



# Cognitive Therapy for Suicide Prevention: A Randomized Pilot with Suicidal Youth Experiencing Homelessness

Natasha Slesnick<sup>1</sup> · Jing Zhang<sup>2</sup> · Xin Feng<sup>1</sup> · Qiong Wu<sup>3</sup> · Laura Walsh<sup>1</sup> · Darcy Haag Granello<sup>4</sup>

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## Abstract

Homeless youth have extremely high rates of suicidal ideation and attempts, but limited research has evaluated the efficacy of suicide prevention interventions. Suicidal homeless youth (N = 150) between the ages of 18 to 24 years were recruited from a local drop-in center. Of interest was (1) whether the proposed sample of eligible youth could be identified, (2) whether youth could be engaged and retained in the prevention intervention, and (3) whether the intervention was associated with reduced suicidal ideation, our primary outcome measure. In particular, youth were randomly assigned to Cognitive Therapy for Suicide Prevention (CTSP) + Treatment as Usual (TAU) (N = 75) or TAU alone (N = 75). Findings showed that the proposed sample of eligible youth could be identified and engaged in the study, and all youth showed a significant decline in suicidal ideation over time, with a faster decline among youth assigned to CTSP. These findings suggest that (1) at-risk suicidal youth can be identified and engaged outside of hospital emergency rooms, such as in drop-in centers, and (2) intervention added to TAU can strengthen reductions in suicidal ideation. Ultimately, attention towards reducing suicide risk among these youth has the potential to reduce premature mortality, hospitalization and loss of human capital.

**Keywords** Suicidal ideation · Suicide attempts · Homeless youth

## Introduction

Suicide is the third leading cause of death among youth between the ages of 10 to 24 years (Center for Disease Control and Prevention 2013). The risk of suicide is especially high among homeless youth, and is the leading cause of death with studies reporting that between 20 and 68% of homeless youth report a lifetime suicide attempt (Kidd 2006; Kidd and Carroll 2007; Rew et al. 2001; Rotheram-Borus and Milburn 2004; Yoder et al. 2010), compared to 7.8% in

the general youth population (Centers for Disease Control and Prevention 2012). In addition, 66% to 89% of homeless youth have a mental health disorder (Cauce et al. 2004). These rates are alarming, and underscore the vulnerability of this population of youth. In fact, the lives of homeless youth are often characterized by violence, chaos, abuse and neglect prior to, and after, becoming homeless (Gaetz 2004; Hammer et al. 2002), factors which have been associated with higher suicide risk (Kidd 2006; Rew et al. 2008).

Despite the high prevalence of suicidal ideation and attempts among homeless youth, interventions for this population are essentially nonexistent. In fact, interventions for suicidal behavior in general have not been well-developed or rigorously evaluated, even for non-homeless youth (Linehan 2008; Macgowan 2004; Miller and Glinski 2000). One reason for this gap may be due to the assumption that suicidal behavior is a symptom of an underlying disorder (substance abuse, depression, personality disorder, etc.). Consequently, treatment efforts have traditionally focused on treating possible underlying disorders (Linehan 2008). However, interventions tested with samples of housed individuals have not found that the treatment of underlying mental health disorder leads to a decrease in suicidal behavior (Linehan

✉ Natasha Slesnick  
Slesnick.5@osu.edu

<sup>1</sup> Department of Human Sciences, College of Education and Human Ecology, The Ohio State University, 1787 Neil Ave, 135 Campbell Hall, Columbus, OH 43210, USA

<sup>2</sup> Department of Human Development and Family Studies, Kent State University, Kent, USA

<sup>3</sup> Department of Family and Child Sciences, Florida State University, Tallahassee, USA

<sup>4</sup> Department of Educational Studies, College of Education and Human Ecology, The Ohio State University, Columbus, USA

2008; Miller and Glinski 2000). Therefore, recent efforts have sought to directly target suicidal behavior, including the current study, which tested a cognitive therapy intervention for suicide prevention for suicidal homeless youth.

A variety of prevention intervention strategies have been used to address suicidal behavior among youth. Yet, due to the limited research evaluating the efficacy of these interventions, it is unclear whether one intervention is superior to others (Macgowan 2004; Miller and Glinski 2000). In fact, while some studies report decreases in suicidal behavior following participation in a study intervention, significant differences between the study intervention and treatment as usual are generally not found (Calear et al. 2016; Macgowan 2004; Miller and Glinski 2000). Even so, these interventions offer an alternative to psychiatric hospitalization. Cognitive Therapy for Suicide Prevention (CTSP), developed by Wenzel et al. (2009) has shown promising results for both adults (Brown et al. 2005) and youth (Brent et al. 1993; Stanley et al. 2009). This approach is innovative in that suicidal behavior is the primary target for treatment, rather than being secondary to an underlying psychological disorder, which has been the standard in the field (Wenzel et al. 2009). As a short-term treatment (10 sessions), the intervention is particularly feasible for youth who have high rates of treatment refusal and dropout. Clients in need of additional services, such as substance use or mental health treatment are referred to auxiliary services.

Brown et al. (2005) tested CTSP in a randomized trial with 120 adults recruited from the emergency room after a suicide attempt. The comparison condition included usual care from clinicians in the community, as well as referral services by the study case manager. Factors associated with suicide were addressed in the intervention, including feelings of hopelessness, helplessness, lovability, perceived inability to tolerate distress, black and white thinking and poor problem-solving skills. Findings showed that at the 18-month follow-up, participants in the cognitive therapy condition were 50% less likely than the comparison condition to attempt suicide, and reported significantly less severe depressive symptoms.

Stanley et al. (2009) offered CTSP to 110 depressed, recent suicide attempters aged 13–19 years across five sites. The treatment was modified to fit the developmental and clinical needs of depressed, suicidal adolescents. First, special attention was placed on rapport building during the initial sessions. Second, adolescents/young adults are more likely to engage in self-injurious behaviors; thus, self-injury was carefully monitored. Third, the cognitive-behavioral strategies used with adults were adapted so that the adolescents would find them more pleasurable (e.g. use of electronic devices, such as cell phones instead of traditional paper). Another study tested this same intervention with depressed adolescents who had made a recent suicide

attempt (Brent et al. 2009), and showed that the intervention significantly reduced risk for recurrent suicidal behavior. However, the adolescent/young adult studies were not randomized, therefore conclusions regarding efficacy cannot be made. The promising findings, however, provide support for conducting a randomized pilot study with youth (18–24 years) experiencing homelessness.

Not all individuals who have suicidal ideation complete suicide, but suicidal ideation is a central component of suicidal acts, and researchers have demonstrated that suicidal ideation is a robust predictor of suicide attempts and deaths (e.g. Wenzel et al. 2009). Furthermore, assessment of lethal suicide is typically conducted over a period of years through examination of public records (Motto and Bostrom 2001). Suicidal ideation was therefore the targeted primary outcome in this study. By targeting suicidal ideation, this study adds to a small number of clinical trials seeking to prevent suicide among a very high-risk group of youth. This study had three goals: (1) to assess the viability of recruiting the intended sample of currently suicidal youth, and (2) to assess the feasibility of engaging and retaining non-treatment seeking suicidal youth in the suicide prevention intervention. Finally, we sought to assess the efficacy of the suicide prevention intervention, as compared to treatment as usual (TAU) provided at a local drop-in center. Although this was a pilot feasibility study, it was expected that youth assigned to CTSP would report a faster decline over time in suicidal ideation than those assigned to TAU.

## Method

### Participants

Homeless youth (N = 150) were recruited from the only drop-in center for homeless youth in a large Midwestern city. In order to meet eligibility to study inclusion, homeless youth had to meet the following criteria: (a) be between the ages of 18 to 24 years, (b) not require hospitalization, (c) be able to provide informed consent as determined by Structured Clinical Interview for DSM-5 disorders psychotic screening (First et al. 2015), and (d) score > 16 on the Scale for Suicide Ideation-Worst Point (SSI-W; Beck et al. 1999). Scoring 16 or higher on the SSI-W is associated with a 14 times higher chance to complete suicide (Beck et al. 1999). Table 1 presents a summary of demographic variables.

### Procedure

Youth were approached at the drop-in center and screened for suicidal ideation and interest in the study by a research assistant (RA). In particular, youth were asked if they had current or recent thoughts of wanting to harm themselves. Interested

**Table 1** Demographic characteristics of the current sample

Variables	n (%)	Mean (SD)
Age		20.99 (1.96)
Sex		
Female	61 (40.7%)	
Male	89 (59.3%)	
Race/ethnicity		
American Indian or Alaskan Native	1 (0.7%)	
Asian, Asian-American, or Pacific Islander	1 (0.7%)	
Black or African American	57 (38.0%)	
Hispanic, other Latin American	2 (1.3%)	
White, not of hispanic origin	59 (39.3%)	
Other	30 (20.0%)	
Highest degree received		
Vocational	4 (2.7%)	
High school diploma	79 (52.7%)	
GED	13 (8.7%)	
Associate's degree	0 (0%)	
Bachelor's degree	1 (0.7%)	
Other	6 (4.0%)	
None	47 (31.3%)	
Current marital status		
Single, never married	142 (94.7%)	
Legally married	4 (2.7%)	
Divorced	4 (2.7%)	
Number of children		
0	106 (70.7%)	
1	26 (17.3%)	
2 and more	18 (12.0%)	
Yes	31 (70.5%)	
Number of lifetime suicide attempts		6.11 (9.69)
Length of homelessness		126.74 (198.82)
Score on SSI-W		22.91 (4.84)

youth who also reported current or recent suicidal ideation reviewed and signed an informed consent statement. If a youth reported current suicidal ideation, they were assessed for imminent risk by the research staff member which included (1) whether a plan is in place, (2) whether the means to carry out the plan are available, and (3) intent to carry out the plan, (4) date of prior suicide attempt, and reasons for wanting to harm self. The research staff member then called the first author, a licensed clinical psychologist, to review the information. If imminent risk was determined, the client was asked to accompany the staff member to local hospital which provides 24 h mental health crisis intervention, stabilization and assessment for Franklin County, Ohio residents. Potential study participants not at imminent risk were administered the SSI-W and the Structured Clinical Interview for DSM-5 Disorders (SCID) (First et al. 2015) section on psychosis to determine formal eligibility. Those meeting the criteria for participation in the study continued with the assessment battery. Those not passing

inclusion criteria for the project were provided a care package with toiletries and food items and continued to receive treatment as usual through the drop-in center. Upon completion of the baseline assessment, youth were randomly assigned using a computerized randomization program to either CTSP+TAU (N=75) or TAU (N=75). An intent to treat design was used in which all youth, regardless of participation in treatment, were tracked for follow-up. Follow-up assessments occurred at 3-, 6- and 9-months post-baseline, and youth received a \$40 gift card as compensation for their time after each assessment was completed. All research procedures were approved by the university's Institutional Review Board.

## Intervention Conditions

### Treatment as Usual (TAU)

The drop-in center is located in an easily accessible area in a low-income neighborhood. Homeless youth can access services to meet their basic needs (e.g., food, laundry and shower facilities), as well as take part in recreational activities, such as watching television, checking out books, playing board games or video games, and interacting with other youth and staff. Similar to other drop-in centers, youth are linked to community resources as needed, including many onsite and offsite providers offering psychiatric evaluation and psychological services. Imminent threat of suicide and need for hospitalization is determined by the onsite licensed therapists. Unlike the experimental suicide prevention intervention, TAU sessions offered by therapists at the drop-in center are unsystematic and not manualized. Sessions are usually 50 min.

### Cognitive Therapy for Suicide Prevention (CTSP) + TAU

CTSP was added onto TAU in order to determine the intervention effects above and beyond TAU. TAU sessions focus on a range of needs associated with homelessness, while CTSP therapy sessions focused solely on suicide prevention. CTSP is based upon the theoretical assumption that the manner by which people think and interpret their life events determines their emotional and behavioral responses to those events. Hence, maladaptive cognitions associated with suicidal ideation are the primary focus of the treatment. Given that the intervention protocol was developed based on empirical studies designed to identify cognitive processes relevant to suicidal acts, targeted vulnerability factors include hopelessness, social isolation, poor problem solving, and impaired impulse control. The treatment is designed as a 10 (50 min) session protocol including weekly or bi-weekly meetings with the option of 9 additional maintenance sessions, provided within the first six months post-baseline.

A crisis plan is developed in the first session and is expanded as therapy progresses. It includes emergency contact numbers as well as positive coping behaviors, such as walking or taking a hot bath that the client can perform alone. Assessment of recent suicidal thoughts and behaviors is conducted every session. Clients in need of additional mental health treatment or services are referred to those respective agencies to receive in addition to CTSP. The treatment process is highly structured and consists of three phases. During the initial phase of treatment (sessions 1–3) clients are educated about the cognitive model and a cognitive case-conceptualization is developed to guide the intervention based on client's individual risk-factors and experiences. Specifically, automatic thoughts, core beliefs,

and key life events associated with suicidal behaviors and thoughts are identified. The middle phase of treatment (sessions 4–7) focuses on both cognitive restructuring and behavior change through a variety of cognitive techniques designed to address suicide-specific risk factors. For example, therapists teach clients positive behaviors, such as distraction, relaxation, and intense physical sensations. These techniques can be used to cope with a suicidal crisis and may mitigate the effect of the acquired ability to enact lethal injury. Another form of coping is through a personal support system. Thus, therapists help clients develop/strengthen their social network, which may include other homeless youth, intimate partners, pro-social adults and drop-in center staff. Therapists can also work with the client to create a hope kit, which includes reasons to live such as memories, letters, pictures or other reminders of positive relationships with others. The objective of the later sessions (8–10) is to prevent relapses through practicing the newly acquired skills through a guided imagery process. To improve treatment retention, an open door policy was used so that youth could meet with their therapist without an appointment, and all youth were offered a small incentive, a \$5 food gift card, for each session attended.

### Training and Supervision

Therapist training consisted of readings (manual/book: Wenzel et al. 2009) and a three-day onsite training in the intervention, including role play exercises by one of the original developers, Dr. Amy Wenzel. Dr. Wenzel provided ongoing weekly telephone/skype supervision. Therapists were independently licensed master's level counselors/social workers hired from the drop-in center. All therapy sessions were digitally recorded, and adherence to treatment procedures were evaluated using the Cognitive Therapy Adherence Sheet (Young and Beck 1980) by Dr. Wenzel.

### Meetings with Therapists

The total possible number of sessions included 10 CTSP, and 9 booster sessions. All youth received TAU sessions as well. At 6-months, the average number of any meetings with therapists (CTSP or TAU sessions) was 5.01 (SD = 6.08) among participants in the CTSP + TAU condition and 3.32 (SD = 4.65) among participants in the TAU condition (see Table 2). Youth in the CTSP condition attended more meetings with their therapist, but the difference was not significant [ $t(147) = 1.64, p = 0.10$ ]. However, participants in the CTSP condition attended significantly more meetings with their therapist from baseline to the 3-month follow-up [ $t(148) = 2.81, p < 0.01$ ].

**Table 2** Number of meetings with therapist and contact days

	CTSP+ TAU <i>M (SD)</i>	TAU <i>M (SD)</i>	Independent-sample t-test	
			<i>t</i>	<i>p</i>
Intent to treat	N = 75	N = 75		
Average # of CTSP sessions	2.85 (2.47)	n/a		
Average # of booster sessions	0.35 (1.56)	n/a		
Average # of TAU sessions	2.80 (4.53)	3.33 (4.63)		
Average # of total sessions	5.01 (6.08)	3.33 (4.63)	1.90	0.06
Treated (at least 1 session)	N = 59	N = 46		
Average CTSP sessions	2.36 (2.57)	n/a		
Average booster sessions	0.44 (1.75)	n/a		
Average TAU sessions	3.56 (4.84)	5.43 (4.85)		
Average number of total sessions	6.37 (6.20)	5.43 (4.85)	0.85	0.40

### Fidelity Ratings

The Cognitive Therapy Rating Scale (CTRS; Young and Beck 1980) is an 11-item scale developed to assess therapist competence. Items are scored on a 7-point scale: 0 (Poor), 1 (Barely Adequate), 2 (Mediocre), 3 (Satisfactory), 4 (Good), 5 (Very Good), and 6 (Excellent). The 11 items are summed to yield a CTRS total score, ranging from 0 to 66. Two therapists received CTSP training and received weekly supervision with audiotape reviews. The supervisor rated 53 sessions for therapist “a”, and 36 sessions for therapist “b”. The scores for therapist “a” ranged from 20 to 41, with a mean score = 31.2 (SD = 5.54) and for therapist “b” ranged from 13 to 42, with a mean score = 32.26 (SD = 6.59). Overall, both therapists scored in the satisfactory range.

### Measures

Youth were provided a battery of assessment instruments focused on suicide related cognitions and behaviors, but the current study focused on the primary outcome, suicidal ideation. A baseline demographic questionnaire assessed participants’ race/ethnicity, gender, age, prior suicide attempts and homeless experiences. The Scale for Suicide Ideation-Worst (SSI-W; Beck et al. 1997) is a 19-item interviewer-administered rating scale, which was used as the measure of youths’ suicidal ideation as well as their eligibility for the study. The SSI-W measures the intensity of individuals’ specific attitudes, behaviors, and plans to complete suicide in the prior 90 days. Specifically, interviewers instruct respondents to recall the approximate date and circumstances when they experienced the most intense desire to complete suicide in the past 90 days. Respondents are then asked to keep this experience in mind while the interviewer rates their responses regarding how suicidal they were at that time. The possible range of scores is 0 to 38 with higher scores

indicating greater suicidal ideation. The SSI-W has moderately high internal consistency (Cronbach alpha = 0.88). The scale also has established validity, showing significant associations with other measures of suicidal ideation including the suicide item from the Beck Depression Inventory, and the suicide item from the Hamilton Rating Scale for Depression (Beck et al. 1997). In the current study, the reliability scores of SSI-W at baseline, 3-, 6-, and 9-months were 0.69, 0.89, 0.87, and 0.89, respectively.

Hopelessness was measured by the Beck Hopelessness Scale (BHS; Beck and Steer 1988). The BHS is a self-report instrument that consists of 20 true–false statements designed to assess the extent of positive and negative beliefs about the future during the past week. The BHS is one of the most widely used measures of hopelessness and has demonstrated high internal reliability across diverse clinical and nonclinical populations with Kuder–Richardson reliabilities ranging from 0.87 to 0.93 (Beck and Steer 1988). In the current study, the reliability for the scale ranged from 0.90 to 0.91 across different time points. Cognitive distortions were assessed by the Inventory of Cognitive Distortions (ICD; Yurica 2002). The ICD is a 69-item self-report questionnaire designed to assess cognitive distortions in clinical populations. The ICD contains 11 scales, each assessing a distinct cognitive distortion. Each item is rated on a Likert scale from 1 (“never”) to 5 (“always”), and has demonstrated excellent internal consistency reliability ( $\alpha = 0.96$ ) (Jager-Hyman et al. 2014). The ICD has also demonstrated strong concurrent validity with measures of dysfunctional attitudes and correlates positively with measures of depression and anxiety (Yurica 2002). In the current study, the reliability of the scale ranged from 0.96 to 0.97 across the four time points. Hopelessness and cognitive distortions were controlled in estimating the change in suicidal ideation given that research shows that hopelessness and cognitive distortions are associated with youth’s suicidal ideation (Beck 1967; Brausch and Gutierrez 2010; Brown et al. 2000).

## Results

The follow-up rates were 87%, 87% and 87% at the 3-, 6-, and 9-month follow-up in the CTSP+TAU condition, and 92%, 85%, and 87% in the TAU condition, respectively. Missing data patterns was examined using Little's MCAR test, and were not significant [ $\chi^2(596) = 540.61, p > 0.05$ ]. Therefore, the current data were missing completely at random. Table 3 presents the means and standard deviations for SSI-W, BHS, and ICD across the four time points. Participants in the two intervention conditions did not differ in age, sex, race/ethnicity or childhood history of sexual or physical abuse ( $p$ 's  $> 0.05$ ). Overall, 80% of youth in the study reported a history of suicide attempts. Specifically, 77% of youth in CTSP and 84% of youth in TAU reported prior suicide attempts at baseline. The between group difference was not statistically significant.

### Sample Identification, Recruitment, and Treatment Retention

The consort diagram (Fig. 1) details the number of youth approached at the drop-in center, eligibility and engagement in the study. Overall, 271/639 (43%) youth at the drop-in center reported current suicidal ideation, and 225/639 (35%) completed the formal screening assessment. Ultimately, nearly 25% (150/639) of those approached met all eligibility criteria and agreed to enter the study. In regard to engagement and retention in the prevention intervention, youth

completed an average of 5 sessions in the CTSP+TAU condition and 3 sessions in TAU. Youth in the CTSP+TAU condition had sessions with the therapist for an average of 2.32 months. Few CTSP+TAU youth completed any booster sessions. For the total sample, as well as for CTSP alone, treatment attrition was not significantly related to SSI-W scores at baseline (all  $p$ 's  $> 0.05$ ).

### Primary Analyses

The change in suicidal ideation was estimated through a multilevel modeling framework with Mplus 8.3. The unconditional model with time as the only Level-1 predictor was estimated first. Then, the conditional model was estimated with time-varying covariates including BHS and ICD added to Level-1 of the model. Intervention condition, as well as the number of CTSP sessions, were added to Level-2 of the model to test the treatment effects.

In the unconditional model, youth exhibited a decline in suicide ideation as measured on the SSI-W ( $B = -5.52, SE = 0.21, z = -26.51, p < 0.001$ ). In the conditional model, at Level-1, both ICD ( $B = 0.02, SE = 0.01, z = 2.29, p < 0.05$ ) and BHS ( $B = 0.43, SE = 0.07, z = 5.92, p < 0.001$ ) were positively associated with suicidal ideation. At Level-2, after controlling for the number of CTSP+TAU sessions ( $B = 0.06, SE = 0.03, z = 2.10, p < 0.05$ ), intervention condition was predictive of the slope of change in suicidal ideation, such that participants in CTSP+TAU group showed a faster decline in suicidal ideation than those in the TAU condition ( $B = -0.85, SE = 0.43, z = -2.01, p < 0.05$ ).

**Table 3** Descriptive statistics of the study variables

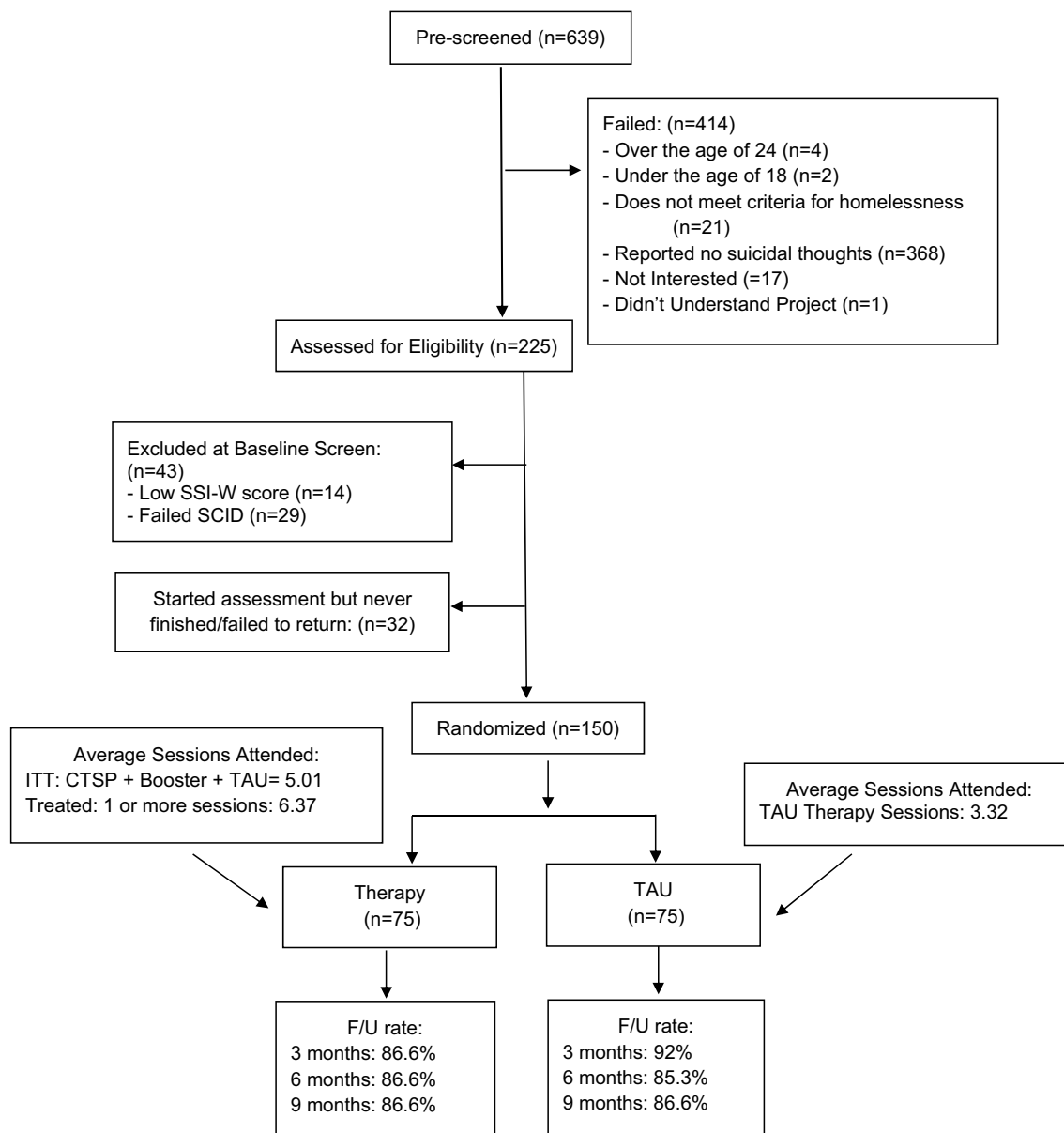
Variable	CTSP+TAU Mean (SD)	TAU Mean (SD)	Total sample Mean (SD)
<b>SSI-W</b>			
Baseline	23.15 (5.03)	22.68 (4.66)	22.85 (4.90)
3 months	6.58 (5.14)	7.74 (7.80)	7.17 (6.63)
6 months	5.25 (5.27)	6.81 (6.33)	6.02 (5.85)
9 months	4.91 (5.60)	6.00 (6.16)	5.45 (5.89)
<b>BHS</b>			
Baseline	9.61 (5.73)	8.08 (5.37)	8.85 (5.58)
3 months	6.08 (5.14)	5.88 (4.88)	5.98 (4.99)
6 months	5.45 (5.67)	5.11 (4.65)	5.28 (5.17)
9 months	6.09 (5.39)	5.16 (4.37)	5.68 (4.99)
<b>ICD</b>			
Baseline	212.21 (47.07)	200.84 (43.46)	206.53 (45.51)
3 months	195.88 (47.98)	193.06 (44.37)	194.44 (46.02)
6 months	198.75 (51.12)	183.36 (38.83)	191.12 (45.92)
9 months	191.54 (51.59)	186.31 (44.05)	188.95 (47.88)

SSI-W suicidal ideation, BHS Beck Hopelessness Scale, ICD inventory of cognitive distortions

## Discussion

Likely a reflection of the high amount of trauma endured by homeless youth, suicidal thoughts and attempts are common. The high risk for suicide, paired with the lack of access to support systems, underscores the importance of identifying successful suicide prevention strategies for use with this high-risk group. Prevention interventions embedded within systems that serve these youth, such as drop-in centers, are likely to overcome barriers to service access, providing an opportunity to identify and engage youth who might not otherwise seek assistance. To our knowledge, this is the first randomized trial to test a suicide prevention intervention with youth. In particular, the current study tested the integration of Cognitive Therapy for Suicide Prevention (CTSP) in an urban drop-in center for homeless youth. Youth between the ages 18–24 years who reported at least one episode of severe suicidal ideation in the prior 3 months were identified and engaged. Overall, the findings support the feasibility of identifying, engaging and retaining non-treatment seeking, suicidal youth in suicide prevention intervention services.

## OSU-Suicide Prevention Project Pre-Screening, Screening, & Randomization



**Fig. 1** Consort diagram

Furthermore, preliminary support for the efficacy of the intervention was found.

### Identifying At-Risk Suicidal Youth

The proposed sample of 150 youth was identified and engaged into the study, all of whom scored 16 or higher on the SSI-W. In this sample, 80% of youth reported a prior suicide attempt, indicating that the SSI-W is a valid screen for identifying youth experiencing homelessness at risk for

suicide. Of note, 42% of those approached at the drop-in center ( $N = 271/639$ ) reported having current suicidal ideation. This study also showed the feasibility of identification and engagement of non-treatment seeking, suicidal youth outside of an emergency room, and within a community-based setting. That is, a small number of suicide prevention studies have engaged individuals at a hospital following a suicide attempt (e.g. Brown et al. 2005; Stanley et al. 2015; Warman et al. 2004), thereby identifying those at high risk for a future suicide episode. However, hospital/emergency

room recruitment following a suicide attempt was not considered feasible for engaging our proposed sample of at-risk homeless youth given the infrequency of the event. Furthermore, we sought to test an intervention that could have broad applicability to homeless youth across the country. Given that up to 68% of homeless youth populations report a prior suicide attempt (Yoder et al. 2010), and that few youth utilize services where they can be evaluated and treated (Kelly and Caputo 2007; NAEH 2012), recruitment from a drop-in center, considered the “front door” for services among street living youth was considered ideal.

### Engaging and Retaining Youth in Cognitive Therapy for Suicide Prevention

In terms of engaging and retaining youth into the suicide prevention intervention, youth in the CTSP + TAU condition completed 5 sessions, half of the available sessions. The session completion rates reported here are similar to prior studies with currently street-living homeless youth who were also not treatment seeking, in which youth completed on average, half of the available sessions (Slesnick et al. 2013, 2015). Anecdotally, therapists noted that youth were reluctant to discuss suicide-related content, rather, youth preferred to focus on daily needs. Future research to increase the acceptability of focus on suicide related content might enhance the uptake of the intervention. Such focus could include relaxation strategies, including mindfulness, and breathing exercises prior to, during, and/or post-session.

### Efficacy

Most importantly, supporting the efficacy of the intervention, all youth in this study showed reduced suicidal ideation over time, and those in CTSP + TAU showed a faster reduction in suicidal ideation than those assigned to TAU. Clinically, a quicker decline in suicidal ideation is preferable when seeking to reduce risk for suicide. As this study was a pilot, these findings are especially significant in light of the comparison condition. That is, underpowered pilot studies often utilize less potent comparison conditions such as wait list controls or referral only (Arnold et al. 2009; Hart et al. 2008), which were not considered viable options for use in this study with vulnerable youth experiencing great psychological pain. Therefore, our comparison condition also showed evidence of significantly reducing suicidal ideation over time.

Given that a relatively low number of sessions were attended but significant treatment effects were observed, it is possible that the development of the crisis plan and identification of individual’s automatic negative thoughts and core beliefs associated with suicide, which occurred in the first few CTSP sessions, were particularly salient for youth.

In addition, some literature suggests that even brief interventions (1–2 Motivational Interviewing sessions) can result in quick and sustainable treatment response among youth (Slesnick et al. 2015).

### Limitations

Several limitations should be considered when interpreting the findings. First, a sample of convenience was used, and youth accessing the drop-in center may be more or less willing to accept the intervention than youth not accessing a drop-in center. Another potential limitation is that therapists at the drop-in center were utilized, rather than graduate clinical research students. Therapists at the drop-in center have multiple competing demands. Demand for their time from drop-in center youth is high, allowing little time to seek out and encourage their clients to participate in the intervention. However, this likely mirrors real-world practice. It is possible that session attendance would have been higher if project therapists provided the therapy, as project therapists would have more time to seek out and encourage youth to attend sessions. Furthermore, the drop-in therapists received satisfactory fidelity ratings which may have improved with project therapists. Ultimately, these experiences are useful for informing future real-world implementation strategies, which would not have been observed if project therapists had been utilized.

### Conclusions

Suicide is a significant public health concern in this population, especially given that homelessness among youth is not rare, with an estimated 4.6 to 7.6% of adolescents and young adults experiencing homelessness in the United States (Shelton et al. 2009). This study was a first step towards assessing the feasibility, acceptability and initial efficacy of a cognitive therapy for suicide prevention intervention for this marginalized group of underserved youth. While findings provide preliminary support for identifying and engaging a diverse sample of non-treatment seeking youth through a non-traditional setting, the study suggests future directions. In particular, attention towards increasing dosage of the CTSP sessions among youth could enhance the observed reductions in suicide ideation. Others have noted that attrition in mental health treatment for youth, including homeless youth, is high (Hobden et al. 2011). Some have suggested that youth experiencing homelessness have primary focus on attending to basic survival needs, with less motivation to focus on mental health and/or substance use (Bucher 2008; Hughes et al. 2010). Indeed, homeless youth experience a high amount stress associated with uncertainty,



unpredictability and uncontrollable life events, victimization while living on the streets, and daily hassles (Son 2002). Possibly, attending to reducing stress prior to, during and after suicide prevention sessions could increase uptake. Such strategies could include meditation through virtual reality applications, found to reduce psychological stress in adults (Gaggioli et al. 2014) and increase treatment attendance (Navarro-Haro et al. 2019). While this study focused on homeless youth, it is also the first randomized trial to test a suicide prevention intervention with youth, regardless of housing status. The methods used in this study were successful in identifying those most at risk for suicide (e.g., administering the SSI-W), and could be tested for utility in other community-based settings with high-risk youth. Finally, this study provides further empirical support for the efficacy of CTSP as a suicide prevention intervention for youth.

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### Compliance with Ethical Standards

**Conflict of interest** Natasha Slesnick, Jing Zhang, Xin Feng, Qiong Wu, Laura Walsh and Darcy Haag Granello declare that they have no conflict of interest.

**Ethical Standards** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed Consent** Interested youth who also reported current or recent suicidal ideation reviewed and signed an informed consent statement.

**Animal Rights** No animal studies were carried out by the authors for this article.

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