and medical students are unaware of modern HCV treatments.
- Experience managing HCV is associated with increased awareness of new therapeutics.

Introduction

In light of Centers for Disease Control and Prevention (CDC) and United States Preventative Task Force (USPTF) screening guidelines for HCV, we aimed to quantify the awareness of HCV curability and management among gastroenterologists, primary care physicians and medical students.

Methods

An online survey was disseminated to several email listservs affiliated with the Tulane University School of Medicine. Four categories of respondents were evaluated with Chi-Squared and Kruskal-Wallis testing: Gastroenterology (GI); Family and Internal Medicine (FIM); Clinical Medical Student (CMS); and Preclinical Medical Student (PMS).

Results

196 responses were analyzed (9 GI, 27 FIM, 90 PMS, and 70 CMS). Analysis identified differences in knowledge of HCV curability ($p < 0.001$), experience managing HCV ($p < 0.001$), and frequency of identifying interferon ($p < 0.001$), ribavirin ($p < 0.001$), or a protease inhibitor ($p < 0.001$) as treatment modalities. GI respondents consistently demonstrated greater knowledge of HCV curability, management, and treatment. Less than 60% of FIM and only 12-30% of medical students were aware that HCV is curable.

Discussion

The FIM, CMS, and PMS groups lacked knowledge concerning HCV treatments and curability, which indicates a possible need for outreach to non-GI specialists and medical training sites.

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INTRODUCTION

The hepatitis C virus (HCV) is estimated to infect 1.9-5.2 million Americans, with over 75% of cases becoming chronic.^{1,2} Many develop hepatic complications, such as cirrhosis or hepatocellular carcinoma, leading to total annual HCV management costs projected to exceed \$9 billion by 2024.^{3,4}

In the summer of 2012, the Centers for Disease Control and Prevention (CDC) advocated one time HCV screening for all persons born between 1945 and 1965, which the United States Preventative Task Force (USPSTF) later corroborated.^{5,6} This recommendation was likely related to the release of first generation direct antiviral agents (DAA), which have drastically increased sustained viral response (SVR) rates.^{7,8}

Though underreporting of both acute and chronic HCV have been confirmed elsewhere,⁹⁻¹³ few studies have examined knowledge among healthcare providers (HCPs) in the United States concerning curability and current pharmacotherapy for HCV. The Institute of Medicine's (IOM) 2010 report on viral hepatitis acknowledged a gap in provider knowledge about several aspects of HCV management, including the "sequelae of chronic viral hepatitis" as well as in "proper follow-up management for chronic infection", but did not squarely assess understanding of curability.² Studies assessing trainees' knowledge are also scant and could only be identified from Eastern countries.^{14,15}

Given the availability of new HCV therapeutics and increased potential for cure, it is necessary to assess knowledge about treatments among current and future physicians in the United States. We aimed to quantify the awareness of HCV curability and treatment among gastroenterologists, primary care physicians, and medical students.

METHODS

This is a cross-sectional study to assess the knowledge, attitudes and practices (KAP) of HCV pathogenesis and treatment among medical students and physicians at a single academic medical center (Tulane University School of Medicine in New Orleans, Louisiana).

Survey Creation

An online survey was created via GoogleForms, which included demographic (age, sex, zip code) and four study questions, listed in Table 1. Medical specialty or year of medical school education was also collected, as appropriate. To prevent bias by later study questions,

Question 1 concerning HCV curability, was presented on a single page before the remaining questions. The word "Cure" was used in the place of "SVR," as the authors did not believe the idiomatic hepatology language would be equally understood across all specialties. Students and faculty from the single center vetted the survey for clarity before distribution. Complete surveys are available in the online supplemental materials.

Survey Distribution

The KAP survey was initially distributed electronically to listservs of gastroenterology, family medicine, internal medicine and medical students on October 9, 2013. The subject line of the first recruitment email read "Louisiana Hepatitis Study". Recruitment was considered complete if twenty-five responses were received or the survey was distributed to the listserv three times. When required, surveys were redistributed with the subject line reading: "Quick Survey for Louisiana Hepatitis Study". A standardized form email was used to recruit survey responses (supplemental materials). Individuals 18 years of age or older who were either a current medical student or medical doctor affiliated with the single center were included.

Statistical Analysis

Data were downloaded from the GoogleSurvey tool, transformed for SPSS and divided into four subject populations for analysis: Gastroenterologist/Hepatologist (GI), Family and Internal Medicine (FIM), Clinical Medical Student (CMS) and Preclinical Medical Student (PMS). For the study, PMS included first- and second-year, and CMS includes third- and fourth-year medical students.

Chi-squared or Fisher's Exact were used to evaluate Questions 1, 2, and 4. Shapiro-Wilk testing for normality was performed on the Likert-scale responses of Question 3; none of the four subgroups were normally distributed (GI $p=0.037$; FIM $p<0.001$; CMS $p<0.001$; PMS $p<0.001$). Kruskal-Wallis testing was then employed for Question 3. SPSS Version 21.0 was used for analysis. Significance was set at $\alpha=0.05$.

RESULTS

Survey Respondents

A total of 201 survey responses were collected (9 GI, 24 Family Medicine, 8 Internal Medicine, and 160 medical students). The initial survey completion rate among students exceeded expectations, but physician response

rate was low and required multiple emails to the GI, Internal Medicine and Family Medicine listservs. Of the 8 Internal Medicine responses, 5 self-identified as specialists other than GI and were not included in the analysis. Family and internal medicine were combined to represent the primary care population. A total of 196 responses were evaluated (9 GI, 27 FIM, 70 CMS,

and 90 PMS). The average age and sex distribution by subgroup are presented in Table 2.

Knowledge of HCV Curability (Question 1)

Chi-squared testing showed significant differences when comparing all four groups for knowledge of HCV curability (p<0.001): 100% of GI, 59.3% of FIM,

Table 1. Questions and Responses to Survey

Survey Question	GI (n=9)	FIM (n=27)	CMS (n=70)	PMS (n=90)	Sig.
1. Is Chronic Hepatitis C Curable?	100%	59.3%	30.0%	12.2%	<0.001
Yes % (n)	(9)	(16)	(21)	(11)	
2. Have you managed a patient infected with the Hepatitis C virus?	100%	81.5%	72.9%	7.8%	<0.001
Yes % (n)	(9)	(22)	(51)	(7)	
3. What magnitude of impact does Chronic Hepatitis C infection have on patient health?	4.00	3.67	4.10	3.80	0.026
Mean (IQR)	(3-5)	(3-4)	(4-5)	(3-4)	
4. Please list any drugs used to treat Chronic Hepatitis C virus infection.					
IFN Mentioned % (n)	100% (8)	82.6% (19)	78.9% (45)	20.0% (12)	<0.001
RBV Mentioned % (n)	87.5% (7)	56.5% (13)	59.6% (34)	11.9% (7)	<0.001
DAA Mentioned % (n)	75.0% (6)	17.4% (4)	14.0% (8)	5.0% (3)	<0.001

Questions 1. and 2. were drop down selections of “Yes/No” and “I Do Not Know” what HCV is for question 1. Chi-Squared was calculated for proportions answering “Yes”. Question 3. was a Likert-Scale (1-5) response, and was assessed via Kruskal-Wallis Testing. Question 4. was open-ended; responses were screened for mention of IFN, RBV, or a PI. If a respondent left question 4. blank, that response was censored from analysis.

Abbreviations: GI – Gastroenterologist; FIM – Family and Internal Medicine; CMS – Clinical Medical Students; PMS (Preclinical Medical Students); Sig. – Significance; IQR – Interquartile Range; IFN – Interferon; RBV – Ribavirin; DAA – Direct Antiviral Agent

30.0% of CMS and 12.2% of PMS reported that HCV was curable. Proportional analysis showed that all four groups were significantly different from each other in awareness of curability.

Experience Managing HCV Infection (Question 2)

Chi-squared testing detected a significant difference in experience managing HCV patients ($p < 0.001$). 100% of GI, 81.5% of FIM, 72.9% of CMS and 7.8% of PMS claimed experience managing HCV. Respondents with experience managing HCV had 4.883 the odds of reporting that HCV was curable (95% CI: 2.497 – 9.549; $p < 0.001$).

Perception of Hepatitis C on Patient Health (Question 3)

Kruskal-Wallis testing found significant differences among subject populations on awareness of the extent of injury associated with chronic HCV ($p = 0.026$). Mean and interquartile range was 4 (3-5) for GI, 3.67 (3-4) for FIM, 4.10 (4-5) for CMS and 3.80 (3-4) for PMS. No post-hoc comparisons were significant.

Knowledge of Hepatitis C Treatments (Question 4)

There was a significant difference in proportions reporting interferon as a drug used to treat hepatitis C ($p < 0.001$): 100% of GI, 82.6% of FIM, 78.9% of CMS and 20.0% of PMS cited interferon. Proportional analysis showed that PMS had lower proportional knowledge of interferon than all other groups.

There was a significant difference in proportions reporting ribavirin as a drug used to treat hepatitis C ($p < 0.001$): 87.5% of GI, 56.5% of FIM, 59.6% of CMS and 11.9% of PMS cited ribavirin. Proportional analysis showed that PMS had lower proportional knowledge

of ribavirin than all other groups.

There was a significant difference in proportions naming a DAA (telaprevir, boceprevir, or sofosbuvir) as a treatment for HCV ($p < 0.001$): 75.0% of GI, 17.4% of FIM, 14.0% of CMS and 5.0% of PMS cited one or more protease inhibitors. Proportional analysis showed that GI mentioned a protease inhibitor in greater proportions than all other groups.

DISCUSSION

This study exposed shortfalls of knowledge about the prognosis and treatments for hepatitis C. In light of the rapidly evolving field of HCV therapeutics and the recent joint release of guidelines by the American Association for the Study of Liver Disease and the Infectious Disease Society of America on screening and treatment of HCV, it is of great importance to assess healthcare provider knowledge.¹⁶

Greater knowledge of curability and treatment among GI was expected, as they are most involved in HCV management and research. With the recent release of second generation DAAs promising fewer side effects, lower rates of complication, and shorter treatment periods,¹⁷⁻¹⁹ it may fall on primary care physicians to discuss treatment with the HCV patient. Thus, with only 60% of FIM acknowledging curability for HCV in our cohort, and even fewer capable of mentioning a DAA, there is a clear need for improved outreach.

Similarly, underreporting of HCV is a serious issue increasingly documented in the literature.^{12,13,20} A recent NHANES report showed that only 32-38% of all HCV antibody positive people in the United States received follow-up care.¹² Specialist referral of diagnosed HCV patients has failed to surpass 50% in several cross sectional studies.^{21,22} Definitive reasons for undertreatment and underreporting are not answered

Table 2. Age and Sex Distribution by Study Group

Subject Population (n)	GI (9)	FIM (27)	CMS (70)	PMS (90)
Age, Mean (IQR)	39 (34-41)	46 (40-56)	28 (26-29)	26 (23-27)
Sex, n (% Male)	7 (77.8)	21 (77.8)	38 (54.3)	45 (50.0)

Only responses Included in analysis are represented. Age rounded to nearest year.

Abbreviations: GI – Gastroenterologist; FIM – Family and Internal Medicine; CMS – Clinical Medical Students; PMS – Preclinical Medical Students; IQR – interquartile range

by the study, but it is reasonable to assume insufficient incentive for either with limited knowledge regarding its curability.

The low level of insight among medical students regarding HCV curability and pharmacological agents suggests that a push towards graduate medical education is necessary. Interestingly, CMS were able to mention interferon and ribavirin at higher rates than PMS, suggesting some exposure to early HCV treatments in clinical years.

There were several limitations to this study. Firstly, the data set was restricted to a single academic center, limiting generalizability and may be skewed by the university's educational programming. Additionally, the initial protocol compared subspecialists with primary care and medical students, but the survey response rate among physicians was lacking and consequently subspecialists were excluded from analysis. Although respondents were instructed not to use outside resources, the online format for the survey created potential for bias by respondents researching answers.

CONCLUSION

We identified a gap in knowledge about HCV treatments and curability among primary care providers and medical students. Though a full policy discussion is beyond the scope of this paper, we recognize the need for a national assessment and possibly improved dissemination of information concerning HCV treatments to non-GI specialists and medical trainees. Without an appropriate fund of knowledge amongst medical trainees and general practitioners, patients with chronic HCV are wont to face difficulty in obtaining appropriate medical referrals for the most up-to-date treatments. ■

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