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ABSTRACT

Decreasing stigma levels is critical for improving treatment access and outcomes for individuals with substance use disorder (SUD). This research evaluated the effectiveness of an educational session for students in criminal justice and psychology on the science of drug addiction and naloxone use in improving attitudes toward addiction, comfort using naloxone, and reducing stigma. Students attended a three-hour session that included education about SUD and treatment, speakers in recovery, and naloxone training. Post-educational intervention surveys revealed greater acceptance of the disease model of addiction, knowledge, and comfort using naloxone and reduced stigma. Educating students before they enter mental health and criminal justice professions could help increase addiction knowledge and reduce stigma among these professional groups.

Introduction

Despite widespread recognition that alcohol and drug addiction are diseases, there is still a great deal of stigma toward people with substance use disorder (SUD). Social stigma has been measured as perceived dangerousness, social distance, and blame toward people who use drugs (Corrigan, Morris, Michaels, Rafacz, & Rüsch, 2012; Kruis & Choi, 2020; Link, Struening, Rahav, Phelan, & Nuttbrock, 1997). Even when people endorse a disease view of addiction, they can hold moralistic and negative views of people who use drugs (Carroll, 2006; Murphy, 2017). National polls, and studies using smaller samples, have shown that alcohol and drug addiction are more stigmatized than other mental health problems (Barry, McGinty, Pescosolido, & Goldman, 2014; Corrigan, Kuwabara, & O'Shaughnessy, 2009). Social stigma is pervasive, as news media continue to use stigmatized terms when covering the opioid crisis (McGinty, Stone, Kennedy-Hendricks, & Barry, 2019). Stigma also exists among professionals who encounter people with SUD, including health workers (McCradden, Vasileva, Orchanian-Cheff, & Buchman, 2019; Mendiola, Galetto, & Fingerhood, 2018), and police officers (Kruis, Choi, & Donohue, 2020; Murphy & Russell, 2020).

These forms of social stigma toward addiction can lead to self-stigma, where individuals with SUD internalize the negative stereotypes and messages they perceive from others (Corrigan et al., 2017). Self-stigma is especially problematic as studies have found self-stigma is related to poorer treatment outcomes (Brener, von Hippel, von Hippel, Resnick, & Treloar, 2010; Lloyd, 2013), physical and mental health problems (Ahern, Stuber, & Galea, 2007; Birtel, Wood, & Kempa, 2017; Link et al., 1997), and a reluctance to access treatment services (Paquette, Syvertsen, & Pollini, 2018; Radcliffe & Stevens, 2008). Given the negative outcomes associated with stigma, this study attempts to reduce social stigma among college students majoring in fields where related professionals are likely to encounter people with substance use disorder. Reducing stigma could lead to improved empathy and compassion that students employ in their future professions.

Literature review

Stigma reduction through education

Social stigma is widespread but can be reduced through purposeful interventions. Most of the research on stigma reduction efforts has examined educational interventions aimed at reducing stigma toward people with mental health problems (National Academies of Sciences, Engineering, & & Medicine, 2016). These interventions typically involve education about the disorder and/or contact with people who have been treated for mental illness and have been shown to effectively reduce stigma among various groups (Davies, Beever, & Glazebrook, 2018; Foster et al., 2019; Friedrich et al., 2013; Morgan, Reavley, Ross, San Too, & Jorm, 2018; Muzyk et al., 2017; Robinson, Maslo, McKeirnan, Kim, & Brand-Eubanks, 2020). The purpose of education is to erase myths about the condition and increase knowledge about the medical aspects of mental illness. Contact (either in-person or video messaging) is designed to combat stereotypes and elicit empathy. Both education and contact have been shown to reduce stigma, although research suggests that contact with someone who has a mental illness may be more effective for reducing stigma than education alone (Corrigan et al., 2012; Yamaguchi et al., 2013).

Reducing stigma toward people with substance use disorder

There is a growing body of research on stigma reduction efforts related to substance use disorder. However, the number of published studies is small compared to interventions designed to reduce stigma toward mental illness. Overall, the research suggests that educational interventions and contact with people who have SUD can reduce social stigma (Brannock, White, & Baker, 2020; Livingston, Milne, Fang, & Amari, 2012; McGinty, Goldman, Pescosolido, & Barry, 2015). Targeted interventions for professionals have also reduced stigma among health care workers (Brener, Cama, Hull, & Treloar, 2017) and pharmacists (Eukel, Skoy, Werremeyer, Burck, & Strand, 2019).

Stigma reduction efforts often target students in the health professions because they will encounter people with SUD in their future careers. For example, Crapanzano, Vath, and Fisher (2014) studied the effects of a three-hour educational session for

physician assistant students that included lectures, discussion, and interaction with a person in recovery. While stigma decreased after the training, the effects were minor, and written reflections revealed that high levels of stigma remained. The authors followed up with students one year later and found that the students' overall stigma scores were still relatively high (Crapanzano & Vath, 2017). Countey, Steinbronn, and Grady (2018) developed a 3-hour opioid education session for pharmacy students (the session did not include any interaction with people in recovery). Opioid knowledge increased, and stigma scores decreased post-session immediately. More recently, Muzyk et al. (2019, 2020) integrated educational sessions into the curriculum for students in medicine, pharmacy, physician assistant, nursing, and social work. They also found that attitudes toward people with SUDs improved significantly after the sessions with no differences in effects across fields of study. Additional studies have shown reduced stigma for medical students after educational interventions (Balasanova, MacArthur, & DeLizza, 2020; Mort, Díaz, & Beverly, 2021; This growing body of research on addiction stigma reduction efforts for students in the health professions shows reduced stigma, although the long-term impacts are often not studied directly.

Several studies have examined addiction knowledge and stigma reduction interventions for college students. A short training showed increased knowledge of the risks associated with opioids (Johnson et al., 2020). Musco, Hargett, Shollenberger, Kicklighter, and Carilli (2020) also found positive increases in knowledge about drugs and overdose after a one-hour training session with college students. Witte, Schroeder, and Hackman (2018) examined stigma change after a semester-long course in addiction studies (specific majors were not indicated). Pre and post-tests revealed lower initial stigma levels among students in the addiction course (compared to a control group) but no impact of the course on stigma levels post-semester compared to the control group. The few studies examining educational interventions in university settings reveal mixed results, suggesting further research is needed.

Current study

While previous studies on addiction stigma reduction show mixed results, overall, they suggest that educational interventions can be effective at reducing stigma. However, most of the research occurred with students related to the health professions. Given that students in other fields will also encounter people with substance use disorder as part of their careers, we targeted students majoring in psychology, criminal justice, and rehabilitation and human services for an educational intervention to improve knowledge about addiction and reduce stigma. A recent study showed that students in these majors have relatively high levels of stigma toward people with substance use disorder, as measured by social distance, blame, and dangerousness (Kruis & Choi, 2020), suggesting this group should also receive stigma-reducing interventions. Reducing stigma could lead to improved knowledge and empathy toward people with SUD, resulting in more positive interactions when students enter these professions.

Many of the existing studies also have methodological flaws, including limited reliability of stigma measures, lack of a comparison group, and/or small samples that make generalizing results difficult (Foster et al., 2019; Muzyk et al., 2017; Muzyk et al.,

2019; Robinson et al., 2020; Tostes, Dias, Reis, Silveira, & Ronzani, 2020). Most do not control for other variables that could impact stigma levels. For instance, people demonstrate lower stigma if they have had exposure to people who use drugs (Palamar, Kiang, & Halkitis, 2011). The current study attempts to address some of these limitations by utilizing stigma measures that have been validated in previous studies, including a control group, and measuring exposure to opioid use.

Given the positive effects of educational interventions that include contact with individuals in recovery, we hypothesized that students who participated in the educational training session would demonstrate stigma reduction. Further, we anticipated more significant endorsement of the disease model of addiction and more knowledge and comfort administering naloxone at post-test than students who did not attend the session. We also hypothesized that students with more exposure to opioid use (Palamar et al., 2011) would be less likely to embrace stigmatizing attitudes and more likely to endorse the disease model of addiction. Given that students in the targeted majors might encounter class material on addiction in their advanced coursework, we also controlled for age and grade point average (GPA).

When developing interventions to reduce stigma toward people who use drugs, it is also important to remember that the social stigma toward addiction is more significant than that for mental illness (Barry et al., 2014; Corrigan et al., 2009). Therefore, the direct application of strategies used to destigmatize mental illness might not have the same impact on addiction stigma. One issue is the criminalization of drugs; stigma reduction efforts need to incorporate strategies that address this additional stigma for addiction (Corrigan et al., 2017). The current intervention included several speakers who discussed the role of the criminal justice system and attempts by criminal justice professionals to destigmatize addiction.

Materials and methods

Design overview

A pre-test-post-test design was used for the experimental group and compared to a static group (control group). Students in both groups were chosen specifically from majors comprising Criminal Justice, Psychology, and Rehabilitation and Human Services (RHS). Students in these majors were targeted, as they are entering jobs where they will likely encounter someone with a substance use disorder at some point in their career paths. Students in the control group did not participate in the training but were surveyed as a comparison with students who participated in the training group.

Sample

Students in the experimental "training" group included 33 students, including 20 females (60.6%) and 13 males (39.4%). Student age ranged from 18-32, with a mean age of 20.93 ($SD = 2.90$). Most students were white (n = 25, 75.8%), followed by 5 (15.2%) Latino, 2 (6.1%) African American, and 1 (3.0%) Asian. Student majors comprised of Criminal Justice (n = 14, 43.8%), RHS, 10 (31.3%), and 8 (25%) in Psychology.

Most students attending the educational session were juniors or seniors (60.6%), and the remaining were sophomores (n = 11) or freshmen (n = 2). Student grade point averages (GPA) ranged from 2.10 to 3.9, with a mean of 3.21 (SD = .43). When asked whether any experimental group participants knew someone who had overdosed, 17 (51.5%) stated they knew someone who overdosed. One person in the experimental group (3.0%) said they had previously administered naloxone to someone who overdosed. All students in the respective courses were invited to complete the training. Students were provided with an email invitation asking them to participate in the three-hour training and receive a certificate of completion on opioid addiction training and extra credit for their participation.

Students in the "control" or no training group included 102 students (40 female and 62 males) with an age range of 18-67 (M = 21.03, SD = 5.44) who were recruited from the same courses (Rehabilitation and Human Services, Criminal Justice, and Psychology) but chose not to participate in the training. Students interested in participating in the control group survey were offered extra credit on an assignment for their participation. Students were recruited in introductory to senior-level courses and therefore represented a broader range of majors as some introductory courses were considered general education. Almost 60% (57.8%) of students in the control group included RHS, Criminal Justice, and Psychology majors. Forty-seven students (46.1%) were criminal justice majors, 8 (7.8%) psychology, 4 (3.9%) were RHS majors. The rest of the sample included science, engineering, computer science, undecided, communications, and business majors. Students in the control group evenly represented all levels of college including first-year students (n = 27, 26.5%), sophomore (n = 31, 30.4%), junior (n = 22, 21.6%) and seniors (n = 22, 21.6%). Students were primarily White (n = 74, 72.5%), African American (n = 12, 11.8%), Latino/Hispanic (n = 12, 11.8%), Asian (n = 3, 2.9%) or other. Thirty-seven (36.3%) reported they knew someone who had overdosed, and none of the control group participants had ever administered naloxone (Narcan).

Intervention

The intervention consisted of a three-hour live session on campus. Upon arrival at the training session, students completed a pre-test and were then presented with the training. The purpose of the training was to discuss addiction issues and focus primarily on opioid addiction, stigma related to addiction, treatment options, and the use of naloxone. Four presentations were included in the training. First, a medical doctor specializing in addiction addressed the science of addiction and contemporary treatment options. This was followed by two speakers who discussed their own experiences with addiction and recovery. A discussion followed about various efforts in the county that encouraged people to enter treatment. The third presentation was delivered by a police officer and a recovery specialist from the county's Drug and Alcohol Authority. These presenters addressed the "Warm Handoff" programs available in local hospital emergency rooms and a program where a police officer and a recovery specialist visit a person who overdosed in their home to provide information about treatment options. The final presentation included training on naloxone (Narcan) administration.

Students completed post-tests, and Narcan kits were distributed to students who wanted one.

Measures

Exposure to opioid drug use
Developed by Palamar et al. (2011), this 9-item scale was used to assess exposure to opioid drug use. This scale included nine items designed to assess exposure to opioid use in the context of friends, classrooms, family members, and neighborhood use of opioids. Response options were $0 =$ No and $1 =$ yes. Higher scores indicated greater exposure to opioids. Cronbach's alpha for the experimental group was $\alpha = .72$ and $\alpha = .66$ for the control group.

We also added two questions to assess their overdose and Narcan administration knowledge. Participants were asked to report (yes/no) whether they knew someone who had overdosed and whether they had ever administered Narcan to someone who overdosed.

Stigma
Previous research conducted by Murphy (2017) and others (Murphy & Russell, 2020; Kruis et al., 2020) has demonstrated stigma-influenced attitudes in law enforcement, the public, and students enrolled in criminal justice and nursing. Thirteen items were chosen from previous research to assess drug use stigma in the current study. All items were measured on a 5-point Likert scale where $1 =$ strongly disagree to $5 =$ strongly agree. Items included; "Most people who use drugs are dishonest."; "Most people who use drugs are not well educated."; "Increasing access and utilization of Narcan enables users to continue their drug use."; "Lacking will power is a major factor of addiction."; "The use of medications such as methadone for an opioid use disorder replaces one addiction for another."; "Lacking good morals is a major factor in addiction."; "There should be a limit on the number of times the same person is given Narcan."; "People who overdose need to learn a lesson from it."; "People who overdose are to blame for their own overdose."; "If someone is addicted to drugs it's their own fault."; and the following variables which were reversed coded: "Tax dollars should pay for drug treatment."; "I have a lot of sympathy for people addicted to drugs."; and "Everyone at risk of witnessing an overdose should be given a Narcan supply." The experimental training group's reliability was $\alpha = .86$ at pre-test and $\alpha = .76$ at post-test. Cronbach's reliability for the control group was $\alpha = .77$.

Endorsement of the disease model
This scale is comprised of 4 items designed to measure endorsement of the medical/disease model of addiction. Items were based on previous research (see Murphy, 2017). All items were measured on a 5-point scale where $1 =$ strongly disagree to $5 =$ strongly agree. Questions assessed agreement or disagreement with the following questions, "Relapse of addiction is like that of other chronic diseases.;" "Addiction is a brain disease.;" "Individuals with substance use disorder experience a change in their brain.;" and "Addiction is a medical disorder/disease." Higher scores suggested greater

agreement with the medical/disease model. Cronbach alphas for the experimental group was $\alpha = .66$ at pre-test, and $\alpha = .75$ at post-test and .72 for the control group.

Narcan administration and knowledge

Two questions were added to assess their knowledge of Narcan administration; "I know how to correctly administer Narcan." and "I feel comfortable administering Narcan in an overdose situation." Both questions were measured on a Likert scale where 1 = strongly disagree and 5 = strongly agree. Pearson Product Moment Correlations for the experimental group was significantly and positively correlated $r(33) = .55$, $p.< 0001$ at pre-test, and at post-test, $r(33) = .54$, $p < .0001$. Similarly, a significant positive correlation was found for the control group, $r(102) = .61$, $p < .0001$.

Demographic information

Demographic information was collected that included gender, race, year in college, and college major. Of the 135 participants, there were 10 majors represented; we collapsed this into 4 categories (RHS (n = 14), Criminal Justice (n = 61), Psychology (n = 16), and Other (n = 38), with 6 missing data.

Procedure

Participation in this study was voluntary. Students were informed about the study through their class instructors. A recruitment email was sent to upper-level (junior/senior) students in criminal justice, psychology, and rehabilitation services approximately one month prior to the scheduled training. Due to space limitations, students in the experimental group were encouraged to sign-up to reserve their seats. A follow-up email was sent to students who signed up to attend. Most students were offered extra credit for their participation in control or training conditions, and an alternative extra credit assignment was available. Control group participants were also targeted in the same majors. Most students (57.8%) comprised primarily from criminal justice, psychology, and rehabilitation and health services. Control students who did not attend the training session were provided with pre-test surveys the week the training took place[1]. In preparation for the training, researchers arrived at the training 30 minutes early to hand out pre-tests to participants as they arrived. Distribution continued until the presentation began. Post-tests were administered to participants upon completion of the training. Each survey took 10-15 minutes to complete. All participants were provided with informed consent prior to participation. The University Office of Research and Protections approved the protocol and all recruitment procedures and materials.

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[1]We had intended to collect post-test surveys from the control group but were unable to because of the shutdown of in-person classes due to COVID-19. The pre-post test data was not affected for the experimental/training group as participants completed pre-post tests on the same day of the training.

Results

Preliminary analyses and baseline measures

Descriptive statistics were computed to review potential covariates using Pearson Product Moment Correlations, including student age, exposure, GPA, and college major as possible covariates with dependent variables of interest. Results showed that exposure to opioid use was not significantly correlated to comfort in administering Narcan or knowing how to administer Narcan. Opioid exposure was not statistically related to age or student GPA for experimental or control group. However, Narcan administration/knowledge was positively correlated with exposure to opioid use, $r(134) = .18$, $p = .03$.

While measures for stigma at pre-test were not statistically correlated to opioid exposure, age, or GPA, there was a statistically significant negative correlation between stigma and pre-test scores on the endorsement of the disease model, $r(130) = -.24$, $p = .005$. Those who endorsed a disease view of addiction showed lower stigma levels. There were no other significant correlations between covariates and other dependent variables. Lastly, to investigate whether students in various college majors differed on baseline pre-test scores, we conducted a series of one-way analyses of variance for each dependent variable using four major groups (rehabilitation services/criminal justice/psychology/other). Results for exposure found a significant main effect for college major, $F(3, 124) = 3.17$, $p = .02$. Tukey Post hoc tests showed those in other majors had significantly less exposure ($M = .86$, $SD = 1.31$) than rehabilitation services ($M = 2.00$, $SD = 1.70$) and criminal justice students ($M = 1.26$, $SD = 1.64$), however psychology students had significantly higher exposure ($M = 2.12$, $SD = 1.99$) than students in other majors. Analysis of additional variables revealed no significant effects for stigma scores and college major at pre-test, $F(3, 122) = 2.55$, $p = .06$, the medical/disease model, $F(3, 122) = .84$, $p = .47$, or Narcan knowledge and comfort, $F(3, 125) = 1.40$, $p = .30$.

Independent t-tests were computed to compare pre-tests for training and control groups. Paired t-tests were computed to compare the training group pre-post test scores. Lastly, the control group's pre-test responses were compared to the training group's post-test scores using one-sample t-tests.

First, we examined whether exposure to opioid use contributed to stigma, endorsement of the disease model, and naloxone knowledge and administration for experimental and control subjects. Opioid exposure was low for both the experimental and control groups. However, there was a significant difference that showed students in the experimental group had significantly more exposure to opioid use ($M = 2.09$, $SD = 1.92$) than the control group ($M = 1.06$, $SD = 1.45$), $t(132) = 3.22$, $p = .002$; $d = 1.57$ [CI .39, 1.64]. Results showed a significant effect for stigmatized attitudes, as the experimental group had significantly lower stigmatized attitudes ($M = 2.64$, $SD = .71$) than the control group ($M = 2.92$, $SD = .58$) at pre-test, $t(130) = -2.24$, $p = .02$; $d = .61$, [CI $-.52$, $-.03$]. We then conducted an analysis of covariance (ANCOVA) to control for opioid exposure and found differences between groups were no longer statistically significant, $F(1, 128) = 3.16$, $p = .07$, suggesting exposure to opioid use resulted in lower baseline stigma levels in the experimental group. However, no significant differences were found for adherence to the disease model between the experimental

Table 1. Means for training group, control, and follow-up groups on stigma, acceptance of disease model, & naloxone use.

| | Control Group | | | Training Group | | | Training Group | | |
| | Pretest | | | Pretest | | | Posttest | | |
	Mean	SD	n	Mean	SD	N	Mean	SD	n
Stigma	2.92$_{ac}$	.58	100	2.64$_{abc}$	.71	32	2.03$_{abc}$	.58	30
Acceptance of Disease Model	3.65$_{ac}$	.76	99	3.84$_{bc}$	.74	33	4.36$_{abc}$	.78	33
Naloxone Knowledge and Comfort	1.78$_{b}$	1.04	102	2.10$_{a}$	1.09	33	4.84$_{ab}$	.41	33

Note: Means that share the same subscripts in rows denote significant mean differences.

group ($M = 3.84$, $SD = .74$) and control group at pre-test ($M = 3.65$, $SD = .75$), $t(130) = 1.29$, $p = .19$; d $= .75$, [CI $-.10$, .49], indicating opioid exposure did not affect addiction conceptualization. Lastly, there were no significant differences among the experimental ($M = 2.10$, $SD = 1.09$) or control ($M = 1.78$, $SD = 1.04$) groups at pre-test for naloxone comfort and knowledge, $t(133) = 1.49$, $p = .13$; d $= 1.05$ [CI $-.10$, .73].

Experimental group pre-post training scores

Table 1 shows mean pre-test-post-tests for students in the experimental group using paired t-tests to assess stigma, medical/disease model, and naloxone comfort and knowledge. Results of the experimental group showed significant changes from pre-to-post test scores on all three variables. Stigmatization scores reduced significantly from pre-test ($M = 2.67$, $SD = .68$) to post-test ($M = 2.03$, $SD = .58$), $t(29) = 7.34$, $p < .0001$; d $= .47$. Adherence to the disease model increased from ($M = 3.84$, $SD = .74$) at pre-test to ($M = 4.36$, $SD = .78$) at post-test, $t(32) = -3.56$, $p = .001$; d $= .83$. Finally, results for naloxone administration comfort and knowledge also increased significantly from ($M = 2.10$, $SD = 1.09$) at pre-test to ($M = 4.84$, $SD = .31$) at post-test, $t(32) = -13.66$, $p < .0001$; d $= 1.15$.

Experimental post training scores v. control group

Lastly, we compared post-test scores of the treatment group to the pre-test scores of the control group. A series of one-sample t-tests were used to assess group differences using post-test scores from the experimental group as the reference point and comparing those scores to control group mean scores on each variable. When we compared the pre-test mean for the control group on stigmatized attitudes ($M = 2.92$, $SD = .58$) to the experimental post-test score ($M = 2.03$, $SD = .58$), results found mean stigma scores for the experimental group were significantly lower than the control group, $t(99) = 15.33$, $p < .0001$; d $= .58$. Similarly, results for endorsement of the disease model showed that the experimental group had significantly higher endorsement of the medical/disease model ($M = 4.36$, $SD = .78$) compared to the control group ($M = 3.65$, $SD = 76$), $t(98) = -9.28$, $p < .0001$, d $= .76$. Lastly, results demonstrated that students in the experimental training group scored significantly higher on Narcan comfort and knowledge of administration ($M = 4.84$, $SD = .31$) compared to the control group ($M = 1.78$, $SD = 1.04$), $t(101) = -29.45$, $p < .0001$; d $= 1.04$ (see Table 1).

Discussion

Reducing social stigma among students who will be entering careers where they will interact with people with substance use disorder is important. Fortunately, our study shows that negative attitudes toward people who use drugs can be lowered through educational interventions. The students who participated in the training session demonstrated reduced social stigma, as measured by lower negative attitudes toward people who use drugs. In addition, they showed higher endorsement of the disease model of addiction and increased knowledge and comfort using naloxone after the educational session.

One strength of this study is the use of a control group; training effects were significant both pre/post-test for the training group and compared to the baseline scores of the control group. Much of the previous research on stigma reduction among students lacked the use of a comparison group, limiting the impact of their results.

The educational training session was likely effective because it included presentations and contact with people in recovery. These two methods have been shown to have the most substantial impact on reducing stigma (Corrigan et al., 2012). Interacting with people with SUD and those who have overdosed can improve empathy and compassion, as well as demonstrate why naloxone access should be widespread. Having these improved attitudes while working in careers that demand interactions with people who have SUD could lower the self-stigma that people with SUD experience. If their interactions with criminal justice and mental health professionals are more positive, people with SUD will not feel stigmatized by these professionals and will be more likely to seek treatment for their problems.

For the training group, scores improved the most on the measure of naloxone comfort/knowledge, likely because almost no students had been exposed to naloxone before the session. This is encouraging because students were given Narcan to take home and should be able to assist if they witness an overdose. This knowledge will also be helpful in their future careers, as most were intending to pursue jobs in law enforcement, probation, social work, or case management. Our training session also offered students a certificate of completion about addiction and naloxone, which could be an asset when they are on the job market.

Students who attended the training session also showed significantly lower stigma scores and higher endorsement of the disease model of addiction post-training than the control group. Unfortunately, we could not administer a post-test to the control group because of the campus shutdown; still, the results suggest that the training session effectively reduced stigma. Pre-test comparisons also showed that the training group exhibited more exposure to opioids than the control group. While this difference was not attributed to age, it suggests a possible selection bias in students who chose to attend the session. They may have been interested in the training because of their own experiences with people who use opioids.

Several limitations exist that should be addressed. For example, the current study utilized undergraduate college students majoring in potential professions (Criminal Justice, Rehabilitation Services, and Psychology) who will encounter people who use drugs. However, while the results of the training demonstrated significant reductions in stigma and greater endorsement of the medical model, the sample size of training participants was small and the study exploratory in nature. Generalizations from the

study are also limited by the control group. The study took place just prior to the campus closures due to COVID-19. While this did not affect the experimental/training group, we were unable to do a follow-up post-test with the control group. Additionally, while the researchers in this study intended to investigate follow-up results to examine whether reductions in stigma persisted over time, we were unable to conduct this research upon the campus closure. Future research is necessary that incorporates larger sample sizes in training and control group conditions with follow-up studies to examine the long-term effects of such training. Further, additional populations such as college faculty, law enforcement, mental health and addiction practitioners, medical, and public health professionals should be provided with training to examine the extent to which training would be successful within these groups.

Despite these limitations, results from this research have several important practical implications. First, this exploratory study provides persuasive evidence that training that includes medical knowledge about addiction, information about community resources, Narcan administration, and in-person stories from those who are in recovery from SUD appear to be extremely helpful techniques that can be used to reduce stigma. Other colleges and universities should consider training students about addiction and stigma, especially in majors where students will enter professions where they encounter people with SUD.

Funding

Notes on contributors

Jennifer Murphy is Associate Professor of Criminal Justice at Penn State Berks. Her research interests are in drug policy, addiction stigma, and the medicalization of addiciton.

Brenda Russell is Professor of Psychology at Penn State Berks. Her scholarly and teaching interests include psychology and law, perceptions of victims and perpetrators of domestic violence, homicide defendants, and the social psychological and cognitive aspects of jury decision making.

References

Ahern, J., Stuber, J., & Galea, S. (2007). Stigma, discrimination and the health of illicit drug users. *Drug and Alcohol Dependence*, *88*(2–3), 188–196. doi:10.1016/j.drugalcdep.2006.10.014

Balasanova, A. A., MacArthur, K. R., & DeLizza, A. A. (2020). " "From all walks of life": Attending an alcoholics anonymous meeting to reduce addiction stigma among medical students". *Academic Psychiatry: The Journal of the American Association of Directors of Psychiatric Residency Training and the Association for Academic Psychiatry*, *44*(6), 714–720. doi:10.1007/s40596-020-01302-0

Barry, C. L., McGinty, E. E., Pescosolido, B. A., & Goldman, H. H. (2014). Stigma, discrimination, treatment effectiveness, and policy: public views about drug addiction and mental illness. *Psychiatric Services (Washington, D.C.)*, *65*(10), 1269–1272. doi:10.1176/appi.ps.201400140

Birtel, M. D., Wood, L., & Kempa, N. J. (2017). Stigma and social support in substance abuse: Implications for mental health and well-being. *Psychiatry Research*, *252*, 1–8. doi:10.1016/j.psychres.2017.01.097

Brannock, C. L., White, J., & Baker, J. A. (2020). Reducing Opioid Bias is Necessary (ROBIN): An educational program to reduce addiction stigma. *Journal of Addictions Nursing*, *31*(1), 2–8. doi: 10.1097/JAN.0000000000000319

Brener, L., Cama, E., Hull, P., & Treloar, C. (2017). Evaluation of an online injecting drug use stigma intervention targeted at health providers in New South Wales, Australia. *Health Psychology Open*, *4*(1), 2055102917707180. doi:10.1177/2055102917707180

Brener, L., von Hippel, W., von Hippel, C., Resnick, I., & Treloar, C. (2010). Perceptions of discriminatory treatment by staff as predictors of drug treatment completion: utility of a mixed methods approach. *Drug and Alcohol Review*, *29*(5), 491–497. doi:10.1111/j.1465-3362.2010.00173.x

Carroll, J. (2006). *Addicts' family members say lack of willpower top addiction factor*. Princeton, NJ: Gallup News Service.

Corrigan, P. W., Kuwabara, S. A., & O'Shaughnessy, J. (2009). The public stigma of mental illness and drug addiction: Findings from a stratified random sample. *Journal of Social Work*, *9*(2), 139–147. doi:10.1177/1468017308101818

Corrigan, P. W., Morris, S. B., Michaels, P. J., Rafacz, J. D., & Rüsch, N. (2012). Challenging the public stigma of mental illness: a meta-analysis of outcome studies. *Psychiatric Services (Washington, D.C.)*, *63*(10), 963–973. doi:10.1176/appi.ps.201100529

Corrigan, P. W., Schomerus, G., Shuman, V., Kraus, D., Perlick, D., Harnish, A., … Smelson, D. (2017). Developing a research agenda for reducing the stigma of addictions, part II: Lessons from the mental health stigma literature. *The American Journal on Addictions*, *26*(1), 67–74. doi:10.1111/ajad.12436

Countey, H., Steinbronn, C., & Grady, S. E. (2018). Changing student attitudes and perceptions toward opioid use disorder. *Mental Health Clinician*, *8*(5), 222–226. doi:10.9740/mhc.2018.09.222

Crapanzano, K., & Vath, R. J. (2017). Long-term effect of a stigma-reduction educational intervention for physician assistants. *The Journal of Physician Assistant Education: The Official Journal of the Physician Assistant Education Association*, *28*(2), 92–95. doi:10.1097/JPA.0000000000000117

Crapanzano, K., Vath, R. J., & Fisher, D. (2014). Reducing stigma towards substance users through an educational intervention: harder than it looks. *Academic Psychiatry*, *38*(4), 420–425. doi:10.1007/s40596-014-0067-1

Davies, E. B., Beever, E., & Glazebrook, C. (2018). A pilot randomised controlled study of the mental health first aid eLearning course with UK medical students. *BMC Medical E Education*, *18*(1), 1–12.

Eukel, H. N., Skoy, E., Werremeyer, A., Burck, S., & Strand, M. (2019). Changes in pharmacists' perceptions after a training in opioid misuse and accidental overdose prevention. *Journal of Continuing Education in the Health Professions*, *39*(1), 7–12. doi:10.1097/CEH.0000000000000233

Foster, K., Withers, E., Blanco, T., Lupson, C., Steele, M., Giandinoto, J. A., & Furness, T. (2019). Undergraduate nursing students' stigma and recovery attitudes during mental health clinical placement: A pre/post-test survey study. *International Journal of Mental Health Nursing*, *28*(5), 1068–1080. doi:10.1111/inm.12634

Friedrich, B., Evans-Lacko, S., London, J., Rhydderch, D., Henderson, C., & Thornicroft, G. (2013). Anti-stigma training for medical students: The Education Not Discrimination project. *British Journal of Psychiatry*, *202*(s55), s89–s94. doi:10.1192/bjp.bp.112.114017

Johnson, E. C., Huffman, A. E., Yoder, H. A., Bordelon, N. M., Sewczak-Claude, G., & Smith, D. T. (2020). Educational intervention changes college students' attitudes toward prescription opioid drug use. *Substance Use & Misuse*, *55*(3), 367–376. doi:10.1080/10826084.2019.1673418

Kruis, N. E., & Choi, J. (2020). Exploring social stigma toward opioid and heroin users among students enrolled in criminology, nursing, and EMT/Paramedic courses. *Journal of Criminal Justice Education*, *31*(3), 319–340. doi:10.1080/10511253.2020.1736112

Kruis, N. E., Choi, J., & Donohue, R. H. (2020). Police officers, stigma, and the opioid epidemic. *International Journal of Police Science & Management*, 22(4), 393–406. doi:10.1177/1461355720962524

Link, B. G., Struening, E. L., Rahav, M., Phelan, J. C., & Nuttbrock, L. (1997). On stigma and its consequences: evidence from a longitudinal study of men with dual diagnoses of mental illness and substance abuse. *Journal of Health and Social Behavior*, 38(2), 177–190. doi:10.2307/2955424

Livingston, J. D., Milne, T., Fang, M. L., & Amari, E. (2012). The effectiveness of interventions for reducing stigma related to substance use disorders: a systematic review. *Addiction (Abingdon, England)*, 107(1), 39–50. doi:10.1111/j.1360-0443.2011.03601.x

Lloyd, C. (2013). The stigmatization of problem drug users: A narrative literature review. *Drugs: Education, Prevention and Policy*, 20(2), 85–95. doi:10.3109/09687637.2012.743506

McCradden, M. D., Vasileva, D., Orchanian-Cheff, A., & Buchman, D. Z. (2019). Ambiguous identities of drugs and people: A scoping review of opioid-related stigma. *The International Journal on Drug Policy*, 74, 205–215. doi:10.1016/j.drugpo.2019.10.005

McGinty, E. E., Goldman, H. H., Pescosolido, B., & Barry, C. L. (2015). Portraying mental illness and drug addiction as treatable health conditions: effects of a randomized experiment on stigma and discrimination. *Social Science & Medicine*, 126, 73–85. doi:10.1016/j.socscimed.2014.12.010

McGinty, E. E., Stone, E. M., Kennedy-Hendricks, A., & Barry, C. L. (2019). Stigmatizing language in news media coverage of the opioid epidemic: Implications for public health. *Preventive Medicine*, 124, 110–114. doi:10.1016/j.ypmed.2019.03.018

Mendiola, C. K., Galetto, G., & Fingerhood, M. (2018). An exploration of emergency physicians' attitudes toward patients with substance use disorder. *Journal of Addiction Medicine*, 12(2), 132–135. doi:10.1097/ADM.0000000000000377

Morgan, A. J., Reavley, N. J., Ross, A., San Too, L., & Jorm, A. F. (2018). Interventions to reduce stigma towards people with severe mental illness: Systematic review and meta-analysis. *Journal of Psychiatric Research*, 103, 120–133. doi:10.1016/j.jpsychires.2018.05.017

Mort, S. C., Díaz, S. R., & Beverly, E. A. (2021). Using contact-based education to destigmatize opioid use disorder among medical students. *Teaching and Learning in Medicine*, 33(2), 196–209.

Murphy, J. (2017). Addiction frameworks and support for expanding treatment for drug offenders. *Contemporary Drug Problems*, 44(3), 232–245. doi:10.1177/0091450917723770

Murphy, J., & Russell, B. (2020). Police officers' views of naloxone and drug treatment: Does greater overdose response lead to more negativity? *Journal of Drug Issues*, 50(4), 455–471. doi:10.1177/0022042620921363

Musco, S., Hargett, B., Shollenberger, T., Kicklighter, J., & Carilli, C. (2021). Impact of a multidisciplinary educational training program (OverdosED) on knowledge and perceptions of depressant substance use on a college campus. *Journal of American college health*, 69(8), 820–826.

Muzyk, A. J., Lentz, K., Green, C., Fuller, S., May, D. B., & Roukema, L. (2017). Emphasizing Bloom's affective domain to reduce pharmacy students' stigmatizing attitudes. *American Journal of Pharmaceutical Education*, 81(2), 35. doi:10.5688/ajpe81235

Muzyk, A., Mullan, P., Andolsek, K. M., Derouin, A., Smothers, Z. P., Sanders, C., & Holmer, S. (2019). An interprofessional substance use disorder course to improve Students' Educational Outcomes and Patients' Treatment Decisions. *Academic Medicine: Journal of the Association of American Medical Colleges*, 94(11), 1792–1799. doi:10.1097/ACM.0000000000002854

Muzyk, A., Mullan, P., Andolsek, K., Derouin, A., Smothers, Z., Sanders, C., & Holmer, S. (2020). A pilot interprofessional course on substance use disorders to improve students' empathy and counseling skills. *American Journal of Pharmaceutical Education*, 84(4), 7415. doi:10.5688/ajpe7415

National Academies of Sciences, Engineering, and Medicine. (2016). *Ending discrimination against people with mental and substance use disorders: The evidence for stigma change*. Washington, D.C.: National Academies Press.

Palamar, J. J., Kiang, M. V., & Halkitis, P. N. (2011). Development and psychometric evaluation of scales that assess stigma associated with illicit drug users. *Substance Use & Misuse*, 46(12), 1457–1467. doi:10.3109/10826084.2011.596606

Paquette, C. E., Syvertsen, J. L., & Pollini, R. A. (2018). Stigma at every turn: health services experiences among people who inject drugs. *The International Journal on Drug Policy*, *57*, 104–110. doi:10.1016/j.drugpo.2018.04.004

Radcliffe, P., & Stevens, A. (2008). Are drug treatment services only for 'thieving junkie scumbags'? Drug users and the management of stigmatised identities. *Social Science & Medicine*, *67*(7), 1065–1073. doi:10.1016/j.socscimed.2008.06.004

Robinson, J. D., Maslo, T. E., McKeirnan, K. C., Kim, A. P., & Brand-Eubanks, D. C. (2020). The impact of a mental health course elective on student pharmacist attitudes. *Currents in Pharmacy Teaching & Learning*, *12*(7), 885–892. doi:10.1016/j.cptl.2020.02.011

Tostes, J. G. D. A., Dias, R. T., Reis, A. A. D. S., Silveira, P. S. D., & Ronzani, T. M. (2020). Interventions to reduce stigma related to people who use drugs: systematic review. *Paidéia (Ribeirão Preto)*, *30*. doi:10.1590/1982-4327e3022 https://www.scielo.br/j/paideia/a/3qRXKVd33xm6r3ZzK33GFXD/?lang=en

Witte, T. H., Schroeder, C. C., & Hackman, C. L. (2018). Stigma and substance use: Can undergraduate instruction in addiction studies change stigmatizing attitudes? *Journal of Alcohol & Drug Education*, *62*(3), 8–16. doi:10.1016/j.cptl.2020.02.011

Yamaguchi, S., Wu, S. I., Biswas, M., Yate, M., Aoki, Y., Barley, E. A., & Thornicroft, G. (2013). Effects of short-term interventions to reduce mental health-related stigma in university or college students: a systematic review. *The Journal of Nervous and Mental Disease*, *201*(6), 490–503. doi:10.1097/NMD.0b013e31829480df