HHS Public Access

Author manuscript

*J Alcohol Drug Educ*. Author manuscript; available in PMC 2016 April 01.

Published in final edited form as:

*J Alcohol Drug Educ*. 2014 December ; 58(3): 7–18.

# Development of a Measure of Hepatitis C-alcohol Knowledge

**Rae Jean Proeschold-Bell, PhD**,
Duke Global Health Institute, Center for Health Policy and Inequalities Research, Duke University

**Jia Yao, MA**,
Center for Health Policy and Inequalities Research, and NINR P30 Adapt Center for Cognitive/Affective Symptom Science, Duke University

**Sisira Gorthala, BS**, and
Duke Global Health Institute, Duke University

**Andrew Muir, MD, MHS**
Duke Clinical Research Institute, Duke School of Medicine, Duke University Medical Center, Department of Gastroenterology, Duke University Medical Center

## Abstract

Alcohol use by persons with hepatitis C (HCV) increases the risk of cirrhosis and hepatocellular carcinoma, yet no measures on knowledge of the effects of alcohol use on HCV have been published. We developed 7 items assessing knowledge of the relationship between HCV and alcohol use. We enrolled 53 patients with HCV and risky alcohol use in an HCV-alcohol treatment study. All 53 participants completed a baseline interview, with 35 and 45 participants completing additional interviews at three and six months, respectively. We used generalized estimating equations (GEE) regression to account for non-independence of subjects and attrition. We assessed changes in HCV-alcohol knowledge at three and six months compared to baseline. Knowledge significantly increased at three months, compared to baseline (β=0.392, $p$=0.005), and had a trend toward significance at six months, compared to baseline (β=0.232, $p$=0.074). We also tested for between-subject differences in HCV-alcohol knowledge by demographic variables. HCV-alcohol knowledge did not significantly vary by gender, age, baseline HIV status, or baseline depression. Participants with higher educational attainment (β=0.052, $p$=0.057) had a trend toward significantly higher HCV-alcohol knowledge scores, and White participants had higher HCV-alcohol knowledge scores (β=0.349, $p$=0.002) than participants of all other races combined. In a second GEE regression model, we examined the relationship between change in HCV-alcohol knowledge and change in alcohol use severity scores over time. Increases in one's HCV-alcohol knowledge score were significantly related to greater reductions in alcohol use severity scores (β=−0.052, $p$=0.027). Thus, the seven-item HCV-alcohol Knowledge Scale successfully identified changes in HCV-alcohol knowledge after exposure to HCV-alcohol education. In addition, improvements in HCV-alcohol knowledge, as assessed by the scale, predicted decreases in alcohol use over time. These findings support the use of the HCV-alcohol Knowledge Scale as both a research and clinical tool.

Please direct comments to Rae Jean Proeschold-Bell at rae.jean@duke.edu.

## Introduction

Hepatitis C (HCV) is the most common blood-borne virus in the United States (US), infecting an estimated 1.6% of the US population, corresponding to 4.1 million people (Armstrong et al., 2006). Alcohol use in patients with HCV has been shown to increase the risk of progression to cirrhosis, as well as the development of hepatocellular carcinoma (Poynard et al., 1997). Despite these health implications, studies have shown that adults with HCV are eight times more likely to consume three or more drinks daily, compared with adults who do not have HCV (Armstrong et al., 2006). Thus, it is essential that persons with HCV infection understand the need to abstain from alcohol use and then get the support to do so.

Interventionists designing alcohol treatment programs for HCV-infected individuals may choose to incorporate education on the relationship between alcohol use and liver health. Research suggests that persons with dual disease states are more motivated to make behavioral changes, when the behavior directly affects one or more of their diseases (Weisner et al., 2001). Because alcohol use directly impacts HCV-related health outcomes, people with HCV should be especially motivated to decrease their alcohol consumption, when provided with education.

Researchers studying alcohol treatment outcomes for HCV-infected individuals could benefit from measures of whether participants understand the HCV-related reasons to decrease alcohol use. Such a measure may be helpful for interventionists to use mid-intervention to assess what essential HCV-alcohol information participants do and do not yet understand. The measure could also be used as an indicator of an individual's ultimate alcohol outcome.

We were unable to find any existing measures of HCV knowledge that include a substantial alcohol component. Of general HCV knowledge measures, the Brief HCV Knowledge Scale devotes only 1 out of 19 items to alcohol use (Balfour et al., 2009). A measure by Strauss and colleagues (2006) consisting of 20 items on HCV knowledge has only one item that references alcohol (Strauss et al., 2006). Finally, a measure used by Surjadi and colleagues includes 31 HCV knowledge questions, but none of the items reference alcohol (2011). Thus, HCV knowledge measures that include alcohol-related content are needed, especially given the impact of alcohol use on HCV-related health outcomes.

We developed a measure of knowledge of the relationship between HCV and alcohol. Two of us wrote HCV-alcohol items and then shared them with three HCV medical providers and one addictions therapist. The providers suggested wording changes to make the items optimally clear from a patient perspective. The authors incorporated this feedback and finalized seven items for inclusion in interviews with HCV-infected patients reporting alcohol use.

We conducted a study with three aims. The first aim was to assess the ability of this HCV-alcohol knowledge measure, called the HCV-alcohol Knowledge Scale, to identify changes in HCV-alcohol knowledge after exposure to HCV-alcohol education. This is important because to be useful for both research and clinical purposes, any knowledge measure needs

to be sensitive to changes in knowledge. The second aim was to determine any demographic characteristics related to HCV-alcohol knowledge, to inform targeting HCV-alcohol knowledge interventions to specific sub-groups. The third aim was to determine if changes in HCV-alcohol knowledge as assessed by this measure predict changes in alcohol use, because decreased alcohol use is the ultimate goal of providing HCV-alcohol education in the context of alcohol treatment.

## Methods

As part of the Hepatitis C-Alcohol Reduction Team (Hep ART) study (Proeschold-Bell et al., 2012), we screened patients presenting with HCV at the Duke Liver Clinic for risky alcohol use using the 10-item Alcohol Use Disorders Identification Test (AUDIT). Cut-off scores of eight in men and four in women have been shown to identify risky alcohol consumption with adverse medical consequences (National Institute of Alcohol Abuse and Alcoholism, 2007). HCV medical providers invited patients with risky alcohol scores who were also age 18 or older and English-speaking to participate in an HCV-alcohol treatment study. Consenting patients agreed to complete research interviews at baseline, three, and six months, and to attend six months of group and individual addictions therapy provided in the liver clinic. The therapy included psychoeducation on the content included in the seven-item HCV-alcohol measure.

A trained interviewer who was not involved in the intervention conducted face-to-face participant interviews in a private location at the clinic or participant's home. The baseline interview contained demographic items including race, gender, age, and education as well as HIV status. For race, participants could choose multiple categories of: Black or African-American, Alaska Native/American Indian, Asian, White, Native Hawaiian/Pacific Islander, and Other. Education was measured in number of years completed. The interviews at zero, three, and six months included the seven HCV-alcohol knowledge items, provided at the end of this letter, which were scored as correct (1) or incorrect (0), with a response of "don't know" being counted as incorrect. We scaled the items by counting the number of correct answers, such that the final scale ranges from 0 to 7, with higher scores indicating better HCV-alcohol knowledge.

All interviews assessed depression symptoms using the Patient Health Questionnaire (PHQ–9), which consists of nine items on the frequency of symptoms during the past two weeks. Scores range from 0 to 27, with higher scores indicating more severe depression (Spitzer et al., 1999). All interviews also used the Addiction Severity Index-Lite (ASI) to assess the severity and patterns of alcohol use over time (McLellan et al, 1992).

### Statistical Analyses

In statistical analyses, we used generalized estimating equations (GEE) regression to account for non-independence of subjects and attrition. In the first multivariable regression model, we assessed changes in HCV-alcohol knowledge at three and six months compared to baseline. We also tested for between-subject differences in HCV-alcohol knowledge by gender, age, White race compared to all other racial identifications, education, depression score, and HIV status using multivariable analyses. In a second GEE regression model, we

examined the relationship between change in HCV-alcohol knowledge and change in alcohol use severity scores over time, including the same set of control variables. All analyses were conducted using STATA 13.1.

This study was approved by the Duke Medical Center Institutional Review Board. All patients provided written informed consent before study participation.

## Results

A total of 53 patients with HCV and risky alcohol use enrolled in the HCV-alcohol treatment study. All 53 participants completed the baseline interview, with 35 and 45 participants completing the three- and six-month interviews, respectively. Table 1 depicts changes in HCV-alcohol knowledge across time. The regression analysis pairs observations from each individual who answered the items at two or more time points, thereby accounting for attrition. Knowledge significantly increased at three months, compared to baseline (β=0.392, $p$=0.005), and had a trend toward significance at six months, compared to baseline (β=0.232, $p$=0.074). HCV-alcohol knowledge did not significantly vary by gender, age, baseline HIV status, or baseline depression. Participants with higher educational attainment (β=0.052, $p$=0.057) had a trend toward significantly higher HCV-alcohol knowledge scores. White participants had higher HCV-alcohol knowledge scores (β=0.349, $p$=0.002) than participants of all other races combined.

Table 2 depicts the relationship between variables and change in alcohol severity scores across time. Increases in one's HCV-alcohol knowledge score were significantly related to greater reductions in alcohol use severity scores (β=−0.052, $p$=0.027). Higher depression scores at baseline were also related to significantly greater reductions in alcohol use severity scores (β=−0.011, $p$<0.001). In contrast, having HIV at baseline, compared to not having HIV, was related to significant increases in alcohol use severity scores (β=0.117, $p$=0.013).

## Discussion

The reduction of alcohol use among people with HCV is critically important because it prevents or delays HCV disease progression. For people who successfully undergo antiviral treatment for HCV, reduced alcohol consumption prevents additional damage to a liver that has already been assaulted by HCV. To date, no measures assessing HCV-infected patients' understanding of the interplay between alcohol and HCV disease have been published.

This study's findings indicate that the seven-item HCV-alcohol Knowledge Scale successfully identifies changes in HCV-alcohol knowledge after exposure to HCV-alcohol education. In addition, improvements in HCV-alcohol knowledge, as assessed by the scale, predicted decreases in alcohol use over time. Taken together, these findings support the use of the HCV-alcohol Knowledge Scale as both a research and clinical tool. Interventionists can use the seven items to identify gaps in knowledge about the relationship between HCV and alcohol use. Furthermore, the measure can be used to assess changes in HCV-alcohol knowledge over time, linked with the goal of decreasing or eliminating alcohol use. Evaluation research of alcohol reduction programs for persons with HCV may benefit from

the HCV-alcohol Knowledge Scale as an intermediate indicator of patient progress, in conjunction with alcohol use outcome measures.

Improving HCV-alcohol understanding based on the items in this measure may be important for alcohol use outcomes. When paired with opportunities for individual and group alcohol therapy, improvements in HCV-alcohol knowledge predicted significant decreases in alcohol use at three and six months. This study is unable to assess changes in alcohol use based on HCV-alcohol education in the absence of alcohol treatment; however, patients with HCV who continue risky drinking after their HCV diagnosis – a time when patients are universally instructed not to drink alcohol – likely need more support than information alone to reduce their alcohol consumption. It is possible that HCV-alcohol information is a helpful but insufficient support in reducing alcohol use. As noted previously, patients with a health diagnosis related to a behavioral diagnosis such as alcohol use disorders, are more motivated to change their behavior (Weisner et al., 2001). Providing education on the interplay between the behavior and health diagnosis is a necessary step to enhance motivation. The HCV-alcohol Knowledge Scale reported here can play an important role in measuring initial HCV-alcohol knowledge and then changes over time to assist in alcohol use reduction.

In addition, we tested for differences in HCV-alcohol knowledge among a number of demographic groups at baseline, and found significant differences in only two subgroups. First, there was a trend for participants with more education to have better HCV-alcohol knowledge scores. This is not surprising; people with more education may do better on test-like questions in general, and may also seek more health information or better remember information given to them by medical providers. Second, we found a trend for White participants to have better HCV-alcohol knowledge, above and beyond education status. More study is needed to determine if any terms used in the measure's items were not culturally relevant or understandable to participants of other races, who mostly identified as African-American in the study's sample. However, it is also possible that African-American participants with HCV were, in fact, less informed about HCV and alcohol use and should be targeted for HCV-alcohol education.

One study limitation is the use of a predominantly White and African-American sample, all with HCV infection, drawn from a single liver clinic. Additional research is needed to examine whether the HCV-alcohol Knowledge Scale is acceptable to other populations, such as Latino patients and those of unknown or negative HCV status. In addition, the small sample size in this study limited the diversity of the sample. At the same time, it is encouraging that statistically significant changes in HCV-alcohol knowledge were found with such a small sample, indicating that the measure is sensitive to knowledge changes. Finally, future research is needed to test the utility of this measure as an intermediate or endpoint measure with diverse interventions.

Alcohol use among HCV-infected patients is a serious problem with direct negative health consequences. Programs to improve patient understanding of the effects of alcohol use on liver health among people with HCV are needed, and those programs need corresponding evaluation to assess their success. Interventionists and therapists also need tools to assess

patient knowledge of HCV and alcohol use. This study offers a brief HCV-alcohol knowledge measure that can support researchers and clinicians in this important work.

## Acknowledgments

The study was funded by NIH-NIAAA 1R21AA017252-01A1, “Integrated Intervention for Co-Occurring Alcohol Abuse and HCV.” We would like to thank the Duke Center for AIDS Research (NIAID grant P30-AI064518) for assistance with study design and measures; Elizabeth Goacher for help developing the knowledge items; Christopher Foye and Donna Safley for data collection and management; Liz Turner of the Duke Global Health Institute Biostatistics Core and Kaitlin Toner at Duke’s Social Science Research Institute for statistical consultation; and Dana Mangum for literature review.

## References

Armstrong GL, Wasley A, Simard EP, McQuillan GM, Kuhnert WL, Alter MJ. The Prevalence of hepatitis C virus infection in the United States, 1999 through 2002. Annals of Internal Medicine. 2006; 144(10):705–714.10.7326/0003-4819-144-10-200605160-00004 [PubMed: 16702586]

Balfour L, Kowal J, Corace KM, Tasca GA, Krysanski V, Cooper CL, Garber G. Increasing public awareness about hepatitis C: development and validation of the brief hepatitis C knowledge scale. Scandinavian Journal of Caring Sciences. 2009; 23(4):801–808.10.1111/j.1471-6712.2008.00668.x [PubMed: 19500309]

McLellan AT, Kushner H, Metzger D, Peters R, Smith I, Argeriou M. The fifth edition of the Addiction Severity Index. Journal of Substance Abuse Treatment. 1992; 9(3):199–213. [PubMed: 1334156]

National Institute of Alcohol Abuse and Alcoholism. Helping patients who drink too much: A clinician’s guide. 2007. Retrieved from http://pubs.niaaa.nih.gov/publications/practitioner/cliniciansguide2005/clinicians_guide.htm

Poynard T, Bedossa P, Opolon P. Natural history of liver fibrosis progression in patients with chronic hepatitis C. The Lancet. 1997; 349(9055):825–832.10.1016/S0140-6736(96)07642-8

Proeschold-Bell RJ, Patkar AA, Naggie S, Coward L, Mannelli P, Yao J, Muir AJ. An integrated alcohol abuse and medical treatment model for patients with hepatitis C. Digestive Diseases and Sciences. 2012; 57(4):1083–1091.10.1007/s10620-011-1976-4 [PubMed: 22134784]

Spitzer RL, Kroenke K, Williams JW. and the Patient Health Questionnaire Primary Care Study Group. Validation and utility of a self-report version of prime-md: The PHQ primary care study. JAMA: Journal of the American Medical Association. 1999; 282(18):1737–1744.10.1001/jama.282.18.1737 [PubMed: 10568646]

Strauss SM, Astone-Twerell JM, Munoz-Plaza C, Jarlais DCD, Gwadz M, Hagan H, Rosenblum A. Hepatitis C knowledge among staff in U.S. drug treatment programs. Journal of Drug Education. 2006; 36(2):141–168.10.2190/3EMQ-N350-W4XN-WT1X [PubMed: 17153514]

Surjadi M, Torruellas C, Ayala C Jr, HFY, Khalili M. Formal patient education improves patient knowledge of hepatitis C in vulnerable populations. Digestive Diseases and Sciences. 2011; 56(1):213–219.10.1007/s10620-010-1455-3 [PubMed: 20972850]

Weisner C, Mertens J, Parthasarathy S, Moore C, Lu Y. Integrating primary medical care with addiction treatment: A randomized controlled trial. JAMA: Journal of the American Medical Association. 2001; 286(14):1715–1723.10.1001/jama.286.14.1715 [PubMed: 11594896]

## Appendix

## HCV-alcohol Knowledge Scale

1. If you have hepatitis C, what is the amount of alcohol you think you are allowed to drink without harming your health?

   No alcohol*

1–2 drinks per week

1–2 drinks per day

I don't know

2. If you have hepatitis C, will quitting drinking increase the chances that your liver will get better? Response options: Yes*, No, I don't know

3. What can alcohol cause hepatitis C to do? Would you say…

   Alcohol can cause hepatitis C to progress faster to liver cirrhosis.*

   Alcohol can cause hepatitis C to attack your blood vessels.

   Alcohol can cause hepatitis C to go away.

   I don't know

4. If you have hepatitis C and you feel fine, does that mean that your liver is normal? Response options: Yes, No*, I don't know

5. Is it OK to drink alcohol if you have hepatitis C but do not have any liver symptoms, like cirrhosis or liver cancer? Response options: Yes, No*, I don't know

6. If you need hepatitis C treatment, would your doctor advise postponing it if you drink alcohol? Response options: Yes*, No, I don't know

7. Does your team of hepatitis C providers think that it is OK for you to drink alcohol? Response options: Yes, No*, I don't know

*An asterisk is next to the correct answer.

**Table 1**

GEE regression analysis examining change in HCV-alcohol knowledge over time and the relation between demographic variables and HCV-alcohol knowledge

| Variable | Coefficient | Standard Error | P value |
|---|---|---|---|
| Female gender | 0.007 | 0.135 | 0.962 |
| Age (in years) | −0.004 | 0.008 | 0.603 |
| White race (compared to all others) | 0.349 | 0.114 | 0.002 |
| Education | 0.052 | 0.028 | 0.057 |
| HIV status at baseline | 0.198 | 0.161 | 0.218 |
| Depression score at baseline (sum) | −0.013 | 0.010 | 0.184 |
| Three months compared to baseline | 0.392 | 0.140 | 0.005 |
| Six months compared to baseline | 0.232 | 0.130 | 0.074 |

Individuals = 53, completing a total of 133 interviews. All participants were included even if they only completed the baseline interview.

White race is compared to participants of all other races, who were Black (n=34), mixed Black and American Indian (n=1), and “Other” (n=2).

**Table 2**

Multivariable regression on change in alcohol use severity scores over time from baseline to three- or six-month interview

| Variable | Coefficient | Standard Error | P value |
|---|---|---|---|
| Change in alcohol knowledge score from baseline | −0.052 | 0.023 | 0.027 |
| Female gender | −0.009 | 0.039 | 0.817 |
| Age (in years) | 0.003 | 0.003 | 0.261 |
| White race (compared to all others) | 0.058 | 0.042 | 0.175 |
| Education | −0.007 | 0.007 | 0.333 |
| HIV status at baseline | 0.117 | 0.046 | 0.013 |
| Depression score at baseline (sum) | −0.011 | 0.003 | 0.000 |

Individuals = 46, completing a total of 80 interviews. Participants were included only if they completed the baseline interview and at least one of the follow-up interviews.

White race is compared to participants of all other races, who were Black (n=34), mixed Black and American Indian (n=1), and “Other” (n=2).