Evaluating the Effectiveness of the AIDS Education and Training Center (AETC) National Human Immunodeficiency Virus/Hepatitis C Virus (HCV) Curriculum

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ABSTRACT

BACKGROUND: People with human immunodeficiency virus (PWHIV) who have hepatitis C virus (HCV) coinfection are at a higher risk of progression of liver disease than the general population. Direct acting antivirals provide a therapeutic option for HCV cure, however access to HCV specific care for PWHIV can be challenging. A paucity of specialist providers is a barrier to this care.

OBJECTIVES: This study aims to assess knowledge gained about HIV/HCV coinfection among health care providers.

METHODS: AIDS Education Training Centers (AETC) have developed a modular national HIV/HCV coinfection curriculum consisting of a free selfdirected online curriculum to educate health care providers, including nonspecialist providers, involved in the care of PWHIV on HCV care and management. The effectiveness of this curriculum was evaluated with pre and post module assessment completion by learners compared with a paired *t*-test.

RESULTS: 716 people received links to the curriculum and 277 modules were completed by 221 unique individuals. 86% completed one module, 9% complete 2 modules, and the remaining 5% completed between 3 and all 6 modules. There were statistically significant increases in knowledge in the epidemiology module.

KEYWORDS: HIV, hepatitis C, coinfection

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Introduction

Immunodeficiency virus (HIV) infection is known to accelerate the progression of liver disease in people co-infected with both HIV and hepatitis C virus (HCV) compared to those mono-infected with HCV only.[1,2] It is therefore important that people with HIV (PWHIV) who are also co-infected with HCV are cured of their HCV infection. Furthermore, HCV infection brings a risk of hepatocellular carcinoma (HCC) associated with liver fibrosis and cirrhosis. The risk of HCC is 17-fold higher in HCV-infected persons (OR 17.2, 95% CI 13.9-21.6).[3,4] Patients with HCV-related cirrhosis have a 2% to 6% annual risk of HCC, with 3 and 5 year cumulative probabilities of developing HCC of 6% and 9%, respectively. Approximately 80% of HCC cases in the United States can be attributed to HCV infection[5] and HCV-related HCC has had a large proportionate increase in incidence in recent years.

Direct acting antivirals (DAAs) have changed the HCV treatment landscape. DAAs are more effective at curing HCV than previous interferon-based treatment regimens. Guidelines in the United States[4] changed in 2012 to recommend screening all people born between 1945 and 1965 (baby boomers) at least once for HCV; in 2019 the guidelines evolved to recommend universal screening of all adults aged 18 to 79 years for HCV.[6] This combination of more screening and more effective treatment has led to increasing numbers of people needing and wanting HCV treatment. There is a shortage of physicians and moreover specialist hepatologists to fulfill this demand.[7] Population studies show a significant gap in the HCV cascade of care in the United States,[8,9] with a steep drop off from the numbers tested for HCV and found to have chronic HCV infection to the numbers ultimately able to access care and achieve cure. Limited specialist availability is a significant barrier to achieving a cure for HCV. The ASCEND study showed that HCV treatment administered independently by primary-care physicians and nurse practitioners who have undergone training was safe and as effective as care observed with experienced specialists, inclusive of challenging sub-populations.[10] There is, therefore, evidence to support the workforce development of nonspecialist clinical providers to treat HCV infection.

It is essential for providers who want to broaden their clinical skill set to have access to effective educational tools. Online modules facilitate the accessibility of educational materials. To this end, the AIDS Education and Training Center (AETC) has developed a modular national HIV/HCV coinfection curriculum. The AETC national HIV/HCV coinfection curriculum is a free self-directed online curriculum developed to educate health care providers involved in the care of PWHIV with HCV.[11] The curriculum identifies 6 core competencies for providers treating HCV in PWHIV with multiple lessons within each topic area. The core competencies are as follows: (1) epidemiology, (2) prevention, (3) screening, testing and diagnosis, (4) HCV treatment, (5) recommendations for subpopulations of HIV/HCV co-infected persons, and (6) addressing barriers for co-infected people of color. The curriculum was developed between 2016 and 2017 as a component of the project A Jurisdictional Approach to Curing Hepatitis C among HIV/HCV Co-infected People of Color funded by the Secretary's Minority AIDS Initiative Fund through the Health Resources and Services Administration (HRSA) HIV/AIDS Bureau (HAB). The curriculum was developed by the AETC National Coordinating Resource Center (NCRC) in collaboration with multiple regional AETCs including MidAtlantic AETC, New England AETC, Northeast/Caribbean AETC, South Central AETC and Southeast AETC and was launched in July 2017. We describe here the objective assessment of the effectiveness of the AETC national HIV/HCV curriculum within the first year of its launch.

Methods

This was a cross-sectional study design with a pre and post test used to assess short term knowledge gain after a learner went through an AETC national HIV/HCV curriculum module. Based on the curriculum modules' learning objectives, six sets of 10 true and false questions were created as an assessment tool to measure the participant knowledge change from before to after reviewing a module. The questions were developed by an infectious disease physician and reviewed by a hepatologist and staff from Valley AIDS Council South Central AETC, an AETC local partner site. The same 10 questions were asked for pre and post tests and in total, 60 true and false questions were developed.

The modules and assessment questions were distributed to the attendees of AETC supported conferences and symposiums related to HIV/HCV (hereafter termed 'face to face education events') across South Texas and to staff at the clinical sites across South Texas within a HRSA funded Special Project of National Significance (SPNS) to Cure Hepatitis C in People of Color Living with HIV. A valid email address and a confirmed conference registration where applicable were necessary for participation. Distribution occurred in March–September 2018 with modules accessed by learners from 30 March to 26 September 2018. The module and assessment question distribution occurred via Research Electronic Data Capture (REDCap), a secure web application for building and managing online surveys and databases.[12] REDCap facilitated the distribution of both the modules and the assessment via a uniform resource locator (URL) link. Duplicate module completions by persons who attended multiple targeted face to face education events were excluded.

Face to face education event registrants received an email about the AETC national HIV/HCV curriculum containing a REDCap link seven days prior to the event start date. The link led to the following sequence: (i) Participants were asked demographic and employment questions; (ii) Participants then chose one of the modules based on their interest; (iii) Choosing a module prompted the module's 10 item pretest to appear followed by the module slides for self-directed learning; (iv) At the end of the slide deck, participants were directed to a post test consisting of the same questions as the pre test; (iv) After learners completed the post test, they were directed to a page with the correct answers to pre and post test questions and provided with their pre and

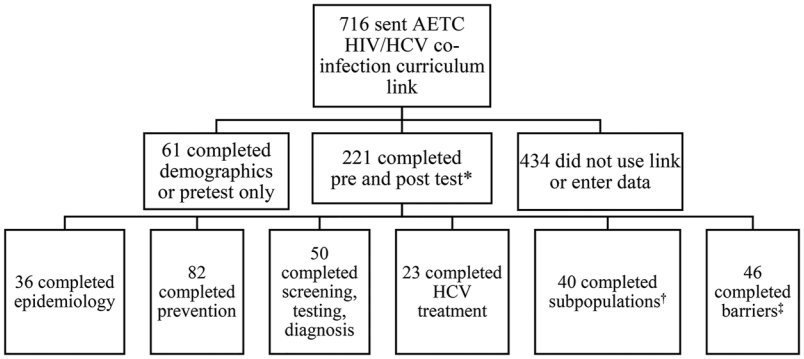

Figure 1. Responders to the AETC HIV/HCV curriculum. *Responders are able to complete more than one module. †Subpopulation: Recommendations for the Subpopulations of the HIV/HCV Co-infected Person module. ‡Barriers: Addressing Barriers for the Co-infected People of the Color module.
Abbreviations: AETC, AIDS Education Training Center; HIV/HCV, human immunodeficiency virus/hepatitis c virus.

post test scores along with a module completion certificate; (vi) The learners were finally invited to complete another module. Those who did not complete at least one module's pre and post test, received a reminder email 3 days before the event start date. The curriculum distribution and assessment process was first piloted with distribution to attendees of the HIV in Primary Care Symposium held in San Antonio and then subsequently distributed to attendees of the following: the National HIV/HCV Latino Conference held in San Antonio (May 18-20, 2018), HIV and HCV 1 day mini provider conference in Harlingen (June 23, 2018) and the South Texas HIV Symposium held in Corpus Christi (September 27-29, 2018).

In addition to the face to face learning events, the curriculum link was sent to staff with direct patient contact at four HIV clinic sites and two substance use disorder and mental health services (SUD/MH) sites for the HRSA SPNS to cure HCV in PWHIV: San Antonio AIDS Foundation, Coastal Bend Wellness Foundation, Valley AIDS Council, the City of Laredo Health Department, PILLAR – Mental Health and Addiction Care and the Center for Health Care Services. Providers at these HIV clinic and SUD/MH sites had 6 weeks to complete at least 1 module with the corresponding pre and post test assessment. The providers received notification emails introducing the curriculum four days before they received the REDCap URL link. E-mail reminders were sent every two weeks during the six week time period to those who did not complete at least one module's pre and post test. In addition, a list of nonresponders were sent to the SPNS project coordinators at each site who contacted nonresponsers in person, via email or telephone to remind them to access the curriculum and complete the pre and post tests.

Descriptive analysis was used to assess the demographic characteristics of learners while a paired *t*-test was used to assess short-term knowledge changes before and after reviewing the curriculum. Overall changes in knowledge and knowledge changes stratified by the module were assessed. Data were analyzed using SAS (version 9.4; SAS Institute). Study approval was obtained from the University of Texas Health Science Center at San Antonio Institutional Review Board (IRB).

Results

The main finding of the pilot was that the number of learners completing the post test was low compared to those completing the pre test. To improve the observed low completion rate of post test assessments, a lottery draw for complimentary registration to one of the conferences organized by Valley AIDS Council South Central AETC in 2019 was offered to those who completed both pre and post test assessments for at least one module. This incentive subsequently considerably improved the number of learners completing the post test (Figure 1).

Table 1. Learner characteristics.

		N (%)
Gender	Male	70 (31.7)
	Female	151 (68.3)
Age	<25	18 (8.1)
	26-35	64 (29.0)
	36-45	66 (29.9)
	46-55	43 (19.4)
	56-65	23 (10.4)
	> 65	7 (3.2)
Race/ethnicity	Hispanic	147 (66.5)
	Non-Hispanic White	46 (20.8)
	Non-Hispanic Black	20 (9.1)
	Non-Hispanic other	8 (3.6)
Education	High school diploma/GED	43 (19.4)
	Associates degree	23 (10.4)
	Bachelor's degree	66 (29.9)
	Master's degree	76 (34.4)
	Doctorate degree	13 (5.9)
Work setting	Academic Institution	7 (3.2)
	Community clinic/Health center/FQHC	123 (55.7)
	Fed/State/Local government	35 (15.8)
	Non-profit Organization	23 (10.4)
	Not applicable	9 (4.1)
	Other	19 (8.6)
Role	Administrator	26 (11.8)
	Case manager	44 (19.9)
	Community Health Worker/Health educator/Navigator	41 (18.5)
	Social Worker	9 (4.1)
	Counselor	42 (19.0)
	Licensed Vocational Nurse/Registered Nurse	11 (5.0)
	Nurse Practitioner/Physician/Physician Assistant	25 (11.3)
	Pharmacist	3 (1.3)
	Epidemiologist/Data analyst	7 (3.2)
	Medical Assistant	4 (1.8)
	Other	9 (4.1)
Ryan White Affiliation	Yes	113 (51.1)
	No	108 (48.9)

Abbreviations: FQHC, Federally Qualified Health Center; GED, General Education Development.

A total of 716 people received links to the curriculum and 277 modules were completed by 221 unique people. Of the 221 learners, 86% completed one module, 9% complete two modules, and the remaining 5% completed between three and all six modules. An outline of the module and pre/post test distribution is illustrated in Figure 1. Table 1 details the demographics of learners who completed at least one module (N= 221). Among the 221 learners, over two-thirds were female and a majority of them were between the ages of 26 to 45 years. The majority of the learners were Hispanic (67%, n= 147), followed by non-Hispanic White (21%, n=46). 70% and had a Bachelor's degree or higher. Over half of the learners (56%, n=123) reported they worked at a community clinic, health center or Federally Qualified Health Center (FQHC). Most learners were case managers (19%, n=44), counselors (19%, n=42), or community health worker/patient navigators (19%, n=41). A total of 51% of the learners were identified as having a Ryan White HIV/AIDS Program affiliation. There was significant association between the completion of the screening module and the professional role variable (P= .004). The professional role variable was categorized into three levels: (1) medical care provider role (nurse practitioner/physician/physician assistant, licensed vocational nurse/registered nurse, medical assistant, pharmacist); (2) patient care provider role (case manager, community health worker/health educator, counselor, social worker); and (3) other role (administrator, epidemiologist/data analyst, etc).

The most popular module was prevention, followed by screening, testing and diagnosis and addressing barriers for co-infected people of color, recommendations for subpopulations of HIV/HCV co-infected persons, epidemiology, and HCV treatment. The mean pre and post test scores for each of the six modules and overall mean pre and post test scores across all six modules are shown in Figure 2. There were statistically significant increases in knowledge in the following three modules: epidemiology (P< .001), recommendations for the subpopulations of HIV/HCV co-infected persons (P< .001), addressing barriers for co-infected people of color (P= .008), and overall for the curriculum (P< .001).

Discussion

The concept of nonspecialist providers providing care is not new with respect to HIV management. While care of PWHIV in the United States is done by infectious disease specialists this scope of practice is also shared by primary care providers who have done adequate training to be able to manage HIV disease and treatment. Nonspecialist providers deliver excellent care to PWHIV and these primary care providers can be important avenues of access to HCV care and treatment. Knowledge deficits among healthcare workers in relation to HCV can contribute to poor access to prevention, screening, diagnosis, and treatment services and increase stigma.[13,14] Furthermore, it cannot be assumed that all infectious disease specialists are comfortable treating HCV in their patients living with HIV. Given the recency of the advent of DAAs, older physicians may not have had HCV treatment experience with DAAs during their fellowship training.

Workforce development of nonspecialist clinical providers including nurse practitioners and physicians to treat HCV infection in PWHIV requires easily accessible as well as effective educational tools. There are extensive online educational resources for HIV management for primary care providers including those provided by the AETC. While there are educational resources for HCV monoinfection,[6,15] there is a paucity of similar online resources specifically for education on HIV/HCV coinfection management. The AETC national HIV/HCV curriculum fills this gap as an educational tool for HCV management for all involved in providing care along the HIV care continuum

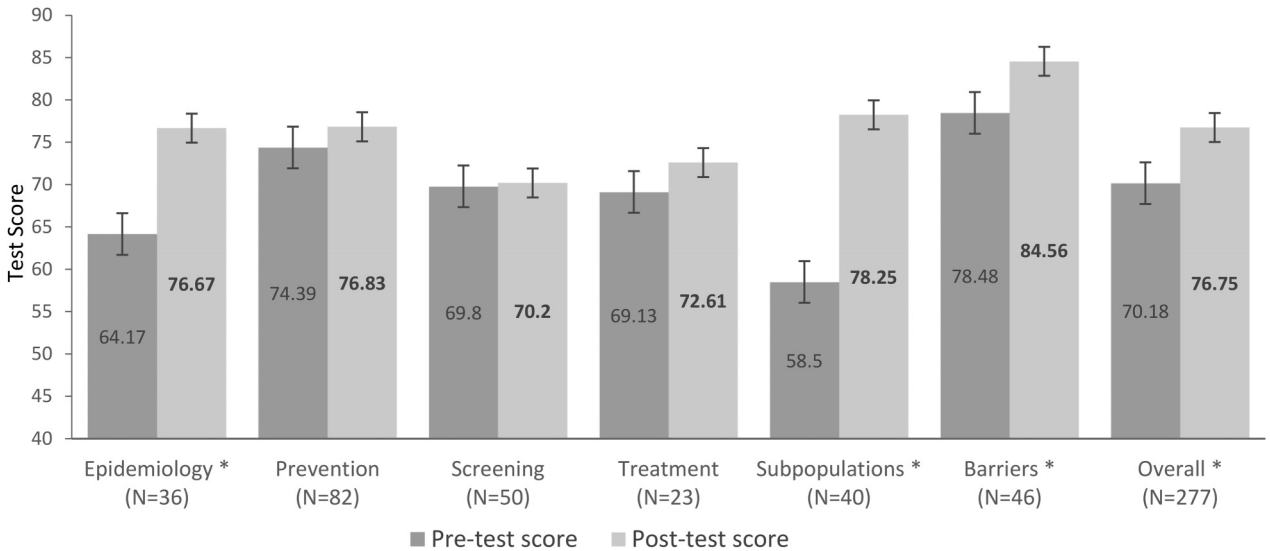

Figure 2. Mean pre and posttest scores by the module. *Statistically significant difference between prepost means (paired *t*-test *P*-value <.05).

including HIV providers. One advantage of the assessed HIV/HCV curriculum is the online modular availability. In comparison with in person training, online training opportunities provide flexible timing of access for the learner, no cost associated with travel, availability to learners across different geographical locations, and economic options as online training is more likely to be free of charge.[16]

Following the roll out nationally of the AETC national HIV/HCV curriculum, this study was important in assessing the effectiveness of the curriculum so as to direct modifications and improvements as necessary. The national HIV/HCV curriculum was found to be effective in improving overall knowledge scores among learners. This is encouraging and supports a conclusion that the curriculum is doing what it was developed to do—increases learner knowledge with regards to HIV/HCV coinfection. Among the learners assessed it was noted that the prevention module was the most popular choice and the treatment module was the least selected module choice. This suggests the possibility that in this group of learners, the prevention of HCV is an area of perceived lack of knowledge.

The lack of popularity of the treatment module may be a reflection of only 11% of assessed learners being treating providers (nurse practitioners, physicians, and physician assistants). The largest increase in the knowledge score post test was seen in the subpopulations of the HIV/HCV coinfected persons module. The smallest increase in the knowledge score post test was seen in the screening testing and diagnosis module. This suggests the possibility that in this group of learners, the background knowledge of screening, testing, and diagnosis of HCV was the highest.

A limitation of this study was that because the curriculum was distributed at AETC events in South Texas it may not be generalizable to learners in other states. However, this limitation was mitigated by the distribution of the curriculum at a national conference that had participants from a number of different states. A second limitation is that the number of physicians, nurse practitioners and physician assistants represented is relatively small; it will be important to further assess the effectiveness of this curriculum among this group of health care workers recognizing additionally that physician assistants and nurse practitioners provide a significant amount of HIV care particularly for rural and remote populations. A final limitation of this study was that with the post test being done immediately after the completion of the module, it only measured short-term knowledge gain. Despite these limitations this study is an important evaluation of the effectiveness of the AETC national HIV/HCV curriculum within the first year after it was launched.

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REFERENCES

1. Roe B, Hall WW. Cellular and molecular interactions in coinfection with hepatitis C virus and human immunodeficiency virus. *Expert Rev Mol Med.* 2008;10:e30.
2. Benhamou Y, Bochet M, Di Martino V, et al. Liver fibrosis progression in human immunodeficiency virus and hepatitis C virus coinfected patients. *Hepatology.* 1999;30(4):1054-1058.
3. Donato F, Boffetta P, Puoti M. A meta-analysis of epidemiological studies on the combined effect of hepatitis B and C virus infections in causing hepatocellular carcinoma. *Int J Cancer.* 1998;75(3):347-354.
4. Fattovich G, Giustina G, Degos F, et al. Morbidity and mortality in compensated cirrhosis type C: a retrospective follow-up study of 384 patients. *Gastroenterology.* 1997;112(2):463-472.
5. Kim HS, El-Serag HB. The epidemiology of hepatocellular carcinoma in the USA. *Curr Gastroenterol Rep.* 2019;21(4):17.
6. AASLD-IDSA. Recommendations for testing, managing, and treating hepatitis C. Available at: http://www.hcvguidelines.org. Accessed 5 April 2020.
7. Association of American Medical Colleges. Myths and facts: the physician shortage. Available at: https://www.aamc.org/system/files/2019-08/myths-facts-physician-shortage.pdf. Accessed 1st April 2020.
8. Yehia BR, Schranz AJ, Umscheid CA, Lo Re V3rd. The treatment cascade for chronic hepatitis C virus infection in the United States: a systematic review and meta-analysis. *PLoS One.* 2014;9(7):e101554.
9. Zein NN, Rakela J, Krawitt EL, Reddy KR, Tominaga T, Persing DH. Hepatitis C virus genotypes in the United States: epidemiology, pathogenicity, and response to interferon therapy. *Ann Intern Med.* 1996;125(8):634-639.
10. Kattakuzhy S, Gross C, Emmanuel B, et al. Expansion of treatment for hepatitis C virus infection by task shifting to community-based nonspecialist providers: a nonrandomized clinical trial. *Ann Intern Med.* 2017;167(5):311-318.
11. AETC. HIV/HCV coinfection: an AETC national curriculum. Available at: https://aidsetc.org/hivhcv. Accessed 24th March 2020.
12. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)–a metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform.* 2009;42(2):377-381.
13. Cox J, Graves L, Marks E, et al. Knowledge, attitudes and behaviors associated with the provision of hepatitis C care by Canadian family physicians. *J Viral Hepat.* 2011;18(7):e332-e340.
14. Samuel ST, Martinez AD, Chen Y, Markatou M, Talal AH. Hepatitis C virus knowledge improves hepatitis C virus screening practices among primary care physicians. *World J Hepatol.* 2018;10(2):319-328.
15. University of Washington. Hepatitis C Online. Available at: https://www.hepatitisc.uw.edu/. Accessed 5th April 2020.
16. Wang D. A comparison of in-person and online training in a statewide clinical education program for dissemination of HIV, HCV and STD clinical evidence. *Stud Health Technol Inform.* 2019;264:2003-2004.