Available online at www.sciencedirect.com
ScienceDirect
General Hospital Psychiatry 32 (2010) 413–418
General Hospital Psychiatry

Predictors of pain intensity and pain functioning in patients with the hepatitis C virus☆

Benjamin J. Morasco, Ph.D.[a,b,*], Marilyn Huckans, Ph.D.[a,b,c], Jennifer M. Loftis, Ph.D.[a,b,c], Jonathan Woodhouse, Psy.D.[a,d,1], Adriana Seelye, M.S.[a,e], Dennis C. Turk, Ph.D.[f], Peter Hauser, M.D.[a,b,c,2]

[a]*Northwest Hepatitis C Resource Center and Mental Health and Clinical Neurosciences Division, Portland VA Medical Center, Portland, OR 97239, USA*
[b]*Department of Psychiatry, Oregon Health and Science University, Portland, OR, USA*
[c]*Research Division, Portland VA Medical Center, Portland, OR, USA*
[d]*Department of Psychology, George Fox University, Newberg, OR, USA*
[e]*Department of Psychology, Washington State University, Pullman, WA, USA*
[f]*Department of Anesthesiology and Pain Medicine, University of Washington School of Medicine, Seattle, WA, USA*

Received 3 December 2009; accepted 26 March 2010

Abstract

Objective: To examine the relationships among biological and psychological variables with pain intensity and pain functioning in patients with the hepatitis C virus (HCV).
Methods: Participants were 49 patients with HCV who completed well-validated assessments of pain intensity and pain functioning. Participants also completed measures of psychological functioning, and medical records were reviewed.
Results: Thirty-three (67.3%) of 49 participants had a current diagnosis for a pain-related condition. Regression analyses were conducted to examine variables associated with pain intensity and pain functioning. The psychosocial variables, particularly depression severity, accounted for an additional 21% of the variance in average pain intensity (P=.002) and 33% of the variance in pain functioning (P<.001). These results remained significant even after controlling for demographic characteristics, opioid prescription status and disease-related variables.
Conclusion: These results provide preliminary support for the role of biological and psychological factors in the development and exacerbation of pain in HCV patients. Future studies should include a more comprehensive assessment of pain-related factors and examine their associations with additional disease-related and biological variables. Developing a better understanding of the factors associated with pain in HCV patients will help to inform future interventions for chronic pain in this patient population.
Published by Elsevier Inc.

Keywords: Chronic pain; Hepatitis C virus; Depression; Biopsychosocial model

1. Introduction

The hepatitis C virus (HCV) is the most common blood-borne infection and affects approximately 2% of the US population [1,2]. HCV causes inflammation of the liver that can be characterized by liver enlargement, fibrosis, cirrhosis, abnormal liver function and other symptoms. HCV is a leading cause of liver disease, cirrhosis, hepatocellular carcinoma and liver transplantation [3].

Pain conditions in HCV patients are also common. In samples of patients treated at hepatology clinics, musculoskeletal pain was present in 50–70% of patients [4,5]. Fibromyalgia is also common in HCV patients, but prevalence rates vary across

☆ This study was supported in part by a VA Career Development Award and Northwest Health Foundation grant awarded to Dr. Huckans. Dr. Morasco was supported by award K23DA023467 from the National Institute on Drug Abuse. The content of this manuscript is the responsibility of the authors and does not necessarily represent the official views of the Department of Veterans Affairs or the National Institute on Drug Abuse.

* Corresponding author. Portland VA Medical Center (R&D99), 3710 SW US Veterans Hospital Road, Portland, OR 97239, USA.
E-mail address: benjamin.morasco@va.gov (B.J. Morasco).

[1] Dr. Woodhouse is now affiliated with the Department of Psychiatry and Behavioral Sciences, University of Oklahoma Health Sciences Center, Oklahoma City, OK, USA.

[2] Dr. Hauser is now affiliated with the Desert Pacific Healthcare Network Office, Long Beach, CA, USA.

0163-8343/$ – see front matter. Published by Elsevier Inc.
doi:10.1016/j.genhosppsych.2010.03.010

studies, ranging from 4% to 19% [6]. Arthritis may occur in up to 30% of patients with HCV [7]. Peripheral neuropathy is associated with chronic HCV, which is often characterized by sensory neuropathy of the lower limbs, in approximately 10% of HCV patients [7].

Several studies among veterans with HCV have found similarly high rates of pain symptomatology. In a recent study, Silberbogen et al. [8] examined pain severity in 33 patients presenting to liver clinics at two Veterans Administration Medical Centers (VAMCs). They found that 82.7% of participants with HCV also reported pain symptoms. Furthermore, the duration of pain symptoms was often chronic, with 65% of participants reporting pain for 1 year or more. In a recent study of 8224 US veterans with HCV accessing VAMCs in the Pacific Northwest (Washington, Oregon, Idaho and Alaska), Whitehead et al. [9] found that 67% of patients had a comorbid chronic pain diagnosis documented in their medical record.

The etiology of pain syndromes among HCV patients is unclear. The immune system may play a role in the pathogenesis of pain and HCV, but the precise mechanisms are unknown [10]. Recent research has focused on abnormal cytokine regulation. Elevations of pro-inflammatory cytokines may be the common link between HCV and pain-related disorders [7].

The high rates of pain-related disorders among HCV patients could also be due to comorbid substance use disorders (SUDs) and/or psychiatric disorders. Chronic substance use is associated with high rates of pain [11–13], and HCV patients have high rates of SUD. Intravenous drug use is the primary cause of HCV infection [14,15], and prior studies suggest 64–90% of HCV patients have a history of SUD [16,17]. HCV patients also have high rates of psychiatric comorbidity [18,19], which are associated with increased pain [20,21].

Prior research with HCV patients indicates that behavioral factors are most predictive of the need for acute pain management [22], and body mass index (BMI) was a factor in pain reporting among patients with liver disease [23]. There are, however, limited studies available that have specifically examined factors associated with chronic pain among HCV patients. In this study, HCV patients were administered well-validated measures of pain intensity and pain functioning. The goal was to build upon prior research by examining psychological and disease-related factors associated with pain in HCV patients. We hypothesized that, in patients with chronic HCV, psychological variables (depression, severity of substance use) would be significantly associated with pain-related outcomes, even after controlling for demographic and disease-related variables.

2. Methods

2.1. Participants

Data reported in this manuscript represent a subset from a larger study that examined cognitive deficits associated with HCV [24]. Participants were recruited into the parent study through posted advertisements, advertisements mailed to a database of patients who had previously participated in other HCV research and consented to be contacted about future studies, verbal announcements at a bi-monthly HCV education class and referrals from medical providers. Study procedures included a clinical interview, medical record review, psychological questionnaires and a comprehensive battery of neuropsychological tests for which participants were compensated $30. Evaluations were reliably conducted by clinical psychology graduates who completed extensive training in study procedures and were closely supervised by a licensed psychologist. The institutional review board at the Portland VAMC approved this study and all participants provided written informed consent.

All participants from the parent study were included in the present analyses if they had evidence in their medical record of a detectable HCV viral load based on polymerase chain reaction (PCR) tests and if they completed all measures of interest outlined in the following section. Exclusion criteria consisted of nonveterans, history of severe neurological or immune dysfunction, severe traumatic brain injury with loss of consciousness >30 min, use of alcohol or sedating substances on the day of testing, advanced liver disease (Stage 4 liver disease or Grade 4 inflammation on biopsy, or classified by a hepatologist as having probable decompensated cirrhosis based on standard liver labs), or aspartate aminotransferase (AST) to platelet ratio index (APRI) >1.5) [25,26], current pregnancy, untreated severe psychiatric disorder, or history of interferon therapy or chemotherapy. Participants were also excluded for active SUD with <90 days of remission.

2.2. Measures

Demographic variables, including age, gender, race, years of education, marital status and current occupation, were collected during the clinical interview.

HCV and liver disease variables were collected through comprehensive review of the patients' complete electronic medical records. Quantitative PCR tests were used as the indicator of viral load; viral load reflects the amount of virus present in the blood but does not necessarily correlate with liver disease severity. The APRI was used as the measure of liver disease severity, which is a noninvasive index that reliably predicts fibrosis and cirrhosis in HCV patients using routine laboratory data, with higher scores indicating more advanced liver disease [25,26]. The calculation for APRI= [AST level/upper limit of normal]/[platelet counts×(10^9/L)]×100. AST is an enzyme found in high concentrations in metabolic tissues such as the liver, and injury to these tissues causes release into the blood stream. Higher serum AST levels are associated with greater tissue damage.

Pain intensity was assessed with a 0–10 numeric rating scale (NRS), where 0=*no pain* and 10=*extremely severe pain* [27]. Pain functioning was assessed with the Bodily Pain