

Brief Psychotherapeutic Intervention Compared with Treatment as Usual for Adolescents with Nonsuicidal Self-Injury: Outcomes over a 2–4-Year Follow-Up

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Keywords

Nonsuicidal self-injury · Randomized controlled trial · Adolescents · Psychotherapy · Longitudinal outcome

Abstract

Introduction: The “Cutting Down Programme” (CDP), a brief psychotherapeutic intervention for treating nonsuicidal self-injury (NSSI) in adolescents, was comparable to high-quality treatment as usual (TAU) in a previous randomized controlled trial (RCT). **Objective:** The aim of the study was to evaluate the long-term outcomes of the CDP over up to 4 years. **Methods:** Assessments of NSSI, suicide attempts, borderline personality disorder (BPD), depression, and quality of life took place 2 to 4 years (T3) after enrollment in a RCT. The evolution of NSSI, suicide attempts, depression, and quality of life was analyzed using (generalized) linear mixed-effects models. Ordered logistic regression was used for analyzing BPD diagnoses. Data from T0, T2, and T3 are reported. **Results:** Out of 74 patients, 70 (95%) were included in the T3 assessment. The frequency of NSSI events alongside with suicide attempts and depression

further decreased between T2 and T3 and BPD between T0 and T3 in both groups. Quality of life remained stable in both groups between T2 and T3. Both groups received substantial but comparable additional treatment between T2 and T3. More treatment sessions during the follow-up period were linked to larger improvements of NSSI. **Conclusions:** The CDP was found to be as effective as TAU in promoting recovery from NSSI and comorbid symptoms in the long term. Results suggest that treatment effects from a brief psychotherapeutic intervention may endure and even further improve after completion of the program. However, additional treatment seems to improve chances for recovery independent from CDP versus TAU.

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Published by S. Karger AG, Basel

Introduction

Nonsuicidal self-injury (NSSI) is defined as “the deliberate, self-directed damage of body tissue without suicidal intent and for purposes not socially or culturally sanctioned”

[1]. It is particularly prevalent in mid-adolescence with a decrease in frequency over the course of adolescence and young adulthood [2]. Prospectively, NSSI is an important predictor for suicidal behavior [3–5] as well as long-term morbidity and mortality [6]. The reduction of NSSI has been shown to be linked to a risk decrease for suicidal behavior in community adolescents [7], which emphasizes the potential of and need for effective interventions. Cross-sectionally, it is associated with severe emotion dysregulation [8] and a wide range of comorbid diagnoses [9, 10] including borderline personality disorder (BPD) [11, 12].

NSSI is one of the most frequent symptoms in adolescents with BPD; however, a diagnosis of BPD is only present in around 30–50% of clinical samples with NSSI [9]. Besides categorical diagnoses, dimensional BPD pathology commonly underlies NSSI [12], and in those engaging in NSSI, underlying BPD pathology is associated with a variety of unfavorable parameters such as more severe NSSI and lower psychosocial functioning [13]. Furthermore, affective disorders are common among adolescents with NSSI, and depressive symptoms were found to be both correlated with and predictive of NSSI [3, 14–16]. NSSI can lead to impairment in different areas of life and is often linked to a considerable decrease in quality of life [13, 17]. Noteworthy, both depression and BPD seem to independently contribute to lower psychosocial functioning in individuals with NSSI [18].

Despite the serious clinical and functional impairments commonly associated with repeated NSSI [19, 20], the majority of adolescents with NSSI do not receive adequate treatment [21, 22]. While help-seeking behavior tends to be particularly low among adolescents with NSSI [23, 24], this patient group is also considered to be challenging by professionals and, as a result, limited treatment capacities are available. Specific treatment options for NSSI are scarce, and research regarding positive as well as potential negative effects of psychotherapy or medication is limited in this context. Side effects in both treatment modalities may include perceived lack of control, feelings of stagnation, or even worsening of symptoms [25, 26], and for antidepressant medication, which is commonly prescribed among adolescents with self-injury, significantly increased rates of excessive mood elevation (e.g., mania-hypomania) have been reported [27]. Therefore, there is a great need for long-term effective interventions that are easily accessible for patients as well as feasible to deliver by clinicians in outpatient settings [28–30]. Brief programs, such as the Attempted Suicide Short Intervention Program (ASSIP), which is delivered after a suicide attempt, are promising [31],

but further research is needed on the distinction between such brief interventions and other treatment options [32].

To address this gap among high-risk adolescents with self-injurious behavior, our group previously translated and evaluated a brief psychotherapeutic program, the “Cutting Down Programme” (CDP), which specifically aims to reduce adolescent NSSI [33, 34]. Because of its short duration of only 8 to 12 sessions, it sets a low threshold and can be provided to a larger number of help-seeking adolescents. Beyond that, the CDP is mainly based on cognitive-behavioral elements and does not require extensive additional training for therapists. Previously, we have reported on the treatment outcome from a randomized controlled trial (RCT) comparing the CDP with high-quality treatment as usual (TAU) [33]. In this RCT, the CDP was as effective as TAU (which involved a significantly higher treatment dose) in reducing frequency of NSSI, attempted suicides, severity of depression as well as improving overall well-being with generally large effect sizes for outcomes in the CDP condition (reduction of NSSI: Cohen’s $d = 0.99$) as well as in the TAU condition (reduction of NSSI: Cohen’s $d = 0.79$) [33]. While these findings are encouraging and show that adequate treatment can lead to significant reductions in NSSI, the literature on the maintenance of treatment effects is scarce, and the effectiveness of brief treatments – such as the CDP – over longer follow-up periods has not yet been examined.

In the present study, we report 2–4-year follow-up outcomes of the previously published RCT. Our main aim was to evaluate whether the equality of treatment outcomes would be sustained 2–4 years after baseline assessment. Primary outcome was number of NSSI events in the 6 months before T3 (2–4-year follow-up), in addition to suicide attempts, BPD pathology, depression, and overall well-being as secondary outcome measures. Beyond that, the impact of further treatment sessions between T2 and T3 was investigated.

Materials and Methods

Participants and Procedure

The original sample consisted of 74 adolescents (mean age 14.9 years, $SD = 1.2$) who were mainly female (96%) and for the most part recruited at the Clinic of Child and Adolescent Psychiatry at the University Hospital Heidelberg, Germany. Inclusion criteria were as follows: a history of at least 5 episodes of NSSI within the previous 6 months, at least 1 episode within the last month, and aged between 12 and 17 years. Exclusion criteria were acute psychotic symptoms, acute intent to harm self or others that

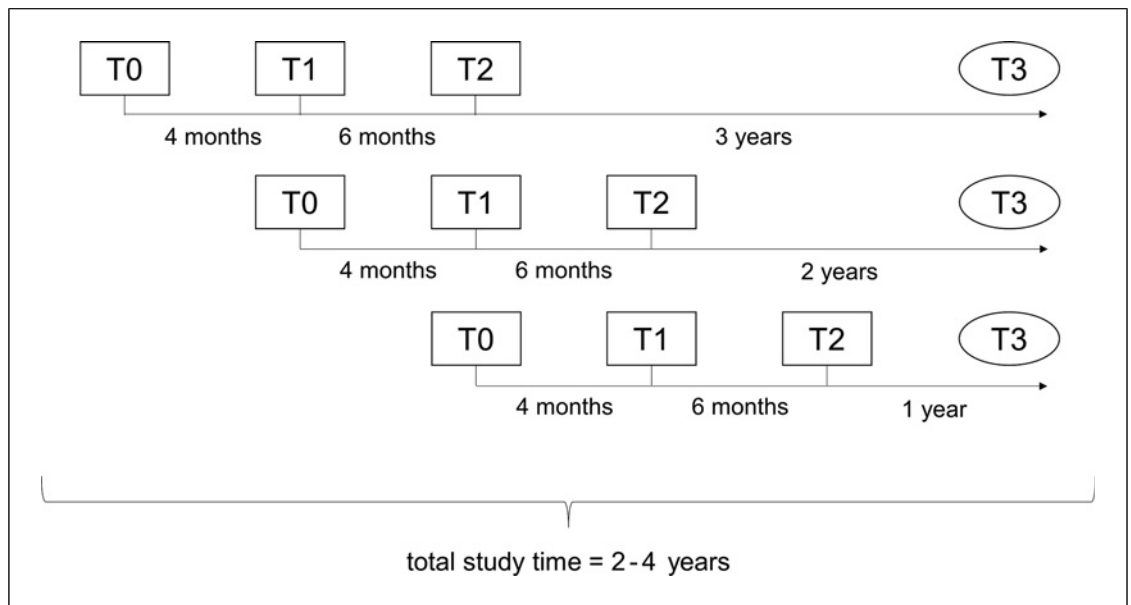


Fig. 1. Study design with assessment time points depending on initial study participation.

requires intensive psychiatric inpatient treatment, impaired intellectual functioning, and/or currently receiving psychotherapeutic treatment.

Participants were randomly assigned to receive, on average, 10 sessions of either CDP or high-quality TAU. CDP was conducted at our university hospital for an average of 10 sessions according to the manual [33]. TAU was delivered by one of our cooperating local child and adolescent psychotherapists or psychiatrists either in private practice or in psychotherapeutic services. It comprised non-manualized standard care enhanced for the purpose of the trial by requiring that TAU therapists agree to provide a first appointment and subsequent therapy within 2–4 weeks to prevent waiting times. TAU was delivered on average for 19 sessions. Both treatment conditions included general child and adolescent psychiatric management as well as ancillary pharmacotherapy as needed. For detailed information on both interventions, see the original study [33].

Study participants were assessed at four time points: T0 (baseline), T1 (postline), T2 (follow-up 1), and T3 (follow-up 2). Postline took place at the end of the CDP or 4 months after baseline in the TAU group. Data from this time point have been published previously and are not included in the current analyses. T2 (primary endpoint of the initial RCT) was conducted 6 months after postline. T3 was conducted 1 to 3 years after T2. The varying time points for T3 are a result of the longer than expected recruitment period for the initial study. In order to examine long-term treatment effects in this valuable high-risk sample, the pragmatic decision was made to implement an additional follow-up assessment during a condensed time period instead of spreading measurements across another 3 years. For patients who began treatment and study participation first, T3 therefore took place 3 years after T2. Participants who enrolled last in the study returned for T3 1 year after T2. See Figure 1 for an overview of the assessment time points. As data from the trial period of time

up to T2 have been published previously [31], current analyses focus on T3 as the outcome.

The study was approved by the Institutional Review Board of the medical faculty at the University of Heidelberg (Ethics Committee No.: S-363/2011), and all patients and parents or caregivers (if participants were below 16 years of age) provided written informed consent. Similar to the assessments of the original RCT, assessments at T3 were performed by an independent interviewer (trained and experienced clinical psychologist) blinded to treatment allocation. The interviewer was asked to guess treatment group allocation after the interview, which resulted in 49.1% correct responses, indicating that blinding was successful. Participants received a monetary compensation for participating in the assessment.

Assessments

The same measures of outcome as in the original study were used at T3. The number of NSSI events in the 6 months prior to T3 was measured through the German version of the Self-Injurious Thoughts and Behaviors Interview (SITBI-G) [35, 36]. The number of NSSI events in the first, second, and third years after T2 was measured at T3. The number of suicide attempts since the last study appointment was also assessed using the SITBI-G. Borderline personality pathology was assessed using parts of the Structured Clinical Interview for DSM-IV-Axis II (SCID-II) [37]. Interrater reliability was checked within our outpatient clinic for adolescent risk-taking and self-harm behavior with very good agreements for the SITBI-G (κ s = 0.77–1.00) [35] and for full-threshold BPD (93.62%) [13]. The clinician responsible for the interviews was involved in all inter-rater reliability checks. The level of depressive symptoms was measured by the self-report Beck Depression Inventory-II (BDI-II) [38] and subjective health and well-being by the KIDSCREEN-27 questionnaire for children and adolescents [39]. For further information on psychometric criteria,

see the original study [33]. Data on the use of psychotherapeutic and psychiatric services as well as psychiatric hospitalization during the period between T2 and T3 were collected from each participant through standardized questions at the beginning of the interview.

Statistical Analysis

To analyze the evolution in the frequency of NSSI until T3, two generalized linear mixed models were fit. In model 1, the response variable was the number of NSSI events in the last 6 months, measured at T0, T2, and T3. Since the response is a count variable and significant overdispersion was present, the response was modeled using a negative binomial distribution with a log link. The model included fixed effects for therapy group, time point and an interaction between the two, and a random intercept per study participant. To account for the different durations between T2 and T3 (1, 2, or 3 years), time between T2 and T3 was added in this model (model 1) as a linear predictor at T3. The second model (model 2) also used NSSI counts as the response variable but measured over different time spans. The 6 months before T0 and T2 were included as in the first model, but now the yearly NSSI counts in the first (T3₁), second (T3₂), and third (T3₃) year between T2 and T3 were included. These observations were partially missing depending on the number of years between T2 and T3 for each participant. To make the different time spans comparable, a corresponding exposure correction was specified in the negative binomial mixed model. The effect sizes for these count models are reported as incidence rate ratios (IRRs).

In secondary analyses, means and standard deviations or median and interquartile ranges were computed for normally distributed and non-normally distributed variables, respectively. Yearly suicide attempts were analyzed using mixed-effects Poisson regression, and in line with model 2, an exposure correction was included to account for varying time spans between T2 and T3. The evolution of the number of BPD criteria was modeled using an ordered logistic regression model, where the proportional odds assumption was checked using Brant's test. For data on depression and quality of life over time, mixed-effects linear regression was used, with fixed and random effects as in model 1. Results from T2 to T3 are reported, except for BPD data which were only assessed at T0 and T3.

Age at baseline was included as a covariate in all models to account for the development of NSSI and associated psychopathology across adolescence. A significance level of $\alpha = 0.05$ was used for all analyses. All analyses were performed using STATA 17 (StataCorp LLC, College Station, TX, USA).

Results

Of the 74 adolescents who were enrolled in the study, all continued their participation in the study until T2. At T3, 3 participants of the CDP and 1 participant of the TAU chose to decline further participation or were not contactable, whereas 70 adolescents remained in the study, resulting in a 95% retention rate for T3. The progress of the participants during the trial is shown in Figure 2. The follow-up at T3 was performed one (TAU

$n = 10$; CDP $n = 10$), two (TAU $n = 11$; CDP $n = 10$), or three (TAU $n = 15$; CDP $n = 14$) years after T2, depending on the time of enrollment of the participant (Fig. 1). There was no association between the treatment group and the duration between T2 and T3 ($\chi^2(2) = 0.02$; $p = 0.988$). The sociodemographic sample characteristics have been published in detail elsewhere [33]. There were no differences in the baseline demographic characteristics and pretreatment NSSI between treatment groups.

Development of NSSI

Frequencies and changes of NSSI over time are shown in Table 1. The distributions of NSSI frequencies for the last 6 months at T0, T2, and T3 are shown in Figure 3a. There was no evidence for a group difference between TAU and CDP ($\chi^2(1) = 0.00$, $p = 0.965$) or a group \times time point interaction ($\chi^2(2) = 3.32$, $p = 0.190$), but the time point had a significant effect ($\chi^2(2) = 72.8$, $p < 0.0001$), with a further reduction in the NSSI rate from T2 to T3 (IRR = 0.16, 95% CI: [0.09, 0.28], $p < 0.0001$), meaning that the NSSI frequency further decreased by 84% between T2 and T3. The duration between T2 and T3 also had a significant effect, with each additional year after T2 further reducing the rate of NSSI events at T3 (IRR = 0.59, 95% CI: [0.37, 0.96], $p = 0.032$). The results of model 2, which had as outcome the number of NSSI events in the first, second, and third years after T2, were consistent with the results of model 1, with strong evidence for a decrease in NSSI over time (overall $\chi^2(4) = 155.75$, $p < 0.0001$; IRR from T2 to T3₁ = 0.42, 95% CI: [0.26, 0.70]; IRR from T3₁ to T3₂ = 0.32, 95% CI: [0.19, 0.56]; IRR from T3₂ to T3₃ = 0.64, 95% CI: [0.30, 1.35]), no main group effect ($\chi^2(1) = 0.16$, $p = 0.686$), and no group \times time point interaction ($\chi^2(4) = 5.58$, $p = 0.233$). Age was a significant predictor of NSSI frequency in model 1 (IRR = 0.79, 95% CI: [0.64, 0.99], $p = 0.038$) and model 2 (IRR = 0.71, 95% CI: [0.56, 0.89], $p = 0.004$).

Suicide Attempts

After a significant reduction between T0 and T2 (IRR = 0.46; 95% CI: [0.25, 0.87]; $\chi^2(1) = 5.65$; $p = 0.017$), the number of yearly suicide attempts was further reduced between T2 and T3₁ (IRR = 0.27; 95% CI: [0.10, 0.70]; $\chi^2(1) = 7.32$; $p = 0.007$) as shown in Figure 3b. Between T3₂ and T3₁, there was no additional decrease of suicide attempts (IRR = 0.53; 95% CI: [0.13, 2.23]; $\chi^2(1) = 0.76$; $p = 0.384$), and at T3₃, no suicide attempts were reported since T3₂. There was no evidence for a group effect ($\chi^2(1) = 1.02$; $p = 0.312$) or a group \times time point interaction ($\chi^2(3) = 4.45$; $p =$

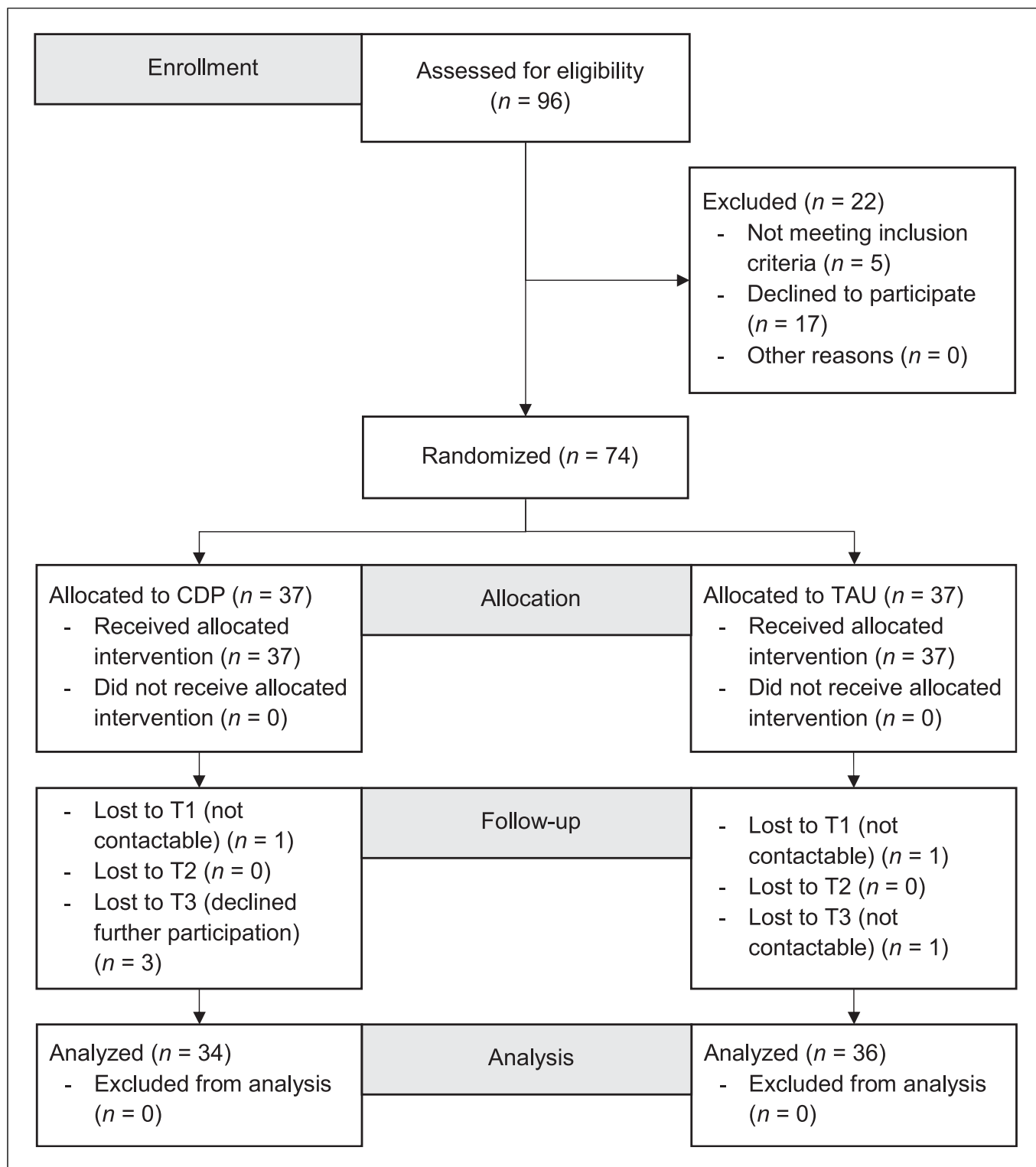


Fig. 2. Flow of study participants through recruitment, intervention, T1, T2, and T3 assessments, and analysis.

Table 1. Clinical characteristics of the sample

Clinical outcome	TAU	CDP	Group differences <i>p</i> value
NSSI in the last 6 months, Md (IQR)			
Before T2	8 (1–50)	10 (2–40)	0.668 ^a
Before T3	0 (0–1)	1 (0–6)	0.066 ^a
NSSI frequency, Md (IQR)			
In the first year after T2	8.5 (0–33.5)	7.5 (1–30)	0.712 ^a
In the second year after T2	0 (0–6)	2.5 (0–22.5)	0.228 ^a
In the third year after T2	1 (0–5)	0 (0–4)	0.516 ^a
SA yes/no, <i>n</i> (%)			
In the first year after T2	7 (19.4)	2 (5.9)	0.090 ^b
In the second year after T2	1 (2.8)	1 (2.9)	0.367 ^b
In the third year after T2	0 (0)	0 (0)	–
BPD diagnosis, <i>n</i> (%)			
At T0	8 (22.2)	15 (44.1)	0.079 ^b
At T3	1 (2.8)	3 (8.8)	0.276 ^b
Depression score, M (SD)			
At T2	20.9 (14.9)	22.8 (13.9)	0.586 ^c
At T3	16.6 (13.7)	19.2 (15.2)	0.456 ^c
Quality of life, M (SD)			
At T2	44.7 (8.4)	43.7 (8.9)	0.638 ^c
At T3	42.9 (6.3)	44.6 (7.8)	0.460 ^c
Number of therapy sessions between T2 and T3, M (SD)	34.7 (39.5)	33.7 (44.0)	0.926 ^c

TAU, treatment as usual; CDP, cutting down program; *n*, sample size; M, mean; SD, standard deviation; Md, median; IQR, interquartile range; NSSI, nonsuicidal self-injury; SA, suicide attempt; BPD, borderline personality disorder. ^a*p* value for a two-sample Wilcoxon rank-sum test at the presented point in time. ^b*p* value for a χ^2 test for group differences at the presented point in time. ^c*p* value for a two-sided *t* test for group differences at the presented point in time.

0.217). Age significantly predicted the decrease in suicide attempts (IRR = 0.73; 95% CI: [0.56, 0.97]; *p* = 0.027).

Borderline Personality Disorder

The development of BPD was assessed using the number of BPD diagnostic criteria according to the DSM-IV (between 0 and 9) as ordinal outcome. The distribution of the outcome at T0 and T3 in each group is shown in Figure 3e. The CDP group met significantly more BPD criteria at T0 compared to the TAU group (Wilcoxon rank-sum *p* = 0.049). To analyze the evolution of BPD from T0 to T3, an ordered logistic regression model was fit, with therapy group, time point (T0 or T3), and their interaction as predictors. Brant's test showed no evidence against the proportional odds assumption ($\chi^2(12) = 9.44$; *p* = 0.665). There was a significant decrease in the number of BPD diagnostic criteria from T0 to T3 (OR = 0.10; 95% CI: [0.04, 0.26]; *p* < 0.001), but the reduction did not differ significantly between the two groups (CDP × T3: OR = 0.68; 95% CI: [0.21, 2.24]; *p* = 0.526).

Depression

The mean depression scores by group and time point are shown in Figure 3c; means and standard deviations are reported in Table 1. There was a significant further reduction in depression scores between T2 and T3 ($\chi^2(1) = 4.86$; *p* = 0.028; difference in means: -3.97 ; 95% CI: $[-7.50, -0.44]$) with no group effect ($\chi^2(1) = 0.17$; *p* = 0.682) and no group × time point interaction ($\chi^2(1) = 0.10$; *p* = 0.754). The duration between T2 and T3 had no significant effect on the depression score at T3 (*p* = 0.201).

Quality of Life

Concerning quality of life, there was no further improvement between T2 and T3 (difference in means across both groups: -0.61 , 95% CI: $[-3.16, 1.94]$, *p* = 0.639), with no group difference ($\chi^2(1) = 0.08$, *p* = 0.784) and no group × time point interaction ($\chi^2(1) = 1.21$, *p* = 0.545). The duration between T2 and T3 had no significant effect on the quality of life at T3 (*p* = 0.250). The mean quality of life scores by group and time point are shown in Figure 3d; means and standard deviations by group and time point are reported in Table 1.

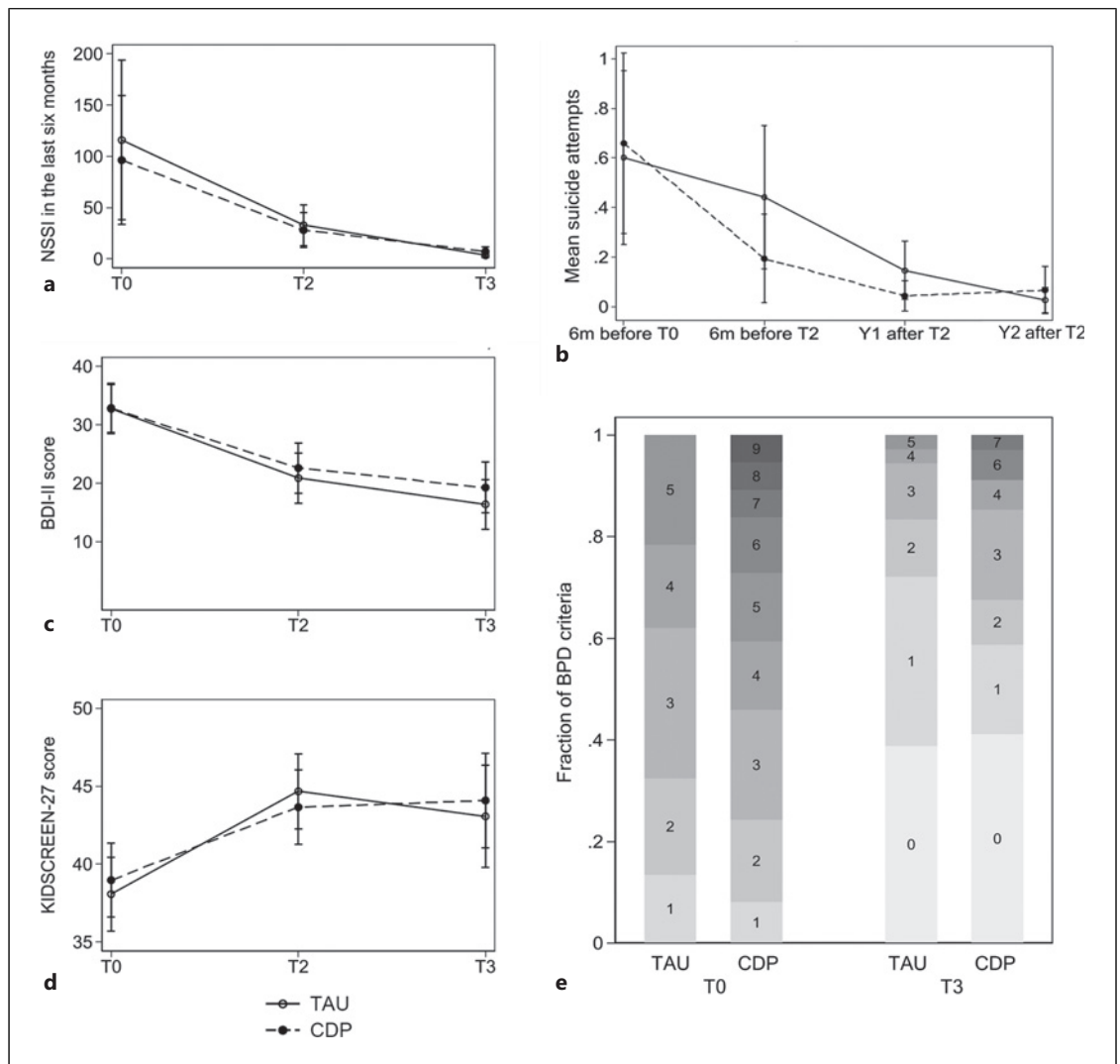


Fig. 3. Trajectory or distribution of all outcomes from T0 to T3. **a** Predicted mean NSSI frequencies over 6 months. **b** Mean suicide attempts. **c** Mean depression scores (BDI-II). **d** Mean quality of life scores (KIDSCREEN-27) over time by group with pointwise 95% confidence intervals. **e** The distribution of the number of BPD diagnostic criteria according to the DSM-IV at T0 and T3 by therapy group. TAU, treatment as usual; CDP, cutting down program. Follow-up of brief therapy for NSSI versus TAU.

Participants' Use and Impact of Treatment between T2 and T3

The TAU group completed on average 34.67 (SD = 39.49; 95% CI: [21.30, 48.03]) therapeutic sessions between T2 and T3, whereas the CDP group attended on average 33.74 sessions (SD = 43.99; 95% CI: [18.39, 49.08]). The between-group difference concerning number of attended therapeutic sessions between T2 and T3 was not statistically significant [$t(68) = 0.09$; $p = 0.926$]. Eleven (32.4%) participants of the CDP group did not attend any sessions between T2 and T3, whereas this was

true for eight (22.2%) participants within the TAU group. Again, there was no difference between the two groups ($\chi^2(1) = 0.91$; $p = 0.341$).

About half of patients who attended psychotherapy between T2 and T3 received behavioral therapy ($n = 26$), and other treatment programs included dialectical behavior therapy ($n = 7$), psychiatric ($n = 4$) and psychoanalytical treatment ($n = 3$), or other forms that were not further specified ($n = 15$). Psychotropic medication was administered to $n = 17$ patients with most adolescents receiving antidepressants ($n = 15$), followed by

methylphenidate ($n = 4$), neuroleptics ($n = 3$), or others ($n = 1$). Some patients received more than one form of psychotherapy ($n = 5$) or types of medication ($n = 6$).

To check for an association between further treatment after T2 and NSSI in the 6 months before T3, the number of outpatient therapy sessions between T2 and T3, standardized by the duration between T2 and T3, was added as an additional predictor to model 1. This model demonstrated that each additional outpatient therapy session was associated with a 5.5% reduction of NSSI at T3 (IRR = 0.95; 95% CI: [0.91, 0.98]; $p = 0.001$), even when controlling for age. There was no significant interaction between further outpatient treatment and treatment group (IRR = 0.97; 95% CI: [0.91, 1.04]; $p = 0.380$) or between further treatment and whether the participant received inpatient treatment between T2 and T3 (IRR = 0.96; 95% CI: [0.90, 1.04]; $p = 0.333$).

Discussion

Research on the long-term course and outcome after psychotherapy in adolescents is very scarce. In an earlier RCT, we compared CDP, a brief psychotherapy program designed for treating NSSI, to a high-quality TAU. There was no superiority of CDP over TAU regarding the 6-month frequency of NSSI, but the CDP group had a faster reduction of NSSI and significantly less therapy sessions than the TAU group [33]. The goal of the current study was to examine the longitudinal outcome of treatment efficacy over a follow-up period of 2–4 years. Our findings provide support for the maintenance of treatment gains achieved in the original study: Improvements from T0 to T2 were maintained or even improved at T3 regarding NSSI frequency, suicide attempts, depression scores, and quality of life. The number of fulfilled BPD criteria dropped significantly from T0 to T3 in both groups.

The frequency of NSSI was further reduced by 84% between completion of the initial study period and up to 4 years after enrollment. The positive effects of treatment were sustained, and patients kept improving in the long term. Due to the study design, the time point of T3 differed between subjects, and assessments were conducted between 2 and 4 years after baseline. With each additional year, a further reduction of NSSI was observed. This finding did not differ between groups, and no superiority of either treatment condition could be detected. Furthermore, age was a significant predictor of NSSI frequency and higher age at treatment, and study initiation was associated with less NSSI at T3. A downward trajectory of NSSI over the course of adolescence

has been described before, and our finding is in line with previous literature. In a systematic review on the longitudinal evolution of NSSI in community and clinical samples, Plener [2] found that after a peak at the age of around 15–16 years, the prevalence of NSSI dropped in late adolescence. With a mean age of 14.9 years (SD = 1.2) at baseline, our study sample fits in this age range, and our findings are in line with the reported change over time. It should be noted, though, that NSSI has a highly transdiagnostic character, and symptom shifts are common. A reduction of NSSI may correspond to an increase in other risk-taking behaviors such as alcohol and drug misuse [40] which was not assessed in the present study.

Clinically, the reported reduction in NSSI frequency is particularly meaningful because repetitive NSSI has been identified as a powerful predictor of further NSSI and suicidality [3–5]. As presented in the original study [33], suicide attempts were reduced significantly in both groups during initial treatment, and this positive development continued over the follow-up period. In year three after T2, no suicide attempts were reported. This is in line with analyses from community data [7] showing that among adolescents who reported NSSI but stopped a year later, after another year, the risk for suicidal thoughts and behaviors was comparable to those who had never self-harmed. This finding is particularly meaningful because, in addition to general improvement of mental health, the goal of reducing NSSI through psychotherapeutic interventions ultimately is the long-term reduction of suicide risk. We found no group differences, and both CDP and TAU seem to effectively lower the risk for suicide attempts over up to 4 years.

Because BPD was not assessed at T1 and T2, firm conclusions about the effectiveness of CDP or TAU regarding BPD cannot be drawn. However, like NSSI, the highest mean levels of BPD symptoms are commonly found during mid-adolescence with a significant decline in mean-level symptoms during late adolescence [41]. Therefore, the critical risk period for BPD characteristics and the ideal time for successful interventions for BPD and NSSI seem to correspond to the mean age of our sample, and we provided treatment just during this critical time which may further explain the improvement of BPD criteria we found in this study. This finding is particularly encouraging because BPD used to be considered a persisting and hardly changeable diagnosis [11], and over a time frame of 2 to 4 years and through rather low-threshold interventions, the symptom severity of BPD was significantly reduced in this sample.

Findings regarding depression and quality of life were also encouraging. The improvement of depressive symptomatology that was achieved during initial treatment was enhanced between T2 and T3 with a significant further reduction of depression scores in both groups. According to BDI-II cut-off thresholds [38], the mean depression scores across the whole sample dropped from the severe range at baseline to moderate at T2 and mild at T3. In addition to NSSI, both interventions therefore seem to be effective in the reduction of depressive symptoms beyond the initial treatment period. Even though quality of life was not further improved between both follow-up assessments, the higher level achieved after initial treatment could be sustained at T3. Quality of life is a broad concept comprising more than symptom severity, and many adolescents with NSSI face impairment in this domain [13]. In such a highly burdened study sample, a rather comprehensive and extensive intervention may be necessary to achieve significant and sustainable advancements across different areas of life and well-being.

As could be expected, many patients attended further therapy sessions after completing the study. The number of participants who continued or resumed therapy between T2 and T3 did not significantly differ between both groups and neither did the quantity of therapy sessions. Although the TAU group received significantly more sessions than the CDP group during the initial treatment period [33], there was no difference in the amount of sessions after the original treatment. Over the complete duration of the study period, the CDP group therefore received less therapy than participants in the TAU condition in total and they did not, as may have been expected, compensate by utilizing more psychotherapeutic treatment after initial therapy completion. Additionally, patients in the CDP group not only received significantly less therapy during initial treatment but also had a 6-month treatment pause between treatment completion and T2. This break does not seem to have been harmful in the long term. Our findings support CDP as an adequate first intervention for adolescents who present with NSSI as we found no disadvantages compared to traditional high-quality TAU regarding treatment outcome. By initially providing a shorter, more accessible, and economical treatment option, patients, therapists, and health care providers in general benefit.

Independent of group or additional inpatient stays, it has to be noted that treatment between T2 and T3 significantly reduced NSSI further. This also means that

in many cases, neither CDP nor high-quality TAU seemed to sufficiently improve long-term NSSI frequency and comorbid psychopathology, and many patients required additional psychotherapeutic care. For a significant group of patients, additional treatment seems to be a vital aspect of long-lasting recovery. Notably, however, around one third of adolescents in this high-risk sample seemed to profit sufficiently from a brief psychotherapeutic program such as CDP as a stand-alone intervention, and they did not seek further treatment. To transfer the implications of our findings to routine clinical care, a “stepped care” approach is suggested [28, 29]. In these models, all patients begin treatment with a brief psychotherapeutic program, such as the CDP, and individuals who have not profited sufficiently from the initial intervention continue with prolonged treatment. This way, a short, easily accessible, and clinically feasible intervention may be offered to a larger group, and patients with an increased need for psychotherapeutic support are provided with more extensive treatment in a next step. Even if a patient received further treatment after the initial study, our analyses showed that the CDP did not result in a worse outcome than TAU. To predict whether a brief intervention may suffice for a patient early in the therapeutic process is extremely challenging, and further longitudinal research is needed to close this gap. Independent of later treatment length and intensity, a low-threshold intervention may reduce the barriers and stigma keeping many adolescents engaging in NSSI from seeking help in the first place and act as a gateway for receiving adequate further psychotherapeutic care.

Limitations and Strengths

There are study limitations to note. Limitations concerning the sample can be found elsewhere [33]. Due to the study design, follow-up time points for T3 were spaced over 2 to 4 years after baseline. As reported in the results, we did not find statistically significant group differences between CDP and TAU regarding any outcome. The non-significance should, however, be treated with caution. The sample size was predetermined by the original study [33] and the initially performed power analysis. Even though our analyses did not show group differences across the follow-up period, a larger sample may have been needed to statistically confirm the equality of both groups, in particular given the high variability of the individual trajectories of NSSI in both groups. This multifinality is not surprising for a transdiagnostic

phenomenon in an adolescent sample, but its exploration certainly constitutes an avenue of future research. As discussed, a high percentage of participants continued treatment, and we cannot distinguish whether the maintenance and further reduction of NSSI and comorbid symptoms are attributable to the initial CDP and TAU intervention or to the continuation of treatment after the study. Since treatment between T2 and T3 was not randomized and there was no waiting condition, we cannot verify a causal link between follow-up treatment intensity and NSSI reduction. NSSI is known for following a longitudinal trajectory with a peak in mid and decline in late adolescence [2], and in order to thoroughly disentangle the effects of treatment and the natural course, further RCTs would be necessary. However, a number of treatment sessions were comparable in both groups, and our results suggest additional therapy can significantly improve long-term outcome in adolescents with NSSI. The prospective follow-up design and the very high follow-up rates of 95% at T3 should be noted as important strengths of the study. Furthermore, rigorous procedures were applied during data collection and standardized instruments were used, ensuring the integrity of ratings.

Conclusions

The present study suggests that initial psychotherapy with the brief intervention CDP is associated with similar long-term outcomes of NSSI, suicide attempts, BPD, depression, and well-being than high-quality TAU involving a higher initial treatment dose. While our findings do not support the use of the CDP as a superior treatment to usual care available in Germany, its short duration, manualized administration, and accessibility make this program an attractive option for health care providers and patients. The CDP may be a suitable intervention as part of a stepped-care treatment approach in form of a low-threshold offer for adolescents. Some patients may profit sufficiently from this program and achieve satisfactory results in just 10 sessions. However, NSSI is a complex phenomenon, and many patients require additional and more extensive treatment which can then be specifically tailored to their needs. Such a customized approach has the potential to save time and costs as well as reduce waiting times for treatment-seeking adolescents who present with NSSI.

Acknowledgments

We thank Ulrike Schmidt and Lucy Taylor at the King's College London for providing the original English version of the "Cutting Down Programme."

Statement of Ethics

This study was reviewed and approved by the Institutional Review Board (Ethics Committee) of the medical faculty at the University of Heidelberg (approval number: S-363/2011). All patients and/or parents or caregivers (if participants were below age 16) provided written informed consent. According to the EU General Data Protection Regulation [42], the cognitive faculty to consent to data sharing and processing is typically acquired at age 16 which is adopted as the age at which minors are allowed to autonomously consent to participate in noninvasive research projects in Germany [43]. The study was conducted in accordance with the Declaration of Helsinki.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Funding Sources

The study was funded by the Dietmar Hopp Foundation (Grant No. 23011188) and additional research funds of the Clinic for Child and Adolescent Psychiatry at the University of Heidelberg.

Author Contributions

F.Ro. interpreted data analyses and wrote the manuscript. A.E. was involved in initial analyses and manuscript drafts. A.E. and G.F.W. carried out data acquisition including recruitment and assessment. J.J. performed statistical analyses. M.K. was responsible for the conception, design, and coordination of the work. R.B. and F.Re. were involved in the study design and supervision. All authors revised the article critically, gave final approval of this version to be published, and agree to be accountable for all aspects of the work.

Data Availability Statement

The data that support the findings of this study are not publicly available due to the particularly sensitive nature of clinical data of minors. Inquiries regarding an anonymized dataset may be addressed to the corresponding author (M.K.) upon reasonable request.

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