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STUDY PROTOCOL

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Development and implementation of a self-directed violence prevention training program for correctional behavioral health providers: a clinical trial study protocol

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Abstract

Background Self-directed violence (SDV) comprises both suicide and self-injury and represents a pressing problem among incarcerated persons. Negative impacts of SDV in correctional settings also extend to behavioral health clinicians (BHCs) (e.g., job turnover). Correctional SDV risk assessment and management standards include staff training as part of the comprehensive approach. The Core Competency Model for Corrections (CCM-C) is a novel, evidence-informed training program for BHCs covering both clinician self-management and clinical care skills.

Methods This pilot trial is a type 3 hybrid implementation–effectiveness approach. It will employ a wait-list control sequential cross-over design. Participants ($N = 50–100$) will be BHCs employed by the North Carolina Department of Adult Corrections. Following stratification for years of clinical experience, BHCs will be randomly assigned to (1) a training group that receives CCM-C immediately and (2) a wait-list control receiving CCM-C approximately 6 weeks later. Electronically administrated survey evaluation will occur across baseline and two follow-up (i.e., 2 weeks after each training session) time points.

Discussion The primary outcome is feasibility assessed through collaboration with a Corrections Advisory Panel and feedback from BHCs. Secondary effectiveness outcomes that will be evaluated over time include SDV-related knowledge, attitudes, stigma, and intent to use training content. We will examine a tertiary outcome, namely compassion fatigue. Clinical trial limitations and impacts are discussed.

Trial registration Clinicaltrials.gov, NCT06359574. This study was registered on 04/05/2024.

Keywords Suicide, Self-injury, Corrections, Mental health provider, Training, Knowledge, Competency

Protocol version: This protocol has been approved by the University of North Carolina at Charlotte (UNC Charlotte) Institutional Review Board (protocol #IRB-24-0209) [I.Z.1].

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Background

Self-directed violence (SDV) comprises both suicide and self-injury [1]. Incarcerated persons are at an elevated risk for SDV compared to the general population [2]. SDV in correctional settings represents a public health problem, as incarcerated persons may experience a range of negative health outcomes, and handling SDV occupies a considerable amount of correctional officer, correctional behavioral health clinician (BHC), and administrative staff time and resources. Furthermore, a need for better training, implementation, and use of evidence-based clinical practices is necessary [3]. Despite the pressing challenges associated with SDV in correctional settings, there is a lack of empirically evaluated evidence-based correctional SDV prevention training programs for BHCs.

SDV in correctional settings: scope and impacts

Suicide remains a leading cause of death among state prisoners as in 2019; 8.1% of correctional deaths were attributed to suicide [4]. The rate of suicide is higher among incarcerated individuals compared to U.S. residents [4]. Of all state and federal prisons, 19% had at least one suicide in 2019, with 9% of all jails reporting at least one suicide [4]. Self-injury was more common, with a national survey indicating that self-injury was a near-universal behavior across prisons (i.e., 98% of prisons had persons engaging in self-injurious acts), but with a prevalence rate of 2.4% of the surveyed prison population [5].

Negative impacts of correctional SDV exist on the system and provider levels. For example, estimates of economic impact show that correctional mental health and related services cost more than $1 billion annually [6]. In terms of providers, there is a significantly higher turnover in correctional staff than in the general workforce, with correctional nurse turnover in a 3-year period being 20% compared to 13% of the national nurse workforce [7]. Research has also indicated a higher prevalence of mental health disorders such as post-traumatic stress disorder (PTSD) and major depressive disorder among correctional workers relative to the general public [8]. These problems may be rooted in part by traumatic incidents (e.g., witnessing the death of an incarcerated individual) [7, 8].

Correctional SDV risk assessment and management practices and training

The American Correctional Association (ACA) [9] and the National Commission on Correctional Health Care [10] both establish standards for health services in correctional facilities, including guidelines for SDV prevention. These standards comprise screening and assessment of individuals at risk of suicide during intake or other mental health assessments, assessment of correctional staff training in identifying and responding to signs of suicidal behavior, assessment of timely and effective access to mental health services, and guidelines for minimizing the risk of SDV in correctional environments [10]. However, due to the flexibility of the ACA and NCCHC standards, the policies and implementation of guidelines may vary among facilities [11]. A recent example of best practice following these guidelines is the development and initial validation of the Self-Injury Risk Assessment Protocol for Corrections (SIRAP-C). Resulting from a corrections–academic partnership to meet the correctional standards for managing and preventing SDV, the SIRAP-C was developed to provide an evidence-based structured approach to risk determination and treatment of SDV in correctional settings [12].

The NCCHC's current training standards for SDV assessment and management recommend that BHCs receive an initial in-depth mental health orientation that is reviewed once every 2 years or as needed and a minimum of 12 h of continuing professional education per year [13]. Speaking to the gap in existing trainings, the suicide-specific trainings that exist for professionals in correctional settings, such as the Question Persuade Refer [14, 15] Model for corrections, their primary emphasis is on correctional officers; the central training focus concerns basic skills such as merely identifying basic warning signs for suicidal behavior [3]. Adequate training tailored to BHCs to address SDV is the next needed step in addressing correctional SDV. The Core Competency Model (CCM) [16, 17] and its adapted correction version [2] provide a framework to address SDV risk assessment and management in correctional settings.

The core competency model: origins and evidence

The CCM [16, 17] is an evidence-based training approach for BHCs. The CCM is grounded in the social cognitive model of suicide prevention training [18]. This model posits that training, in this instance in ten core clinical care and clinician self-management skills, will result in improved BHC suicide-related knowledge, attitudes, and perceived skill mastery. The ten core competencies are (1) manage personal attitudes and reactions to suicide, (2) maintain a collaborative, empathic stance toward the client, (3) elicit evidence-based risk and protective factors, (4) focus on current suicide plan and intent of suicidal ideation, (5) determine the risk level, (6) enact a collaborative evidence-based treatment plan, (7) notify and involve other persons, (8) document risk, plan, and reasoning for clinical decisions, (9) know the law concerning suicide, and (10) engage in debriefing and self-care. Two important CCM principles inform the present trial. First, CCM training approaches involve a combination

of psycho-educational content, self-assessment tools, resource provision, and interactive exercises. Second, the CCM is intentionally flexible, in that the training content and delivery can be tailored to the needs of a treatment setting or population. A fundamental part of the CCM training approach is the development and validation of the Suicide Competency Assessment Form (SCAF) [16, 19]. The SCAF assesses mastery or self-efficacy regarding the ten core competencies and can be used as a total score or individual item ratings. The SCAF is flexible in its use in terms of self-report or observer (e.g., a clinical supervisor) versions.

The CCM has been applied primarily in community mental health, general mental health provider, and university counseling center contexts to date [17, 20]. Numerous studies to date show positive, meaningfully sized impacts on BHC suicide risk assessment and management-related knowledge, attitudes, and perceived skill mastery [3, 17, 20–22]. For instance, the evaluation of a virtual self-paced CCM training yielded reductions in negative beliefs about suicidal patients, as well as positive gains in provider suicide-focused knowledge and self-efficacy in implementing the ten competencies [17]. Training has also demonstrated objective improvements in appropriate clinical responses to persons experiencing suicidal thoughts or behaviors [3], suicide risk recognition in response to standardized clinical vignettes [17], and use of screening tools in clinical practice [20]. Overall, the CCM provides a foundation for the development of an SDV risk assessment and management training program for correctional settings.

Core Competency Model for Corrections (CCM-C)

An adapted version of the CCM was developed and named the Core Competency Model for Corrections (CCM-C) [2]. Specifically, the research outlined the rationale, need for adaptation, and a sample training curriculum for mental health providers working in correctional settings. Owing to the high rates and negative impacts of SDV in correctional settings, the CCM-C adapts the social cognitive model of suicide prevention training [18] and CCM approach in several ways. First, the sole focus on suicide is expanded to include self-injury throughout the model and training curriculum (see Fig. 1). For example, mediating mechanisms of action explaining training impacts on intent and actual use of skills all focus on SDV (e.g., SDV risk assessment and management knowledge, attitudes, skills). Second, contextual factors such as the type of correctional facility need to be factored into training content and trainee selection. Third, the phrasing of competencies and associated SCAF items are reframed to address SDV. Finally, although some general CCM content remains the same, much of the psycho-educational information, clinical resource materials, and interactive training are largely adapted to focus on evidence-based content in the correctional SDV literature [23–25]. Moreover, case law and standards [26–28] specific to SDV management in correctional settings are included in that respective competency. More details regarding the CCM-C training are provided in the study protocol methods below.

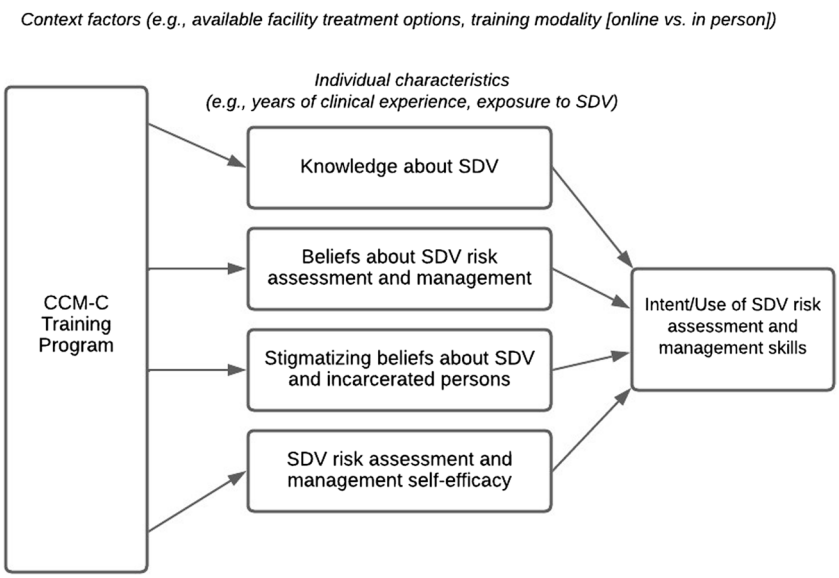

Fig. 1 CCM-C social cognitive training model. SDV self-directed violence, CCM-C Core Competency Model for Corrections

Core competency model for corrections project aims and hypotheses

The overall purpose of this study is to conduct a pilot trial focused on the feasibility and preliminary effectiveness evaluation of the CCM-C [2] among a sample of state correctional BHCs in North Carolina. The CCM-C is an evidence-based training program aimed at training BHCs in SDV prevention skills. Using both quantitative and qualitative assessment approaches, we propose a protocol featuring a wait-list control sequential crossover design. In line with program implementation models [29, 30], we will assess CCM-C training feasibility, acceptability, appropriateness, and usability from the perspectives of BHCs with input from an expert corrections advisory panel (CAP). Based on the social cognitive model of suicide/SDV prevention training [2, 18], preliminary training effectiveness will be judged by trainee SDV risk assessment and management knowledge, attitudes/stigma, perceived skill mastery, and intention to use training content. Because BHC compassion fatigue is associated with interactions with high-risk (e.g., trauma, suicide, violence) patients [31, 32], we selected compassion fatigue as an exploratory outcome. Therefore, this pilot feasibility and preliminary effectiveness evaluation holds three aims, with the following respective research questions (RQ) and hypotheses (H).

Aim 1: To explore CCM-C implementation feasibility, acceptability, appropriateness, and usability.

RQ1: What are the barriers and facilitators of CCM-C implementation?
RQ2: What CCM-C improvements can be made to the training program?

Aim 2: To conduct a preliminary CCM-C effectiveness evaluation.

H1: Participation in CCM-C training will result in improved SDV prevention knowledge.
H2: Participation in CCM-C training will result in improved SDV prevention attitudes (reduced stigmatizing beliefs).
H3: Participation in CCM-C training will result in improved perceived SDV prevention skill mastery.
H4: Participation in CCM-C training will result in improved intent/actual use of CCM-C training content.

Aim 3: To explore the impact of CCM-C training participation on BHC compassion fatigue.

RQ3: Does compassion fatigue change after CCM-C participation?

Methods

Trial design

This pilot trial is a type 3 hybrid implementation–effectiveness trial [33]. A type 3 design has a primary purpose of determining the impact of an implementation strategy and secondary aim of assessing clinical outcomes (i.e., effectiveness) [33]. Previous research clearly states:"A hybrid type 3 is essentially an implementation trial plus an evaluation of outcomes. The primary outcomes are implementation outcomes" [33]. Additionally, prior literature specifies implementation outcomes, which include feasibility, acceptability, and appropriateness [30]. The primary aim of the CCM-C trial is to test the feasibility, appropriateness, intervention revision, etc. of the training intervention (i.e., implementation). The secondary aim is a pilot effectiveness evaluation focused on social learning training-focused outcomes (e.g., knowledge, attitudes).

We will employ a wait-list control sequential crossover design for the present study (see Fig. 2). Based on similar BHC suicide prevention training pilot evaluations in the literature [34, 35], we anticipate that between 50 and 100 BHCs will take part in the CCM-C pilot. We will conduct simple random sampling of eligible BHCs to generate two training intervention groups: training group one versus wait-list control. We will use the population stratification of number of years' clinical experience in adult corrections to randomly assign 50% of each stratum into the two treatment groups. An overview of the study data collection and training implementation timeline is provided in Table 1. In summary, all BHCs will complete a baseline assessment. Those assigned to training group one will complete the CCM-C training program first (week 3). After the first training session has been completed, all BHCs will complete a second assessment (week 7). Then, training group two (wait-list control group) will receive the CCM-C training (week 9). Following training completion, all BHCs will complete a third assessment 1 month from the last training session (week 13).

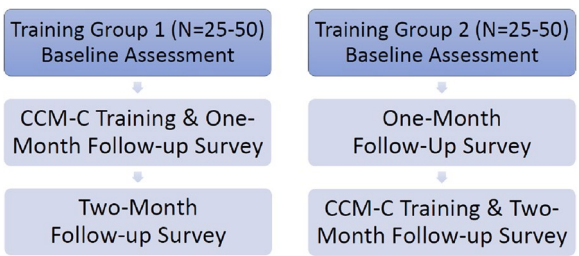

Fig. 2 CCM-C pilot study design

Table 1 Core Competency Model for Corrections (CCM-C) pilot study timeline

Project step	Data collection and training deliver week number												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Baseline data collection	x												
Training group one			x										
Follow-up data collection one							x						
Training group two									x				
Follow-up data collection two													x

Study setting

This study is part of an ongoing community–academic partnership between the University of North Carolian (UNC) at Charlotte and North Carolina Department of Adult Corrections (NC DAC). The partners are as follows.

NC DAC

The state of North Carolina prison system has an average daily population of approximately 31,000 incarcerated persons [36]. The pilot study setting, the NC DAC, is a statewide agency comprising 55 prisons. With regard to security level, 21 are minimum, 14 are medium, and the remaining are a mixture of custody levels. Across all prison facilities statewide, the custody level assignment for those incarcerated reflect 19% close custody, 49% medium custody, and 32% minimum custody assignment. The prison population is 92% men overall, and of the 55 total facilities, 4 house women [36]. There are two prisons that include hospital facilities within the complex. NC DAC facilities are organized by four regions: region 1 (Western, 15 facilities), region 2 (South Central, 12 facilities), region 3 (Central, 15 facilities), and region 4 (Eastern, 13 facilities). The Behavioral Health Services section within NC DAC comprises approximately 160 BHCs across the state including psychologists, clinical social workers, and clinical mental health counselors. While available behavioral health services vary by prison site, the following services are available within the NC DAC: screenings on intake, outpatient services, crisis intervention, management of acute psychiatric episodes, crisis stabilization, prevention of psychiatric deterioration, elective therapy services, preventive treatment, provision for referral and admission to mental health facilities for higher levels of care, procedures for obtaining and documenting informed consent, follow-up services upon discharge from an inpatient psychiatric facility, substance-use-specific treatment services, and aftercare planning for community re-entry. To address SDV, BHCs also conduct mental health screenings of incarcerated persons and self-injury risk assessments (SIRAs) at any indication of risk for self-injury or suicide. To illustrate the scope of the need statewide, in 2023, NC DAC BHCs conducted a total of 3028 SIRAs.

UNC Charlotte

The academic team comprises faculty, staff, and graduate students in the Department of Public Health Sciences within the College of Health and Human Services. At any time, the team is composed of between four and eight team members with disciplinary backgrounds such as clinical psychology, community health, experimental psychology, social work, informatics/decision sciences, and epidemiology. As such, the team contributes expertise in SDV prevention, clinical trial design, and quantitative and qualitative methods and analysis to the partnership. The academic team also contributes project infrastructure in terms of institutional review board application and review, survey data collection and analytic software, and grants management support.

Training sites

The NC DAC will utilize a local community college training venue to implement CCM-C sessions. NC DAC maintains existing agreements with regional community colleges, as well as other training locations made available by counties and municipalities that offer governmental waivers for the locations. Training locations are outside of a prison facility, designed for trainings, and include necessary training facility resources. For this protocol, training will be delivered at the Wake Tech Community College campus facility.

Correctional advisory panel (CAP)

In line with prior correctional healthcare literature [37], we will employ a corrections advisory panel (CAP) to provide expert input for CCM-C training co-design. The CAP will be comprised of six internal BHCs (to the NC DAC) and three to six external BHCs (e.g., from other state departments of corrections) with experience providing correctional behavioral healthcare services and in the administration of correctional behavioral healthcare systems. Each CAP member will be a master's or

doctoral-level BHC in psychology, clinical social work, or clinical mental health counseling.

The CAP members will provide an expert review of the training content, approaches, and evaluation plan at two points. During the preparation phase, CAP members will provide a review of the initial training program with respect to usability, feasibility, applicability, and appropriateness. Considerations will include how well content matches the realities of conducting SDV risk assessment and management work in correctional systems and how correctional behavioral healthcare providers may respond to the training. We will collect this formal input from the CAP via a structured feasibility form (see description in measures section). Once the initial pilot evaluation is completed, the evaluation team (Cramer, Cacace, Moxie, Prowten) will present findings to various NC DAC stakeholders including the CAP. At this time, CAP members will provide additional feedback for training revision focusing on content, training techniques, and implementation guidance for the completion of a CCM-C toolkit. The CAP will further advise on the potential to generalize the training to new prison sites of varying sizes and in different states.

Participants and eligibility criteria

Participants will be 50–100 NC DAC BHCs. The study eligibility criteria include (1) being a BHC, (2) being 18 years of age or older, (3) living in the U.S., and (4) being currently employed by the NC DAC. Study exclusionary criteria include (1) decisional or cognitive impairments that preclude being able to consent to study participation and (2) being a member of the study correctional advisory panel (CAP; see details below).

Intervention: CCM-C training program

The CCM-C training will be delivered via an in-person format to 25–50 trainees per session. The full-day training will contain pre-scheduled breaks and opportunities to debrief about content in smaller groups. The initial CCM-C training program follows the general structure of the CCM competencies, with the exception of previously noted wording changes to fit correctional setting needs (e.g., replacing suicide with SDV throughout the competencies). Table 2 summarizes each CCM-C training module. A total of 10 modules is preceded with a brief introduction to the CCM training framework. Each module contains a combination of psycho-educational material, handouts, case studies, and discussion. Following the social cognitive model of CCM-C training [2], each module intentionally targets mechanisms (e.g., improving knowledge, reducing stigmatizing attitudes) hypothesized to increase the likelihood of the use of evidence-based SDV risk assessment and management practices.

Trainers

In line with the principles in community–academic partnership (e.g., co-ownership of knowledge generation) [86], a member of both NC DAC and UNC Charlotte will co-deliver the training. Specifically, study investigators RC and LJP will coordinate training through two sessions. Combined, the trainers possess experience and expertise in competency-based training delivery for legal, clinical, and correctional audiences; behavioral health services; suicide risk assessment and management practice, training, and research; and correctional psychology. One trainer is a licensed clinical psychologist with correctional practice experience, and the other is a trained clinical psychologist with an established research record in suicide prevention and forensic-correctional behavioral health.

Outcomes

Implementation (e.g., feasibility, usability) is the primary outcome given the novel nature of the CCM-C program and the focus on iterative intervention design [87]. We selected a multi-dimensional model of assessment [88]. We did so for two reasons. First, prior hybrid implementation–effectiveness trials [89, 90] employed more than one facet of implementation, yielding valuable information compared to more restricted sets of outcomes. Second, models of implementation science [91] frame implementation or feasibility as a multi-dimensional outcome set. The secondary aims are SDV risk assessment and management knowledge, attitudes, perceived skill mastery, and intent to employ training content. We identified these outcomes in line with prior general CCM training evaluation studies [3, 17, 20–22], as well as the social cognitive model of training applied to corrections [2, 18]. The tertiary exploratory outcome of this trial is compassion fatigue. We elected to explore training impacts on compassion fatigue given it is a common challenge for BHCs (especially those working in difficult treatment environments) [92], and CCM-C training addresses matters of self-care, critical incident debriefing, and consultation that may mitigate compassion fatigue among BHCs.

Sample size

We opted for a sample size range of 50–100 BHCs for several reasons. First, the total population of NC DAC mental health providers is no more than 160. We therefore wanted to draw a large proportion of the overall group, while leaving room for NC DAC to implement the eventual CCM-C toolkit in a sustainable way (e.g.,

Table 2 Core Competency Model for Corrections training program module structure and program targets

Competency	Training module content	Module handouts and intervention targets
Overview of the CCM framework	1. Presentation of the original CCM competencies and training framework [16, 17] 2. Discussion of unique needs and characteristics of correctional settings 3. Presentation of the CCM-C competencies and training framework [2] 4. Educational overview of key SDV and persistent self-injury (PSI) terminology [1, 38, 39]	Handouts: 1. CCM-C article 2. SIRAP-C article 3. PSI article Intervention targets: 1. Knowledge
1. Manage your attitudes and reactions to SDV	1. Case study focused on personal emotional reactions and stigmatizing attitudes activated by correctional mock scenario 2. Educational overview of literature on types of beliefs about and reactions to SDV [40, 41], cognitive biases, and heuristics [42, 43] 3. Review of general SDV self-report tools to assess personal attitudes toward suicide prevention (Attitudes toward Suicide Prevention Scale) [44] and perceived suicide prevention skills (Suicide Competency Assessment Form) [16, 19] 4. Case study focused on initial reactions to conducting a mental health screening with a newly incarcerated person with a history of self-injury 5. Review of self-report assessment tool capturing attitudes toward incarcerated persons who engage in self-injury (Attitudes toward Offenders who Self-Harm Scale) [24, 45] 6. Discussion of ways to use self-assessment tools	Handouts: 1. SCAF 2. ASP 3. ASQ 4. ASPH Intervention targets: 1. Stigma 2. Attitudes
2. Maintain a professional stance toward the client	1. Case study to promote discussion of ways to show, and challenges to maintaining, a professional stance toward incarcerated persons 2. Overview of empirically-supported strategies (i.e., verbal and non-verbal) to build rapport, including how to ask about SDV (discussing what does and does not apply to corrections) 3. Case study addressing rapport building and engaging with a client in a scenario of a self-injury risk assessment referral 4. Discussion of challenges to rapport and professionalism posed by unique aspects of the correctional setting [46, 47] 5. Educational overview and handout review covering topics of therapeutic detachment and emotional distancing [48] 6. Discussion of ways to use colleagues and supervisors to reinforce, develop, and enhance cognitive complexity [49]	Handouts: 1. Guidelines for therapeutic detachment Intervention targets: 1. Knowledge 2. Self-efficacy 3. Attitudes

Table 2 (continued)

Competency	Training module content	Module handouts and intervention targets
3. Elicit evidence-based risk and protective factors	1. Overview of the Interpersonal Theory of Suicide [50, 51] followed by discussion on how it can be used in risk assessment 2. Educational overview of SDV warning signs [52] 3. Review of major SDV risk and protective factors in correctional [11] and general [53, 54] populations 4. Provision and review of existing suicide risk assessment tools (e.g., Self-Injurious Thoughts and Behaviors Interview-Revised [SITBI-R] [55]; Suicidal Behaviors Questionnaire-Revised [SBQ-R] [56]) 5. Educational overview of risk assessment tool use guidelines and limitations 6. Overview of functional models (e.g., Four Function Model [57]) of self-injury and their applicability to corrections [25]) 7. Discussion of the nature of self-injury in correctional settings 8. Provision and review of existing self-injury risk assessment tools (e.g., Deliberate Self-Harm Inventory [DSHI] [58]) 9. Review with handout of the development and use of the Self-Injury Risk Assessment Protocol for Corrections (SIRAP-C) [12] 10. Case study of a risk assessment scenario requiring trainees to identify SDV risk/protective factors	Handouts: 1. Suicide risk and protective factors summary 2. Self-injury risk and protective factor summary 3. Publicly available clinical risk assessment instruments (e.g., DSHI, SITBI-R; SBQ-R) 4. SIRAP-C Intervention targets: 1. Knowledge 2. Self-efficacy
4. Focus on current plan, intent, and lethality of SDV	1. Review of relevant terminology [1] 2. Summary of SDV-specific risk and protective factors (e.g., history of SDV) [53, 59] 3. Presentation of the visual continuum of SDV ideation/behavior, and suicidal ideation, intent, and preparation [16, 17] 4. Provision of guidelines on how to (and not to) ask about SDV 5. Educational overview, handout provision, and discussion of lethality assessment guidelines 6. Two case studies requiring selection from a set of multiple-choice responses to identify correct SDV-related phrasing in a risk assessment scenario	Handouts: 1. Lethality assessment guide Intervention targets: 1. Knowledge 2. Self-efficacy
5. Determine risk level	1. Introduction of risk determination terminology (e.g., chronic versus imminent risk) 2. Case scenario requiring identification of proximal/distal risk/protective factors and chronic/acute risk determinations 3. Overview of established risk stratification categories [2, 60–63] 4. Continued same case study focusing on identification of SDV-specific content and application of the SIRAP-C risk stratification 5. Discussion of the subjectivity of risk determination and importance of linking risk with intervention	Handouts: 1. Suicide Status Form-IV 2. SAFE-T Risk Assessment Classification System Intervention targets: 1. Knowledge 2. Self-efficacy

Table 2 (continued)

Competency	Training module content	Module handouts and intervention targets
6. Enact an evidence-based treatment plan	1. Review of evidence-based care principles [64] and general short-term risk management strategies [64, 65] 2. Introduction of crisis response and safety planning approaches (e.g., Safety Planning Intervention [66]) and common elements 3. Presentation and provision of sample crisis response planning documents [62] 4. Discussion of appropriate safety planning considerations for correctional facilities 5. Review of leading SDV-specific treatments: Dialectical Behavior Therapy (DBT) [67] and Brief Cognitive-Behavioral Therapy for Suicide (BCBT) [62] 6. Case study to identify limitations of therapeutic approaches with incarcerated persons at risk for SDV 7. Educational overview of systems-level interventions (e.g., multidisciplinary treatment team review) and principles for consideration of inpatient hospitalization	Handouts: 1. Self-injury risk assessment guide 2. Example crisis response plan document Safety Planning Intervention form and risk curve 3. DBT Behavior Chain blank form 4. Sample crisis support plan and means receipt 5. Inpatient transfer procedure Intervention targets: 1. Knowledge 2. Self-efficacy
7. Notify and involve other persons	1. Review and handout provision on social support conceptualization, functions, and assessment 2. Overview of social support options in correctional settings 3. Review of emerging best practices to build social support for incarcerated persons in correctional settings (e.g., peer observation and education programs [23, 68]) 4. Overview of caring contacts interventions [69] 5. Discussion of considerations in using social support for SDV management in correctional settings	Handouts: 1. Social support guidelines Intervention targets: 1. Knowledge 2. Self-efficacy
8. Document risk, plan, and reasoning for clinical decision-making	1. Case study prompting consideration on when and how to document a risk assessment 2. Review of guidelines and benefits of documentation, supplemented by handout [53, 70] 3. Case study providing the opportunity to outline or generate a mock clinical documentation based on a risk assessment scenario	Handouts: 1. Clinical documentation guide 2. Clinical documentation outline Intervention targets: 1. Knowledge 2. Self-efficacy
9. Know the law	1. An educational overview of rationale for covering ethics, and key general ethical issues applied to SDV assessment and prevention (e.g., breaking confidentiality, abandonment) 2. Review of relevant professional ethics standards [71–73] 3. Discussion of general ethical best practices [74], supplemented by an SDV risk assessment and management ethics checklist 4. Critical review showing why no-harm contracts should not be used [75] 5. Discussion of ethical best practices in correctional settings [76, 77] 6. Introductory overview of minimal standards in corrections and key case law informing SDV risk assessment and management [26, 78, 79] 7. Review of transfer procedures in correctional settings 8. Two ethical case scenarios requiring participants to identify (a) ethical principles and (b) appropriate course(s) of action 9. Introduction of the notion of defensive medicine within a case law review [80]	Handouts: 1. Ethics checklist 2. Post-incident review checklist Intervention targets: 1. Knowledge 2. Attitudes 3. Stigma 4. Self-efficacy

Table 2 (continued)

Competency	Training module content	Module handouts and intervention targets
10. Engage in debriefing and self-care	1. Introduction to the concept of critical incident response [9] with a focus on staff well-being 2. Return to case study from competency 1 with a focus on identifying impacts on the clinician 3. Overview of negative occupational, mental health, and physical health impacts of working with high-risk patients [81, 82] 4. Introduction of the concept of compassion fatigue 5. Discussion of personal and organizational solutions to prevent compassion fatigue [82, 83] 6. Provision of corrections-specific mental health resources (e.g., Employee Assistance Program information) 7. Review of evidence for mindfulness as a healthy coping technique [84, 85] 8. Provision of example publicly available mindfulness resources 9. Discussion of the whole of consultation and debriefing with colleagues	Handouts: none Intervention targets: 1. Knowledge 2. Attitudes

train-the-trainer materials). Second, for pragmatic reasons (e.g., room capacity), we wanted to maintain training groups small enough to leverage the interactive nature of training with two trainers. Finally, prior CCM [3, 17, 22] and mental health provider [93, 94] training pilot evaluations have demonstrated success with training groups of this size.

Recruitment

Eligible BHCs will be recruited from the South, Central, Eastern, and Western regional NC DAC facilities. Two recruitment methods will be used in this study: in-person recruitment and email recruitment.

In-person

The NC DAC lead investigator will introduce the study at an all-staff meeting in-person. A study introductory script will be used to explain that this training is mandatory per their position requirements at the NC DAC; this summary will include repetition that participation in the survey evaluation research study is voluntary.

Email

The NC DAC lead investigator will summarize the training and optional evaluation survey research to the full roster of NC DAC BHCs by email after the in-person meeting. He will use the same verbal introductory script, but this time written in an email in text. After he provides the UNC Charlotte research team with the full set of NC DAC BHC email addresses, the UNC Charlotte team will randomly select (see random sampling details section) up to 100 participants to contact for possible participation. Each person will receive a study summary and invitation email. It summarizes how they were randomly selected, why study participation is important, and what to expect next (i.e., a follow-up email with the study link and e-consent form in the following weeks).

BHCs working at the NC DAC who are randomly selected for possible participation will be provided an e-consent document by email inviting them to participate in the CCM-C training program through Qualtrics. This contact will occur several weeks after the initial study advertisements (i.e., in-person and email by the NC DAC lead investigator) in order to allow time for BHCs to carefully consider participation. The consent form will be accessed via a unique Qualtrics link generated using the Qualtrics distribution function. Details about the consent form are contained in the consent section below.

Randomization/allocation

We will use the full pool of eligible BHCs to randomize participants into two training groups. Then, we will use the population stratification of years of experience in adult corrections to randomly assign 50% of each stratum into the two treatment groups: training group one versus training group two (wait-list control). Population strata of years of experience will be calculated using the 10th, 25th, 75th, and 90th percentiles of the NC DAC clinical staff in adult corrections. The sampling procedures will be conducted by co-author SC (statistician) using Stata standard edition (SE) v. 18.0 [95] and stratified random assignment conducted using the randomizr package [96].

Blinding

No study blinding procedures will be used for study personnel. Training groups will be aware which sessions (first or second) they are assigned to but are not privy to the wait-list control design.

Data collection methods

Schedule of assessments

The planned assessment schedule can be seen in Table 3. All surveys will be completed via the Qualtrics survey distribution feature. In addition to being completed by the CAP, the primary outcome (feasibility assessment) will be completed by each training group at the respective follow-up data collection time point closest in time to complete the CCM-C training. Secondary SDV-focused and tertiary compassion fatigue outcomes will be completed at each time point. Characteristics to describe the sample (i.e., demographics and previous SDV exposure) will be collected at baseline only.

Participant retention

The following strategies will be used to ensure maximal survey completion. First, consistent with empirically supported practices [97, 98], we plan to employ pre-study advertisement and a strategically planned survey distribution reminder. We will be transparent with BHCs in study advertisements that their feedback will have direct impacts on improving the training. In doing so, study advertisements will highlight the value and contributions. Second, carefully selected instruments and pilot-tested survey length to minimize the likelihood of survey fatigue. We plan a survey reminder schedule to optimize timing during the week in which to amplify attention to surveys. Finally, the lead NC DAC study investigator will communicate to BHCs that they will be afforded time while at work to complete training evaluation surveys.

Primary outcome: training implementation (e.g., feasibility)

In line with program implementation models [29, 30], we will assess CCM-C training feasibility, acceptability, appropriateness, and usability from the perspectives of BHCs using a combined strategy of established and newly adapted measures and questions. We will use the Feasibility of Intervention Measure (FIM), Acceptability of Intervention Measure (AIM), and Intervention Appropriateness Measure (IAM) [88]. Each of these measures contain four theoretically supported [30] items measured on a 5-point Likert scale (1 = completely disagree; 5 = completely agree). Each item requires the study team to insert the name of the intervention being tested. For instance, sample items are as follows: FIM ("CCM-C seems possible"), AIM (e.g., "CCM-C is appealing to me"), and IAM (e.g., "CCM-C seems applicable"). The FIM, AIM, and IAM have been validated in past research, demonstrating strong subscale internal consistency (Cronbach's alpha range 0.85–0.91) and test–retest reliability ($r = 0.73$–0.88) [88]. For the present study, we added four items assessing usability because the assessment of usability is consistent with models of use of new programs [99] and has shown utility in the evaluation of new training programs [100]. We title this set of items Usability of Intervention Measure (UIM); a sample item is "CCM-C seems usable." In line with recent recommendations for mixed methods assessment of program feasibility [101], we incorporated qualitative assessment in our strategy. Namely, BHCs will have the opportunity to respond to a series of eight

Table 3 Assessment schedule

Measure	Timing of assessment		
	BL	FU1	FU2
Primary outcome			
Feasibility of Intervention Measure (FIM)		X	X
Secondary outcomes			
Adapted Suicide Competency Assessment Form (SCAF)	X	X	X
Adapted Attitudes about Intervening with a Suicidal Person (AIBS)	X	X	X
Attitudes toward Prisoners who Self-Harm (ASPH)	X	X	X
Core Competency Model for Corrections Knowledge Quiz	X	X	X
Perceived importance/intention to use training content	X	X	X
Tertiary outcome			
Compassion Fatigue Short Scale	X	X	X
Covariates and descriptors			
Demographics form	X		
Self-directed violence exposure questions	X		

BL baseline, *FU1* follow-up 1 (1 month after first training group), *FU2* follow-up 2 (1 month after second training group)

open-ended questions (two per domain of feasibility, acceptability, appropriateness, and usability).

Secondary outcomes: SDV-focused knowledge, attitudes, stigma, perceived skills, and intent to use training content

Suicide Competency Assessment Form (SCAF)

The Suicide Competency Assessment Form (SCAF) [16, 19] will be used to measure participants' perceived SDV prevention skill mastery. The SCAF contains ten items capturing core competencies of the CCM-C training; these items are measured on a 4-point scale of perceived competency (1 = incapable; 4 = advanced). For the present study, these ten items were adapted to capture SDV-focused skills. Specifically, the term "suicide" was replaced with "self-directed violence" within SCAF items. Studies have indicated good internal consistency in SCAF items (Cronbach's alpha range = 0.88–0.93). Validity was demonstrated in that the SCAF total score was associated with positive attitudes toward suicide prevention [19, 102].

Attitudes about Intervening with a Suicidal Person (AIBS)

The Attitudes about Intervening with a Suicidal Person (AIBS) [103] questionnaire will be used to measure SDV prevention-focused attitudes and the willingness to intervene in an event where a person is experiencing SDV. The AIBS is a subscale of the larger, recently revised Willingness to Intervene against a Suicidal Person Enhanced Questionnaire [104]. The AIBS contains 14 items measured on a 5-point Likert scale (1 = strongly disapprove; 5 = strongly approve). After reverse-coding seven items, these items will be summed to derive a total score. Previous research has suggested that the AIBS is internally consistent with strong reliability (Cronbach's alpha range = 0.78–0.89), and the AIBS total score significantly positively predicted the intention to intervene with a suicidal person [103, 104].

Attitudes toward Prisoners who Self-Harm Scale (APSH)

The Attitudes toward Prisoners who Self-Harm (APSH) [24, 45] scale will be used to measure SDV prevention-focused attitudes and stigma. The APSH consists of 25 items scored on a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree). After 14 items are reverse-coded, these items are summed to derive a total score where a higher score indicates more positive attitudes toward incarcerated persons who self-harm. The APSH also allows for four subscales; however, item scoring differs for subscale tabulation. The four subscales are (1) representing attitudes endorsing harsh treatment (four items; α range = 0.75–0.76); (2) attitudes reflecting understanding (six items; α range = 0.40–0.62); (3) attitudes endorsing negative myths (i.e., four items; α range = 0.71 for both studies), and; (4) relating self-harm to suicide (two items; α range = 0.28–0.58) [24]. Because of poor internal consistency across subscales, we will use the total score in the present study. The APSH total score has demonstrated good overall internal consistency (Cronbach's alpha range = 0.72–0.74) [24, 45] and test–retest reliability ($r = 0.79$, $p < 0.001$) [24]. The APSH total score was positively related to a general measure of pro-social attitudes toward incarcerated persons [45].

Core Competency Model for Corrections (CCM-C) knowledge quiz

CCM trainings typically use a set of 10 to 15 multiple-choice questions based on training content [16, 17, 22]. Items are designed to reflect a range of difficulties from basic factual recall to detection and application of content in applied clinical situations. Accurate response ranges to CCM quiz questions suggest that (a) there is a range of difficulty and (b) the range of accurate responding increases post-training [22]. For this pilot evaluation, we developed a ten-question quiz (one question per competency). Correct answers are summed for a total score where higher scores indicate greater understanding of the CCM-C.

Importance and intent to use training

We will use the intention to use training content scale [17] to capture BHC's perceived importance in using (pre-training) and intent to use (post-training) CCM-C training content. In its original form, this instrument is a seven-item questionnaire where each item queries intent to employ SDV prevention content or skills (e.g., self-reflection tools, clinical interview skills) in the CCM-C training. Items are rated on a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree) and summed to derive a total score where higher scores indicate greater intent to use the training. The intent to use training tool will be measured at baseline and at time points one and two of this study. At baseline, BHCs will be asked about the perceived importance of using the SDV prevention skills. At time points one and two, they will be asked about their intent to use these SDV prevention skills in their future practice. The strategy of asking about perceived importance followed by actual intent to use training is informed by recommendations in the literature in the design of scales measuring intention to engage in behaviors [105] and aligns well with the social cognitive model underpinning CCM-C training [2, 18]. This approach to assessing perceived clinician importance and

intent to use training content has been used in prior literature [106].

Tertiary outcome: Compassion Fatigue-Short Scale (CF-SS)

The Compassion Fatigue-Short Scale (CF-SS) [107] will be used to assess feelings of compassion fatigue, conceptualized as secondary traumatic stress and job burnout. This measure contains 13 items; each item is measured on a 10-point Likert scale (1 = rarely; 10 = very often). Items are summed to derive a total score where higher scores suggest greater compassion fatigue. The CF-SS has been validated in prior research demonstrating strong internal consistency (Cronbach's alpha = 0.80–0.91) [107, 108]. This research has also found that the CF-SS was predictive of secondary traumatic stress and job burnout [108].

Covariates: demographics and self-directed violence exposure

We will collect information regarding participant demographics, work history, and history of SDV and suicide exposure. This assessment will query participant age, gender, race, ethnicity, education level, primary discipline, and years of experience as a BHC in adult corrections. Based on suicide exposure questions in prior CCM training studies [17, 22], we adapted a set of questions to assess SDV exposure via a series of "yes"/ "no" questions. Participants will be asked, "Have you ever known someone in your personal life who…" (1) engaged in non-suicidal self-injury, (2) attempted suicide, and (3) died by suicide. We will also query "Have you ever known anyone in your personal life who has…" (1) non-suicidal self-injury, (2) attempted suicide, and (3) died by suicide. For each SDV exposure item a BHC responds yes to, they will be provided further free response text to indicate who it was (e.g., family member, co-worker). Participants will also be asked to report the total number of hours of suicide prevention training received to date and the total number of patients lost to suicide.

Data management plan

The NC DAC lead investigator provided the university study team with NC DAC email addresses and years of experience via a password-protected excel file. NC DAC email addresses were used to recruit and randomly assign BHCs to participate in this study. These email addresses include BHC names within the address text. UNC Charlotte study members will link email addresses with a random, anonymous study-specific ID number via a password-protected excel document. NC DAC investigators will not have access to this linked summary, nor the dataset, in order to maintain the privacy and confidentiality of NC DAC behavioral health staff participating in the study.

The following infrastructure and training exists to ensure data security and privacy. The University holds a license for DropBox for Business, which utilizes the 256-bit Advanced Encryption Standard (AES) and Secure Sockets Layer (SSL)/Transport Layer Security (TLS) security tunnel, along with a two-step verification for all University faculty and staff, ensuring protection against unauthorized data access for participant responses. All data will be stored in a password-protected DropBox folder to which only the research team will have access. Study participant email addresses will be maintained in the secure study DropBox folder via a password-protected Excel sheet (only study team members at UNC Charlotte will have a password and file access). Third, datasets will be stripped of identifiers (e.g., IP addresses) upon being downloaded. Finally, all members of the research team have completed data security protocol training, per UNC Charlotte, to mitigate user error in sharing confidential research data.

We will take the following steps to maintain participant privacy and confidentiality. First, we will employ personalized Qualtrics links. This strategy will allow participants to complete surveys in a location of their own choosing, thereby enhancing the sense of privacy in responding to surveys. Second, all data will be stored in a password-protected DropBox folder that only the research team will have access. Study participant email addresses will be maintained in the secure study DropBox folder via a password-protected Excel sheet (only study team members at UNC Charlotte will have the password and file access). Third, datasets will be stripped of identifiers (e.g., IP addresses) upon being downloaded. Also, once all data analysis is completed, email addresses linked with study ID numbers will be deleted in all formats (i.e., from Qualtrics, the Excel sheet). This procedure will take place no less than 1 month from the study completion.

Statistical methods

CAP feasibility feedback

Initial CAP feasibility data will be quantified via descriptive statistics of individual and total scores in each domain (e.g., appropriateness). As reported in other intervention development work [109], we will examine open-ended responses using deductive thematic analyses in Dedoose [110] qualitative software. Relying on a previously used approach [111] of familiarizing ourselves with the data, we will create initial codes (based on our question domains of usability, feasibility, applicability, and appropriateness), identify patterns among codes for themes, and review, define, and name themes. A team of two coders will review the data and discuss themes in

team meetings. The lead NC DAC investigator will hold at least two virtual meetings with CAP members in order to discuss CAP feedback prior to the revision of training materials for the primary pilot evaluation.

Primary evaluation data cleaning and handling missing data

Immediately following each data collection period, response data will be exported and analyzed for data quality by examining: (1) completion time extremes and linear response patterns [112] and (2) low-quality entries flagged for sensitivity analysis (i.e., comparisons including and excluding low-quality responses). Low-quality responses will be excluded if they significantly alter the results. Missing responses at follow-up time points will be examined for percent completion and missing at-random data patterns using Little's MCAR test [113]. Missing data will be replaced using factored regression analysis, utilizing appropriate auxiliary predictors [114]. Auxiliary predictors for each time period are shown in Table 4.

Preliminary analyses

Training groups will be compared on years of clinical experience in order to ensure successful randomization. Demographics (e.g., age, race, previous hours of suicide prevention training) and prior experience with SDV information will be described using graphics (i.e., sample percentage bar graphs) and tables (i.e., frequency and percentage). Descriptive statistics tables will be provided for outcome measures, including average and standard deviation aggregated for all participants, and by training group. Potential for covariation for prior experience with SDV and previous suicide prevention training will be assessed for each outcome using visual inspection (i.e., scatterplots) and Pearson's r correlation matrices. Covariates with significant associations with the outcome measures of interest at any time point will be included as covariates in the final models. Internal consistency for all measures will be assessed using Cronbach's alpha and will be interpreted using established conventions in the literature [115].

Table 4 Predictors for factored regression analysis

Time point	Auxiliary predictor
Follow-up one	
SCAF	Baseline SCAF, AIBS, APSH, and CCMC knowledge
AIBS	Baseline SCAF, AIBS, APSH, and CCMC knowledge
APSH	Baseline SCAF, AIBS, APSH, and CCMC knowledge
CCM-C knowledge	Baseline SCAF, AIBS, APSH, and CCMC knowledge
Follow-up two	
SCAF	Follow-up SCAF, AIBS, APSH, and CCM-C knowledge
AIBS	Follow-up SCAF, AIBS, APSH, and CCM-C knowledge
APSH	Follow-up SCAF, AIBS, APSH, and CCM-C knowledge
CCM-C knowledge	Follow-up SCAF, AIBS, APSH, and CCM-C knowledge

SCAF Suicide Competency Assessment Form, *AIBS* Attitudes about Intervening with a Suicidal Person, *APSH* Attitudes toward Prisoners who Self-Harm Scale, *CCM-C* Core Competency Model for Corrections

Aim 1. Descriptive CCM-C feasibility, acceptability, appropriateness, and usability analyses

To examine the feasibility of the CCM-C training (RQ1), we will provide descriptive statistics about the acceptability, appropriateness, feasibility, and usability of the training for all participants and by training group as graphics (e.g., bar graphs). We will also examine associations of acceptability, appropriateness, feasibility, and usability by demographic characteristics by providing descriptive statistics by demographic categories and visuals (e.g., scatterplots or bar graphs).

Aim 1. Qualitative CCM-C feasibility, acceptability, appropriateness, and usability analyses

We will use Dedoose online qualitative software [110] to conduct both thematic and content analyses with survey responses to the eight open-ended implementation outcome form questions. First, content analysis [116] will be employed to examine trends, patterns, and relationships of words [117] used in these brief responses. Second, we will use an inductive approach to develop themes based on participant responses rather than a priori theories [116]. Based on our questionnaire, we will examine the domains of acceptability in content and activities, appropriateness of topics, feasibility of participation in the training, and usability of the training. We planned supplemental data sources in the instance open-ended questions do not generate sufficient data for thematic analysis. We will employ supplemental qualitative data generation in the form of process or field notes [118]. These written observational notes will be taken by research team members and trainers during and immediately after the training sessions. These notes will emphasize aspects of the training that worked, BHC's responses to training, and other observations that can supplement survey data for analysis. In the scenario this strategy does not work, we will default to reliance on content analysis alone.

Content analysis

Themes will describe larger patterns within the domains, while categories will label the specificities of the content within the theme (i.e., "the coding tree") [117]. As is standard in qualitative content analysis to enhance

coding reliability [119, 120], we will use multiple independent raters ($n=3$), and each response will be coded twice. Inter-rater reliability will be calculated using Cohen's kappa scores using Dedoose's "test" function. Any Kappa scores of less than 0.6 (indicating less than "substantial" agreement) [121] will be discussed until consensus is reached and the codebook will subsequently be refined. We will then re-test to confirm the reliability of all codes. As is common in qualitative team analyses [122], the research team will meet regularly to discuss analytic challenges and establish consensus. During the coding process, coders will document their assumptions, biases, and developing patterns using analytic memos in Dedoose. Participants will not provide feedback on the themes. Themes will be presented with representative excerpts. Themes and excerpts will be integrated into a feedback presentation for the CAP and other relevant stakeholders.

Aim 2: CCM-C Program effectiveness analyses

To address aim 2, outcome analysis will be performed using multi-group interrupted time-series analysis using the user-generated ITSA package [123] in Stata v. 18 [95]. Interrupted time-series analysis uses ordinary least-squares regression adjusted for time point autocorrelation [124, 125], and the Newey–West method will be used for standard error autocorrelation adjustment [126]. A total of five interrupted time series models will be examined for each of the following outcomes: (a) CCM-C knowledge quiz, (b) attitudes about intervening with SDV (AIBS), (c) attitudes toward offenders/prisoners who self-harm (APSH), (d) SDV prevention competency (SCAF), and (e) intent to use or actual use of the CCM-C training content. Each interrupted time series model will be presented in a table including the coefficient of time, the training intervention, training group membership, interactions between time, training, and group membership, covariate associations with the outcome (if applicable), Newey–West standard errors, and significance level for each coefficient, a table showing comparison of post-training trends, and a graphic showing actual and predicted values of change over time for each training group. To address H1–H4, we anticipate a positive association between the training intervention and each outcome, resulting in a statistically significant ($p<0.05$), positive coefficient for the training intervention in each model. In the event that training group membership has a significant association with the outcomes above, we will investigate potential demographic differences between training groups (e.g., age, gender, race) using analysis of variance (ANOVA) and include demographics with significant variation between groups as covariates in each interrupted time-series model.

Aim 3. Exploratory training impact on compassion fatigue

We will run an additional interrupted time series analysis to address RQ3, where we anticipate an association between the training intervention and compassion fatigue, resulting in a statistically significant coefficient ($p<0.05$) in either the positive or negative direction.

Sensitivity analyses

As a part of the interrupted time series analysis, membership to each training group will be entered as a predictor of all outcomes of interest, along with years of clinical training experience, and an interaction term between both training group membership and years of clinical experience. Statistical significance of any of these parameters will signify confounding and will be retained for all models to control for the impact of training group assignment, variation in years of clinical experience, or their interaction.

Monitoring

Data monitoring

A research monitoring plan nor data monitoring committee is required for studies of minimal risk. We do not plan to conduct interim analyses. Should unforeseen circumstances occur, the study administrative team (Cramer, Peiper, Cacace, Moxie) in consultation with the UNC Charlotte IRB and NC DAC research committee would make the determination whether to end the trial early.

Harm, adverse events, and auditing

The study leadership team will track any unintended impacts of training intervention or study team interactions with participants. Training trial outcomes are not deemed serious; however, in line with Institutional Review Board (IRB) requirements, we will track and report any serious adverse events through the university IRB electronic reporting form. All adverse events will be reported in compliance with university requirements of 5 days. Corrective actions will be determined by the study leadership team in consultation with the UNC Charlotte IRB and NC DAC research committee. We will comply with all IRB auditing requests. We will perform an initial data quality check within 3 days of each survey administration time point to ensure coding of study variables occurs correctly.

Ethics and dissemination

Protocol approvals and amendments

We will complete the annual UNC Charlotte IRB reports and file amendments as needed. Appropriate (re)training of all research staff will occur to ensure compliance with any protocol modifications.

Consent

Eligible participants will read the informed consent form at every time point. The consent form will contain the study investigator contact information and encouragement to contact the study team should they have questions prior to study participation. It also contains clear statements concerning the study purpose, voluntary nature of the training evaluation, study procedures and risks, rights as a research participant, and collection and management of survey information. Participants will indicate their consent by selecting, "Yes, I choose to participate" radio button. Participants who select "No, I do not agree to participate" will not be able to continue with the study and will receive a termination debrief (i.e., "Thank you for considering being a part of our study."). Consenting participants will be given the option to screenshot and/or print a copy of the consent form for their records. They may also contact study investigators for a copy at any time. A copy of the most recent consent form is available by email to the corresponding author, and online in the clinicaltrials.gov study record.

Debriefing

Participants will be debriefed after each data collection session via an e-debriefing form at the end of the Qualtrics survey. It will contain a message of thanks, behavioral health support contact information, and either a reminder of the next survey administration timeline (for baseline and follow-up 1 (FU1)) or conclusion statement (for follow-up 2 (FU2)). Participants will be reminded to print or screenshot a copy of the debriefing form. A copy of the most recent debriefing form is available via email to the corresponding author.

Confidentiality

We will use the following strategies to ensure participant confidentiality. First, data collection is being conducted via secure Qualtrics administration with individualized, anonymous survey links. Identifying information collected to link surveys will be stripped in favor of study random ID numbers. Also, participants will be allowed to complete surveys in their private work stations or other personal locations of their choice. Data will be stored in a secure, credential login-required mechanism. The data management plan section of this manuscript contains additional information regarding ensuring participant confidentiality.

Access to data

Only university study investigators will have access to data files. NC DAC investigators will not have data file access due to a conflict of interest in having access to colleagues' and subordinates' survey responses. We will not allow external data access for secondary analysis because of the possibility of identifying survey responses linked to a specific provider in the NC DAC system and because of the NC DAC standing expectations for data use.

Dissemination

In line with prior practice of the NC-DAC/UNC Charlotte corrections–academic partnership [2, 12, 38, 127], we will engage in a robust dissemination plan. Clinical trial results will be communicated via a conference abstract, peer-reviewed journal article, and report and presentation to NC DAC stakeholders. We will also compose the CCM-C toolkit, a publicly available resource for future CCM-C implementation and evaluation. The CCM-C toolkit will include at least the following items: (1) primary and supplemental slide decks, (2) training handouts (e.g., ethics checklist), (3) self-assessment (e.g., modified SCAF) and clinical (SIRAP-C) instruments, (4) CCM-C training implementation guide, and (5) foundational peer-reviewed readings. The CCM-C toolkit will be jointly owned, hosted, and distributed by NC DAC Behavioral Health Services, NC Department of Health and Human Services, and UNC Charlotte Violence Prevention Center (VPC). External agencies will be able to request CCM-C training and consultation via the UNC Charlotte VPC. Authorship for all dissemination activity will be determined using the CRedIT Taxonomy [127, 128]. Per the corrections–academic partnership agreement, to be credited authorship on any project-related output, an investigator must satisfy at least four domains of CRedIT Taxonomy contributions including editing/approving the final output. NC DAC retains the rights of final approval of all dissemination outputs.

Ancillary and post-trial care

There will be no care provided during or after this training trial.

Discussion

SDV in corrections settings has deleterious impacts on incarcerated persons, BHCs, and the larger system [7, 11]. Correctional SDV risk assessment and management standards and best practices exist [10, 11]. Training for BHCs working in correctional settings is one such best practice requiring a theory-driven, evidence-informed approach. The Core Competency Model (CCM) of Suicide Prevention Training [16, 17] provides a foundation for the development of such a program for correctional BHCs.

This clinical trial will pilot test the Core Competency Model for Corrections (CCM-C), an adaptation of the CCM accounting for prison-specific needs (e.g., self-injury assessment and management) and content (e.g., relevant case law) [2]. We will conduct a hybrid pilot implementation–effectiveness trial via a cross-over stratified random sampling approach. In line with corrections–academic partnership principles [127], this clinical trial meets the needs of an identified NC DAC problem in the form of SDV. Results will be translated into a variety of practice- and research-focused dissemination outputs toward sustainability and spread of CCM-C training.

To date, the study team set up study infrastructure (e.g., training materials), obtained UNC Charlotte IRB and NC DAC research committee approvals, and validated study data collection procedures. We acknowledge several limitations of this pilot implementation–effectiveness design that will temper conclusions. First, we are limited to BHCs in one state system, impacting both the total possible sample and ultimate generalizability of study conclusions. Additional limitations encompass lack of a formal comparison group and lack of behavioral outcome measures. Study design limitations are offset by a number of strengths (e.g., use of a CAP); moreover, we will carefully document observed limitations and their impacts throughout the trial for inclusion in dissemination output.

Abbreviations

IRB	Institutional Review Board
SDV	Self-directed violence
BHC	Behavioral health clinician
U.S.	United States
PTSD	Post-traumatic stress disorder
ACA	American Correctional Association
NCCHC	National Commission on Correctional Health Care
SIRAP-C	Self-Injury Risk Assessment Protocol for Corrections
QPR	Question, persuade, refer
CCM	Core Competency Model
SCAF	Suicide Competency Assessment Form
CCM-C	Core Competency Model for Corrections
CAP	Corrections advisory panel
RQ	Research question
H	Hypothesis
NC DAC	North Carolina Department of Adult Corrections
SIRA	Self-injury risk assessment
UNC	University of North Carolina
SE	Standard edition
FU1	Follow-up 1
FU2	Follow-up 2
FIM	Feasibility of Intervention Measure
AIBS	Attitudes about Intervening with a Suicidal Person
APSH	Attitudes toward Prisoners who Self-Harm
CF-SS	Compassion Fatigue-Short Scale
ID	Identification
AES	Advanced Encryption Standard
SSL	Secure Sockets Layer
TLS	Transport Layer Security
IP	Internet protocol
MCAR	Missing completely at random
ITSA	Interrupted time-series analysis
ANOVA	Analysis of variance
VPC	Violence Prevention Center
CRedIT	Contributor Roles Taxonomy
PSI	Persistent self-injury
CDC	Centers for Disease Control and Prevention
SITBI-R	Self-Injurious Thoughts and Behaviors Interview-Revised
SBQ-R	Suicidal Behaviors Questionnaire-Revised
SIRAP-C	Self-Injury Risk Assessment Protocol for Corrections
SAFE-T	Suicide Assessment Five-Step Evaluation and Triage

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s40814-024-01533-0.

Supplementary Material 1.

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Authors' contributions

Conceptualization: RC, LJP, and SC. Data curation: SC. Formal analysis: SC and JM. Funding acquisition: RC and LJP. Investigation: SC, RC, AP, and SP. Methodology: LJP, RC, AC, AP, AFP, SC, and JM. Project administration: RC and LJP. Resources: LJP and AC. Software: N/A. Supervision: RC, LJP, and AFP. Validation: N/A. Visualization: SC and RC. Writing: All. Editing: RC, LJP, SC, JM, and SP. All the authors participated in the review and revision of the manuscript and approved the final manuscript to be published.

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Availability of data and materials

Dataset(s) resulting from the clinical trial will not be made publicly available in light of NC DAC data use protocols and concerns about participant employee confidentiality.

Declarations

Ethics approval and consent to participate

The study protocol was approved by the UNC Charlotte Institutional Review Board (IRB) in compliance with the Declaration of Helsinki and with all applicable federal regulations governing the protection of human subjects. All participants will affirm consent via the IRB-approved e-informed consent form prior to participation in the study. Current protocol version and approval date: IRB-24–0209, amendment 2 (January 4, 2024).

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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References

1. Crosby AE, Ortega L, Melanson C. Self-directed violence surveillance: uniform definitions and recommended data elements, version 1.0. Centers for Disease Control and Prevention. 2011. Available from: https://www.cdc.gov/suicide/pdf/Self-Directed-Violence-a.pdf. Accessed 8 Mar 2024.
2. Cramer RJ, Kaniuka AR, Peiper LJ. The core competency model for corrections: an education program for managing self-directed violence in correctional institutions. Psychol Serv. 2022;19(4):658–70. https://doi.org/10.1037/ser0000624.
3. Cramer RJ, Bryson CN, Eichorst MK, Keyes LN, Ridge BE. Conceptualization and pilot testing of a core competency-based training workshop in suicide risk assessment and management: notes from the field. J Clin Psychol. 2017;73(3):233–8. https://doi.org/10.1002/jclp.22329.
4. Carson EA. Mortality in state and federal prisons: 2001 - 2019 Statistical tables. Bureau of Justice Statistics; 2021. https://bjs.ojp.gov/content/pub/pdf/msfp0119st.pdf. Accessed 18 Mar 2024.
5. Smith HP, Kaminski RJ. Self-injurious behaviors in state prisons: findings from a national survey. Crim Justice Behav. 2011;38(1):26–41. https://doi.org/10.1177/0093854810385886.
6. Pew Trusts. State prison health care spending report. Pew Trusts. 2014. Available from: https://www.pewtrusts.org/~/media/assets/2014/07/stateprisonhealthcarespendingreport.pdf. Accessed 25 Mar 2024.
7. Zhang Y, Steege LM, Pavek KU, Brown RL, Zhang Y. Identifying patterns of occupational stress trajectories among newly graduated nurses: a longitudinal study. Int J Nurs Stud. 2019;99:1–9. https://doi.org/10.1016/j.ijnurstu.2019.03.022.
8. Johnston MS, Ricciardelli R, McKendy L. Improving the mental health of correctional workers: perspectives from the field. Crim Justice Behav. 2022;49(7):951–70. https://doi.org/10.1177/00938548221081468.
9. American Correctional Association. Performance-based standards and expected practices for adult correctional institutions. 5th ed. 2021.
10. National Commission of Correctional Healthcare. Standards for mental health services in correctional facilities. 2015. https://www.ncchc.org/mental-health-standards-1. Accessed 18 Mar 2024.
11. Cramer RJ, Wechsler HJ, Miller SL, Yenne E. Suicide prevention in correctional settings: current standards, and recommendations for research, prevention and training. J Correct Health Care. 2017;23(3):313–28. https://doi.org/10.1177/1078345817716162.
12. Cramer RJ, Peiper LJ, Kaniuka AR, Diaz-Garelli F, Baker JC, Robertson RA. Development of the Self-Injury Risk Assessment Protocol for Corrections (SIRAP-C). Law Hum Behav. 2022;46(3):227–43. https://doi.org/10.1037/lhb0000480.
13. Hayes L. Guide to developing and revising suicide prevention protocols within jails and prisons. National Center on Institutions and Alternatives. 2017:2–5. https://www.ncchc.org/wp-content/uploads/Suicide-Prevention-2017.pdf. Accessed 25 Mar 2024.
14. QPR Institute. Question. Persuade. Refer. QPR Institute. https://qprinstitute.com/. Accessed 8 Mar 2024.
15. QPR Institute. QPR for corrections. QPR Institute. https://courses.qprinstitute.com/index.php?option=com_zoo&task=item&item_id=10&Itemid=101. Accessed 8 Mar 2024.
16. Cramer RJ, Johnson SM, McLaughlin J, Rausch EM, Conroy MA. Suicide risk assessment training for psychology doctoral programs: core competencies and a framework for training. Train Educ Prof Psychol. 2013;7(1):1–11. https://doi.org/10.1037/a0031836.
17. Cramer RJ, Long MM, Gordon E, Zapf PA. Preliminary effectiveness of an online-mediated competency-based suicide prevention training program. Prof Psychol Res Pr. 2019;50(6):395–406. https://doi.org/10.1037/pro0000261.
18. Burnette C, Ramchand R, Ayer L. Gatekeeper training for suicide prevention: a theoretical model and review of the empirical literature. Rand Health Q. 2015;5(1). https://www.rand.org/pubs/research_reports/RR1002.html.
19. Cramer RJ, Ireland JL, Long MM, Hartley V, Lamis DA. Initial validation of the suicide competency assessment form among behavioral health staff in the National Health Services Trust. Arch Suicide Res. 2020;24(sup2):S136–49. https://doi.org/10.1080/13811118.2019.1577194.
20. Hager NM, Cramer RJ, Kaniuka AR, Vandecar-Burdin T, Badger N, Holley AM, Foss J, Glenn CR, Judd S, South G, Judah MR. An evaluation of the core competency suicide prevention training program for university health service providers. J Coll Student Psychother. 2023;37(2):127–43. https://doi.org/10.1080/87568225.2021.1911726.
21. Cramer RJ, Bryson CN, Stroud CH, Ridge BE. A pilot test of a graduate course in suicide theory, risk assessment and management. Teach Psychol. 2016;43(3):238–42. https://doi.org/10.1177/0098628316649483.
22. La Guardia AC, Cramer RJ, Brubaker M, Long MM. Community mental health provider responses to a competency-based training in suicide risk assessment and prevention. Community Ment Health J. 2019;55:257–66. https://doi.org/10.1007/s10597-018-0314-0.
23. Junker G, Beeler A, Bates J. Using trained inmate observers for suicide watch in a federal correctional setting: a win-win solution. Psychol Serv. 2005;2(1):20–7. https://doi.org/10.1037/1541-1559.2.1.20.
24. Garbutt K, Casey H. Attitudes towards prisoners who self-harm scale: a psychometric evaluation. J Aggress Confl Peace Res. 2015;7(3):158–66. https://doi.org/10.1108/JACPR-08-2014-0133.
25. Power J, Smith HP, Beaudette JN. Examining Nock and Prinstein's four-function model with offenders who self-injure. Pers Disord. 2016;7(3):309–14. https://doi.org/10.1037/per0000177.
26. Estelle v. Gamble, 429 U.S. 97 (1976). https://supreme.justia.com/cases/federal/us/429/97/. Accessed 20 Mar 2024.
27. Ruiz v. Estelle, 503 F. Supp. 1265 (S.D. Tex. 1980). https://law.justia.com/cases/federal/district-courts/FSupp/503/1265/1466998/. Accessed 20 Mar 2024.
28. Vitek v. Jones, 445 U.S. 480 (1980). https://supreme.justia.com/cases/federal/us/445/480/. Accessed 20 Mar 2024.
29. Damschroder LJ, Reardon CM, Widerquist MAO, Lowery J. The updated consolidated framework for implementation research based on user feedback. Implement Sci. 2022;17(1):1–16. https://doi.org/10.1186/s13012-022-01245-0.
30. Proctor E, Silmere H, Raghavan R, Hovmand P, Aarons G, Bunger A, Griffey R, Hensley M. Outcomes for implementation research: conceptual distinctions, measurement challenges, and research agenda. Adm Policy Ment Health. 2011;38:65–76. https://doi.org/10.1007/s10488-010-0319-7.
31. Bell S, Hopkin G, Forrester A. Exposure to traumatic events and the experience of burnout, compassion fatigue and compassion satisfaction among prison mental health staff: an exploratory survey. Issues Ment Health Nurs. 2019;40(4):304–9. https://doi.org/10.1080/01612840.2018.1534911.
32. Sprang G, Clark JJ, Whitt-Woosley A. Compassion fatigue, compassion satisfaction, and burnout: factors impacting a professional's quality of life. J Loss Trauma. 2007;12(3):259–80. https://doi.org/10.1080/15325020701238093.
33. Landes SJ, McBain SA, Curran GM. Reprint of: an introduction to effectiveness-implementation hybrid designs. Psychiatry Res. 2020;283:112630. https://doi.org/10.1016/j.psychres.2019.112630.
34. Cross WF, West JC, Pisani AR, Crean HF, Nielsen JL, Kay AH, Caine ED. A randomized controlled trial of suicide prevention training for primary care providers: a study protocol. BMC Med Educ. 2019;19:1–9. https://doi.org/10.1186/s12909-019-1482-5.
35. Darnell D, Areán PA, Dorsey S, Atkins DC, Tanana MJ, Hirsch T, Mooney SD, Boudreaux ED, Comtois KA. Harnessing innovative technologies to train nurses in suicide safety planning with hospitalized patients: protocol for formative and pilot feasibility research. JMIR Res Protoc. 2021;10(12):1–16. https://doi.org/10.2196/33695.
36. North Carolina Department of Adult Correction (NCDAC). Prison Population 1–31–2024. DAC Research and Planning Automated System Query (A.S.Q. DOC 3.0b). https://webapps.doc.state.nc.us/apps/asqExt/ASQ. Accessed 18 Mar 2024.

37. Moreira Borges DT, Blanes L, Sobral CS, Ferreira LM. Development and validation of a manual of skin care for persons deprived of liberty in the Sao Paulo State prison system: a descriptive study. Wound Manag Prev. 2019;65(10):37–44.
38. Cramer RJ, Cacace S, Coffey A, Hazlett E, Kaniuka AR, Robertson R, Peiper LJ. Latent profiles and psychosocial correlates of persistent self-injury among incarcerated adults. Int J Law Psychiatry. 2024;93:1–8. https://doi.org/10.1016/j.ijlp.2024.101967.
39. Silverman MM, Berman AL, Sanddal ND, O'Carroll PW, Joiner TE Jr. Rebuilding the tower of Babel: a revised nomenclature for the study of suicide and suicidal behaviors. Part 2: suicide-related ideations, communications, and behaviors. Suicide Life Threat Behav. 2007;37(3):264–77. https://doi.org/10.1521/suli.2007.37.3.264.
40. Batterham PJ, Calear AL, Christensen H. Correlates of suicide stigma and suicide literacy in the community. Suicide Life Threat Behav. 2013;43(4):406–17. https://doi.org/10.1111/sltb.12026.
41. Hewson T, Shepherd A, Hard J, Shaw J. Effects of the COVID-19 pandemic on the mental health of prisoners. Lancet Psychiatry. 2020;7(7):568–70. https://doi.org/10.1016/S2215-0366(20)30241-8.
42. Neal TMS, Brodsky SL. Forensic psychologists' perceptions of bias and potential correction strategies in forensic mental health evaluations. Psychol Public Policy Law. 2016;22(1):58–76. https://doi.org/10.1037/law0000077.
43. Neal TMS, Lienert P, Denne E, Singh JP. A general model of cognitive bias in human judgment and systematic review specific to forensic mental health. Law Hum Behav. 2022;46(2):99–120. https://doi.org/10.1037/lhb0000482.
44. Herron J, Ticehurst H, Appleby L, Perry A, Cordingley L. Attitudes toward suicide prevention in front-line health staff. Suicide Life-Threatening Behav. 2001;31(3):342–7. https://doi.org/10.1521/suli.31.3.342.24252.
45. Ireland JL, Quinn K. Officer attitudes towards adult male prisoners who self-harm: development of an attitudinal measure and investigation of sex differences. Aggress Behav. 2007;33(1):63–72. https://doi.org/10.1002/ab.20168.
46. Magaletta PR, Ternes M, Patry M, editors. The history and future of correctional psychology. New York: Springer Nature; 2023.
47. Wooldredge J. Prison culture, management, and in-prison violence. Annu Rev Criminol. 2020;3:165–88. https://doi.org/10.1146/annurev-criminol-011419-041359.
48. Galloway VA, Brodsky SL. Caring less, doing more: the role of therapeutic detachment with volatile and unmotivated clients. Am J Psychother. 2003;57(1):32–8. https://doi.org/10.1176/appi.psychotherapy.2003.57.1.32.
49. Magaletta PR, McLearen AM. Promoting cognitive complexity in corrections practice: clinical supervision processes with psychotherapist trainees. Psychotherapy. 2015;52(2):164–8. https://doi.org/10.1037/a0037931.
50. Joiner T. Why people die by suicide. Boston: Harvard University Press; 2005.
51. Van Orden KA, Witte TK, Cukrowicz KC, Braithwaite SR, Selby EA, Joiner TE Jr. The interpersonal theory of suicide. Psychol Rev. 2010;117(2):575–600. https://doi.org/10.1037/a0018697.
52. American Foundation for Suicide Prevention. Risk factors, protective factors, and warning signs. https://afsp.org/risk-factors-protective-factors-and-warning-signs/#warning-signs. No date. Accessed 1 Mar 2024.
53. Bryan CJ, Rudd MD. Advances in the assessment of suicide risk. J Clin Psychol. 2006;62(2):185–200. https://doi.org/10.1002/jclp.20222.
54. Rudd MD, Bryan CJ. Finding effective and efficient ways to integrate research advances into the clinical suicide risk assessment interview. Front Psychiatry. 2022;13:1–6. https://doi.org/10.3389/fpsyt.2022.846244.
55. Fox KR, Harris JA, Wang SB, Millner AJ, Deming CA, Nock MK. Self-injurious thoughts and behaviors interview—revised: development, reliability, and validity. Psychol Assess. 2020;32(7):677–89. https://doi.org/10.1037/pas0000819.
56. Osman A, Bagge CL, Gutierrez PM, Konick LC, Kopper BA, Barrios FX. The Suicidal Behaviors Questionnaire-Revised (SBQ-R): validation with clinical and nonclinical samples. Assessment. 2001;8(4):443–54. https://doi.org/10.1177/107319110100800409.
57. Nock MK, Prinstein MJ. A functional approach to the assessment of self-mutilative behavior. J Consult Clin Psychol. 2004;72(5):885–90. https://doi.org/10.1037/0022-006X.72.5.885.
58. Gratz KL. Measurement of deliberate self-harm: preliminary data on the deliberate self-harm inventory. J Psychopathol Behav Assess. 2001;23:253–63. https://doi.org/10.1023/A:1012779403943.
59. Favril L, Yu R, Hawton K, Fazel S. Risk factors for self-harm in prison: a systematic review and meta-analysis. Lancet Psychiatry. 2020;7(8):682–91. https://doi.org/10.1016/S2215-0366(20)30190-5.
60. Jacobs D. A resource guide for implementing the joint commission 2007 patient safety goals on suicide featuring the Suicide Assessment Five-Step Evaluation and Triage (SAFE-T). Screening Ment Health. 2007. https://www.sprc.org/sites/default/files/migrate/library/jcsafetygoals.pdf. Accessed 15 Mar 2024.
61. Jobes DA. Managing suicidal risk: a collaborative approach. New York: Guilford Publications; 2023.
62. Bryan CJ, Rudd MD. Brief cognitive-behavioral therapy for suicide prevention. New York: Guilford Publications; 2018.
63. Van Orden KA, Witte TK, Gordon KH, Bender TW, Joiner TE Jr. Suicidal desire and the capability for suicide: tests of the interpersonal-psychological theory of suicidal behavior among adults. J Consult Clin Psychol. 2008;76(1):72–83. https://doi.org/10.1037/0022-006X.76.1.72.
64. Jacobs JA, Jones E, Gabella BA, Spring B, Brownson RC. Tools for implementing an evidence-based approach in public health practice. Prev Chronic Dis. 2012;9:1–9. https://doi.org/10.5888/pcd9.110324.
65. Daniel AE. Suicide-related litigation in jails and prisons: risk management strategies. J Correct Health Care. 2009;15(1):19–27. https://doi.org/10.1177/1078345808326618.
66. Stanley B, Brown GK. Safety planning intervention: a brief intervention to mitigate suicide risk. Cogn Behav Pract. 2012;19(2):256–64. https://doi.org/10.1016/j.cbpra.2011.01.001.
67. Koerner K, Dimeff LA. Overview of dialectical behavior therapy. In: Dimeff LA, Koerner K, editors. Dialectical behavior therapy in clinical practice: applications across disorders and settings. Guilford Press; 2007. p. 1–18.
68. Barker E, Kõlves K, De Leo D. Management of suicidal and self-harming behaviors in prisons: systematic literature review of evidence-based activities. Arch Suicide Res. 2014;18(3):227–40. https://doi.org/10.1080/13811118.2013.824830.
69. Reger MA, Luxton DD, Tucker RP, Comtois KA, Keen AD, Landes SJ, Matarazzo BB, Thompson C. Implementation methods for the caring contacts suicide prevention intervention. Prof Psychol Res Pr. 2017;48(5):369–77. https://doi.org/10.1037/pro0000134.
70. American Psychiatric Association. Assessing and treating suicidal behaviors: a quick reference guide. 2003. https://psychiatryonline.org/pb/assets/raw/sitewide/practice_guidelines/guidelines/suicide-guide.pdf/. Accessed 26 Mar 2024.
71. American Counseling Association. 2014 ACA code of ethics. https://www.counseling.org/docs/default-source/default-document-library/2014-code-of-ethics-finaladdress.pdf. Accessed 15 Mar 2024.
72. American Psychological Association. Ethical principles of psychologists and code of conduct (2002, amended effective June 1, 2010, and January 1, 2017). https://www.apa.org/ethics/code/. Accessed 15 Mar 2024.
73. National Association of Social Workers. NASW code of ethics. 2017. https://www.socialworkers.org/About/Ethics/Code-of-Ethics/Code-of-Ethics-English. Accessed 25 Mar 2024.
74. Barnett DJ, Taylor HA, Hodge JG Jr, Links JM. Resource allocation on the frontlines of public health preparedness and response: report of a summit on legal and ethical issues. Public Health Rep. 2009;124(2):295–303. https://doi.org/10.1177/003335490912400218.
75. Lee JB, Bartlett ML. Suicide prevention: Critical elements for managing suicidal clients and counselor liability without the use of a no-suicide contract. Death Stud. 2005;29(9):847–65. https://doi.org/10.1080/07481180500236776.
76. Brown E. A systematic review of the effects of prison segregation. Aggress Violent Behav. 2020;52:1–83. https://doi.org/10.1016/j.avb.2020.101389.
77. Konrad N, Daigle MS, Daniel AE, Dear GE, Frottier P, Hayes LM, Kerkhof A, Liebling A, Sarchiapone M. Preventing suicide in prisons, part I: recommendations from the International Association for Suicide Prevention

Task Force on Suicide in Prisons. Crisis. 2007;28(3):113–21. https://doi.org/10.1027/0227-5910.28.3.113.
78. Baugh v. Woodard, 808 F.2d 333 (4th Cir. 1987). https://law.justia.com/cases/federal/appellate-courts/F2/808/333/174479/. Accessed 15 Mar 2024.
79. Bowring v. Godwin, 551 F2d 44 (4th Cir. 1977). https://law.justia.com/cases/federal/appellate-courts/F2/551/44/44129/. Accessed 15 Mar 2024.
80. Bongar B, Sullivan GR. The suicidal patient: clinical and legal standards of care. 3rd ed. American Psychological Association; 2013. https://doi.org/10.1037/14184-000. Accessed 25 Mar 2024.
81. Kleespies PM. Decision making in behavioral emergencies: acquiring skill in evaluating and managing high-risk patients. American Psychological Association; 2014. https://doi.org/10.1037/14337-000.
82. Pratt SD, Jachna BR. Care of the clinician after an adverse event. Int J Obstet Anesth. 2015;24(1):54–63. https://doi.org/10.1016/j.ijoa.2014.10.001.
83. Huggard P. Secondary traumatic stress doctors at risk. New Ethicals J. 2003;6(9):9–14.
84. Escuriex BF, Labbe EE. Health care providers' mindfulness and treatment outcomes: a critical review of the research literature. Mindful. 2011;2:242–53.
85. Urso C, Laserna A, Feng L, Agnite A, Jawe N, Magoun C, Layton LS, Nates JL, Gutierrez C. Mindfulness as an antidote to burnout for nursing and support staff in an oncological intensive care unit: a pilot study. Holist Nurs Pract. 2022;36(5):E38–47. https://doi.org/10.1097/HNP.0000000000000544.
86. Drahota A, Meza RD, Brikho B, Naaf M, Estabillo JA, Gomez ED, Vejnoska SF, Dufek S, Stahmer AC, Aarons GA. Community-academic partnerships: a systematic review of the state of the literature and recommendations for future research. Milbank Q. 2016;94(1):163–214. https://doi.org/10.1111/1468-0009.12184.
87. Adam M, McMahon SA, Prober C, Bärnighausen T. Human-centered design of video-based health education: an iterative, collaborative, community-based approach. J Med Internet Res. 2019;21(1):1–18. https://doi.org/10.2196/12128.
88. Weiner BJ, Lewis CC, Stanick C, Powell BJ, Dorsey CN, Clary AS, Boynton MH, Halko H. Psychometric assessment of three newly developed implementation outcome measures. Implement Sci. 2017;12:1–12. https://doi.org/10.1186/s13012-017-0635-3.
89. Calvert HG, McQuilkin M, Havlicak A, Lewis T, Turner L. Acceptability, appropriateness, and feasibility of Rural School Support Strategies for behavioral interventions: a mixed methods evaluation over two years of a hybrid type 3 implementation-effectiveness trial. Implement Sci Commun. 2023;4(1):1–17. https://doi.org/10.1186/s43058-023-00478-4.
90. Johnson AL, Ecker AH, Fletcher TL, Hundt N, Kauth MR, Martin LA, Curran GM, Cully JA. Increasing the impact of randomized controlled trials: an example of a hybrid effectiveness–implementation design in psychotherapy research. Transl Behav Med. 2020;10(3):629–36. https://doi.org/10.1093/tbm/iby116.
91. Lewis CC, Fischer S, Weiner BJ, Stanick C, Kim M, Martinez RG. Outcomes for implementation science: an enhanced systematic review of instruments using evidence-based rating criteria. Implement Sci. 2015;10:1–17. https://doi.org/10.1186/s13012-015-0342-x.
92. Singh J, Karanika-Murray M, Baguley T, Hudson J. A systematic review of job demands and resources associated with compassion fatigue in mental health professionals. Int J Environ Res Public Health. 2020;17(19):1–28. https://doi.org/10.3390/ijerph17196987.
93. Boekeloo B, Fish J, Turpin R, Aparicio EM, Shin R, Vigorito MA, Lare SM, McGraw JS, King-Marshall E. LGBTQ+ cultural-competence training effectiveness: mental health organization and therapist survey outcome results from a pilot randomized controlled trial. Clin Psychol Psychother. 2024;31(1):1–15. https://doi.org/10.1002/cc.2893.
94. Salyers MP, Hudson C, Morse G, Rollins AL, Monroe-DeVita M, Wilson C, Freeland L. BREATHE: a pilot study of a one-day retreat to reduce burnout among mental health professionals. Psychiatr Serv. 2011;62(2):214–7. https://doi.org/10.1176/appi.ps.62.2.214.
95. StataCorp. Stata statistical software: Release 18. College Station, Texas: StataCorp LLC; 2023.
96. Ternovski J, Coppock A. RANDOMIZR: Stata module to implement random assignment procedures. https://EconPapers.repec.org/RePEc:boc:bocode:s458403. Accessed 8 Mar 2024.
97. Sammut R, Griscti O, Norman IJ. Strategies to improve response rates to web surveys: a literature review. Int J Nurs Stud. 2021;123:1–26. https://doi.org/10.1016/j.ijnurstu.2021.104058.
98. Triplet JJ, Momoh E, Kurowicki J, Villarroel LD, Yee Law T, Levy JC. E-mail reminders improve completion rates of patient-reported outcome measures. JSES Open Access. 2017;1(1):25–8. https://doi.org/10.1016/j.jses.2017.03.002.
99. Davis FD. Perceived usefulness, perceived ease of use, and user acceptance of information technology. Manage Inf Syst Q. 1989;13(3):319–39. https://doi.org/10.2307/249008.
100. Gayed A, LaMontagne AD, Milner A, Deady M, Calvo RA, Christensen H, Mykletun A, Glozier N, Harvey SB. A new online mental health training program for workplace managers: pre-post pilot study assessing feasibility, usability, and possible effectiveness. JMIR Ment Health. 2018;5(3):1–14. https://doi.org/10.2196/10517.
101. Aschbrenner KA, Kruse G, Gallo JJ, Plano Clark VL. Applying mixed methods to pilot feasibility studies to inform intervention trials. Pilot Feasibil Stud. 2022;8(1):1–13. https://doi.org/10.1186/s40814-022-01178-x.
102. Lund EM, Schultz JC, Nadorff MR. The factor structure, internal consistency, and convergent validity of two suicide assessment competency measures in vocational rehabilitation counselors. Rehabil Counsel Bull. 2017;61(1):20–7. https://doi.org/10.1177/0034355216660840.
103. Aldrich RS, Harrington NG, Cerel J. The willingness to intervene against suicide questionnaire. Death Stud. 2014;38(2):100–8. https://doi.org/10.1080/07481187.2012.738763.
104. Aldrich RS, Cerel J. The willingness to intervene against suicide enhanced questionnaire. Health Commun. 2023:1–10. https://doi.org/10.1080/10410236.2023.2227435.
105. Fishbein M, Ajzen I. Predicting and changing behavior: the reasoned action approach. New York: Psychology Press; 2010.
106. Long MM, Cramer RJ, Leiferman JA, Bennington LK, Paulson JF. Perinatal depression educational training for graduate nursing students. Community Health Equity Res Pol. 2022;42(4):381–9. https://doi.org/10.1177/0272684X211004685.
107. Adams RE, Boscarino JA, Figley CR. Compassion fatigue and psychological distress among social workers: a validation study. Am J Orthopsychiatry. 2006;76(1):103–8. https://doi.org/10.1037/0002-9432.76.1.103.
108. Yıldırım S, Cavcav F. The compassion fatigue-short scale for healthcare professionals: a Turkish study of validity and reliability. Perspect Psychiatr Care. 2021;57(3):1459–65. https://doi.org/10.1111/ppc.12712.
109. Baumel A, Correll CU, Birnbaum M. Adaptation of a peer based online emotional support program as an adjunct to treatment for people with schizophrenia-spectrum disorders. Internet Interv. 2016;4:35–42. https://doi.org/10.1016/j.invent.2016.03.003.
110. Dedoose. n.d. Dedoose: Home. https://www.dedoose.com/. Accessed 8 Mar 2024.
111. Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol. 2006;3(2):77–101. https://doi.org/10.1191/1478088706qp063oa.
112. Leiner DJ. Too fast, too straight, too weird: non-reactive indicators for meaningless data in internet surveys. Surv Res Methods. 2019;13(3):229–48. https://doi.org/10.18148/srm/2019.v13i3.7403.
113. Little RJ. A test of missing completely at random for multivariate data with missing values. J Am Stat Assoc. 1988;83(404):1198–202. https://doi.org/10.2307/2290157.
114. Enders CK. Applied missing data analysis. New York: Guilford Publications; 2022.
115. Royal KD, Hecker KG. Understanding reliability: a review for veterinary educators. J Vet Med Educ. 2016;43(1):1–4. https://doi.org/10.3138/jvme.0315-030R.
116. Hsieh HF, Shannon SE. Three approaches to qualitative content analysis. Qual Health Res. 2005;15(9):1277–88. https://doi.org/10.1177/1049732305276687.
117. Vaismoradi M, Turunen H, Bondas T. Content analysis and thematic analysis: implications for conducting a qualitative descriptive study. Nurs Health Sci. 2013;15(3):398–405. https://doi.org/10.1111/nhs.12048.
118. Phillippi J, Lauderdale J. A guide to field notes for qualitative research: context and conversation. Qual Health Res. 2018;28(3):381–8. https://doi.org/10.1177/1049732317697102.

119. Kurasaki KS. Intercoder reliability for validating conclusions drawn from open-ended interview data. Field Methods. 2000;12(3):179–94. https://doi.org/10.1177/1525822X0001200301.
120. Shin TS, Ranellucci J, Roseth CJ. Effects of peer and instructor rationales on online students' motivation and achievement. Int J Educ Res. 2017;82:184–99. https://doi.org/10.1016/j.ijer.2017.02.001.
121. Landis JR, Koch GG. An application of hierarchical kappa-type statistics in the assessment of majority agreement among multiple observers. Biometrics. 1977;33(2):363–74. https://doi.org/10.2307/2529786.
122. Neufeld A, Harrison MJ, Stewart M, Hughes K. Advocacy of women family caregivers: response to nonsupportive interactions with professionals. Qual Health Res. 2008;18(3):301–10. https://doi.org/10.1177/1049732307313768.
123. Linden A. Conducting interrupted time-series analysis for single- and multiple-group comparisons. Stata J. 2015;15(2):480–500. https://doi.org/10.1177/1536867X1501500208.
124. Hartmann DP, Gottman JM, Jones RR, Gardner W, Kazdin AE, Vaught RS. Interrupted time-series analysis and its application to behavioral data. J Appl Behav Anal. 1980;13(4):543–59. https://doi.org/10.1901/jaba.1980.13-543.
125. Lopez Bernal JA, Cummins S, Gasparrini A. Interrupted time series regression for the evaluation of public health interventions: a tutorial. Int J Epidemiol. 2017;46(1):348–55. https://doi.org/10.1093/ije/dyw098.
126. Turner SL, Forbes AB, Karahalios A, Taljaard M, McKenzie JE. Evaluation of statistical methods used in the analysis of interrupted time series studies: a simulation study. BMC Med Res Methodol. 2021;21:1–18. https://doi.org/10.1186/s12874-021-01364-0.
127. Cramer RJ, Peiper LJ, Kaniuka AR. Addressing self-directed violence in prisons: lessons from a corrections-academic partnership in North Carolina. Perspectives. 2023;46(4):20–8.
128. Allen L, O'Connell A, Kiermer V. How can we ensure visibility and diversity in research contributions? How the Contributor Role Taxonomy (CRediT) is helping the shift from authorship to contributorship. Learn Publ. 2019;32(1):71–4.

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