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Education and counseling in the methadone treatment setting improves knowledge of viral hepatitis

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ABSTRACT

The aim of this study was to evaluate the effectiveness of an educational method of providing viral hepatitis education for methadone maintenance patients. Four hundred forty participants were randomly assigned to either a control or a motivationally-enhanced viral hepatitis education and counseling intervention. Viral hepatitis A (HAV), B (HBV), and C (HCV) knowledge tests were administered at baseline, following each of two education sessions (post-education), and at a 3-month follow-up assessment. Results indicated a significant increase in knowledge of HAV, HBV, and HCV over time. No differences were found in knowledge between the intervention groups in knowledge acquisition regarding any of the hepatitis viruses suggesting that a motivational interviewing style may not augment hepatitis knowledge beyond standard counseling. A two-session viral hepatitis education intervention effectively promotes hepatitis knowledge and can be integrated in methadone treatment settings.

1. Introduction

Injection drug users (IDUs) have a high prevalence of viral hepatitis A, B, and C infection (HAV, HBV, HCV) in the U.S. (Hutin et al. 2005; Kuo, Sherman, Thomas, & Strathdee, 2004; Hennessey, Bangsberg, Weinbaum, & Hahn, 2009; Nelson et al., 2011). However, many IDUs do not know their HAV, HBV, and HCV serostatus (Carey et al. 2005; Gelberg et al. 2012; Reimer et al. 2006; Roblin, Smith, Weinbaum, & Sabin, 2011; Southern et al. 2011), may miss opportunities for prevention, and may be more likely to transmit these viruses to both drug using contacts and to non-drug using sexual and close contacts (Kuo et al. 2004; Thiede et al. 2007). While drug treatment programs are an ideal setting for viral hepatitis education, viral hepatitis is poorly addressed in U.S. opioid replacement therapy programs. In 2003 a nationwide survey of 595 drug abuse treatment programs in the U.S., findings revealed that methadone maintenance (MMT) programs provided HCV education to 72.7% of all patients, while abstinence-based drug treatment programs provided education to 50.9% of patients (Strauss, Astone, Vassilev, Des Jarlais, & Hagan, 2003). Similarly, a more recent survey of substance abuse treatment programs that participate in the National Drug Abuse Treatment Clinical Trials Network, Brown et al. (2006) found that only 74.1% offered education on HCV and 58.9% offered HCV counseling. However, most programs do not address HAV and HBV education, which represent missed opportunities for prevention (Substance Abuse & Mental Health Services Administration, 2012).

Low levels of awareness and knowledge about viral hepatitis represent a significant challenge to prevention and treatment among IDUs. Previous research has shown that IDUs have many misconceptions about HCV transmission, symptoms, clinical markers, and treatment including a perceived fear of HCV treatment (Munoz-Plaza et al., 2008; O'Brien, Day, Black, & Dolan, 2008). Moreover, IDUs generally acknowledge the need for HCV education services (Strauss et al. 2007), and improved knowledge of HCV disease is associated with increasing interest in HCV treatment (Stein, Maksad, & Clarke, 2001; Surjadi, Torruellas, Ayala, Yee, & Khalili, 2011; Walley, White, Kushel, Song, & Tulsky, 2005). While few studies have been conducted to examine HAV and HBV knowledge among IDUs (Carey et al. 2005; Heimer et al. 2002), these studies indicate that IDUs generally have a poor understanding of HAV and HBV transmission and prevention, including knowledge of the vaccine to prevent HBV infection (Carey et al. 2005; Heimer et al. 2002). Information regarding the effectiveness of educational programs

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targeting viral hepatitis knowledge among MMT program patients is critical in efforts to decrease the acquisition and spread of viral hepatitis among MMT patients and their contacts. Thus, results from this study may have the potential to inform the development of future hepatitis education services for this high-risk group.

We conducted a two-site randomized controlled trial of a motivational interviewing (MI) enhanced case management intervention designed to promote hepatitis A/B vaccination and HCV clinical evaluation among methadone patients, as part of which all participants were given a manual-guided two-session education and counseling intervention focused on viral hepatitis (Masson et al. 2013). Control condition participants were presented with hepatitis educational material in one on one didactic teaching sessions, and in the MI-enhanced case management condition, the interventionist presented the educational material in a collaborative style that is consistent with the principles of MI (Miller & Rollnick, 2013). The experimental condition was superior to the control condition in increasing adherence to HAV-HBV vaccination, and adherence to an initial appointment with a hepatitis C care provider. In current analysis, we investigated whether there was also an advantage of receiving motivationally-enhanced viral hepatitis (i.e., HAV, HBV, HCV) education on participants' knowledge of these viruses post-education. In some settings, when MI is added to health care education classes, knowledge is increased (Bailey, Baker, Webster, & Lewin, 2004; Byers, Lamanna, & Rosenberg, 2010; Hawkins, 2010), however, few studies have examined whether this finding may extend to knowledge of viral hepatitis among drug users (Nyamathi et al. 2010). It is unclear whether MI counseling style is an important ingredient of health promotion educational interventions targeting drug users. Thus, in these analyses, we examined whether the hepatitis educational intervention increased knowledge of hepatitis among drug users, and whether the incorporation of MI techniques into the educational module further increased viral hepatitis knowledge compared to the more standard didactic manner of education in a sample of methadone maintenance patients.

2. Materials and methods

The study design was a randomized trial of 489 adults receiving methadone maintenance treatment who were randomly assigned to one of two intervention groups: 1) standard viral hepatitis education and counseling (control group); or 2) MI-enhanced hepatitis education and counseling (MI-enhanced group). Randomization occurred upon completion of a structured baseline interview by trained research staff. Both conditions received on-site HAV, HBV, HCV screening, a two-session manual-guided viral hepatitis education and counseling intervention, and off-site referral for hepatitis-related medical care. In addition, the MI-enhanced group received weekly 60-minute individual theory-based case management focused on facilitated linkage to hepatitis-related medical care, other general medical services, social services, and on-going risk reduction education and counseling. Case management services were provided using a counseling style consistent with MI principles.

2.1. Sample and setting

The two-arm randomized clinical trial was conducted in MMT programs in New York City and San Francisco. MMT patients were recruited from methadone waiting rooms to participate in eligibility screening. Eligibility requirements included that participants were 18 years of age or older; HCV-negative, of unknown HCV status, or if HCV-positive, had no prior medical care or diagnostic evaluation for HCV; and were able to give informed consent.

2.2. Measures

At baseline, the Addiction Severity Index (ASI; McLellan et al. 1992) was used to collect socio-demographic information and drug and alcohol use behavior over the participants' lifetime and in the past 30 days. Hepatitis knowledge questionnaires were administered on four different occasions including baseline, immediately following each education session (post-education), and at the 3-month follow up assessment.

2.3. Education and counseling intervention

The viral hepatitis education sessions were manual-guided, and PowerPoint presentations were facilitated by a mixture of bachelor and master's level interventionists. Interventionists received a 4-hour training session in MI techniques provided by a doctoral level clinical psychologist with extensive post-doctoral training in MI; the training was repeated once when new staff were hired, and so two of the interventionists received the training twice. Information on viral hepatitis prevention, diagnosis, symptoms, transmission, natural history, treatment, and the benefits of immunization for HAV and HBV was included in the presentations. Several sources were used to develop the presentations including the Northwest Hepatitis C Resource Center (Northwest Hepatitis C Resource Center, 2006) and Centers for Disease Control (CDC) educational resources in viral hepatitis (Centers for Disease Control, 2010). The informational content of the PowerPoint presentations was identical for both intervention conditions, although in the MI-enhanced arm there were additional slides incorporating MI techniques to reinforce the educational content (Miller & Rollnick, 2013). Knowledge questionnaires consisted of multiple-choice and true/false questions including 35-items for the HAV questionnaire, 39-items for the HBV questionnaire, and 64-items for the HCV questionnaire. The total number of correct answers was computed separately for each questionnaire.

2.4. Data analysis

Descriptive statistics for sociodemographic and substance use characteristics and knowledge scores were calculated. We created a post-education knowledge score for each of the hepatitis virus (i.e., HAV, HBV, HCV) knowledge tests by adding the total number of correct items from post-education sessions 1 and 2. In a first set of analyses, we performed three-factor ANOVAs with treatment group and site (New York versus San Francisco) as between subjects factors and time as a within subjects factor on dependent variables of HAV, HBV, and HCV knowledge. We performed post-hoc analyses with a Bonferroni correction to examine specific time effects. All ANOVAs used Greenhouse-Geisser (Greenhouse & Geisser, 1959) corrections for sphericity, and the corrected degrees of freedom are reported for all results involving repeated measures. In addition, for each dependent variable, we examined predictors of change, and when the predictor was statistically significant ($p < .05$), the predictor was included as a factor in the final ANOVA model.

3. Results

3.1. Sociodemographic characteristics

Four hundred forty of the 489 enrolled in the randomized controlled trial completed both baseline educational sessions and knowledge tests. Table 1 shows the characteristics of these 440 participants (222 in the control condition and 218 in the MI-enhanced condition). The sample was racially/ethnically diverse, and the majority was male (68.2%) and unemployed (75.0%). More than half of the participants completed high school, and almost two-thirds had a history of injection drug use (64.8%). There were no significant

Table 1
Participant demographic and drug use characteristics.

Characteristic	MI-enhanced (n = 218)	Control (n = 222)
Gender		
Female (n, %)	68 (31.2)	72 (32.4)
Race/Ethnicity (n, %)		
African American	61 (30.0)	72 (32.4)
White	76 (34.9)	80 (36.0)
Hispanic	42 (19.3)	39 (17.6)
Other	39 (17.9)	31 (14.0)
Age (Mean, SD)	44.93 (10.2)	45.26 (9.7)
High school education (n, %)	113 (51.8)	133 (59.9)
Homeless in the past 6 months (n, %)	44 (20.2)	39 (17.6)
Unemployment in the past 30 days (n, %)	169 (77.5)	161 (72.5)
History of injection drug use (n, %)	147 (67.4)	138 (62.2)
Years of heroin use (mean, SD)	15.41 (10.8)	14.80 (10.5)
Heroin use past 30 days (mean, SD)	2.73 (6.4)	2.19 (5.5)
Cocaine use past 30 days (mean, SD)	4.74 (9.2)	5.65 (9.7)
Alcohol use past 30 days (mean, SD)	4.68 (8.8)	6.11 (10.2)

differences in the baseline characteristics of those who completed the knowledge tests as compared with those who had missing data, and there were no significant differences in baseline characteristics, including HCV prevalence, between the intervention groups.

3.2. Effect of education on the HAV Knowledge Scale

ANOVA revealed a significant time effect [F (1.49, 649) = 520.6, $p < .0001$]. However, effects of treatment group were not statistically significant (all Fs < 1.0) indicating that knowledge of HAV increased significantly in both groups at each time point. Post-hoc comparisons showed that knowledge of HAV increased from baseline (M = 20.62; SD = 6.32) to immediately post-education ($p < .0001$, M = 26.04; SD = 4.18). Participants showed additional gains at the 3-month follow-up assessment ($p < .0001$, M = 29.09; SD = 3.22). In addition, a site by time interaction was significant indicating that although HAV knowledge for both conditions increased from baseline to post-education, the increase was greater for the New York site than the San Francisco site [F (1.49, 649) = 13.6, $p < .0001$].

3.3. Effect of education on the HBV Knowledge Scale

The results for HBV knowledge were similar with respect to the effect of education on knowledge scores. There was a significant increase in knowledge of HBV over time [F (1.41, 614.0) = 323, $p < .0001$]. However, neither the main effect for treatment group (F (1, 436) = .001, $p = .97$] nor the treatment by time interaction were significant indicating that knowledge increased significantly for both intervention groups at each time point [F(1.41, 614.04) = 1.78, $p = .18$). Post-hoc comparisons revealed that knowledge of HBV increased from baseline (M = 25.21; SD = 7.72) to immediately following education ($p < .0001$, M = 30.48; SD = 4.33). Similarly, knowledge scores continued to increase at the 3-month follow-up assessment ($p < .0001$, M = 32.87; SD = 3.66). Furthermore, a main effect for site was observed indicating that the New York site had higher HBV knowledge scores across all time points than the San Francisco site [F(1, 436) = 35.3, $p < .0001$).

3.4. Effect of education on the HCV Knowledge Scale

For HCV knowledge, a treatment group by time interaction was significant, $F(1.57, 663.7) = 2.35$, $p = 04$. An examination of the pattern of results revealed an ordinal interaction, which reflected baseline differences in knowledge scores between conditions, but not at follow up assessments. Thus, the ordinal interaction allowed for the interpretation of the main effect for time, $F(1.56, 663.7) = 456.6$, $p < .0001$. Post-hoc comparisons revealed that in both conditions, HCV knowledge scores increased significantly from baseline (M = 40.74; SD = 11.02) to immediately following education ($p < .0001$, M = 48.50; SD = 8.22), and these gains continued through the 3-month follow-up assessment ($p < .0001$, M = 54.69; SD = 6.26). In addition, a site by race by time interaction was significant indicating that although HCV knowledge for both conditions increased from baseline to post-education, the increase was greater for the New York site than the San Francisco site, $F(4.7, 663.7) = 2.55$, $p = .03$, and for African American participants in the New York site in particular.

4. Discussion

These analyses show that a two-session viral hepatitis education intervention can improve knowledge of hepatitis in a diverse sample of methadone maintenance patients. Viral hepatitis knowledge increased over time and was retained for at least 3 months post-education. However, a motivational interviewing style used in the hepatitis care coordination intervention did not improve knowledge acquisition above the effects observed in the standard counseling and education intervention. This finding is consistent with a study by Nyamathi et al. (2010) who found that MI-enhanced education did not increase knowledge of HBV and HCV above the effects observed for a nurse-led hepatitis health promotion intervention. MI is a skill requiring training and optimal methods, and extents of training are not clearly defined. In our study, we used a mixture of bachelor and masters level interventionists trained for relatively brief periods in an attempt to study an intervention that would be easily replicated. Wolfe et al. (2010) examined the ability of drug using peers to learn how to administer an MI-based care linkage intervention with 3 hours of training weekly for 6 months, and found that 3 out of the 4 trainees were able to achieve a high fidelity to MI techniques with moderately intensive training. Future studies are needed to directly examine the level and extent of MI training required to reliably deliver MI, and whether greater fidelity to MI principles would further enhance the hepatitis education intervention.

It was notable that knowledge measured at the 3-month follow up assessment was greater than that measured after the last educational session. The knowledge tests were scored and reviewed with participants after the last educational session, and this may have contributed to the increase in educational scores at the 3-month assessment. Further, it is possible that this aspect of the intervention might have increased knowledge in both arms of the study obscuring any possible augmentation in knowledge by the MI-enhanced arm at the 3-month follow up assessment. Another possible consideration for the findings might be that a focus on viral hepatitis as an important clinical issue might have generated an increased level of awareness and interest generally at both study sites that might also have contributed to general knowledge gains.

Consistent with previous findings in samples of drug users, knowledge of viral hepatitis was limited in our sample of methadone maintenance patients (Carey et al. 2005; Strauss et al. 2007; Walley et al. 2005). Prior studies have shown that HCV patient education may play an important role in increasing willingness to accept HCV treatment (Gupta, Romney, Briggs, & Benker, 2007; Surjadi et al. 2011). Similarly, educational programs targeting other high risk populations for HBV have shown that education is a key component in increasing willingness to be screened for and vaccinated against HAV and HBV (Nyamathi et al. 2009). Drug treatment programs offer an important opportunity to engage and encourage dialogue concerning viral hepatitis prevention and treatment among its patients, and to support drug users' hepatitis-related health care needs (Strauss et al. 2007).

Limitations must be considered when interpreting the results of the present study. First, changes over time cannot be solely attributed to the education intervention. They may reflect measurement error, regression toward the mean, or other factors that may correlate with

change over time. A no-education control condition could clearly establish the extent that the education sessions produced increased knowledge over time. Providing education, however, is generally considered a standard of care. Moreover, there is a possibility that the lack of differences between intervention conditions could have resulted from exposure to MI strategies by some participants in the control condition given that interventionists at the New York site delivered both the MI-enhanced education and control conditions. Second, whether more extensive MI training would have produced better outcomes is unknown. Third, site differences were observed on viral hepatitis knowledge, which may reflect differences in the way the interventions were delivered at each site or perhaps differential exposure to other sources of viral hepatitis information between the two sites. Finally, the study was conducted among MMT patients living in urban settings, and whether the findings are generalizable to other settings is not known.

In summary, the hepatitis educational module employed increased drug users' knowledge of viral hepatitis A, B and C both post education and at 3 months follow up. In this study, the use of an MI style did not further increase knowledge gains, but whether the use of more extensive MI training would have improved knowledge gains requires further study.

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