

Efficacy of Group Education in Veterans with Hepatitis C

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Despite the high prevalence of hepatitis C virus infection among veterans, patients seem to know very little about the disease. Here, VA clinicians investigate whether a group class for infected veterans could be the answer.

Hepatitis C virus (HCV) infection affects approximately four million Americans and is the most common blood-borne illness in the United States.¹⁻³ In the VHA, HCV is a particular focus, since its incidence is believed to be up to four times greater among veterans who use VHA facilities than among the general U.S. population.⁴⁻⁶

Nevertheless, studies have found poor knowledge of HCV among the general population as well as infected patients.^{7,8} The disease is estimated to affect 60% to 90% of past or current intravenous drug users,⁹⁻¹² yet many people in this category do not know their HCV status or wrongly believe they are seronegative.^{8,13,14} A study at the substance abuse treatment unit of the Philadelphia VA Medical Center, Philadelphia, PA found that over 90% of patients tested positive for HCV—among whom 90% were unaware of their diagnosis and 41% were unable to describe the mode of transmission or complications of HCV.¹⁵ Furthermore, a Spanish study of individuals infected with hepatitis B virus or

HCV found that only 24% understood how their disease was transmitted.⁷ In light of these findings, it is not surprising that many authors have cited the need for better patient education about HCV.^{7,8,15-19}

Group educational classes offer one possible means of providing HCV education. Research has identified group educational programs for patients with other chronic illnesses—such as HIV, asthma, and epilepsy—as an effective means of increasing knowledge, modifying risk behavior, improving self-management skills, and enhancing quality of life.²⁰⁻²³ Given the success of these programs, the NIH and VHA have encouraged the development of similar educational programs for HCV-infected individuals.^{1,24} At present, though, most medical facilities do not offer such classes, and one study found that only about half of U.S. drug treatment programs provide HCV education to all patients.^{16,17} To our knowledge, no studies have evaluated the efficacy of group education in patients with HCV.

To help fill this gap, we implemented a group HCV educational class at the Northwest Hepatitis C Resource Center (HCRC) at the Portland VA Medical Center (VAMC), Portland, OR and studied the impact of this class on patients' knowledge of their disease. In this article, we describe the class and the methods we used to test patients' HCV knowledge before and after the class. We then

present our statistical analysis of patients' test scores and discuss the possible influences of demographic and other patient characteristics—such as educational levels attained, mental health histories, and preclass exposure to HCV education.

THE CLASS

Between October 2002 and October 2004, staff at the Portland VAMC invited all patients newly referred to the HCV clinic who were deemed appropriate to receive education in a group setting and who had not received prior group HCV education to attend a one-session educational class entitled "Living with Hepatitis C." The invitations were extended by letter and telephone approximately one month before each patient's initial HCV clinic appointment. Approximately two classes were held per month, for a total of 45 classes held during the study period.

The 90-minute class began with an orientation to the Northwest HCRC and its services, including discussion and signing of informed consent for the study. Next, patients completed a Patient Screening Questionnaire (PSQ) for mental health and substance-related disorders (available from the corresponding author, D.W. Indest, by e-mailing david.indest@va.gov), as well as the second edition of the Beck Depression Inventory (BDI-II), a 21-question, self-report survey of depression.²⁵ Before the conclusion of the class session, staff

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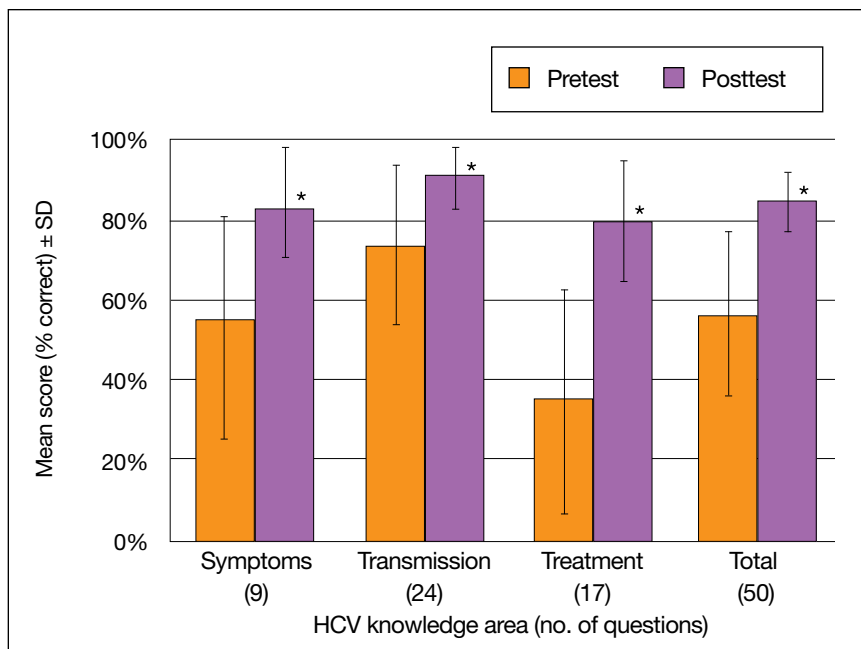


Figure 1. Change in mean hepatitis C virus (HCV) knowledge scores between pretest and posttest for patients in the main study sample (n = 224). *Increase between pretest and posttest scores significant at $P < .001$.

reviewed the BDI-II scores and assessed any patient who had reported symptoms of severe depression (defined as a BDI-II total score of 29 or higher) or serious suicidal ideation (defined as a score of 2 or 3 on items two or nine of the BDI-II) for suicide risk. For patients who reported symptoms of moderate depression (defined as a BDI-II total score of 20 or higher), staff notified the appropriate mental health provider. If a given patient had no previously assigned mental health provider, he or she was informed of opportunities to access mental health care within our health care network.

After completing these questionnaires, patients took a written test on HCV (pretest) and then watched a narrated slide presentation about the disease. The time allotted for the slide presentation included a question-and-answer period. Following the slide

presentation, patients took the same test for a second time (posttest). At their next HCV clinic appointment (anywhere from a few weeks to several months after the class), patients were asked to take the same test for a third time (follow-up test).

The initial versions of the test and slide presentation were developed by clinicians from the Northwest HCRC at the VA Puget Sound Health Care System, Seattle, WA, with the original goals of: (1) offsetting a high no-show rate for initial HCV appointments at both the Puget Sound and Portland facilities and (2) improving clinic efficiency by providing basic HCV information to patients in a group setting. They designed the presentation to cover important questions patients typically ask at their first HCV clinic visit, and they designed the tests to reinforce the presentation's most fundamental points.

The draft presentation and test were then reviewed and modified by hepatologists at the Portland VAMC for use at that site. An expert in patient education worked with staff to enhance the formatting, graphics, and language of the presentation and the tests—resulting in development of a more concise and appealing product, suitable for most VA patients. Finally, the slide show and knowledge test packet was edited and approved by the national HCRC executives.

The final version of the knowledge test includes 50 multiple choice questions—with primarily “yes,” “no,” and “don't know” answer choices—that fall into the categories of HCV symptoms (nine questions), HCV transmission (24 questions), and HCV treatment (17 questions). The VA's National Hepatitis C Program web site features a slightly modified version of the slide presentation (www.hepatitis.va.gov/vahep?page=prtop05-pe-01) and a guide for presenting the class (www.hepatitis.va.gov/pdf/va01-pr/prtop05/hepc_toolkit_web.pdf). Copies of the test may be obtained from the corresponding author.

DATA COLLECTION AND ANALYSIS

The PSQ completed by attendees of the HCV group educational class is an unvalidated, two-page, self-report form developed by the Northwest HCRC at Portland to promote mental health and addictions comanagement in veterans with HCV. In addition to demographic items (such as gender; race/ethnicity; educational level; and marital, housing, and employment status) and a question on prior exposure to HCV education, the PSQ contains nine multifaceted questions that address symptom criteria, diagnostic history, prescription medication, and alcohol use. These questions are in-

tended to reveal any history of major psychiatric conditions included in the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)*,²⁶ such as major depressive disorder, bipolar disorder, posttraumatic stress disorder (PTSD), schizophrenia or other psychotic disorders, and substance-related disorders. The PSQ also includes the three alcohol consumption questions from the Alcohol Use Disorders Identification Test (AUDIT-C), which uses cutoff scores to determine the likelihood of heavy alcohol use, abuse, or dependence.²⁷

Since the PSQ has not been validated, however, we did not rely on it to determine study participants' psychiatric and substance use histories. Instead, we retrospectively reviewed patients' medical records, after the class, to obtain actual practitioner diagnoses of psychiatric and substance-related disorders. We also collected information about patients' ages from their medical records.

The forms for completing the PSQ, BDI-II, and HCV knowledge test were created using Cardiff TELEform Information Capture System Version Elite 8 (Cardiff Software, Inc. Vista, CA), which allowed subsequent data entry using a high-speed scanner. In scoring the tests, we determined each patient's total score, as well as scores for each of the three knowledge subcategories of the test, by calculating the percentage of questions answered correctly. Missing values and "don't know" responses were counted as incorrect answers.

We analyzed the test results using SPSS for Windows Version 12.0.1 (SPSS, Inc, Chicago, IL). We used Bonferroni-adjusted independent samples *t* tests to determine statistical differences between test scores and demographic variables and paired samples *t* tests to determine differ-

ences between pretest and posttest scores. Pearson's correlations also were computed to determine the degree of linear relationship between selected quantitative variables and pretest scores, posttest scores, and improvement in scores. For the follow-up sample, repeated-measure analyses of variance with post hoc Bonferroni-adjusted paired samples *t* test were used to determine differences between pretest, posttest, and follow-up test scores.

THE PATIENT SAMPLES

During the study period, a total of 1,347 patients were invited to attend the HCV group educational class. Of these, 356 attended, for an attendance rate of 26%. Most of these patients (254, or 71%) consented to allow analysis of their test scores.

Among this group, 224 patients (88%) completed both the pretest and the posttest, thus comprising the main study sample. (We defined a completed test as one on which at least 75% of the items were answered.) Fifty-three (24%) of the patients from the main study sample

nic backgrounds, and 13 (6%) did not describe their ethnicity. The mean age in this group was 54 years (range, 29 to 87 years).

The vast majority of the main study sample (212 patients, or 95%) indicated that they had received some prior information about HCV—most commonly from a primary care provider (126 patients, or 56%). Medical record review indicated that 96 (43%) of the patients had previous contact with a VA or non-VA liver specialist.

The medical records review also revealed that 141 (63%) of the patients had at least one confirmed psychiatric diagnosis, with 51 (23%) having two or more disorders. Just under half (108 patients, or 48%) had an alcohol-related diagnosis, 46 (43%) of whom were in full or partial remission. When responding to the AUDIT-C questions on the PSQ, 53 (24%) of the main sample reported current heavy or hazardous alcohol use. A total of 78 patients (34%) had a drug-related diagnosis in their medical records, with 7 (47%) in full or partial remission and another seven (9%) receiving opioid agonist ther-

The main study sample showed significant improvement from the pretest to the posttest—in total scores and in all three subcategories.

also completed the follow-up test at their first HCV clinic appointment—a mean of 120 days after the class (range, 11 to 511 days).

In the main study sample, 213 (95%) of the patients were male, 173 (77%) were white, 18 (8%) were black, 20 (9%) represented other eth-

nic backgrounds, and 13 (6%) did not describe their ethnicity. The mean age in this group was 54 years (range, 29 to 87 years).

CHANGES IN TEST SCORES

Matched-pairs analyses of scores from the main study sample showed significant improvement from the pretest

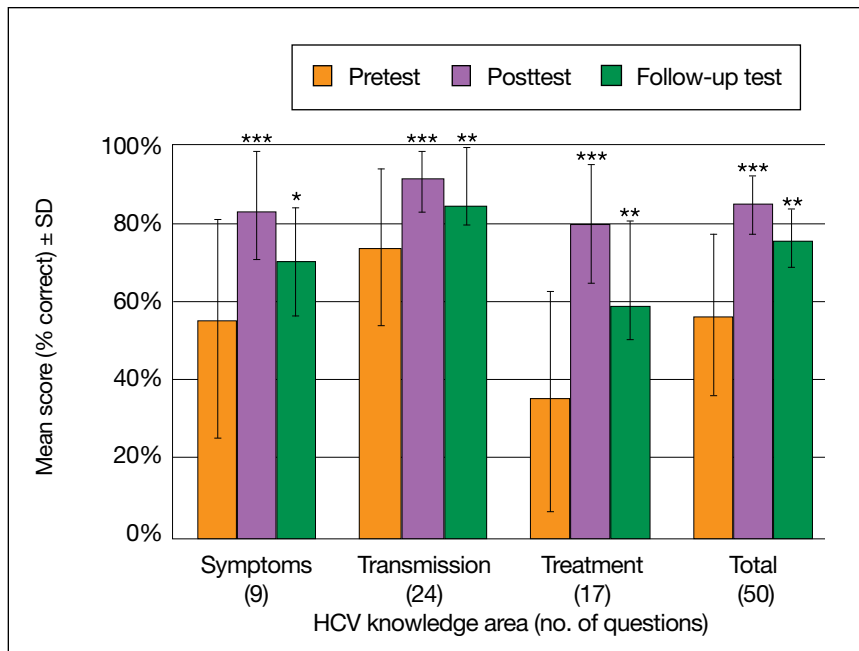


Figure 2. Change in hepatitis C virus (HCV) knowledge scores between the pretest, posttest, and follow-up test in the sample of patients for whom follow-up scores were available ($n = 53$). *Increase between pretest and follow-up test scores significant at $P < .005$. **Increase between pretest and follow-up test scores significant at $P < .001$. ***Decrease between posttest and follow-up test scores significant at $P < .001$.

to the posttest—in total scores and in all three subcategories (Figure 1). The mean total score for the main sample was 57% on the pretest and 86% on the posttest ($t = -22.9$, $P < .001$). In the subcategory of HCV symptoms, the mean scores were 54% on the pretest and 85% on the posttest ($t = -17.4$, $P < .001$). The mean HCV transmission scores were 73% on the pretest and 91% on the posttest ($t = -13.4$, $P < .001$). In the HCV treatment subcategory, the mean scores were 35% on the pretest and 80% on the posttest ($t = -23.4$, $P < .001$).

Similarly, matched-pairs analyses of the 53 patients in the follow-up sample showed significant knowledge gain from the pretest to the follow-up test. Between these two tests, mean total scores increased from 58% to 73% ($t = -8.2$, $P < .001$), mean HCV symptom scores increased from 57%

to 69% ($t = -3.4$, $P < .005$), mean HCV transmission scores increased from 76% to 86% ($t = -6.3$, $P < .001$), and mean HCV treatment scores increased from 35% to 59% ($t = -6.4$, $P < .001$) (Figure 2). Despite this overall improvement, there were significant decreases in scores between the posttest and follow-up test, with mean total scores dropping from 88% to 73% ($t = 8.2$, $P < .001$), mean HCV symptom scores dropping from 85% to 69% ($t = 6.3$, $P < .001$), mean HCV transmission scores dropping from 93% to 86% ($t = 3.9$, $P < .001$), and mean HCV treatment scores dropping from 83% to 59% ($t = 8.3$, $P < .001$).

There was no correlation between the time elapsed from posttest to follow-up test and either total follow-up test scores ($r = -.09$, $P =$ nonsignificant) or score improvement ($r = -.05$, $P =$ nonsignificant).

SUBGROUP AND VARIABLE ANALYSES

In order to determine the influence of baseline HCV knowledge on levels of improvement after the educational class, we split the main study sample into two subgroups: a “low group,” composed of the 111 patients (50%) who scored lower than the median total score of 60% on the pretest, and a “high group,” composed of the 113 patients (50%) whose total pretest score was 60% or higher. We found that, while the high group continued to score significantly higher than the low group on the posttest ($t = -3.7$, $P < .001$), the low group showed significantly greater total score improvement ($t = 16.4$, $P < .001$) (Table and Figure 3).

We also found significant relationships between the number of prior HCV information sources reported by patients in the main sample on the PSQ and those patients’ performance on the knowledge tests. There were significant positive correlations between the number of prior information sources and both mean pretest scores ($r = .36$, $P < .001$) and mean posttest scores ($r = .15$, $P < .05$). Similar to the effect seen in the high and low pretest scoring groups, total score improvement between the pretest and posttest was negatively correlated with the number of prior information sources ($r = -.32$, $P < .001$). That is, the more prior information sources patients reported, the better they performed on both tests, and the fewer prior information sources patients reported, the more dramatic their improvement between the pretest and posttest.

In the follow-up sample, the significant positive correlation held up between the number of prior HCV information sources reported at pretest and the total follow-up test score ($r = .42$, $P < .005$). Notably, the cor-

relation between the number of prior information sources and improvement between the pretest and follow-up test was positive for this sample ($r = .40, P < .005$), which might suggest that a greater number of prior HCV information sources helped patients retain their HCV knowledge better in the long term.

Demographic variables

Much of the demographic data that we gathered from patients in our main sample seemed unrelated to their test scores. Due to the homogenous nature of the main study sample, we did not assess differences in test scores based on gender or ethnicity. Among the other variables, age, marital status, housing status, and employment status were not significantly related to differences in pretest scores, posttest scores, or overall improvement between these two tests. Due to the limited number of participants in the follow-up sample, we did not conduct analyses comparing pretest and follow-up test scores according to demographic variables.

By contrast, there were significant correlations between patients' education levels and mean total scores on both the pretest and posttest in the main sample. Of 211 patients who answered the question, the 125 (59%) who reported having at least some college education had a mean total score of 60% on the pretest, compared to 52% for the 86 patients (41%) who did not report any college education ($t = -2.8, P < .01$). Similarly, the college-educated patients had a mean total score of 88% on the posttest, compared to 83% for the patients without college education ($t = -3.9, P < .001$). There was no significant difference in the rates by which the college-educated and non-college-educated patients improved their mean total scores between the two tests, however.

Table. Hepatitis C virus (HCV) knowledge test scores in the main study sample (n = 224), by significant performance, demographic, and clinical variables

Patient variables	Mean total pretest score	Mean total posttest score	Improvement*
Performance on pretest			
At or above median score [†]	73%	88%	15%
Below median score	40%	84%	44%
Prior HCV information sources			
0	44%	85%	42%
1	47%	84%	37%
2	55%	86%	31%
3	58%	85%	27%
4	63%	89%	26%
5	67%	87%	19%
6	69%	89%	20%
7	66%	87%	22%
8	66%	88%	22%
9	79%	91%	12%
> 9	82%	94%	12%
Education			
At least some college	60%	88%	28% [‡]
No college	52%	83%	32% [‡]
History of psychotic disorder			
Yes	52% [‡]	82%	30% [‡]
No	57% [‡]	86%	30% [‡]

*Improvement between mean total pretest and posttest scores. [†]Median score was 60%. [‡]Differences nonsignificant for this parameter.

Mental health and substance use

We found no significant correlations between patients' BDI-II and AUDIT-C scores and their performance on the knowledge tests in the main study sample. Nor did test performance correlate with the presence of most mental health and substance use disorders identified through medical record review—with the exception of

schizophrenia or other psychotic disorders. The 13 patients (6%) who had diagnostic histories of schizophrenia or other psychotic disorders had a mean total posttest score of 82%, which was significantly lower than the 86% mean score achieved by patients without these disorders ($t = 2.1, P < .05$). There was no significant difference, however, in mean total pretest scores between these two patient

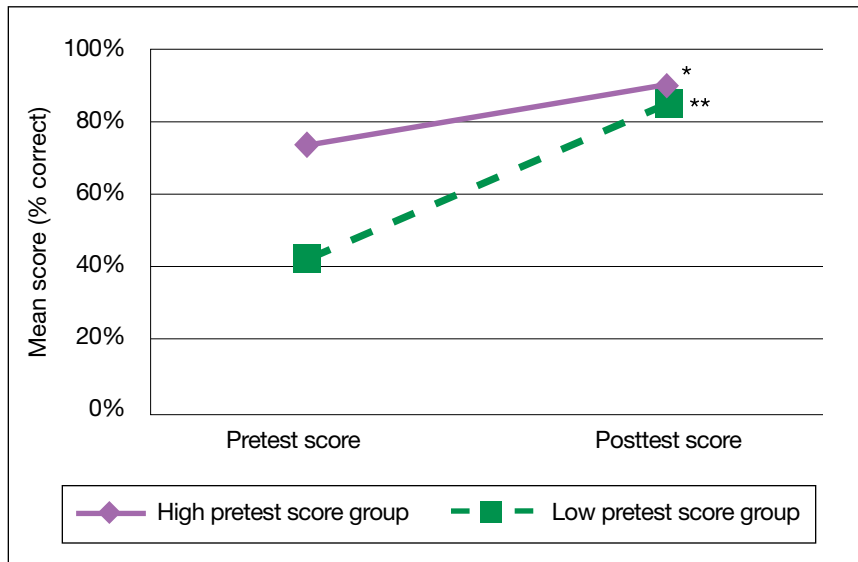


Figure 3. Knowledge gain after group HCV educational class, according to level of achievement on pretest. The high and low pretest score groups were created by splitting the main study sample into two groups at the median total pretest score of 60%. *Significant difference between posttest scores for high group versus low group ($P < .001$). **Significant difference in total score improvement from pretest to posttest in low group versus high group ($P < .001$).

groups, and both groups achieved nearly identical rates of improvement from the pretest to the posttest.

STUDY IMPLICATIONS

Our study confirms that, after attending a group education class, patients with HCV demonstrated a significantly increased understanding of their disease's symptoms, transmission, and treatment. This improvement was apparent both immediately after the class (in the posttest scores) and several weeks or months later (in the follow-up test scores).

Knowledge retention appeared robust. While knowledge gains from pretest to posttest in each of the three subcategories decayed by approximately half between posttest and follow-up test, scores on the follow-up test remained significantly higher than pretest scores. Furthermore, despite a wide range of follow-up intervals, we found no relationship

between the amount of time that had passed since the class and scores achieved on the follow-up test, suggesting there is a minimal core of information from the class that patients tend to retain over time

Our results suggest that the class was particularly helpful in increasing patients' knowledge of HCV treatment. After a single 90-minute session, the main sample's mean scores on the HCV treatment subsection of the test more than doubled, from 35.2% to 79.9%. As with total scores, analysis of the follow-up sample showed significant knowledge retention in treatment subsection scores from baseline at follow-up test administration, despite the decrease from posttest levels.

Patients of all prior HCV knowledge levels improved their knowledge significantly, though patients who entered the class with poorer baseline HCV knowledge showed more dra-

matic improvement. This enhanced effect in the patients with lower levels of baseline HCV knowledge greatly reduced the gap between these two patient groups by posttest. In addition, there was less overall variation in scores at posttest than at pretest ($s^2 = .007$ at posttest versus $.042$ at pretest). Furthermore, level of formal education did not affect the impact of the class. Although college-educated patients displayed significantly higher pretest and posttest scores, their overall rate of improvement between the two tests did not differ from other attendees.

These data indicate that the group education format of the class is effective regardless of patients' educational background or experiences—and is especially beneficial to those with the poorest knowledge of their disease. Nevertheless, it is interesting that patients in the follow-up sample who reported more prior HCV information sources tended to retain more knowledge from posttest to follow-up test. This finding suggests that providing ample “booster” educational opportunities and reiterating aspects of novel topics, such as HCV treatment, at the first HCV clinic visit and afterwards may be crucial to maintaining knowledge gain. Future studies should examine potential benefits of providing such reinforcing education.

Nearly all assessed demographic variables proved not to be significant indicators of pretest, posttest, or follow-up test scores or score improvement. With the possible exception of patients with a diagnosis of schizophrenia or other psychotic disorders, a history of psychiatric or substance-related disorders did not affect average score improvement. This suggests that a single “one size fits all” educational class may be effective for patients of disparate ages, backgrounds, education levels, and most diagnoses,

thus reinforcing the model of group HCV education as simple, efficient, and cost effective.

The data regarding participants with psychotic disorders are inconclusive. Statistical analyses indicate that while these patients' posttest scores were significantly lower than those of other participants, their pretest scores and score improvement between the two tests were not significantly lower. It's likely that this contradictory finding stems from the small number of patients in our sample with these diagnoses (13 of 224) and that the statistically significant differences found among these patients actually are clinically insignificant. It's also possible that the informal class enrollment process may not have successfully screened out those with the most profound deficits.

STUDY LIMITATIONS AND FUTURE DIRECTIONS

Despite the positive findings in this study, it does not answer all questions regarding variables that may affect patients' knowledge gain and retention. To learn more, further research should explore differences between past and current psychiatric symptoms, incorporate confirmation of psychiatric diagnoses by structured diagnostic interview, and assess comorbid medical conditions (such as HIV) and use of prescription medications that could alter cognition (such as opioids).

In addition, the Northwest HCRC has conducted trials of a simplified, multiple-visit HCV educational class designed specifically for patients with or without HCV who have chronic mental illness, such as schizophrenia, as well as those with cognitive deficits. Patients with these conditions were excluded from the educational class examined in the present study, but they are at high risk for HCV and

might benefit from specialized education. Results of the trials will indicate whether a group educational format is also effective in these special populations. A guide for conducting the specialized class is available on the VA HCRC web site, at www.hepatitis.va.gov/pdf/va01-pr/prtop-05/aayl_toolkit_web.pdf.)

Another limitation of this clinically based study is that it did not assess outcome measures beyond simple knowledge gain. Studies on HCV, HIV,

that consume the most resources.³¹ As the number of patients with HCV grows, so will the demand for costly HCV treatments, such as combination interferon-ribavirin therapy (the standard pharmacologic treatment for chronic HCV) and liver transplantation. Data suggesting the long-term cost-efficiency of a group educational class could spur managed care organizations to adopt interventions aimed at preventing further transmission and liver damage.

Ultimately, the cost-effectiveness of an educational class may be the most influential factor in its adoption by managed care organizations such as the VHA.

and safe sex strategies have shown a significant decrease in risk behaviors after a single educational session, even in current injection drug users.²⁸⁻³⁰ Group education studies in other chronic illnesses have noted improvements in symptom severity; self-efficacy; quality of life; and medical outcomes as measured by hospitalizations, emergency department visits, and need for medication as compared with controls.^{21,22} Future research should assess similar health outcomes among patients who receive HCV group education to further evaluate the clinical merit of this model.

Cost savings from a group education class also will be important to document. Ultimately, the cost-effectiveness of an educational class may be the most influential factor in its adoption by managed care organizations such as the VHA. With limited resources, these organizations tend to focus attention on diseases

The high prevalence of mental health and substance-related disorders in our main study sample underscores the importance of interdisciplinary care for patients with HCV. An educational class provides another opportunity to evaluate, engage, and offer services to patients with complex needs. Screening, referring, and treating patients before the first HCV clinic appointment expedites their access to needed psychiatric and substance use services. These services, in turn, could enhance patients' eligibility for interferon-ribavirin therapy, which is contraindicated in patients with active, severe, uncontrolled mental health conditions.

CONCLUSIONS

Our study found that a one-session group educational class can significantly improve patients' understanding of their HCV diagnosis. This benefit is seen across demographic

categories and persists well after the class. These results serve as a basis for investigation of the broader implications and applications of educational groups in the treatment of HCV. ●

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