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Evaluation of Two Videos that Apply Evidence-Based Strategies to Increase Self-Efficacy and Reduce Opioid-Related Stigma Among Medical Students

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Abstract

Objective—This study evaluated the video-based application of evidence-based stigma reduction strategies to increase medical students' screening-diagnostic self-efficacy for opioid use disorder (OUD) and reduce stigma toward opioid use.

Methods—Formative qualitative research informed development of two videos for medical students. One uses an education strategy by including education regarding non-stigmatizing language use and OUD screening and diagnosis (Video A); the other uses an interpersonal contact strategy by presenting narratives regarding opioid use from three people who have a history of opioid use and three physicians (Video B). Both videos were administered to all respondents, with video order randomized. Effects on outcomes were evaluated using a pre-/post-test design with a 1-month follow-up. Participants also provided feedback on video content and design.

Results—Medical students (N = 103) watched the videos and completed the pre-/post-test, with 99% (N = 102) completing follow-up 1 month after viewing both videos. Self-efficacy increased directly following viewing Video A, and this increase was sustained at 1-month follow-up. Stigma toward opioid use decreased directly following viewing Video B, and this decrease was sustained at 1-month follow-up for participants who watched Video B first. Statistically significant improvements were observed in most secondary outcomes (e.g., harm reduction acceptability) directly following watching each video and most were sustained at 1-month follow-up. Feedback about the videos suggested the delivery of evidence-based strategies in each video was appropriate.

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Conclusions—Video-based applications of these evidence-based strategies were found acceptable by medical students and have potential to elicit sustained improvement in their screening-diagnostic self-efficacy and opioid-related stigma.

Keywords

Opioid use disorder; Substance use; Stigma; Evaluation; Medical education

The overdose epidemic in the United States is an ongoing public health crisis that requires a shift in how medicine regards the treatment of opioid use disorder (OUD) [1–3]. Despite the availability of evidence-based treatments for OUD (e.g., medications for opioid use disorder [MOUD], which include methadone and buprenorphine), the vast majority of people with OUD do not receive any treatment [4, 5]. Various efforts have been made to lower barriers to OUD treatment, including the use of innovative treatment models and changes in federal policy [6, 7]. However, despite these efforts, stigma toward opioid use remains a pervasive barrier to OUD treatment [5, 8, 9] and a significant driver of overdose and other health disparities among those living with OUD [2].

Stigma, as defined by Link and Phelan [10], is the convergence of several processes—including labeling, stereotyping, separation into “us” and “them” groups, status loss, and discrimination—that serve to devalue groups based on particular characteristics in the context of differentials in power [10]. These processes can operate in distal and proximal ways; stigmatizing laws and policies can interact with public attitudes and beliefs that can play out in interpersonal interactions (e.g., provider-patient conversations) and be internalized by individuals with the stigmatized status [10]—in this case, using opioids or having OUD. Stigma toward opioid use has structural manifestations in the traditional separation of the addiction treatment system (e.g., prevention, treatment, and associated insurance coverage for substance use disorders [SUDs]) from the general healthcare system [3], and is perpetuated by inaccurate beliefs that addiction is a personal choice and moral failing [11].

Physicians can play a vital role in ongoing efforts to address the overdose epidemic, but opioid-related stigma among physicians continues to negatively influence clinical interactions and patient outcomes [1, 3]. Despite increasing amounts of opioid-related resources and training, studies of provider attitudes continue to document high levels of stigma toward OUD and SUD [8, 12, 13] upheld by persisting fear, lack of awareness, and uncertainty in treating SUD [8, 14, 15]. These stigmatizing attitudes are also cited as major reasons among providers for substandard care or denial of care to people with OUD [15]. Among primary care physicians, stigma has also been found to be associated with a lower likelihood of treating OUD with medication and less support for policies designed to increase access to OUD medication [12]. Taken together, this evidence underscores the need for additional efforts beyond resource provision and training alone to change opioid-related stigma among physicians.

Focused stigma interventions using evidence-based stigma reduction strategies may be able to support physicians’ ability to respond to opioid use, OUD, and the overdose epidemic. However, materials that have been used in opioid-related stigma reduction efforts for

healthcare workers to date have typically been adapted from stigma campaigns meant for the general public and not grounded in stigma theory, the stigma intervention literature, or formative research [16]. This can result in unintended consequences, including possible increases in stigma [16]. Evidence from decades of stigma intervention research suggests that the two strategies of education and interpersonal contact (e.g., involving people who use opioids to provide narratives of their own lived experience) tend to be most effective [17], especially when applied in combination. Further, studies suggest that interventions tailored to individuals early in their medical education are likely to be particularly impactful in reducing stigma [18, 19]. While studies have documented stigmatizing attitudes toward opioid use among medical students (albeit lower than the general population), and relatively low knowledge related to the treatment of OUD and opioid overdose, few anti-stigma interventions for opioid-related stigma among medical students have been evaluated [16, 18–24].

To address this need to reduce opioid-related stigma among medical students, two videos were developed specifically for medical students that apply evidence-based stigma reduction strategies. These videos employed the evidence-based strategies of education (i.e., around OUD screening and diagnosis) and interpersonal contact (i.e., presenting stigma-related narratives of people who have a history of opioid use and physicians who have treated patients who use opioids) to increase screening-diagnostic self-efficacy for OUD and reduce stigma toward opioid use. The delivery of these evidence-based strategies was informed by themes elicited through focus groups with resident physicians and in-depth individual interviews with people who have a history of opioid use. To overcome challenges in feasibility of in vivo interpersonal contact interventions, video-based interventions were selected as a promising alternative that can be easily disseminated [25]. All outcomes were evaluated with validated pre-existing scales at pre-/post-intervention and at 1-month follow-up. One month was hypothesized to be long enough for participants to lose any recency effects from the training, yet short enough to not risk significant loss to follow-up.

For Video A, it was hypothesized that medical students' self-efficacy and other outcomes relevant to the screening for and diagnosis of OUD would show improvements after viewing Video A (the core of which was the education strategy, described further below), and that these improvements would be sustained at 1-month follow-up. For Video B, it was hypothesized that medical students' stigma toward opioid use and other relevant outcomes would show improvements after viewing Video B (the core of which was the use of the interpersonal contact strategy, described further below), and that these improvements would be sustained at 1-month follow-up. To inform any future adaptation and dissemination efforts, participants' structured and open-ended feedback on both videos was also collected.

Methods

Following review by the New York City Department of Health and Mental Hygiene Institutional Review Board, all aspects of this project were deemed an evaluation and exempt from full committee review. All participants provided electronic assent after being asked to read information outlining the project's purpose, inclusion criteria, activities, time burden, benefits, risks, confidentiality, and incentives. Participants also read that they could stop the

activities at any point, and that there were no penalties or consequences of any kind if they decided they did not want to participate. Contact information was kept separate from study data so that data were not attributable to individual participants.

Formative Qualitative Work

Focus groups with resident physicians (n = 5, with 14 participants total) and in-depth individual interviews with people who use opioids (n = 3) were conducted to tailor the delivery of the education strategy in Video A and guide the presentation of the interpersonal contact strategy in Video B. Participants were asked about their experiences in healthcare/clinical interactions, then asked to provide feedback on two brief sample videos drawn from publicly accessible work online (one about clinical interactions with people who use opioids regarding starting buprenorphine, and one about people who use opioids' lived experiences of stigma). The focus groups and in-depth individual interviews were recorded, transcribed, and thematically coded. Overall, the data suggested interest in and need for additional educational training and elucidated some of the essential stigma processes in clinical interactions involving people who use opioids. Specifically, the data indicated that an educational video should increase provider awareness of assessment and/or treatment modalities and provide actionable information, and that narratives presented as part of an interpersonal contact strategy should include diverse voices (e.g., racial/ethnic, gender, sexual orientation, and age range) and acknowledgement of the structural factors that physicians face in healthcare settings while providing care. These results directly informed the creation of two videos.

Videos

Video details are provided in Table 1. The two videos were developed by the research team, then filmed and produced in partnership with two different professional video production teams. These videos are available to view on the New York City Department of Health and Mental Hygiene website at the following link under "Reducing substance use stigma": https://www.nyc.gov/site/doh/providers/health-topics/alcohol-and-drugs.page. Video A, presented by a clinician specialist, begins with an overview of opioid use, stigma, and harm reduction. The video then covers a brief case study to highlight how structural and personal biases may play out in clinical interactions to negatively affect care. The bulk of the video focuses on covering three tools hypothesized to improve the screening-diagnostic self-efficacy of providers in clinical interactions: non-stigmatizing language use (e.g., replacing stigmatizing language with person-centered language); the Screener and Opioid Assessment for Patients with Pain-Revised (SOAPP-R), a validated tool to assess patients' risk of OUD [26]; and the OUD diagnostic checklist from the DSM-5. The video then walks through the same case study to educate on how to apply these tools, including sample scripts of how to talk to patients who use opioids. The video concludes by highlighting the main educational points and overall, how recognizing biases and empathizing with patients in healthcare settings can increase personal feelings of competency while also improving patients' treatment outcomes.

Video B presents narratives from three people who have a history of opioid use and three physicians to illustrate real-life experiences with stigma toward opioid use, particularly in

the context of healthcare settings. People who have a history of opioid use were recruited via opioid-related subforums on the social media platform Reddit; people who responded to the postings were pre-screened, screened, and then three people were invited for filming. Physicians were recruited via their participation in addiction-related trainings in the New York City area; they were similarly screened and three were invited for filming. The three people who have a history of opioid use and three physicians were selected to maximize diversity in race/ethnicity and gender. The video shares experiences with stigma that people who have a history of opioid use have had in healthcare settings and physicians' experiences in navigating personal and structural biases when treating patients with OUD. The video concludes with success stories when stigma was overcome, from both parties' perspectives. Each person's narratives were interspersed across four parts, described in more detail in Table 1: Part 1—Experiences with Stigma, Part 2—How Stigma Affects Outcomes, Part 3—Systemic Stigma in Healthcare, and Part 4—Rising Above Stigma.

Evaluation Design and Measures

The videos and corresponding evaluation surveys were disseminated via the Qualtrics platform to an email list of 800 medical students who had voluntarily signed up for and participated in at least one program of the American Medical Student Association Reproductive Health Project from January 2019 to April of 2022. Inclusion criteria were being over 18 years of age and enrolled in medical school. The first ~ 100 participants who responded and met inclusion criteria were enrolled. Participants received $50 for viewing the videos and completing the baseline pre- and post-video surveys and $75 for completing the 1-month follow-up survey.

Following assent, participants first completed the sociodemographic questionnaire. Video order was then randomly assigned. Participants responded to the pre-test items associated with the first randomly assigned video, watched that video, responded to an identical set of post-test items associated with that video, and then were offered a brief break. Following this break, participants responded to the pre-test items associated with the other video, watched that video, and responded to an identical set of post-test items associated with that video. After watching both videos and completing all post-test items, participants answered questions evaluating their opinions of the videos' qualities. One month later, participants were asked for assent again, completed a subset of the same sociodemographic questions, and responded to the identical sets of items administered prior in relation to Videos A and B, with order of administration randomized.

Sociodemographics collected were age, gender, sexual orientation, race/ethnicity, years of medical training (i.e., since starting medical school), frequency of contact with patients who use opioids not as prescribed, and any close relationship with a person who has had a problem with using opioids. Data on what medical school participants attended were not collected.

Participants responded to two primary outcome measures and seven secondary outcome measures. Validated measures were used to assess constructs related to attitudes and opinions (including stigma) around opioid use, screening-diagnostic self-efficacy for OUD, and patient-provider interactions [12, 20, 27–30]. Scale selection was informed by

reviewing all measures previously used in substance use–related anti-stigma interventions for healthcare providers [19, 20]. Table 2 provides a summary of outcomes measured, scale names, a sample item from each scale, number of items used per video, range of total scores for each measure, and each scale's reliability (i.e., internal consistency) in this sample. Minor adaptations were made as needed to make items specific to opioid use, less stigmatizing, and/or more applicable to the video's purpose (e.g., changing "drug addiction" to "opioid use disorder").

The primary outcomes measured were screening-diagnostic self-efficacy for OUD (Video A) and stigma toward opioid use (Video B). Secondary outcomes that were hypothesized to be changed by viewing these videos and had a previously validated scale were also measured. Because some selected secondary outcomes were relevant to both Videos A and B (e.g., harm reduction acceptability), measures were split into different subsets for each of the two videos. For Video A, additional measured constructs included general clinical empathy, harm reduction acceptability, role adequacy, role legitimacy, and individual motivation and reward. For Video B, these included general clinical empathy, harm reduction acceptability, role legitimacy, individual motivation and reward, medical condition regard for patients with OUD (i.e., the belief that patients with OUD are treatable and worthy of medical resources) [30], and clinical attitudes toward people who use opioids.

Participants were asked questions soliciting feedback regarding the videos' content and quality. Using two formats (i.e., select-all-that-apply and open-ended), participants were asked what they would change about each video, what educational method(s) covered in Video A they would most likely use in their future clinical practice, and the most impactful aspects of Video B. Participants were also given space for open-ended feedback on both videos. The outcome and quality feedback questions were designed to be as brief as possible. It was estimated that the pre-viewing outcome measures would take approximately 10 min, the post-viewing outcome measures would take approximately 10 min, and the quality feedback questions would take approximately 5 min; the entire 1-month follow-up survey was designed to take no more than 15 min.

Data Analysis

Descriptive statistics were used to describe participants' sociodemographic characteristics. Paired *t*-tests were used to test for statistically significant differences in mean outcome scores between each pair of timepoints (i.e., between pre and post; post and follow-up; and pre and follow-up) for all outcomes. Two-way repeated measures ANOVAs were used to test the interactions of select sociodemographic characteristics (i.e., gender, race/ethnicity, years of medical training, close relationship with someone who has had a problem with using opioids) and changes in the two primary outcomes (i.e., screening-diagnostic self-efficacy for OUD for Video A, and stigma toward opioid use for Video B). Changes were tested for both pre versus post and pre versus follow-up timepoints. Two-way repeated measure ANOVAs were also used to test for interactions between the order the videos were presented and accompanying changes in the primary outcomes. Results were considered statistically significant if $p < 0.05$; all analyses were conducted in Stata 17 (StataCorp LLC, 2021).

Results

A total of 103 medical students responded to the pre-/post baseline survey, and 102 of these medical students responded to the 1-month follow-up survey ($N = 102$; > 99% follow-up). The one medical student who did not respond to the follow-up survey was excluded from all analyses. Sociodemographics of the analytic sample of participants who responded to both the baseline and follow-up surveys ($N = 102$) are provided in Table 3.

Outcomes

Means and standard deviations of each outcome at each timepoint for Video A are presented in Table 4. Notably, participants reported greater screening-diagnostic self-efficacy for OUD directly following Video A ($t(100) = -10.7$, $p < 0.001$); this increase was sustained at 1-month follow-up after viewing both videos ($t(99) = -7.5$, $p < 0.001$). Directly following Video A, participants also reported greater endorsement of positive attitudes toward harm reduction ($t(100) = -2.8$, $p < 0.01$), role adequacy ($t(98) = -7.9$, $p < 0.001$), role legitimacy ($t(99) = -5.3$, $p < 0.001$), and individual motivation and reward ($t(99) = -2.4$, $p = 0.02$). Each of these increases was sustained at the 1-month follow-up after viewing both videos, except for individual motivation and reward ($t(101) = -0.3$, $p = 0.69$). No significant change was seen in empathy before and directly following Video A ($t(98) = -0.2$, $p = 0.87$).

The means and standard deviations of each outcome at each timepoint for Video B are presented in Table 5. Notably, even though stigma was low prior to viewing Video B (mean = 9.2, SD = 3.4; observed range = 6–18, scale range = 6–30), participants reported statistically significant lower stigma directly following Video B ($t(101) = 5.4$, $p < 0.001$); this decrease was sustained at 1-month follow-up after viewing both videos ($t(101) = 2.7$, $p < 0.01$). Directly following Video B, participants also reported higher empathy ($t(101) = -4.3$, $p < 0.001$), more positive attitudes toward harm reduction ($t(100) = -3.9$, $p < 0.001$), higher role legitimacy ($t(100) = -4.2$, $p < 0.001$), higher medical condition regard ($t(101) = -7.5$, $p < 0.001$), and more positive clinical attitudes directly following Video B ($t(98) = -6.6$, $p < 0.001$). Each of these increases was sustained at 1-month follow-up after viewing both videos, except for empathy ($t(100) = -0.8$, $p = 0.41$). No significant change was seen in individual motivation and reward pre- versus directly following Video B ($t(100) = -1.5$, $p = 0.13$).

For Video A, none of the selected sociodemographic characteristics (i.e., gender, race/ethnicity, years of medical training, close relationship with someone who has had a problem with using opioids) nor video presentation order was significantly associated with changes in screening-diagnostic self-efficacy for OUD either pre vs. post or pre vs. 1-month follow-up. Video presentation order was significantly associated with pre vs. follow-up changes in the Video B outcome of stigma toward opioid use ($F(1,99) = 4.06$, $p = 0.046$). Participants who viewed Video A first showed no improvement in stigma at 1-month follow-up (no significant change from mean of 9.11 to 8.91, $t(52) = 0.6$, $p = 0.55$), while participants who viewed Video B first showed significant improvement in stigma at 1-month follow-up (significant decrease from mean of 9.27 to 8.02, $t(47) = 3.2$, $p < 0.01$).

Quality Feedback

In feedback for Video A, a substantial number of participants reported interest in adding interactive components, increasing the video's pacing, adding more graphics, and shortening the video. There was no consensus regarding a single aspect of the video that should be changed. A majority reported they would be likely to use the educational methods of the non-stigmatizing language use, the SOAPP-R screening tool, and the OUD diagnostic checklist in their future clinical practice. Less than a majority reported that they would be likely to use the sample scripts provided for both the SOAPP-R and OUD diagnostic checklist. Positive open-ended feedback about Video A included appreciation for specific tools (e.g., non-stigmatizing language, the SOAPP-R screening tool), belief that the video was helpful and practical, and other general praise. Suggestions for improvement were few, with four total remarks around wanting more information about specific topics of interest (e.g., pregnant people, harm reduction strategies).

Regarding feedback for Video B, a high number of participants reported interest in increasing the video's pacing and shortening the video; like Video A, there was no consensus regarding a single aspect of the video that needed change. A majority of participants reported being most impacted by patient experiences living with OUD, patient positive experience with OUD treatment, patient negative experience with OUD treatment, physician positive experience with treating OUD, patient stories of remission and/or recovery, and interestingly, physician experience of OUD outside of their professional role. Only the category of physician negative experience with treating OUD was endorsed by less than a majority of participants as impactful, although this category was still endorsed by > 40% of participants. Positive open-ended feedback for Video B indicated the video was effective, inspiring, and well-executed, and participants expressed appreciation for how the video included both parties' perspectives and addressed structural barriers (e.g., clinician time constraints). Participants remarked it was an "incredibly done video" that "opened [their] eyes" to opioid-related stigma and taught them "how you don't have to be a perfect empathic doctor with no intrinsic bias, you just have to actively reframe and work against your bias to help people" and "anyone can have OUD." Few suggestions for improvement were expressed; participants suggested discussing harm reduction to an even greater extent and including links to more information or resources.

Discussion

This study's findings support that these or similar videos that leverage the evidence-based stigma reduction strategies of education (i.e., education related to non-stigmatizing language use, screening, and diagnosis of OUD) and interpersonal contact (i.e., presenting narratives related to opioid-related stigma from both people who have a history of opioid use and physicians) can be disseminated in an online format and lead to sustained improvements in screening-diagnostic self-efficacy for OUD, stigma toward opioid use, and other related outcomes (i.e., harm reduction acceptability, role adequacy, role legitimacy, medical condition regard, and clinical attitudes) among medical students. Importantly, neither video resulted in worsened measured attitudes or stigma. Of particular interest among secondary outcomes, the sustained improvements in harm reduction acceptability from viewing both

videos suggests that these videos could play a role in addressing documented gaps in harm reduction knowledge among physicians [35]. Further, improvement in these outcomes appeared to persist 1 month after viewing the two videos in combination, indicating the possibility of continued attitudinal changes among respondents; however, due to the study design, it is not certain that benefits would persist for 1 month if only one or the other video was viewed or for greater than 1 month.

As for video content, the videos themselves and the scope of strategies included within each video were generally well-received by the target demographic of medical students, suggesting acceptability of this format of video intervention. Participants indicated they anticipated using the three methods covered in Video A in their clinical interactions, and that Video B's narratives of patient experiences in combination with physician experiences, both positive and negative, were impactful and highly praised. Some changes to both videos were suggested, primarily to make each video even faster-paced and shorter (Video A was 18 min and Video B was 20.5 min). Suggestions from participants, such as adding interactive components to Video A, discussing harm reduction more thoroughly, and providing specific resources and action steps, provide a clear impetus for developing materials to supplement the videos (e.g., a manual that includes a training and discussion guide). Positive feedback around inclusion of patient experiences in Video B suggests that medical students may particularly appreciate the highlighting of lived experience in future video interventions.

This evaluation can also inform future development of video-based stigma interventions that can build on this intervention as well as the few existing similar interventions [20–23, 25, 31]. The application of these evidence-based strategies in video format adds to existing evidence that anti-stigma interventions for medical students administered online are no less effective than those delivered in-person [22, 23]. Video B's use of the interpersonal contact strategy is among the first uses of this strategy in substance use–related stigma interventions for medical students [16, 18, 19], and the use of stigma-related narratives from both people with a history of opioid use and physicians who have treated patients who use opioids may have benefits above the use of narratives from either group alone. At the same time, the development of stigma interventions with people with lived experience of substance use stigma should be undertaken with careful consideration of power and privilege, reciprocal community partnerships and engagement in decision-making, and with particular attention to avoiding tokenism [32]. As such, there may be some advantages to using standardized patients in some instances. Two past interventions using internet-based learning modules involving standardized patients have been shown to improve substance use–related attitudes among medical trainees [20, 21], and past research on stigma toward other conditions (e.g., mental illness [33]) has shown that interactions with standardized patients can reduce stigma among physicians.

Study findings also have relevance for future evaluations of similar interventions. It is noteworthy that these videos seemed to further decrease stigma among a study sample reporting a low pre-existing level of stigma. This low pre-existing level of stigma in this sample could be due to recruitment being done among students who had voluntarily signed up for and participated in at least one program of the American Medical Student Association Reproductive Health Project. Further confirmation will be required to determine

this intervention's effectiveness among medical students with higher pre-existing stigma (e.g., among a sample designed to be representative of medical students). Other additional next steps could be to determine how these videos may be most effectively incorporated into medical school curriculum (e.g., in psychiatry clerkships), and test the intervention with resident physicians, trainees in other health professions, and practicing physicians and allied health professionals [34, 35]. This study was also among the first to evaluate sustainment in changes via a follow-up survey. One related study evaluated outcomes of an opioid use-related intervention (i.e., overdose education) from baseline to 6-month follow-up and found sustained improvement in some opioid overdose knowledge domains (i.e., signs of an opioid overdose, naloxone use) and attitude domains (i.e., competency) [31]. However, this study did not analyze sustained changes in attitudinal outcomes toward people with SUD (i.e., medical condition regard) because only minimal changes in those indicators were seen immediately post-intervention.

The outcomes that did not change, the measurement of the outcomes, and the role of video order deserve consideration. The two constructs that did not demonstrate either immediate or sustained measured change after viewing one or both videos (i.e., general clinical empathy and individual motivation and reward) may require more sustained interactions with people with OUD to enact change. For empathy, interventions must contend with medical training's documented association with decreases in empathy, meaning any intervention seeking to increase empathy among medical trainees will likely need to counter prevailing aspects of their formal medical training [27]. The lack of sustained change in individual motivation and reward may reflect that this construct is closely tied to systemic factors that are less easily changed via a video intervention, such as how training in and practicing addiction medicine is not incentivized within healthcare broadly [3]. Additionally, some of the measures, especially those split across the two videos, had lower than ideal reliability (i.e., internal consistency) due to fewer items, although scale reliability was sufficient when pooling items across the two videos. Increasing the number of items used to measure each construct could help improve the reliability of these scales in future evaluations. Furthermore, video order appeared to influence sustained improvements in stigma toward opioid use at 1-month follow-up but exerted no influence on individual pre- and post-video effects. This suggests that Video B should be shown first if these videos are used together. This finding adds to existing evidence in the stigma intervention literature that suggests that sustained changes in stigma may be more likely when components using interpersonal contact-based strategies precede educational ones [17]. More evaluation is required for additional confirmation of video order effects.

This evaluation had limitations that can be addressed in future work. These videos' effects were not evaluated in comparison with a control condition. Nonetheless, these promising pre- vs. post evaluation results suggest readiness for a future randomized control trial with a comparative control arm to increase confidence that these observed effects are due to these specific applications of evidence-based strategies. There were also no power calculations conducted prior to determining sample size for this project; this is an important step to enhance the statistical rigor of future evaluations. In addition to the low stigma at baseline, this sample was also notable in that it spanned medical students with 0 to 5 years of medical training and drew from an unknown number and range of medical schools that

have unknown degrees of inclusion of opioid-related topics in their required curriculum. Although no differences were found in changes in primary outcomes depending on years of medical training in this sample, ensuring future samples are adequately powered for testing for heterogeneity in measured effects (e.g., among medical students with different numbers of years of training, different personal experiences with OUD, and different levels of exposure to related topics) could help direct these interventions to those for whom it would be most effective or needed. Future work can also monitor how and to what extent changes from these sorts of interventions persist across longer than 1 month and across stages of training (e.g., across the transition from student to resident), as well as investigate how to best ensure these improvements persist (e.g., via the administration of brief modules that recapitulate key aspects of the original videos). Additionally, in regard to content, this intervention focused specifically on stigma related to OUD, though future interventions could address intersectional stigma, thus better equipping physicians to address stigmatization that occurs on the basis of multiple statuses [36]. For example, racialized individuals who are caregivers, pregnant, or may become pregnant face high levels of opioid-related stigma intersecting with systemic racism and misogyny that produce elevated consequences (e.g., surveillance, criminalization, and child apprehension by state services) [37].

In conclusion, study findings suggest that applications of these two evidence-based strategies, including when delivered via videos, have the potential to be aspects of a comprehensive approach toward addressing opioid-related stigma among medical students [34, 38, 39]. Focused efforts to reduce stigma, alongside the recent increases in opioid addiction content in required medical school curriculum [40], can further beneficially impact physician practice if they are also accompanied by additional structural changes [39]. These include amending institutional and government policies to allow physicians to implement harm reduction in treatment [35], to expand access to MOUD and other evidence-based treatment [9, 13], and to improve integration and coordination of SUD and OUD care [1]. All of these efforts can be further supported by measuring and monitoring stigma toward OUD in healthcare facilities and prioritizing meaningful engagement of people impacted by stigma in service delivery, intervention design, and healthcare policy reforms [16, 38, 39]. In tandem with ongoing and future structural changes, video-based anti-stigma interventions can be an important tool for advancing physicians' ability to address the overdose crisis and provide people who use opioids the best possible care.

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Data Availability

The de-identified dataset used in this article is available from the authors on request.

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Table 1

Details of two videos to increase screening-diagnostic self-efficacy for OUD and reduce opioid-related stigma among physician trainees

Video	Total length	Outline of content	Visual description	Primary outcome	Secondary outcomes
Video A	18 min	Introduction (3.5 min): definition of stigma; overview of opioid use; how stigma negatively affects healthcare; introduction of harm reduction Brief case study (2 min): walk-through of case vignette to recognize ways intersecting biases shape clinical interaction Three educational components covered: non-stigmatizing language use (3 min), SOAPP-R (3.5 min), OUD diagnostic checklist from DSM-5 (1.5 min) Review and application (2 min): re-visiting case vignette and how to apply educational methods; sample scripts for talking to patients who use opioids Conclusion (3 min): highlighting take-home educational messages from entire video	Waist-up view of presenter, either next to or on top of slides with relevant text; graphics used to complement text	• Screening-diagnostic self-efficacy for OUD	• General clinical empathy • Harm reduction acceptability • Role adequacy • Role legitimacy • Individual motivation and reward
Video B	20.5 min	Four sections in which people with lived experience with opioid use and physicians discuss: Part 1—Experiences with Stigma (7 min): how stigma toward opioid use has manifested in their healthcare experiences and clinical interactions Part 2—How Stigma Affects Outcomes (4 min): how stigma has made seeking, receiving, or providing clinical care more difficult Part 3—Systemic Stigma in Healthcare (3.5 min): how healthcare providers face structural challenges and navigating structural pressures in delivering clinical care (e.g., lack of training, lack of time) Part 4—Rising Above Stigma (6 min): success stories and tips for mitigating and overcoming stigma to deliver care (e.g., providing empathy)	Utilizes talking head-style view of the three people with lived experience with opioid use and three physicians; each person talks in each section; title slides before each section	• Stigma toward opioid use	• General clinical empathy • Harm reduction acceptability • Role legitimacy • Individual motivation and reward • Medical condition regard • Clinical attitudes

SOAPP-R, Screener and Opioid Assessment for Patients with Pain-Revised

OUD, opioid use disorder

DSM-5, Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition

Table 2

Summary of outcome measures

Construct	Scale name	Sample item	# of items, Video A	# of items, Video B	Range	Cronbach's alpha
Primary outcomes						
Screening-diagnostic self-efficacy for OUD	Lanken et al. (2015) Resident Physicians Pre-Survey [20]	How confident are you in your ability to provide an initial diagnosis to patients with opioid use disorders?	4	-	4–40	Video A α= .91–.92
Stigma toward opioid use	Stone et al. (2021) Stigma Scale [12]	Individuals with opioid use disorder only have themselves to blame for their problem	-	6	6–30	Video B α= .72–.82
Secondary outcomes						
General clinical empathy	Jefferson Scale for Physician Empathy [27]	Physicians should try to stand in their patients' shoes when providing care to them	4	4	4–28	Video A α= .35–.61 Video B α = .40–.51 Combined α = .60–.74
Harm reduction acceptability	Harm Reduction Acceptability Scale (HRAS-R) [28]	People who use opioids should be given accurate information about how to use opioids more safely (for example, how to avoid overdose or related health hazards)	3	3	3–15	Video A α=.46–.69 Video B α= .56–.64 Combined α= .68–.79
Role adequacy	Work Practice Questionnaire – Role Adequacy Subscale [29]	I have the necessary knowledge to help opioid-related issues	4	-	4–16	Video A α= .83–.87
Role legitimacy	Work Practice Questionnaire – Role Legitimacy Subscale [29]	I have a legitimate role to play in responding to opioid-related issues	3	3	3–12	Video A α = .48–.58 Video B α= .50–.55 Combined α= .69–.76
Individual motivation and reward	Work Practice Questionnaire – Individual Motivation and Reward Subscale [29]	Experiences of responding to opioid-related issues would be rewarding	3	3	3–12	Video A α= .47–.69 Video B α= .63–.69 Combined α= .72–.84
Medical condition regard	Medical Condition Regard Scale (MCRS) [30]	I feel especially compassionate toward patients with opioid-related issues	-	6	6–30	Video B α= .74–.80
Clinical attitudes	Lanken et al. (2015) Resident Physicians Pre-Survey [20]	Most persons who misuse opioids are unpleasant to work with as patients	-	5	5–20	Video B α= .61–.69

OUD, opioid use disorder

Table 3

Sociodemographics of sample ($N = 102$)

Characteristic	*n* (%)[a]
Age (years)	
20–24	29 (28.4)
25–29	50 (49.0)
30–34	13 (12.8)
35–39	7 (6.9)
40–44	2 (2.0)
45 +	1 (1.0)
Gender[b]	
Woman	82 (80.4)
Man	16 (15.7)
Nonbinary person	2 (2.0)
Decline to state	2 (2.0)
Sexual orientation	
Bisexual, lesbian, gay, queer, asexual, or questioning	28 (27.5)
Straight	69 (67.6)
Decline to state	5 (5.0)
Race/ethnicity (select-all-that-apply)	
Hispanic or Latinx	12
White	39
Black or African American	18
Asian	29
Middle Eastern or North African	2
Race/ethnicity not listed or declined to state	7
Years of medical training	
0	4 (3.9)
1	7 (6.9)
2	27 (26.5)
3	35 (34.3)

Table 4

Mean scores and standard deviations of outcomes related to an education-based video for improving screening-diagnostic self-efficacy for opioid use disorder (Video A) across three timepoints ($N = 102$)

Outcome	Mean scores[a] (SD)		
	Pre	Post	Follow-up[b]
Primary outcome			
Screening-diagnostic self-efficacy for OUD	22.6 (8.5)	28.4* (7.2)	28.2* (7.2)
Secondary outcomes			
General clinical empathy	25.6 (3.3)	25.7 (2.9)	25.4 (3.6)
Harm reduction acceptability	13.6 (1.7)	14.1* (1.7)	14.0* (1.8)
Role adequacy	9.5 (3.4)	11.4* (2.8)	11.4* (2.8)
Role legitimacy	9.3 (2.0)	10.2* (1.6)	9.9* (1.7)
Individual motivation and reward	10.9 (1.2)	11.1* (1.2)	11.0 (1.4)

[a] Only participants with complete data for each scale were used, so *n* ranged from 99 to 102; degrees of freedom are reported in-text

[b] Follow-up occurred 1 month following the viewing of both videos

* Significantly different than Pre ($p < .05$)

OUD, opioid use disorder

Table 5

Mean scores and standard deviations of outcomes related to an interpersonal contact-based video for improving stigma toward opioid use (Video B) across three timepoints ($N = 102$)

Outcome	Mean scores[a] (SD)		
	Pre	Post	Follow-up[b]
Primary outcome			
Stigma toward opioid use	9.2 (3.4)	8.3* (3.3)	8.5* (3.4)
Secondary outcomes			
General clinical empathy	25.2 (2.9)	26.2* (2.7)	25.5 (3.0)
Harm reduction acceptability	12.2 (2.4)	12.9* (2.3)	12.7* (2.3)
Role legitimacy	9.8 (1.7)	10.4* (1.6)	10.2* (1.6)
Individual motivation and reward	8.9 (1.1)	9.1 (1.0)	9.1 (1.0)
Medical condition regard	24.0 (4.1)	26.0* (3.6)	25.0* (3.7)
Clinical attitudes	16.7 (2.2)	17.8* (2.2)	17.2* (2.3)

[a] Only participants with complete data for each scale were used, so n ranged from 99 to 102; degrees of freedom are reported in-text

[b] Follow-up occurred 1 month following the viewing of both videos

* Significantly different than Pre ($p < .05$)