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Reliability and Validity of a Self-Efficacy Instrument for Hepatitis C Antiviral Treatment Regimens

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Abstract

Self-efficacy or confidence in one's ability to successfully engage in goal-directed behavior has been shown to influence medication adherence across many chronic illnesses. In the present study we investigated the psychometric properties of a self-efficacy instrument used during treatment for chronic hepatitis C viral infection (HCV). Baseline (n=394) and treatment week 24 (n=254) data from the prospective, longitudinal VIRAHEP-C study were examined. Baseline participants were randomly split into two equal sized subsamples (S1 & S2). Initial exploratory and confirmatory factor analyses (EFA/CFA) were performed on S1, while S2 was used to validate the factor structure of the S1 results using CFA. An additional CFA was performed on the treatment week 24 participants. Convergent & discriminant validity were assessed by comparing the revised instrument with other psychosocial measures: depression, social support, quality of life, and medication-taking behavior. Our findings supported a reduced 17-item global measure of HCV Treatment Self-Efficacy (HCV-TSE) with four underlying factors: patient communication self-efficacy, general physical coping self-efficacy, general psychological coping self-efficacy, and adherence self-efficacy. The global score (0.92 to 0.94) and four factors (0.85 to 0.96) demonstrated good internal consistency. Correlations of convergent and discriminant validity yielded low to moderate associations with other measures of psychosocial functioning. The revised HCV-TSE instrument provides a reliable and valid global estimate of confidence in one's ability to engage in and adhere to HCV antiviral treatment. The four factor structure suggests different types of efficacy beliefs may function during HCV treatment and should be explored further in relation to clinical outcomes.

Keywords

Adherence; Confidence; Measurement; Peginterferon; Psychometric

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Declaration of Personal Interests

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Introduction

Chronic hepatitis C viral infection (HCV) is a public health epidemic affecting over 180 million people worldwide. HCV-related cirrhosis and liver cancer contributes to 350,000 annual deaths globally, including 10,000 deaths per year in the United States (1–3). Antiviral therapy is complex, lengthy, and accompanied by numerous adverse side effects that can greatly diminish treatment adherence, persistence, and efficacy (4–7). Further, the recent addition of protease inhibitors (i.e., telaprevir, boceprevir) to the treatment regimens for genotype 1 patients, introduces a more complex dosing regimen which will complicate adherence and risk viral resistance (8–12). As such, identifying and understanding patient-, provider- and system level factors that predict and influence patient adherence to antiviral treatment is a public health priority.

Within the broader chronic disease and behavioral science literature, one of the most widely studied and empirically supported patient-level factors is self-efficacy. Self-efficacy is an optimistic self-belief regarding one's ability (i.e., confidence) to organize and implement internal and external resources to initiate and maintain goal-directed behavior, such as taking medication on a regular, consistent basis despite barriers (13–15). Self-efficacy is a critical component to medication adherence among chronic diseases requiring long-term self-management including, HIV/AIDS (16–22); diabetes (23;24); hypertension (25); asthma & lipid lowering medications (26;27); headache management (28); multiple sclerosis (29); and many other chronic diseases (30–33). Moreover, higher levels of self-efficacy can buffer against the effects of depression, which is a major adverse side effect of interferon-based therapies (13;14;34).

Despite the importance of self-efficacy to medication adherence in other medical regimens, there is limited research in the HCV literature that examine self-efficacy beliefs, and no studies were identified that examined these beliefs during antiviral treatment (35;36). A self-efficacy measure was included in the NIH-funded study, Viral Resistance to Antiviral Therapy of Chronic Hepatitis C (VIRAHEP-C) study. An examination of the psychometric properties of this scale is needed first, in order to facilitate further investigations of self-efficacy and HCV treatment outcomes. The purpose of the present study was to explore the psychometric properties of the VIRAHEP-C self-efficacy measure. We sought to determine the utility of the instrument's overall score as a global measure of self-efficacy during antiviral therapy, as well as determine if underlying factors exist which could provide additional useful information to understanding key efficacy beliefs among patients undergoing antiviral therapy.

Materials and Methods

Design & Sample

This study utilized the prospectively collected data from VIRAHEP-C. Details of the VIRAHEP-C study's intervention, data collection, inclusion/exclusion criteria, and full demographics are described elsewhere (37;38) and can be viewed online from the NIDDK: (https://www.niddkrepository.org/niddk/jsp/public/dataset.jsp#VIRAHEP-C). Current analyses focused on individuals with self-efficacy measurements obtained at baseline (n=394) and treatment week 24 (n=254). Individuals missing 24 week information were similar to those with week 24 information on baseline characteristics such as age, race, sex, employment status, etc. Reasons for missing data could include dropout, early discontinuation from treatment, or missing the 24 week appointment.

Measures

Self-efficacy—The VIRAHEP-C self-efficacy measure was a 24-item self-report measure adapted from previously validated self-efficacy measures created for the Adult AIDS Clinical Trials Group (see Appendix A for the original VIRAHEP-C measure) (19;39) (personal communication, S. Smith, Nov. 11, 2010). The adaptation process involved modifying HIV-related items on the original instrument to reflect HCV-specific disease characteristics and treatments (e.g., weekly self-injected dosing schedule, side effects, etc.) (personal communication, S. Smith, Sept. 16, 2011). Participants rated their confidence in performing specific activities on a scale from 0 (Cannot do at all) to 10 (Certain to Do). The scores were averaged for each participant; higher scores indicate higher self-efficacy. We refer to the revised measure as the HCV Treatment Self-Efficacy (HCV-TSE) instrument. In order to assess concurrent validity of the HCV-TSE instrument, the following additional measures from VIRAHEP-C were included in our analyses.

Depression—Measured using the Center for Epidemiologic Studies–Depression (CES-D) scale, a 20-item self-report measure (40). Items range from 0 (never) to 3 (almost always), with higher scores (potential range 0 to 60) indicating more depressive symptomology.

Social Support—Measured using the Medical Outcome Study Social Support Survey (MOS SSS), a 19-item self-report instrument (41). The MOS SSS score was calculated as a continuous variable and analyzed on a transformed percentage scale (potential range of 0%–100%) with higher scores indicative of greater support (37;41).

Quality of Life (QOL)—Measured using the eight domains (vitality; physical functioning; bodily pain; general health perceptions; physical role functioning; emotional role functioning; social role functioning; mental health) of the Short-Form 36 (SF-36) (42;43). Scores can range from 0 (lowest level of functioning) to 100 (highest level of functioning).

Irritability—Irritability, a measure of negative affectivity (i.e., emotional reactivity), was included as it is a neuropsychiatric side effect of HCV antiviral therapy, predictive of emotional adjustment and related to self-efficacy in the broader health psychology literature (44;45). Measured using a visual analog scale, participants marked a computerized line via a touch screen, which was converted to a continuous 0–10 scale with higher scores indicative of worse irritability (37).

Medication Taking Behavior Questions—Assessed using two self-report questions at treatment week 24 for ribavirin and peginterferon. Patients stated how closely they followed their medication schedule over the previous 4 days (ribavirin) or 4 weeks (peginterferon) prior to a clinic visit, on a 5-item Likert scale, ranging from 1 (never) to 5 (all of the time). During the VIRAHEP-C study, these questions demonstrated relatively reliable and valid estimates, although they tended to overestimate medication adherence to ribavirin and injected pegylated interferon when compared with electronic monitoring devices (46).

Statistical Analysis

To assess construct validity, we used exploratory factor analysis (EFA) with a promax rotation to allow for correlated factors. A priori, we decided the number of factors to be retained would be based on two considerations. First, given the face validity of the items, the measure appeared to potentially assess different types of self-efficacy beliefs which may be important to antiviral treatment (14;15;47;48). For example, items that clustered together which asked about confidence in communicating with one's healthcare provider were retained because "communication self-efficacy" is a psychological construct found in the literature that reflects one's confidence in communicating effectively. Second, empirical

findings, which included a combination of a scree plot; proportion of variance accounted for (at least 5% of common variance explained); and interpretability (49). Based on the face validity of the VIRAHEP-C measure, we anticipated extracting a minimum of four factors. Only items which had meaningful interpretability and loadings (0.40 or greater), and loaded onto a single factor were retained (49).

The EFA was followed by a confirmatory factor analysis (CFA) to further evaluate the fit and refine the model as needed. The chi-square test was used to assess model fit. Since it is often the case that the chi-square test will be significant even though the model provides a good fit (49;50), we used additional measures of goodness of fit including the non-normal fit index (NNFI) (51), and the comparative fit index (CFI) (52;53). Values over 0.9 on the NNFI and CFI are indicative of an acceptable fit (49;54). If necessary and similar to previously published methods (55), we planned to remove items one at a time starting with the item with the lowest factor loading until we attained a satisfactory goodness of fit based on the above criteria.

Since we were aware that performing EFA and CFA on the same sample could lead to less generalizable results and more significance by chance, we randomly split the baseline sample (N=394) into two equal sized subsamples. Subsample 1 (S_1) was used to perform the initial EFA/CFA; subsample 2 (S_2) was used to validate the factor structure of S_1 using CFA. In addition, CFA was performed on the subset of individuals (N=254) with follow-up data measured at treatment week 24.

Discriminant and convergent validity were assessed on the full baseline sample using Pearson correlations (all items) and partial correlations. Measures included: baseline CES-D, social support, the eight domains of the SF-36, and irritability. Similar analyses were performed on the week 24 data. Measures included: week 24 CES-D, social support, irritability, and the self-report medication adherence items. Note: Spearman correlations and partial correlations were used for the medication taking behavior questions. Internal consistency measured with Cronbach's alpha was used to assess reliability of the global and derived factors (56), as well as an additional measure of convergent validity (57). All analyses were conducted using SAS version 9.2 (Cary, NC).

Results

Initial Exploratory Factor Analysis Subsample 1

The scree plot had a relatively large break between factors 1 and 2, a more moderate break between factors 2 and 3, and noticeable breaks between factors 4 and 5 and factors 6 and 7. Four factors explained at least 5% of the variance. Based on these two criteria, we explored 2–6 factors for interpretability. The 4 factor model met the above criteria and was interpretable. The other models had double loading of items onto multiple factors, too many items that were not strongly loading onto one specific factor or interpretability issues.

After a review of the factor loadings in the 4 factor model, we reduced the number of items from 24 to 20. Four items (Items 1–4 of the original measure; Appendix A) were removed because they did not meaningfully load onto a single factor. The model was rerun with the 20 items to ensure that all loadings remained meaningful and the four factors remained interpretable. One additional item (item 13) was removed for failure to meaningfully load onto a single factor.

Guided by theoretical and empirical self-efficacy literature, we labeled the resulting four factors. Factor 1 (items 5–7) reflected communication self-efficacy, or confidence in effectively communicating with a clinician (e.g., "ask, understand, and remember" Clayman,

p. 73) (58). Factors 2 (items 8–12) and 3 (items 14–18) reflected general physical and psychological coping self-efficacy, respectively. These types of self-efficacy represent confidence in coping with physical (e.g., fatigue) and psychological (e.g., depressive symptoms) difficulties that can impede functioning. Factor 4 (items 19–24) reflected adherence self-efficacy, or confidence to adhere to the prescribed antiviral regimen. This included taking all medications even while experiencing side effects and attending doctor visits. Inter-factor correlations demonstrated physical coping and psychological coping were moderately associated (r=0.57), while all other pairwise comparisons demonstrated low associations (r=0.27–0.40).

Exploratory Confirmatory Factor Analysis Subsample 1

The 19 items were assigned to the factor in which they had a meaningful loading for the CFA. Based on the chi-square test (χ^2=573.6, degrees of freedom (df) =146, p<0.0001), the NNFI (0.87) and the CFI (0.89), the fit was not satisfactory. We therefore began removing items one at a time. The item with the lowest factor loading (0.78) was removed (item 21), the model was refitted and further reduction was needed. The item with the next lowest factor loading (0.78) was removed (item12). Our final model contained 17 items distributed across 4 factors (see Appendix B). The model fit was not satisfactory based on the chi square test of fit (χ^2=388.4, df =113, p<0.0001), but met the criteria for NNFI (0.90) and CFI (0.92).

Confirmatory Factor Analysis Subsample 2 (17 items)

The overall fit of the model was not satisfactory (χ^2=371.7, df =113, p<0.0001). The model met the criteria for CFI (0.91), but was just shy of reaching the criteria for NNFI (0.89). When comparing the factor loadings of the EFA and two CFAs (Table 1), we see that the loadings are very similar for the two subsamples. In addition, the factor correlations for both CFAs were nearly identical to those found in the EFA.

Confirmatory Factor Analysis of Follow-up Data (17 items)

To explore the impact of time on the fit of the model, we fit a CFA to the subset of individuals (n=254) with follow-up measurements at treatment week 24. As was seen previously, the overall fit was not satisfactory (χ^2=417.8, df =113, p<0.0001), but this model met the criteria for goodness of fit with both the NNFI (0.92) and the CFI (0.94). In addition, the factor loadings were similar to those obtained in S_1 and S_2 (Table 1).

Reliability

Cronbach's alpha was calculated for S_1 and S_2, separately, the full baseline sample, and the week 24 sample for the global 17-item HCV-TSE measure and the four factors (Table 2). The values for S_2 were slightly lower than those for S_1; yet, all alphas were high (≥0.85) demonstrating good internal consistency.

Convergent and Discriminant Validity

While no other measures of self-efficacy were available to fully assess convergent validity, internal consistency, a type of convergent validity, yielded high to very high correlations for the global and factor scores (Table 2) (57). As expected, low to moderate correlations (0.31 to 0.50) were found between the global HCV-TSE score and other psychosocial measures at baseline (Table 3). The directions of these relationships were also in the expected direction, with the global HCV-TSE score demonstrating negative associations with depression (−0.50) and irritability (−0.38) and positive associations with social support (0.42) and the QOL subscales (0.35 to 0.48). At treatment week 24 (Table 4), the magnitude of these relationships were slightly increased, but the directions remained the same. The global score

also demonstrated low, positive associations with medication taking behavior at treatment week 24.

With respect to the underlying four factors, we anticipated the direction and strength (low to moderate) of the relationships with other psychosocial measures. As noted in Table 3, patient communication self-efficacy demonstrated a low, positive association with social support (0.24). General physical coping self-efficacy had very little (0.13) to moderate (0.44) relationships in the expected directions (e.g., positive with physical functioning, vitality; negative with depression). General psychological coping self-efficacy had moderate correlations with depression (−0.41) and mental health functioning (0.48). Adherence self-efficacy yielded only one small relationship with bodily pain at baseline; however, this was expected as items on this factor corresponded to medication taking behavior which had yet to occur at baseline. At treatment week 24, adherence self-efficacy demonstrated low to moderate positive correlations with medication taking behaviors (0.31–0.45). Additionally, at treatment week 24, the other 3 factors yielded relationships with psychosocial measures that were relatively similar to treatment baseline.

Discussion

Self-efficacy beliefs are important targets for clinical intervention, given that they can be enhanced, resulting in improved patient self-management of chronic illness, including chronic hepatitis C (35;36). However, self-efficacy requires measurement precision specific to the (1) behavior being studied (e.g., medication taking, communication, etc.), and the (2) patient population (e.g., diabetes, cancer, HIV, HCV, etc.). As such, measurement of self-efficacy continues to challenge researchers. Clarification of the psychometric properties of this self-efficacy measure, originally adapted from the HIV literature (19;39), was a key first step to future investigations of self-efficacy beliefs in the HCV population.

Findings from our analyses of the HCV-TSE lend support for a global, overall estimate of self-efficacy during HCV treatment. The global score demonstrated very good reliability and construct validity when compared with other psychosocial measures. A global score is useful in providing an overall estimate of confidence to engage in the complex and demanding treatment regimen. A patient's global score would alert clinicians to patients with low baseline levels of self-efficacy, or patients whose confidence worsens over time, enabling better allocation of resources to improve patient adherence.

Additionally, the HCV-TSE instrument yielded four reliable and valid factors that reflect different types of beliefs that may be important to adherence and treatment persistence during antiviral treatment. Marlatt et al., was the first to posit that different types of self-efficacy may exist simultaneously (33;47). Patients lacking confidence in their ability to effectively communicate with their providers (e.g., factor 1) are indirectly at risk for nonadherence to treatment regimens, as they may misunderstand treatment instructions or fail to report adverse side effects (58).

Our findings indicated that the HCV-TSE instrument has two underlying factors related to one's confidence to cope with physical and psychological stressors (factors 2 and 3) (55). This is critical, as patients with higher coping self-efficacy beliefs are more likely to persevere in treatments that are difficult through behavioral and cognitive processes (13–15;31–33;59). Measurement of these two types of beliefs enables providers to intervene prior to or early in treatment to assist patients in coping with adverse side effects.

Finally, the HCV-TSE yielded evidence of an Adherence self-efficacy (factor 4) scale, which is essentially the belief that one can engage in the intended behavior (i.e., take medications as prescribed, attend clinical visits). This type of self-efficacy is referred in the

literature as task or action self-efficacy and is pivotal to initiating basic cognitive and behavioral processes to initially engage in a behavior, and to a lesser degree, maintain the behavior (33;48). Patient's low scores on this type of self-efficacy would alert providers to individuals who may not fully understand the importance of adhering to the treatment regimen, or may not yet have the internal or external resources to successfully adhere to treatment, thereby facilitating appropriate intervention.

Limitations

There are a few limitations with the present study. First, while there is justification to remove the initial 4 items, which appear to assess social support self-efficacy, it is unclear whether this was an artifact of the patient population. VIRAHEP-C was a large clinical trial that incorporated significant patient-researcher contact, including frequent interactions to assist patients in remaining adherent. The importance of social support, generally accepted among clinicians as a key ingredient to successful treatment, may have been marginalized by the extensive support provided by the study personnel (37). If this was the case, beliefs about social support may have been irrelevant, thus leading to a lack of support for these items.

A second limitation was the inability to *a priori* select measures to compare with the HCV-TSE instrument, including another measure of self-efficacy. A ground-up approach is ideal for the development of a psychometrically sound self-efficacy measure (60) and should consider unique challenges to the target population, including literacy level (22). However, given the lack of published literature on self-efficacy and HCV treatment, it was critical to explore the psychometric properties of this measure to facilitate future research on self-efficacy.

A third limitation was the inability to assess the HCV-TSE instrument's stability over time. The HCV-TSE was only measured at baseline and treatment week 24. This six month time interval would likely have biased test-retest results, as the effects of time and experience with antiviral treatment is expected to affect patients' efficacious beliefs about HCV treatment (14).

A fourth limitation related to the use of self-reported medication adherence items to assess validity of the HCV-TSE's adherence self-efficacy scale. These items were previously found to somewhat overestimate adherence to antiviral medication when compared to electronic monitoring, although this difference was acceptable enough to deem the self-report reliable and valid (61). The items were included in the present study as a means to assess the validity of the adherence self-efficacy subscale. However, future studies using the HCV-TSE to predict actual medication adherence should consider using multi-method approaches to mitigate the effects of over-reporting which tends to hinder self-report only methods.

A final limitation is the reduction in the overall sample size due to the splitting of the baseline sample. Although this splitting did not result in two truly independent populations, obtaining two random subpopulations permitted us to validate the HCV-TSE instrument obtained from the initial EFA/CFA. Ultimately, we felt the benefit gained in having the measure validated far outweighed the loss of power from reduced sample sizes. However, it is important to note that each of the subsamples were of minimally adequate size (49).

Despite these limitations, we believe this study provides a foundation for understanding the role of self-efficacy during HCV treatment. Future studies may begin to examine whether self-efficacy is associated with antiviral treatment and clinical outcomes, such as medication adherence and sustained virologic response, or if it may exert its effects indirectly through

relationships with other constructs, such as depression, which is known to affect treatment outcomes.

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Abbreviations

NIH	National Institutes of Health
VIRAHEP-C	Viral Resistance to Antiviral Therapy of Chronic Hepatitis C
NIDDK	National Institute of Diabetes and Digestive and Kidney Diseases
HCV-TSE	HCV Treatment Self-Efficacy
MOS SSS	Medical Outcome Study Social Support Survey
CESD	Center for Epidemiologic Studies–Depression
QOL	Quality of Life
EFA	Exploratory Factor Analysis
CFA	Confirmatory Factor Analysis
S1	Subsample 1
S2	Subsample 2
NNFI	Non-Normal Fit Index
CFI	Comparative Fit Index

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APPENDIX A: Original VIRAHEP-C Self-Efficacy Instrument

Instructions: We would like to know how confident you are in doing certain activities. We would like you to rate **how confident you are that you could do each activity RIGHT NOW** by circling a number between 0 (no confidence) and 10 (100% confident).

How confident are you that you can…	Can not do at all	Probably cannot do			Moderately certain can do			Probably can do			Certain can do
1. Get family and friends to help you with the things you need (such as household chores like	0	1	2	3	4	5	6	7	8	9	10

How confident are you that you can…	Can not do at all	Probably cannot do			Moderately certain can do			Probably can do			Certain can do
shopping, cooking, or transport)?											
2. Get emotional support from friends and family (such as listening or talking over your problems)?	0	1	2	3	4	5	6	7	8	9	10
3. Get emotional support from resources other than friends or family, if needed?	0	1	2	3	4	5	6	7	8	9	10
4. Get help with your daily tasks (such as housekeeping, yard work, meals, or personal hygiene) from resources other than family or friends, if needed?	0	1	2	3	4	5	6	7	8	9	10
5. Ask your doctor things about your illness that concerns you?	0	1	2	3	4	5	6	7	8	9	10
6. Discuss openly with your doctor any personal problems that may be related to your illness?	0	1	2	3	4	5	6	7	8	9	10
7. Work out difficulties with your doctor when they arise?	0	1	2	3	4	5	6	7	8	9	10
8. Keep fatigue caused by your disease from interfering with the things you want to do?	0	1	2	3	4	5	6	7	8	9	10
9. Keep the physical discomfort or pain of your disease from interfering with the things you want to do?	0	1	2	3	4	5	6	7	8	9	10
10. Keep any symptoms or health problems you have from interfering with the things you want to do?	0	1	2	3	4	5	6	7	8	9	10
11. Control any symptoms or health problems you have so they don't interfere with the things you want to do?	0	1	2	3	4	5	6	7	8	9	10
12. Reduce your physical discomfort or pain?	0	1	2	3	4	5	6	7	8	9	10
13. Keep from getting discouraged when nothing you do seems to make a difference?	0	1	2	3	4	5	6	7	8	9	10
14. Keep from feeling sad or down in the dumps?	0	1	2	3	4	5	6	7	8	9	10
15. Keep yourself from feeling lonely?	0	1	2	3	4	5	6	7	8	9	10

How confident are you that you can…	Can not do at all	Probably cannot do			Moderately certain can do			Probably can do			Certain can do
16. Do something to make yourself feel better when you are feeling lonely?	0	1	2	3	4	5	6	7	8	9	10
17. Do something to make yourself feel better when you are feeling discouraged?	0	1	2	3	4	5	6	7	8	9	10
18. Do something to make yourself feel better when you feel sad or down in the dumps?	0	1	2	3	4	5	6	7	8	9	10
19. Inject interferon every week, exactly as directed, without ever missing a dose?	0	1	2	3	4	5	6	7	8	9	10
20. Take your ribavirin pills twice a day, exactly as directed, without ever missing a dose?	0	1	2	3	4	5	6	7	8	9	10
21. Take both medicines, always at the right time, even when the medications are causing side effects?	0	1	2	3	4	5	6	7	8	9	10
22. Take both medicines, always at the right time, even when feeling very tired or depressed?	0	1	2	3	4	5	6	7	8	9	10
23. Remember to take your medications, always at the right time, for the next 30 days?	0	1	2	3	4	5	6	7	8	9	10
24. Keep all your doctor visits without ever missing an appointment?	0	1	2	3	4	5	6	7	8	9	10

APPENDIX B: HCV Treatment Self-Efficacy Survey with Underlying Factors

Question Stem: **How confident are you that you can…**

FACTOR 1: PATIENT COMMUNICATION SELF-EFFICACY

1 Ask your doctor things about your illness that concerns you?

2 Discuss openly with your doctor any personal problems that may be related to your illness?

3 Work out difficulties with your doctor when they arise?

FACTOR 2: GENERAL PHYSICAL COPING SELF-EFFICACY

4 Keep fatigue caused by your disease from interfering with the things you want to do?

5 Keep the physical discomfort or pain of your disease from interfering with the things you want to do?

6 Keep any symptoms or health problems you have from interfering with the things you want to do?

7 Control any symptoms or health problems you have so they don't interfere with the things you want to do?

FACTOR 3: GENERAL PSYCHOLOGICAL COPING SELF-EFFICACY

8 Keep from feeling sad or down in the dumps?

9 Keep yourself from feeling lonely?

10 Do something to make yourself feel better when you are feeling lonely?

11 Do something to make yourself feel better when you are feeling discouraged?

12 Do something to make yourself feel better when you feel sad or down in the dumps?

FACTOR 4: ADHERENCE SELF-EFFICACY

13 Inject interferon every week, exactly as directed, without ever missing a dose?

14 Take your ribavirin pills twice a day, exactly as directed, without ever missing a dose?

15 Take both medicines, always at the right time, even when feeling very tired or depressed?

16 Remember to take your medications, always at the right time, for the next 30 days?

17 Keep all your doctor visits without ever missing an appointment?

Responses range from 0 (Cannot do at all) to 10 (Certain to Do)

TABLE 1

Standardized factor loadings for the exploratory (EFA) and confirmatory (CFA) analyses.

	Subsample 1		Subsample 2	Week 24 Sample
Factor	**EFA**	**CFA**	**CFA**	**CFA**
Patient Communication Self-Efficacy				
Ask doctor about illness	0.80	0.80	0.79	0.86
Discuss personal problems with doctor	0.96	0.96	0.83	0.96
Work out difficulties with doctor	0.94	0.94	0.82	0.95
General Physical Coping Self-Efficacy				
Keep fatigue from interfering	0.85	0.85	0.73	0.86
Keep pain from interfering	0.85	0.83	0.90	0.95
Keep symptom from interfering	0.94	0.95	0.97	0.97
Control symptoms from interfering	0.88	0.88	0.86	0.91
Reduce discomfort or pain	0.78			
General Psychological Coping Self-Efficacy				
Keep from feeling sad	0.82	0.82	0.80	0.83
Keep from feeling lonely	0.90	0.90	0.83	0.90
Do something feel better when feel lonely	0.90	0.90	0.94	0.97
Do something feel better when discouraged	0.89	0.89	0.94	0.96
Do something feel better when feel sad	0.89	0.89	0.90	0.91
Adherence Self-Efficacy				
Take peginterferon without missing	0.79	0.78	0.65	0.66
Take ribavirin without missing	0.95	0.97	0.89	0.75
Take medication even if side effects	0.78			
Take medication even if depressed	0.87	0.84	0.78	0.84
Take medication correctly for next 30 days	0.93	0.93	0.92	0.90
Keep all doctor appointments	0.86	0.87	0.75	0.63

TABLE 2

Internal consistency of the HCV Treatment Self-Efficacy global and factor scales.

Factor	Cronbach's Alpha			
	Subsample 1	Subsample 2	Full Baseline Sample	Week 24
Global Scale (17 items)	0.92	0.92	0.92	0.94
Patient Communication Self-Efficacy (3 items)	0.92	0.85	0.89	0.94
General Physical Coping Self-Efficacy (4 items)	0.93	0.92	0.93	0.96
General Psychological Coping Self-Efficacy (5 items)	0.94	0.94	0.94	0.96
Adherence Self-Efficacy (5 items)	0.93	0.88	0.91	0.87

TABLE 3

Baseline comparisons (correlations and partial correlations) between psychosocial measures and the HCV Treatment Self-Efficacy global and factor scale scores.

Measures	Global Scale	Communication[a]	General Physical Coping[b]	General Psychological Coping[c]	Adherence[d]
CESD	−0.50&	0.04	−0.27&	−0.41&	−0.07
Social Support	0.42&	0.24&	0.13*	0.21&	0.01
Quality of Life					
Vitality	0.38&	−0.05	0.41&	0.14&	−0.02
Physical Functioning	0.35&	0.02	0.33&	−0.01	0.10*
Bodily Pain	0.37&	0.01	0.37&	0.06	0.02
General Health Perceptions	0.34&	−0.09	0.36&	0.14&	−0.01
Physical Role Functioning	0.34&	0.04	0.44&	−0.01	−0.01
Emotional Role Functioning	0.31&	−0.01	0.26&	0.17&	0.01
Social Role Functioning	0.48&	0.02	0.42&	0.19&	0.03
Mental Health	0.44&	−0.10*	0.15&	0.48&	0.05
Irritability VAS	−0.38&	0.05	−0.23&	−0.28&	−0.02

*$p < 0.05$;

&$p < 0.01$

[a]Controlling for General Physical Coping, General Psychological Coping, Adherence

[b]Controlling for Patient Communication, General Psychological Coping, Adherence

[c]Controlling for Patient Communication, General Physical Coping, Adherence

[d]Controlling for Patient Communication, General Physical Coping, General Psychological Coping

TABLE 4

Treatment Week 24 comparisons (correlations and partial correlations) between psychosocial measures and the HCV Treatment Self-Efficacy global and factor scale scores.

Measures	Global Scale	Patient Communication[a]	General Physical Coping[b]	General Psychological Coping[c]	Adherence[d]
CES-D	−0.59&	0.09	−0.18&	−0.48&	−0.05
MOS Social Support	0.50&	0.24&	0.01	0.28&	0.06
Irritability Visual Analog Scale	−0.46&	0.10	−0.14*	−0.27&	−0.12
Ribavirin Medication Adherence[e]	0.27&	−0.05	−0.01	−0.01	0.45&
Peginterferon Medication Adherence[e]	0.24&	0.02	0.07	−0.07	0.31&

*$p < 0.05$;

&$p < 0.01$

[a]Controlling for General Physical Coping, General Psychological Coping, Adherence

[b]Controlling for Patient Communication, General Psychological Coping, Adherence

[c]Controlling for Patient Communication, General Physical Coping, Adherence

[d]Controlling for Patient Communication, General Physical Coping, General Psychological Coping

[e]Correlation calculated using Spearman correlation