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Peer education for Hepatitis C prevention

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ABSTRACT

The purpose of this article is to describe a model of education about hepatitis C virus prevention tested in a county correctional facility. The Teach One Method and Relational Communication models inform this work. Using a one-group pretest–posttest prospective design our aims were to (1) convey education about prevention, protection, and safety; (2) provide this information through relationship-centered communication; (3) test the reliability and validity of the instruments; and (4) measure changes in behavior, knowledge, and relationship in the learner. A convenience sample of 25 men was recruited at a Massachusetts county jail. Subscale reliability was 0.78 and 0.79 for the relationship and behavior subscales, respectively. Knowledge questions were evaluated using face and content validity by teachers before and during this study. All subscale mean scores improved in the posttest condition. The level of significance of the calculated t value for the behavior subscale was 0.16. The level of significance for the relationship t value was nonsignificant at 0.65. Knowledge, behavior, and relationship scores improved after the intervention. Recommendations include retesting study instruments on a larger sample and using a control group.

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The purpose of this article is to describe a project designed to pilot test a model of education about hepatitis C virus (HCV) prevention in a county correctional facility. Our team tested the effectiveness of peer education focusing on behavior, knowledge, and relationship concepts. The long-term goal of this work is to prevent the spread of HCV by focusing on a high-risk population, using a relationship-based intervention model.

The researchers believe that nurses specializing in liver conditions can impact public health through innovative educational programs. The first aim of this study was to convey education about prevention, protection, and safety related to HCV infection. The second aim was to provide this information through relationship-centered communication based on mutual support and trust. The final aim was to evaluate the effectiveness of this type of education intervention by measuring any changes in behavior, knowledge, and relationship scores.

Background and Significance

It has been estimated that 30%-40% of all those in short-term incarceration are infected with HCV and are at risk of transmitting it to others upon their release (Davis, Albright, Cook, & Rosenberg, 1998). Recent estimates indicate that 12%-39% of all Americans with chronic HCV were incarcerated during the previous year (National Commission on Correctional Health Care, 2002). Injection drug users are the second highest-ranking group in prevalence of HCV and the leading group by incidence (Centers for Disease Control and Prevention [CDC], 1998).

As is true of many persons with HCV, injection drug users, prisoners, and alcohol abusers have three main problems that require education and behavior change to ameliorate: (1) preventing the spread of the disease, (2) maintaining good health, and (3) avoiding long-term complications. Despite the fact that national curricula have been developed, there is little evidence that these curricula reach the audience most in need of the information. Students and staff at the

Hampshire Sheriff's Office have developed creative programs to fill this gap, including harm reduction and communicable disease prevention education and teaching materials. Our project is based in part on the previous successes seen in the National Institutes of Health (NIH) Hepatitis C Consensus Statement (NIH, 2002). The authors concluded that needle exchange programs and comprehensive risk-modifying educational programs that have been successful in preventing HIV transmission might be useful in decreasing HCV transmission.

Among the innovative approaches that have been successful are creative multimodality programs (e.g., using cognitive and behavioral enhancements). Unlike existing curricula that tend to be offered in a solitary modality (such as printed information) rather than through a relationship with another person, our service-learning program brings education to the inmates that will provide ongoing learning and reinforcement using relationship-based communication.

Theoretical Framework

Two theoretical perspectives underpin this project: (1) The Each One Teach One (EOTO) method and (2) Relational Communication. The EOTO program has been used since its inception in the 1930s. It was started with the assistance of universities and colleges as a part of using community resources and support for adult literacy; however, volunteer tutors from any sector of the literate population are fully capable of utilizing this approach (Uppal, 1996). Theoretically, each "student" has the opportunity to become a "teacher." This method uses a relationship-based strategy in which learners know and trust their teacher and perceive him or her to be an authority on the subject matter through life experience (Laubach & Laubach, 1960).

Peer-led models have been used widely for reading literacy (Moore, 1972; National Council of Teachers of English, 1986) as well as health education messages (Mail & Taylor, 1996) spanning childhood to adult age groups. For example, adult peer-led HCV counseling and testing has been used with some success in Australia as part of its National Hepatitis C Health Initiative (Aiken, Kerger, & Crofts, 2002). Abstinence groups such as Alcoholics Anonymous and Narcotics Anonymous support members to stay substance-free through personal group meetings utilizing Twelve Steps. Hepatitis C support groups rely on face-to-face group education and support. To date, there has been no data to demonstrate these groups' effectiveness in decreasing HCV transmission.

As indicated above, Laubach and Laubach (1960) used terms such as "trust" and "equality" to explain why EOTO is effective. Although they did not frame this explanation as relational, these terms may refer to characteristics of interpersonal relationships, such as teacher honesty, sincerity, and knowledge, as well as sharing commonalities and similarities with the learner. The positive interpersonal relationship between teacher and learner is what accounts for the positive outcomes of the EOTO approach.

An interpersonal relationship is the connection or linkage between two people. Relational communication theorist Judee Burgoon (Burgoon & Hale, 1984) has posited that all interpersonal relationships vary along the same dimensions, such as trust, similarity, and competence/knowledge. Furthermore, these dimensions are independent of one another. For example, one person might trust another but might not feel similar to him/her or think that he/she is knowledgeable about hepatitis C. Or, a person might think that another is knowledgeable but not particularly trustworthy or similar. Subsequent research has provided support for Burgoon's framework in disciplines other than communication including nursing (e.g., Gilbert, 1998), medicine (e.g., Gallagher, Hartung, & Gregory, 2001), theology (e.g., Baesler, 2002), and management (e.g., Walther, 1995). Burgoon's framework was used as an element of evaluation in the proposed project.

Methods

Using a one-group pretest–posttest prospective design, our aims were to convey education about prevention, protection, and safety related to HCV infection; provide this information through relationship-centered communication based on mutual support and trust; and evaluate the effectiveness of this type of education intervention by measuring any changes in behavior, knowledge, and relationship scores. Research questions and the study aims are listed in Table 1.

TABLE 1. Study Aims and Research Questions

Research Questions	Aims
What is the reliability and validity of the pretest/posttest questions related to behavior, knowledge, and relationship?	To convey education about prevention, protection, and safety related to hepatitis C virus infection
Is a community health educator effective in providing peer-led education?	To provide this information through relationship-centered communication based on mutual support and trust
Is there a difference in the mean scores in behavior, knowledge, and relationship?	To evaluate the effectiveness of this type of education intervention by measuring any changes in behavior, knowledge, and relationship scores

Peer Education for Hepatitis C Prevention

1. Behavior Questions

Please Underline the number that best describes how true the answer is. The number 1 means that the answer you pick is "Very True." The number 7 means that the answer you pick is "Not Very True." Choose Zero (0) if you do not do that behavior or if the question does not apply to you. Please answer each question.

	"Does not apply to me"	"Not true"						"Very true"
Example:								
I will get a tattoo.	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**<u>7</u>**
1. I will use new needles or syringes when I use IV drugs	0	1	2	3	4	5	6	7
2. I will use condoms more often than I have in the past	0	1	2	3	4	5	6	7
3. I will eat more fruits and vegetables every day	0	1	2	3	4	5	6	7
4. I will make sure I drink at least 9–8 ounce glasses of water every day	0	1	2	3	4	5	6	7
5. I will drink less alcohol	0	1	2	3	4	5	6	7
6. I will get vaccinated for hepatitis A and B	0	1	2	3	4	5	6	7

2. Knowledge Questions (True or False)

<u>UNDERLINE</u> the correct answer.

Example: I like to eat ice cream.	**<u>True</u>**	**False**
1. Hepatitis C is caused by a virus.	True	False
2. A vaccination is available for hepatitis C	True	False
3. All forms of hepatitis can be transmitted by sex.	True	False
4. The easiest way to get or give hepatitis C is through sharing bloody needles, syringes, and deep cuts	True	False
5. Once you are infected, it is possible for you to be a chronic carrier of the virus.	True	False
6. A pregnant woman who is infected with hepatitis B or C can transmit the disease to her unborn child	True	False

3. Relationship Questions

1. How long have you known your teacher? (<u>UNDERLINE</u> one or fill in blank)

One day or less
One week or less
One month or less
One year or less
Other_____

Please <u>UNDERLINE</u> the number that best describes how much you disagree or agree with the statements listed below. The number 1 means that you "strongly disagree" with the statement. The number 7 means that you "strongly agree" with the statement. But please also use all of the numbers between 1 and 7 to say how much you disagree or agree. There are no right or wrong answers, only how much you disagree or agree.

	Strongly disagree					Strongly agree	
2. My teacher was sincere when talking to me.	1	2	3	4	5	6	7
3. My teacher and I had little in common.	1	2	3	4	5	6	7
4. My teacher knew what he/she was talking about.	1	2	3	4	5	6	7
5. My teacher seemed honest when communicating with me.	1	2	3	4	5	6	7
6. My teacher made me feel like we were similar.	1	2	3	4	5	6	7
7. My teacher had little knowledge about hepatitis C.	1	2	3	4	5	6	7

FIGURE 1. Pretest/posttest.

I. Prevention (stop transmission)
    a. Hepatitis C virus infection—how to get it or spread it
II. Safety (prevent liver damage)
    a. Testing for HCV
       i. What and where
    b. Treatment of HCV
       i. Side effects
    c. Alternative and complementary therapies
III. Protection (maintain good health)
    a. Support
    b. Diet and nutrition
    c. Harm reduction
    d. Safe sex
    e. Immunizations for hepatitis A and B

FIGURE 2. Teaching scripts.

TABLE 2. Subjects' Ethnic/Racial Information

Ethnicity/Race	%
Hispanic Latino	48
Non-Hispanic	0
American Indian	4
Black/African	20
White	32

Human subjects approval was granted from the University of Massachusetts Office of Compliance. The Hampshire County Sheriff reviewed the proposal according to facility guidelines and approved the project, which was carried out with the oversight of its communicable disease specialist. The program was offered to men already enrolled in a treatment program.

Instruments
To meet aim 1, a pretest/posttest was designed on the basis of CDC recommendations for hepatitis C prevention and Burgoon's relational communication theory. Three major concerns of these individuals include spreading the disease (prevention), maintaining health (protection), and preventing liver damage (safety). The instrument was administered prior to each educational session and at the conclusion of the last class. It is composed of three subscales that measure behavior, knowledge, and relationship. (See Figure 1 for pretest/posttest.)

Behavior
Six behavior questions are based on CDC recommendations for eliminating high-risk behavior. Each ques-

Steps to follow in training evaluation:
1. Observe trainee behavior.
2. Informally talk about the training activity.
3. Ask to role play and for return demonstration of knowledge.
4. Brief the learner after return demonstration to give feedback.
5. Check your list:
    ✓ Was the information correctly delivered and return demonstrated?
    ✓ Are there any other areas that need attention?
    ✓ Did you believe you met the training objectives?
    ✓ Do the objectives need to be revised?
    ✓ Were the training methods you used culturally appropriate for the learner?

FIGURE 3. Formative training evaluation.

tion attempts to capture the degree to which the learner recognizes an at-risk behavior. Subjects are asked to respond to six statements on a seven-point Likert scale ranging from 1 (*not very true*) to 7 (*very true*). 0 is an option for "does not apply to me." Each question is positively phrased with scores ranging from 0 to 7. A high score represents acknowledgment of a positive behavior.

Knowledge
The six knowledge questions are based on the CDC recommendations for prevention of transmission of HCV: prevention, protection, and safety (NIH, 2002). Subjects are asked to respond to six true/false statements about hepatitis C facts. There are four "true" and two "false" answers. One hundred percent correct represents the highest knowledge score.

Relationship
The six relationship questions are based on concepts from Burgoon's (Burgoon & Hale, 1984) theoretical framework. Their validity and reliability have been extensively tested for use with many populations (e.g., Burgoon & Hale, 1987; Gilbert, 1998). The research team has modified the questions for use in this setting. Subjects are asked to respond to six statements on a seven-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Scores on the two items that are negatively worded were reversed prior to data analysis, and then the six items were summed to obtain

TABLE 3. Percentage of Correct Answers on the Pre- and Posttest for Knowledge

Knowledge Score	K1	K2	K3	K4	K5	K6	Total Percentage Correct
Pretest	96	80	52	100	88	84	83.33
Posttest	100	94	17	100	100	94	84.16

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TABLE 4. *t*-Test–Paired Samples Statistics for the Behavior Subscale

Variable	Mean	N	SD	SE Mean	Paired Difference Mean	SD	t	df	p (Two-Tailed)
Pretest	4.06	25	1.51	0.30					
Posttest	5.06	25	1.23	0.24					
					1.00	1.9	2.60	24	.16

a total relationship score, with scores ranging from 1 to 7. A high score represents a positive interpersonal relationship.

Curriculum and Teaching Approaches

Class times were approximately 1 hour weekly for 6 weeks and were based on the learner's literacy and comfort level. Teaching was aided by using a manual created for this program by inmates and nursing students. Classes were held in a location determined by the correctional facility. The pretest was administered at the beginning of the first session and the posttest was completed on the day the program concluded. Learning outcomes were assessed by measuring changes in self-reported behavior, knowledge, and relationship. Aim 2 was met by informal feedback from the subjects and the director of communicable diseases. The teacher is an addictions specialist and is known to the facility.

The teacher used adult-learning principles emphasizing respect, patience, and clarity as central teaching principles. The teacher displayed confidence and competence with the material and used standard teaching scripts (Figure 2). Finally, the teacher instilled in the learner a responsibility to continue to disseminate HCV education to others by using their skill and knowledge in relationship with the new learner. One strategy used is teacher modeling, which is the process of building a trusting and respectful relationship, and using dialogue as key components of teaching. The teacher referred to the formative teacher evaluation tool (Figure 3) to keep on task and make any necessary changes between classes.

Setting and Sample Size

Twenty-five men incarcerated at a Massachusetts county jail were recruited by the communicable disease educator for a convenience sample. All men spoke and wrote in English. See Table 2 for ethnic/racial demographic information of subjects, derived from the registration form (Figure 4). All subjects who self-identified as Hispanic/Latino were bilingual English/Spanish. A sign-up sheet method was used to populate five groups of five men (1 hour/week for 6 weeks), and a regular meeting time and location were arranged. Sample size was not based on standardized effect size or power analysis.

Program implementation began on November 1, 2005, and lasted for a little more than one calendar year. The communicable disease coordinator recruited participants and got verbal consent. The community health worker and communicable disease coordinator were responsible for subject recruitment, informed consent, and finding proper meeting spaces throughout the recruitment period.

Data Analysis

Seven subjects did not complete posttests because of premature withdrawal from the program. Instead of eliminating those cases, missing data replacement was

TABLE 5. *t*-Test–Paired Samples Statistic for the Relationship Subscale

Variable	Mean	N	SD	SE Mean	Paired Difference Mean	SD	t	df	p (Two-Tailed)
Pretest	5.87	25	1.35	0.27					
Posttest	6.03	25	0.807	0.16					
					0.167	1.8	0.458	24	.651

Code Number_____   Today's Date:_____

THE UNIVERSITY OF MASSACHUSETTS
SCHOOL OF NURSING
AMHERST, MASSACHUSETTS

PEER-EDUCATION FOR HEPATITIS C PREVENTION
REGISTRATION FORM

NAME_____

PLEASE DESCRIBE YOURSELF

Hispanic or Latino_____   Non Hispanic or Latino_____

American Indian or Alaska Native_____   Asian_____

Black or African American_____   White_____

Native Hawaiian or Pacific Islander_____

THANK YOU

FIGURE 4. Registration form.

calculated using SPSS missing value analysis. The research questions formed the basis of the analysis.

Research Question 1

What is the reliability and validity of the pretest/posttest questions related to behavior, knowledge, and relationship?

Cronbach α coefficients were computed for two subscales of the pretest/posttest and revealed statistics of .776 for the relationship subscale and .788 for the behavior subscale. Knowledge questions using the true/false format were chosen to easily determine how subjects remembered detailed information about hepatitis C. Questions came from the CDC curriculum and were evaluated using face and content validity by teachers and educators before and during this study.

Research Question 2

Is a community health educator effective in providing peer-led education?

The teacher was chosen for his familiarity with the institution, vast experience in substance abuse teaching, and desire to work with this population. He has hepatitis C and is a liver transplant recipient. The relationship subscale items were based on EOTO literacy theory and Burgoon's relational communication theory and aimed to evaluate the relationship between teacher and learner. At the request of the facility, two

questions were removed from the relationship subscale. They focused on the element of similarity between the teacher and the students, one negatively and one positively worded: "My teacher and I had little in common" and "My teacher made me feel like we were similar." In both cases, it was felt that these questions ran contrary to inmate/staff relationships, so they were eliminated. Question 1 of this subscale meant to determine whether the teacher was known to the students prior to the program.

Research Question 3

Is there a difference in the mean scores in knowledge, behavior, and relationship after the educational intervention?

All responses to knowledge questions improved except for Question 3: "All forms of hepatitis can be transmitted by sex," which was surprising given the same question scored 52% correct in the pretest (Table 3). Student t tests were performed on the relationship and behavior scores. Means and standard deviations for pre- and posttest variables are reported as well as t values and two-tailed significance (Tables 4 and 5). Mean scores for both subscales increased in the posttest condition. The level of significance of the calculated t value for the behavior instrument is nonsignificant at 0.16. The level of significance for the relationship t value is nonsignificant at 0.65.

Limitations

There are noteworthy limitations to this study. The use of a small, convenience sample was a limitation. Using a pretest–posttest design had limited power with testing and mortality and was the largest threat to validity in this study. The design does allow for a comparison to be made but should be viewed with caution and as a "preexperiment" or pilot to determine the usefulness of the instruments for further work. In addition, there are many things we learned from this study that will improve future work in this area. Half of our sample was composed of Hispanic/Latino subjects and yet no research team members were bilingual, nor were the instruments created with a sense of cultural sensitivity. The environment posed certain challenges regarding the usefulness of the relational communication construct of similarity. Seven subjects did not complete the program because of early withdrawal.

Discussion

Hard to reach populations such as county correction inmates are at increased risk of contracting hepatitis C once released or of infecting others because of a lack of health promotion knowledge. The peer education pilot project was successful in providing a teacher who inspired trust, respect, and competence. Mean relationship scores increased after the 6-week educational program, although we were not able to measure similarity between the teacher and student. Only two men knew the teacher prior to beginning their program.

Both behavior and knowledge scores increased after the educational program with posttest behavior scores approaching significance. The results are encouraging. A follow-up study could describe the aspects of the relationship that seem important from both the teacher's and the learner's perspective. That data could be used to further refine effective teaching and learning protocols. Nurses are successful in providing health-promotion activities, and this study supports the relational aspect of this work as central to program success.✪

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REFERENCES

Aiken, C. K., Kerger, M., & Crofts, N. (2002). Peer-based hepatitis C testing and counseling service at a needle and syringe exchange program. *Drug & Alcohol Prevention, 21*(1), 33-37.

Baesler, E. J. (2002). Prayer and relationship with God II: Replication and extension of the relational prayer model. *Review of Religious Research, 44*, 58-67.

Burgoon, J. K., & Hale, J. L. (1984). The fundamental *topoi* of relational communication. *Communication Monographs, 51*, 193-214.

Burgoon, J. K., & Hale, J. L. (1987). Validation and measurement of the fundamental themes of relational communication. *Communication Monographs, 54*, 19-41.

Centers for Disease Control and Prevention. (1998). Recommendations for prevention and control of hepatitis C virus (HCV) infection and HCV related chronic disease. *Morbidity & Mortality Weekly Report, 47*(RR-19), 1-39. Retrieved November 23, 2008, from http://www.cdc.gov/mmwr/preview/mmwrhtml/00055154.htm

Davis, G. L., Albright, J. E., Cook, S., & Rosenberg, D. (1998). Projecting the future healthcare burden from hepatitis C in the United States. *Hepatology, 28*, 390A.

Gallagher, T. J., Hartung, P. J., & Gregory, S. W. (2001). Assessment of a measure of relational communication for doctor-patient interactions. *Patient Education & Counseling, 45*, 211-218.

Gilbert, D. A. (1998). Relational message themes in nurses' listening behavior during brief patient-nurse interactions. *Scholarly Inquiry for Nursing Practice, 12*, 6-13.

Laubach, F. C., & Laubach, R. S. (1960). *Toward world literacy. The Each One Teach One way*. Syracuse, NY: Syracuse University Press.

Mail, P. D., & Taylor, E. D. (1996). Introduction. Alcohol, women, and the NIAAA: The first two decades. In J. M. Howard, S. E. Martin, P. D. Mail, M. E. Hilton, & E. D. Taylor (Eds.). *Women and alcohol: Issues for prevention research* (pp. 1-17). Bethesda, MD: U.S. Department of Health and Human Services.

Moore, W. G. (1972). *Evaluation of migrant education, Numero Uno. Title 1-M programs in the state of Oregon*. Washington, DC: Bureau of Elementary and Secondary Education (DHEW/OE).

National Commission on Correctional Health Care. (2002). *Health status of soon-to-be released inmates: A report to Congress* (Vol. 1). Washington, DC: Author.

National Council of Teachers of English. (1986). *Activities to promote critical thinking. Classroom practices in teaching English*. Urbana, IL: Author.

National Institutes of Health. (2002). *Consensus development conference statement: Management of hepatitis C: 2002*. Retrieved November 23, 2008, from http://consensus.nih.gov/2002/2002HepatitisC2002116PDF.pdf

Uppal, C. (1996). *Each One Teach One project*. Paper presented at the World Conference on Literacy. Philadelphia, PA. Retrieved November 23, 2008, from http://www.literacy.org/products/ili/pdf

Walther, J. B. (1995). Relational aspects of computer-mediated communication. *Organization Science, 6*, 186-203.