



Original Article

Effectiveness of Cognitive Behavioral Therapy for Suicidal Attempt

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ABSTRACT

Background and Objective: Due to the increasing focus of new therapies on immediate and short-term interventions, Cognitive-Behavioural Therapy (CBT) has been designed to decrease suicidality risk in suicidal patients. This study aimed to evaluate the CBT efficacy for suicide prevention in patients with suicidal attempts.

Methods: The present study was a semi-experimental type of pre-test and post-test study, in which 60 participants were included in the study to evaluate the risk of suicide using the Columbia Suicide Severity Risk Scale between April and June 2023. Participants were randomly assigned to two groups. Suicide ideation was measured using the Beck Scale before, after 1 month, and after the intervention. Data were analysed using a t-test to compare changes in suicide ideation between the Cognitive-Behavioural Therapy (CBT) and control groups.

Results: This study included 60 cases, with 16 males and 44 females. Among the suicidal group (n=28), the mean age was 25.3 ± 6.2 years, 23 (82.1%) were female, and 14 (50%) had a university degree. The most common suicide methods were stabbing (n=12, 42.9%), self-burning (n=11, 39.3%), and jumping from height (n=8, 28.6%). The cognitive behavioural therapy intervention significantly reduced suicidal ideation from pre-test to post-test 2 ($p < 0.001$), while the comparison group showed no significant change from pre-test to post-test 1 ($p = 0.344$). The intervention group had a significant reduction in suicidal ideation between pre-test and post-test2 ($p < 0.001$), whereas the comparison group only showed a significant reduction between post-test1 and post-test2 ($p = 0.013$).

Conclusion: The most commonly used methods of suicide were stabbing, self-burning, and jumping from a height. There was a highly significant association between cognitive behavioural therapy and reducing the risk of suicide attempts.

GRAPHICAL ABSTRACT



Patients with suicidal attempts

Evaluation of using Cognitive-Behavioural Therapy (CBT)



CBT is a highly effective method in reducing suicide attempts in suicidal patients.

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Introduction

Suicide has elevated to a global health concern in the 21st century. The World Health Organization (WHO) estimates that every year, over 700,000 individuals die for committing suicide worldwide. Early risk factor identification can therefore help to improve suicide prevention efforts and direct the development of suicide prevention solutions [1]. Suicide is linked to various circumstances, including age, sex, marital status, economic difficulties, parental conflict, divorce, a lack of social support, unemployment, and physical and mental disorders, particularly despair. Depression is thought to be the most dangerous mental condition in terms of suicide attempts [2]. The most popular methods of suicide include self-harm by hanging, self-poisoning with drugs and pesticides, and self-harm with weapons. The vast majority of suicides globally are caused by psychiatric conditions [3]. In Iran, hanging is the most popular means of suicide, followed by medication overdose or poisoning [4]. Estimated suicide rates in Iraq were 1.7 per 100,000 people, and self-poisoning, self-burning, hanging, and weapons are the most popular means of suicide [5]. According to Amin and Malkhasian (2019), the prevalence of suicide in Erbil was 3.96 per 100000 in 2015-2016 [6]. One of the treatments available for people who have attempted suicide is Cognitive-Behavioural Therapy (CBT), a psychotherapeutic intervention of primary importance. Cognitive-behavioural therapy (CBT) is a widely used psychotherapeutic approach that aims to change patterns of thinking or behaviour that contribute to people's difficulties, ultimately changing how they feel. It is employed to address different issues, including sleeping difficulties, relationship problems, drug and alcohol abuse, anxiety, and depression [7, 8]. CBT works by changing people's attitudes and their behavior by focusing on the thoughts, images, beliefs, and attitudes that are held (a person's cognitive processes) and how these processes relate to the way a person behaves, as a way of dealing with emotional problems [9, 10]. CBT has been demonstrated to lower the risk of suicidal behaviour effectively. The CBT-SP protocol typically consists of ten to twelve outpatient

sessions [11]. Mewton *et al.* (2016), shown that cognitive-behavioural treatment is useful in lowering suicidal inclinations [12]. In a research carried out by Alavi *et al.* (2013), the CBT efficacy in lowering suicidal ideation and hopelessness in previous suicidal attempts has been established [13]. According to a Cochrane review of randomized trials of psychosocial therapies in adults in 2017, CBT was found to lower the occurrence of repeated self-harm compared to usual treatments [14]. CBT has been shown to improve an individual's capacity to manage suicidal thoughts, as well as to reduce the proportion of depressed patients who have suicidal, self-harm, and thoughts of suicide scores [15]. CBT is the most common form of psychotherapy [16]. Compared to the effects of medical intervention, the long-term efficacy of CBT for various disorders is particularly striking [17]. This study brings innovative insights by addressing the urgent issue of preventing and treating suicidal behaviour, offering a novel approach to targeting cognitive distortions, negative thought patterns, and maladaptive behaviours while also exploring the long-term effectiveness of CBT in reducing the danger of future suicidal actions, thereby contributing to the advancement of suicide prevention and mental health outcomes. This study aimed to investigate the effect of cognitive behavioural therapy on patients with a history of suicidal attempts in Erbil city, providing valuable insights into the potential benefits and effectiveness of this therapeutic approach for this specific population, and contributing to the existing knowledge on suicide prevention and mental health interventions in the context of Erbil City.

Materials and Methods

The present research is a quasi-case control experimental pre-test, post-test design that includes 60 participants aged between 18 and 53 years old. The sample size was calculated using a power analysis with an alpha of 0.05 and a power of 80%. Using these parameters in a power analysis calculation for a two-independent sample t-test, the estimated sample size needed per group was approximately 28. Since we had

two groups (intervention and control), the total sample size required was around 60 participants. Participants were randomly assigned to either an intervention or control group using a computerized random number generator. The study included adults aged >18 years with a history of suicidal attempt(s) in the last year, as confirmed through medical records. Participants were required to score above 1 on the Beck Scale for suicidal ideation at screening, indicating the presence of suicidal thoughts. All participants had the ability to provide informed consent and comply with study procedures. Individuals with active psychosis or mania, moderate to severe intellectual disability, a history of traumatic brain injury, current substance intoxication or withdrawal, or an inability to complete study assessments due to language barriers or cognitive impairment were not eligible for inclusion into the study. Exclusion criteria during the study period included initiation of antipsychotic medication, hospitalization for mental health reasons, and withdrawal of consent. Furthermore, the participants could be excluded if they missed more than 3 consecutive CBT sessions. Informed consent was obtained from all participants, and eligible contributors completed a standardized questionnaire. A direct face-to-face approach was employed to collect sociodemographic information, such as age, sex, education level, marital status, profession, residency area, and socioeconomic status, as listed in [Table 1](#). The assessment of suicide risk levels was conducted using the Columbia Suicide Severity Risk Scale (C-SSRS), as detailed in [Appendix \(1\)](#). The Columbia Suicide Severity Risk Scale (C-SSRS) is a standardized instrument created to evaluate the seriousness of suicidal thoughts and actions in individuals [[18](#), [19](#)]. The C-SSRS consists of two main components: the ideation subscale and the behaviour subscale. The ideation subscale measures the intensity and frequency of suicidal thoughts, while the behaviour subscale assesses the presence and severity of suicidal actions [[20](#), [21](#)]. The C-SSRS has displayed favourable levels of both convergent and divergent validity when compared to other assessments of suicidal thoughts and actions, and it boasts high

sensitivity and specificity in categorizing suicidal behaviours. It has also shown to be sensitive to changes over time, making it a valuable tool for tracking treatment response [[21](#), [22](#)]. The duration of the study was three months. Upon receipt of the questionnaires, the participants were informed they were eligible for professional assistance. The research was conducted following the most recent version of the Declaration of Helsinki, and the Hawler Medical University, College of Nursing Human Research Ethics Committee approved the study with the ethical code no.137 on 7/10/2021. The intervention group received 8-12 sessions of cognitive behavioural therapy (CBT) over three months delivered by a licensed therapist. CBT sessions focused on identifying and modifying dysfunctional thoughts, behaviours, and emotions related to suicidal ideation. Specific CBT techniques used included cognitive restructuring, problem-solving, and mood regulation skills. The control group did not receive any psychotherapy during the study period. The CBT sessions were conducted in an outpatient setting, with patients attending scheduled appointments at a dedicated healthcare facility. The sessions were conducted individually, allowing the therapist to focus on the unique needs and situation of each participant. In the present study, the Beck Scale was used to measure suicide ideation at three separate times: before the intervention (pre-test), immediately after the intervention (post-test 1), and three months after the intervention (post-test 2). The scores from these measurements are presented in [Table 2](#). It is a 21-item self-report questionnaire designed to detect and measure the severity of a person's current suicidal intention. The items assess the individual's attitudes, behaviours, and plans to commit suicide. Each item is scored on a scale of 0-2, with a higher total score indicating a higher level of suicidal ideation [[23](#)]. Before beginning, we described the procedure to the potential participants. After receiving the respondent's approval and a signed informed consent form, data were gathered.

Statistical analysis

The data was analysed using SPSS 25.0, the Statistical Package for the Social Sciences. The data was analysed using a t-test. A p-value of less than 0.05 was considered statistically significant in this study, and a 95% confidence interval was calculated for all statistical tests conducted.

Results and Discussion

Table 1 indicates the socio-demographic characteristics of the suicidal group (n=28). The age distribution was 16 (57.1%) aged 18-29 years, 8 (28.6%) aged 30-41 years, and 4 (14.3%) aged 42-53 years. There were 23 females (82.1%) and 5 males (17.9%). Regarding

education, 14 (50%) had an undergraduate degree, over half were never married (n=16, 57.1%) and 10 (35.7%) had paid work, and most lived in urban areas (n=22, 78.6%).

Table 3 compares the methods of suicide attempts between 32 individuals in the negative control group and the 28 in the positive group. The most common methods in the negative group were stabbing 10 (31.3%), self-burning 9 (28.1%), firearms, and hanging 5 (15.6%) while in the positive group, they were stabbing 12 (42.9%), Self-burning 11 (39.3%), jumping from height 8 (28.6%), others 7 (25%), and hanging 6 (21.4%).

Table 1: Sociodemographic characteristics of the studied samples

Sociodemographic Characteristics	Suicidal Group (n=28)	
	F.	(%)
Age Group (years)		
18-29	16	(57.1)
30-41	8	(28.6)
42-53	4	(14.3)
Sex		
Male	5	(17.9)
Female	23	(82.1)
Level of Education		
Cannot read and write	6	(21.4)
Can read and write	5	(17.9)
Primary school graduated	1	(3.6)
Secondary school graduated	1	(3.6)
High school graduated	1	(3.6)
Under-graduated	14	(50)
Marital Status		
Never married	16	(57.1)
Married	11	(39.3)
Divorced	1	(3.6)
Occupational Status		
Paid work	10	(35.7)
Self-employed (own business or farming)	6	(21.4)
Non-paid work (volunteer or charity)	1	(3.6)
Student	2	(7.1)
Keeping house/homemaker	6	(21.4)
Retired	0	(0)
Unemployed (health reason)	2	(7.1)
Unemployed (other reason)	1	(3.6)
Residency Area		
Urban	22	(78.6)
Rural	4	(14.3)
Suburban	2	(7.1)

Table 2: Effect of cognitive behavioural therapy on intervention and comparison groups

Suicide Severity Risk	Pre-test	Post-test 1	Post-test 2	Pre-test and Post-test 2 Paired Differences	t-value	df
	M ± SD	M ± SD	M ± SD	M ± SD		
Intervention Group	3.79 ± 1.93	2.71 ± 1.18	2.57 ± 1.20	1.214 ± 1.595	4.028	27
P-value of Paired t-test	0.006 HS		0.503 NS	< 0.001 VHS		
Comparison Group	1.31 ± 0.59	1.47 ± 0.84	1.97 ± 1.26	- 0.656 ± 1.208	- 3.074	27
P-value of Paired t-test	0.344 NS		0.013 S	0.004 HS		

Table 3: The used methods of suicide in the study samples

Methods of suicide attempts that the study samples used	Suicidal Groups			
	Negative (n=32)		Positive (n=28)	
	F.	%	F.	%
Suicide due to pesticide or unspecified poisoning	1	3.1	2	7.1
Hanging	5	15.6	6	21.4
Drowning	4	12.5	0	0
Firearms	5	15.6	5	17.9
Jumping from height	3	9.4	8	28.6
Self-burning	9	28.1	11	39.3
Water torture	2	6.3	2	7.1
Stabbing	10	31.3	12	42.9
Others	3	9.4	7	25

Assessment of the level of suicide risk was performed using Columbia Suicide Severity Risk Scale (C-SSRS). Table 4 provides a comprehensive assessment of suicide risk levels in two groups: negative (n=32) and positive (n=28). Among the negative group, 34.4% [11] expressed wishing they were dead or desired not to wake up, while 59.4% [19] had actual thoughts of killing themselves in the last month. In contrast, the positive group displayed higher percentages, with 57.1% [16] wishing for death and 75% [21] having thoughts of suicide. Furthermore, 12.5% [4] of the negative group and 35.7% [10] of the positive group contemplated the details of carrying out suicide. While none in the negative group had thoughts with intentions to act, 32.1% [9] of the positive group did. In addition, 46.4% [13] of the positive group had started planning how to end their lives. In terms of lifetime experiences, 28.1% [9] of the negative group and 50% [14] of the positive group engaged in behaviours or preparations to end their lives.

Notably, 39.3% [11] of the positive group had taken such actions within the last three months. Table 2 presents the mean ± standard deviation values for suicide severity risk assessments conducted in three different phases: pre-test, post-test 1, and post-test 2. The intervention group showed a decrease in suicide severity risk from pre-test (3.79 ± 1.93) to post-test1 (2.71 ± 1.18) (p-value= 0.006). In contrast, there was no significant difference between post-test 1 (2.71 ± 1.18) and post-test 2 (2.57 ± 1.20) (p-value= 0.503). Moreover, the pre-test (3.79 ± 1.93) and post-test2 (2.57 ± 1.20) were highly significantly different (P-Value< 0.001). Regarding the comparison group, pre-test (1.31 ± 0.59) and post-test 1 (1.47 ± 0.84) (p-value= 0.344) have no significant difference while a significant difference was found between post-test1 (1.47 ± 0.84) and post-test2 (1.97 ± 1.26) (p-value= 0.013). Finally, the pre-test (1.31 ± 0.59) and post-test 2 (1.97 ± 1.26) were highly significantly different (p-value= 0.004).

Table 4: Assessment of the level of suicide risk

Assessment of the level of suicide risk	Suicidal Groups			
	Negative (n=32)		Positive (n=28)	
	F.	%	F.	%
Over the last month, have you wished you were dead or wished you could go to sleep and not wake up?	11	34.4	16	57.1
Over the last month, have you had any actual thoughts of killing yourself?	19	59.4	21	75
Over the last month, have you been thinking about how you might do this?	4	12.5	10	35.7
Over the last month, have you had these thoughts and had some intention of acting on them?	0	0	9	32.1
Over the last month, have you started to work out or worked out the details of how to kill?	0	0	13	46.4
At any time in the last month did you intend to do this action?	0	0	4	14.3
In your lifetime, have you ever done anything, started to do anything, or prepared to do anything to end your life (for example, collected pills, obtained a gun, gave away valuables, went to the roof, but did not jump)?	9	28.1	14	50
Was this within the last 3 months?	0	0	11	39.3

The study examined the effectiveness of Cognitive Behavioural Therapy (CBT) for individuals who had attempted suicide. The socio-demographic characteristics of the suicidal group included a majority of females. Most participants were in the age range of 18-29 and had completed undergraduate degrees. The study compared the methods of suicide attempts between both groups. In the negative group, the most common methods were stabbing, self-burning, firearms, and hanging. The positive group had higher rates of stabbing, self-burning, jumping from height, and hanging. The level of suicide risk was assessed using the Columbia Suicide Severity Risk Scale (C-SSRS). The positive group had higher percentages of wishing for death, thoughts of suicide, contemplating details of carrying out suicide and planning to end their lives. A substantial portion of the positive group had engaged in behaviours or preparations to end their lives within the last three months. As interventions and preventative efforts have not significantly reduced the suicide rate, there is an urgent need for creative, effective techniques to minimize suicide and to guide future intervention tactics [24, 25]. To the best of our knowledge, this is the first research in our area to look at the impact of cognitive behavioural therapy on

suicidal ideation. From the socio-demographic perspective, our study shows a majority of the suicidal group are young adults aged between 18-29 years, predominantly female, and most of them have never been married. Significant portions of the group hold an undergraduate degree, are employed, and live in urban areas. These findings are particularly interesting when compared with other studies. Research by Justin *et al.* (2014) suggested that married individuals are less likely to commit suicide due to the protective factors inherent in a marital relationship. However, the present study contradicts this, as over half of the individuals in the suicidal group were never married. This could potentially be due to the changing societal norms and increased pressures faced by the younger generation [26]. In terms of education, the present study is inconsistent with Daniel *et al.* (2020) study, which showed that the risk of suicidal outcomes was significantly lower among individuals with a higher level of education [27]. Other studies conducted by Chen *et al.* [28], Rosoff *et al.* [29], also show that a low level of education is associated with a higher risk of suicide. Other studies conducted by Lageborn *et al.* [30], and Perez-Brumer *et al.* [31], support the findings of the present study and state that

people with higher levels of education are more likely to commit suicide. This correlation could be due to the increased pressures and expectations associated with higher education, leading to increased mental health issues. It is worth mentioning that in examining the relationship between education and suicide risk, it is necessary to pay attention to various factors such as socio-economic status, residential environment, and age. Different studies may bring different results depending on the society and the specific context under investigation. The results of the current research align with multiple studies indicating that females have a higher inclination for suicide attempts, while males are more prone to successfully committing suicide. This phenomenon is referred to as the suicide sex paradox. Women exhibit a greater prevalence of nonfatal suicidal actions, while men have a higher occurrence of completed suicides. One potential explanation for this contrast is that men often opt for more aggressive and fatal approaches like firearms in their suicide methods, in contrast to women [32]. An examination of data from England revealed that males were less prone to disclose thoughts of suicide and efforts to end their lives compared to females. Nevertheless, globally, the number of male suicides surpasses that of females in nearly all nations, except within the age range of 15 to 19 years. This is contrary to the results of the present study [33]. Another study by Ariadna Forray *et al.* (2021), found that women attempt suicide three times more often than men, although they are less likely to complete suicide [34]. Regarding methods of suicide used by the participants of the present study, the most commonly used ones were stabbing, self-burning, and jumping from a height, respectively. This is in agreement in part with the study of Lim *et al.* (2014) who considered the most frequently used methods of suicide were drug poisoning, hanging, and stabbing [35]. Hanging is considered the most lethal suicide method followed by jumping, burning, cutting the wrist, and chemical poisoning [36, 37]. Suicide by hanging is the most prevalent technique, followed by suicide by gun, fire, or poison according to Younis *et al.* [5]. The current result is different from that of Kim *et al.* (2021), who stated that

hanging was the most common method of suicide [38]. The C-SSRS has been found to be a useful tool for measuring suicide risk, capturing more of the suicide risk construct and functioning differentially between and within individuals [39]. When assessing the level of suicide risk, the study used the Columbia Suicide Severity Risk Scale (C-SSRS). It was found that a significant portion of the group had thoughts of suicide, with an even greater percentage in the positive group having initiated plans to end their lives. The findings of the present study indicate the presence of high suicidal ideation and planning among the participants. This underscores the significance of promptly intervening and offering mental health support to tackle the notable occurrence of thoughts of suicide and the formulation of suicide plans. The limited number of treatments that have been shown to be effective in lowering posttreatment suicide attempt rates suggests that cognitive-behavioural solutions, such as dialectical behaviour therapy, and cognitive therapy, provide the most promise [40]. It has been demonstrated that cognitive behavioural therapy (CBT) can improve an individual's capability to regulate suicidal thoughts, resulting in a reduction in the number of suicide attempts and suicidal ideation scores in depressed individuals [15]. According to the results of the present investigation, the effect of cognitive behavioural therapy on the intervention group is very highly significant compared to the control group and the suicidal patients greatly improved after treatment sessions. This result is similar to the study of Wu *et al.* (2022) that discovered improvement in the patient's health after CBT and demonstrated that CBT is more cost-effective than conventional face-to-face treatment. CBT programs are at the vanguard of cost-efficiency. CBT has long-term effectiveness for a wide range of issues, particularly when compared with the influence of medical intervention [17]. According to the findings of this research, Stanley (2009) proved that cognitive behavioural therapy (CBT) for the prevention of suicide is a treatment that may be effectively administered and is acceptable to patients. Despite the challenging nature of the patient population, an impressively high

percentage of patients choose to remain in the program. The vast majority of patients continued their treatment for a sufficient amount of time to obtain all of the necessary components [41]. Jeong *et al.* (2023), regarded CBT as a plausible first-line psychological intervention to prevent re-attempts among individuals with prior suicide attempts and observed CBT as the most successful therapy for avoiding suicide re-attempts [42].

Conclusion

It was found that the most commonly used method of suicide was stabbing. Regarding the assessment of the level of suicide risk, most of the suicide attempters had experienced actual thoughts of killing themselves over the past month. Moreover, CBT has been confirmed as a highly effective method in reducing suicide attempts in suicidal patients. It is recommended that CBT be included in suicide prevention strategies. However, more studies are needed to examine its long-term effects and to devise strategies to maintain the benefits of CBT over time. Future research should also focus on determining the most effective components of CBT for suicide prevention, and whether the therapy's effectiveness varies with different demographic group

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Authors' Contributions

All authors contributed to data analysis, drafting, and revising of the paper and agreed to be responsible for all the aspects of this work.

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