



# Online self-help for suicidal thoughts: 3-month follow-up results and participant evaluation



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## ARTICLE INFO

### Article history:

Received 10 September 2014

Received in revised form 8 July 2015

Accepted 8 July 2015

Available online 16 July 2015

### Keywords:

Suicidal thoughts

Self-help

Internet

Follow-up

Evaluation

Cognitive behavioral therapy

Online

## ABSTRACT

**Background:** As a substantial proportion of people with suicidal thoughts does not receive treatment, the internet can be utilized to reach more people who need support.

**Aims:** To examine maintenance of effects of online self-help for suicidal thoughts at 3-month follow-up within the intervention group of a randomized controlled trial (of which between-group 6-week post-test results have previously been reported, showing a small effect of 0.28 for suicidal thoughts in favour of the intervention group), and to investigate acceptability of the intervention through participant evaluation.

**Methods:** 236 adults with mild to moderate suicidal thoughts were randomized to the intervention ( $n = 116$ ) or a waitlist control group ( $n = 120$ ). Assessments took place at baseline, post-test (6 weeks later), and follow-up (3 months after post-test). This paper reports on the intervention group and follow-up assessment only.

**Results:** Effects established at 6-week post-test were generally maintained at 3-month follow-up in the intervention group. Participant evaluation revealed that a majority thought their suicidal thoughts had decreased during the study, that adherence to the intervention was below average, and that levels of satisfaction were acceptable.

**Limitations:** The control group could not serve as a comparator as they had received access to the intervention at post-test.

**Conclusions:** Effects of online self-help for suicidal thoughts can be maintained for up to three months. Participant evaluation indicated that online self-help for suicidal thoughts is acceptable, but there is also room for improvement.

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## 1. Introduction

The internet is increasingly used to deliver interventions in mental healthcare and web-based programmes for a range of mental health problems such as depression, anxiety and problem drinking have been found to be effective (e.g. Andersson and Cuijpers, 2009; Andrews et al., 2010; Cuijpers et al., 2009; Riper et al., 2007). In the field of suicide prevention, there is growing interest in online suicide-related communications and content (e.g. Kemp and Collings, 2011), and prevention efforts (e.g. Barak, 2007; Mokkenstorm et al., 2010; Mishara and Kerkhof, 2013). As a substantial portion of people with suicidal thoughts does not receive treatment (Bruffaerts et al., 2011), it is a promising means to reach more people. Still, very few effectiveness studies have been conducted in online suicide prevention (Pietrzak and McLaughlin, 2009; Luxton et al., 2011; Christensen et al., 2013; Watts et al., 2012).

A review into traditional face-to-face treatment for people with suicidal thoughts shows that cognitive behaviour interventions such as cognitive behaviour therapy (CBT) and dialectical behaviour therapy (DBT) can be effective and that treatment effect persists up to two years (Tarrier et al., 2008). Other cognitive based therapies that have some evidence for reducing suicidal thoughts include mindfulness based cognitive therapy (MBCT) (Forkmann et al., 2014) and problem solving therapy (PST) (Brown and Jager-Hyman, 2014).

A randomized controlled trial (RCT) recently conducted in the Netherlands found significant effects at 6-week post-test in favour of online self-help for people with suicidal thoughts compared with a waitlisted information control group (between-group effect size 0.28 for suicidal thoughts) (van Spijker et al., 2014). In addition, the programme was found to be cost-effective (van Spijker et al., 2012). The current paper presents the 3-month follow-up results for this trial. It is important to note that the control group was provided with access to the self-help programme at 6-week post-test, making between group comparisons at this final 3-month follow-up impossible. Follow-up data reported here therefore only pertain to the intervention group participants and maintenance of their results 3 months after post-test. It is expected that their results will persist at final follow-up, as

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benefits of web-based treatments for depression and anxiety generally seem to be maintained at follow-up (Andrews et al., 2010). In addition, this paper describes the results of the participant evaluation that was part of the 3-month follow-up questionnaires. This may provide insight into utilization, reasons for non-adherence, perceived helpfulness, and satisfaction of online self-help for suicidal thoughts. Moreover, it may indicate potential areas for improvement.

## 2. Methods

This paper is a continuation of a previous publication describing the 6-week post-test results of this study (van Spijker et al., 2014). Full details of the methodology of this study have been described elsewhere (van Spijker et al., 2010). Below, elements relevant to the 3-month follow-up results and evaluation of the intervention are summarised.

### 2.1. Procedure

Recruitment from the general population took place between October 2009 and November 2010 through newspaper advertisements, relevant websites (e.g. [www.113online.nl](http://www.113online.nl)), and Google Adwords.

Eligibility was assessed using a stepwise online screening procedure. Ineligibility at any stage resulted in automatic redirection to a page with referral information. Exclusion criteria were: 1) being under the age of 18, 2) not experiencing suicidal thoughts, 3) being severely suicidal, 4) being severely depressed, 5) not being fluent in Dutch, and 6) not providing a valid email address. To determine presence and severity of suicidal thoughts (criteria 2 and 3), the Beck Scale for Suicide Ideation (BSS) was used (Beck and Steer, 1991). Respondents scoring below 1 (no suicidal thoughts) or above 26 (severe suicidal thoughts) were excluded. The criterion for severe depression was a score above 39 on the Beck Depression Inventory (BDI-II) (van der Does, 2002). These cut-off scores were determined in consultation with clinical experts.

After being deemed eligible, participants received full information about the trial, completed the baseline questionnaire, and provided written informed consent along with personal contact details and those of their general practitioner. Participants were then randomized by an independent researcher using a block design (20 per block), and stratified by gender. Randomization outcome was communicated by e-mail. The intervention group received a link to and login codes for the intervention website, and the control group was provided with a link to a website constructed for this study containing general information on suicidality. Six weeks after randomization, participants in the control group also received access to the intervention website.

Because this study was conducted in a vulnerable population, safety procedures were employed (van Spijker et al., 2010, 2014). Each time a participant exceeded cut-off scores on suicidal ideation or depressive symptoms, a risk assessment was carried out over the phone. If deemed necessary, or if a participant could not be reached, their general practitioner (GP) was contacted.

The study was approved by the Medical Ethics Committee of the VU University Medical Centre (registration number 2008/204).

### 2.2. Participants

Of the 1268 respondents who were assessed for eligibility, about half ( $N = 706$ , 55.7%) was considered eligible. However, a substantial portion of eligible respondents did not return their informed consent ( $N = 417$ , 59.1%) or failed to provide a valid e-mail address ( $N = 53$ , 7.5%). The remaining 236 were randomized to the control condition ( $N = 120$ ) or the intervention condition ( $N = 116$ ). See also Fig. 1.

As follow-up results are only relevant for the intervention group, baseline characteristics are only provided for this group (Table 1). More detailed characteristics for the full sample are described elsewhere (van Spijker et al., 2014).

The safety procedures were applied to 50 participants, of whom 19 were in the intervention group. The GP was called for 3 participants in the intervention group because of high risk (versus 9 calls to the GP in the control group). Based on self-report, four participants in the intervention group attempted suicide during the study (versus seven in the control group). No completed suicides occurred during the study (van Spijker et al., 2014).

### 2.3. Intervention

The main goal of the intervention is helping participants decrease the frequency and intensity of their suicidal thoughts, thereby making these thoughts more controllable. In order to help participants achieve this, the intervention utilizes cognitive techniques. The core of this unguided self-help intervention is cognitive behaviour therapy (CBT) (Beck, 2005). In addition, components of dialectical behaviour therapy (DBT) (Linehan, 1993a,b), problem solving therapy (PST) (Townsend et al., 2001), and mindfulness based cognitive therapy (MBCT) (Segal et al., 2002; Williams and Swales, 2004) are used. These treatment programmes have demonstrated promising results in reducing suicidality (Tarrier et al., 2008; Brown et al., 2005; Linehan et al., 2006; Hawton et al., 1999; Williams et al., 2006).

The intervention consists of six modules. Each module contains a theory section, a weekly assignment, a few 'core exercises', and several 'optional exercises'. In the first module, the often repetitive character of suicidal thoughts is outlined (Kerkhof et al., 2011). Exercises such as 'worry time' (i.e. scheduling discrete times throughout the day to worry about problems/suicidality) are meant to help participants manage their suicidal thoughts better. The second module aims at providing tools to regulate intense emotion (e.g. participants are encouraged to create a crisis plan). Modules 3 to 5 contain basic cognitive exercises, in which participants consecutively work on identifying automatic thoughts, recognizing thinking patterns and reformulating negative automatic thoughts. In the final module, participants are encouraged to create a relapse prevention plan and think about how to deal with possible future setbacks.

Participants are advised to do one module per week and receive a weekly automated motivating e-mail. There are also three exemplifying vignettes to consult when needed. Although no structural guidance was offered, participants are able to ask questions via the website (and have them answered). Finally, participants are informed that the programme will remain available to them after the study so that they can visit the website whenever they need.

### 2.4. Measures

The primary outcome measure in this study was suicidal thoughts. Secondary outcomes were depressive symptoms, hopelessness, worry, anxiety, and health status. All outcomes were assessed at baseline, at post-test (six weeks after baseline), and at final follow-up (three months after post-test). All measures were self-report and administered via the internet.

Suicidal thoughts were measured by means of the BSS (Beck and Steer, 1991). The BSS consists of 21 items, each scored on a 0–2 scale. Total scores range from 0 to 38, and are obtained by adding items 1–19. The last two items deal with suicide attempts and intent to die during the most recent attempt. Internal reliability of the BSS is high, with Cronbach alpha ranging from 0.87 to 0.97 (Brown, 2001). Severity of depressive symptoms was assessed using the BDI-II (van der Does, 2002), which contains 21 items and has a total score range of 0 to 63. Internal consistency is good (Cronbach alpha 0.88–0.93) (van der Does, 2002). The Beck Hopelessness (BHS) scale was administered to assess hopelessness (Beck and Steer, 1988). This scale consists of 20 true/false statements, each scored 0 or 1, which add up to a total score between 0 and 20. Kuder–Richardson reliability lies between 0.87 and 0.93 (Brown, 2001). Worry was assessed using the Penn State Worry

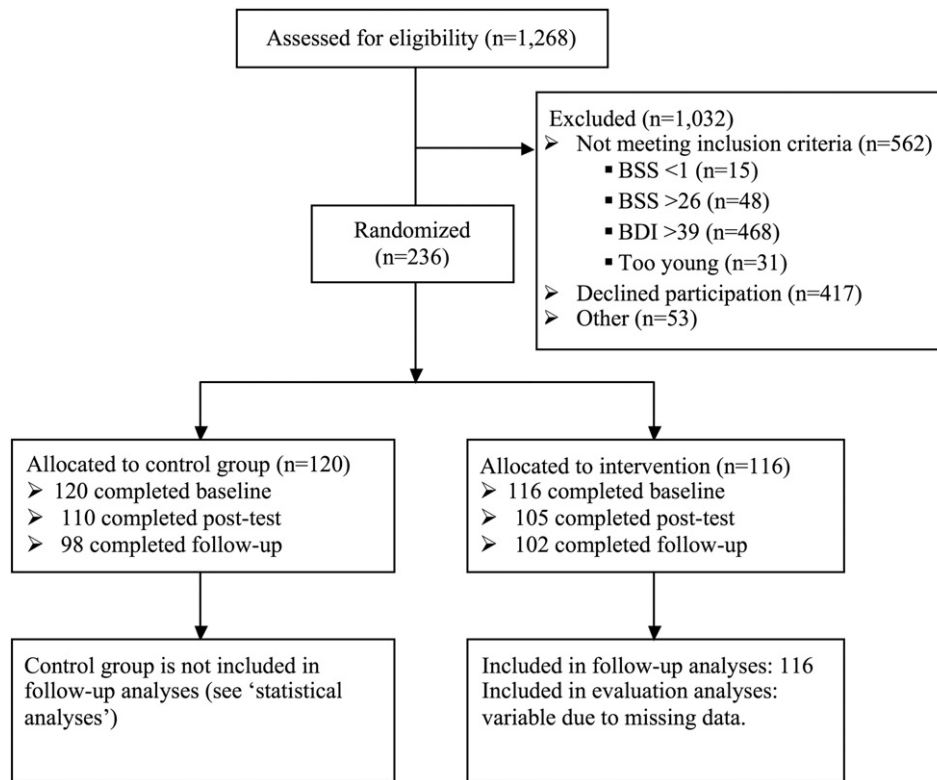


Fig. 1. Participant trial flow.

Questionnaire–Past Week (PSWQ–PW), which is a 15-item scale. Responses can range from ‘never’ (0) to ‘almost always’ (6), yielding a total score of 0 to 90. Average Cronbach alpha for this scale is 0.91 (Stöber and Bittencourt, 1998). The anxiety subscale of the Hospital Anxiety and Depression Scale (HADS–A) was used to assess anxiety symptoms (Bjelland et al., 2002). Each of the 7 items is rated on a 4-point scale (0–3) so that total scores range from 0 to 21. Cronbach alpha varies between 0.80–0.84 (Spinhoven et al., 1997). Health status was measured using the thermometer item of the EuroQol (Brooks,

1996). Respondents rate their current health status on this thermometer, ranging from 0 (worst imaginable health status) to 100 (best imaginable health status).

Finally, a number of questions regarding the use of, and satisfaction with, the intervention were administered at the 3-month follow-up assessment. These questions were developed by the authors for the study and related to number of modules completed, time spent on the intervention, reasons for discontinuing the intervention, subjective improvement in suicidal thoughts, helpful and less helpful elements of the intervention, general satisfaction (expressed on a 1–10 scale), and suggestions for improvement.

Table 1  
Baseline characteristics for intervention group (N = 116).

	Intervention (N = 116)
Demographic characteristics	
Female gender (N, %)	76 (65.5)
Age (M, SD)	40.5 (14.1)
Education (N, %)	
Lower	11 (9.5)
Intermediate	60 (51.7)
Higher	39 (33.9)
Other	6 (5.2)
Living with a partner (N, %)	41 (35.3)
Has children (N, %) <sup>a</sup>	37 (32.7)
Born in the Netherlands (N, %) <sup>a</sup>	107 (94.7)
Paid employment (N, %) <sup>a</sup>	57 (50.4)
Clinical characteristics	
Suicidal thoughts (M, SD)	15.2 (6.8)
Attempted suicide (N, %) <sup>a</sup>	
Never	64 (56.7)
Once	19 (16.8)
More than once	30 (26.5)
Depressive symptoms (M, SD)	27.6 (9.3)
Hopelessness (M, SD) <sup>a</sup>	14.7 (3.5)
Worry (M, SD) <sup>a</sup>	58.8 (11.0)
Anxiety (M, SD) <sup>a</sup>	10.6 (3.5)
Health status (M, SD) <sup>a</sup>	60.0 (17.8)

<sup>a</sup> Missing: N = 3

## 2.5. Statistical analyses

### 2.5.1. Maintenance of results intervention group at 3-month follow-up

To test whether effects detected at 6-week post-test in the intervention group were maintained at 3-month follow-up, missing values at post-test (N = 11, 9.5%) and at follow-up (N = 14, 12.1%) were replaced using multiple imputation in SPSS 22.0, assuming data were missing at random and including group allocation, gender, age, education, suicidal thoughts, depressive symptoms, hopelessness, worrying, anxiety, and health status as predictors. Next, paired samples t-tests were conducted and within-group effect sizes were calculated according to Cohen's d.

### 2.5.2. Participant evaluation

For the analyses of the evaluation, missing values were not imputed as variables were mainly categorical or open-ended. Open-ended questions were numerically coded. If responses pertained to more than one category, these were coded separately. In general, analyses consisted of simple counts. In one of the continuous variables ('time spent on intervention'), four outliers were detected and replaced by the mean value plus two standard deviations. All analyses were done using SPSS 22.0.

**Table 2**  
Follow-up results for the intervention group (N = 116).

	Baseline (M, SD)	Post-test (M, SD)	$\Delta M^a$ (SD)	$t^a$ (df)	$d^a$ (95% CI)	Follow-up (M, SD)	$\Delta M^b$ (SD)	$t$ (df)	$d^b$ (95% CI)
Suicidal thoughts	15.2 (6.8)	10.7 (9.2)	4.5 (8.2)	5.3 (586)**	0.56 (0.34–0.78)	10.3 (9.8)	4.9 (10.0)	6.0 (1638)**	0.49 (0.30–0.68)
Depressive symptoms	27.6 (9.3)	23.5 (13.1)	4.1 (10.1)	5.8 (217)**	0.41 (0.21–0.60)	20.6 (14.3)	7.0 (13.0)	4.4 (3919)**	0.54 (0.37–0.71)
Hopelessness	14.7 (3.5)	12.6 (5.6)	2.1 (5.0)	5.3 (465)**	0.42 (0.22–0.63)	12.0 (6.0)	2.7 (5.6)	4.6 (7199)**	0.48 (0.29–0.68)
Worry	58.8 (11.0)	53.2 (13.9)	5.6 (10.7)	3.9 (44)**	0.52 (0.34–0.71)	53.6 (15.1)	5.2 (14.1)	5.6 (270)**	0.37 (0.21–0.52)
Anxiety	10.6 (3.5)	9.6 (4.3)	1.0 (4.1)	3.9 (274)*	0.24 (0.04–0.45)	9.0 (4.0)	1.6 (4.3)	2.7 (130)**	0.37 (0.19–0.56)
Health status	60.0 (17.8)	62.7 (21.2)	–2.7 (20.8)	–0.9 (584)	–0.13 (–0.07–0.33)	61.8 (19.8)	–1.8 (21.5)	–1.3 (219)	–0.08 (–0.27–0.10)

<sup>a</sup> Within-group results regarding baseline to post-test.  $d = (\Delta M)/SD_{\Delta M}$

<sup>b</sup> Within-group results regarding baseline to follow-up.  $d = (\Delta M)/SD_{\Delta M}$

\*  $p < 0.01$ .

\*\*  $p < 0.0$ .

### 3. Results

#### 3.1. Follow-up results

Within group mean differences and effect sizes for the intervention group are shown in Table 2. Paired samples t-test showed that the intervention group improved significantly on suicidal thoughts, depressive symptoms, hopelessness, worry, and anxiety between baseline and 6-week post-test (see also van Spijker et al., 2014). These effects were generally maintained at 3-month follow-up.

#### 3.2. Evaluation of intervention

##### 3.2.1. Utilization of intervention

At 3-month follow-up, participants reported spending an average of 10.5 h on the intervention (SD = 13.5), which equals 1.8 h per week (i.e. per module), or 15 min per day. As reported previously, 21.6% of participants in the intervention group (N = 25) had completed all modules at 6-week post-test (see van Spijker et al., 2014). Data from the evaluation indicate that this percentage increased to 31.0 (N = 36) at 3-month follow-up. A majority of participants in the intervention group (N = 80, 80.8%) indicated not to have revisited the intervention website after the 6-week intervention period. A minority indicated that they had needed more time to finish the intervention and therefore accessed the website after the 6-week intervention period (N = 10, 10.1%). A similar percentage logged in after the intervention period when they felt they needed it (N = 9, 9.1%). The remaining 17 participants did not indicate whether or not they had accessed the website between the 6-week post-test and the 3-month follow-up assessment.

##### 3.2.2. Reasons for drop out from intervention

Among the 80 participants in the intervention group who indicated at 3-month follow-up not to have completed the intervention, the most reported reasons for non-adherence were lack of energy or discipline (N = 8, 10.0%) and lack of time (N = 5, 6.3%). Four participants (5.0%) reported no further need for treatment due to recovery of symptoms. Three people (3.8%) indicated that they had commenced psychological treatment elsewhere. Illness (N = 1, 1.3%) and admission to a psychiatric hospital (N = 2, 2.5%) during the intervention period were also among the reasons for non-adherence. Another two participants (2.5%) discontinued the intervention due to it influencing them negatively. One of them reported that the intervention triggered a depressive episode, and the other stated that the first three modules did not contain new information, which resulted in disappointment and decreased faith in the potential to recover. Other reasons for not completing the intervention (N = 12, 15.0%) included not having noticed the e-mail with the login codes, and not finding the intervention relevant to one's situation. The remaining 43 participants (53.8%) did not provide a reason for discontinuing the intervention.

##### 3.2.3. Perceived helpfulness and appreciation of intervention elements

A question concerning the subjective change in suicidal thoughts during the study period showed that the majority of participants in the intervention group who responded to this question (N = 97) indicated that their suicidal thoughts became less troubling (N = 40, 41.2%) or a lot less troubling (N = 27, 27.8%). The same number reported no change (N = 27, 27.8%), and a small number of participants indicated that their suicidal thoughts troubled them more (N = 3, 3.1%). The three individuals in this latter category did not provide further information about this. These three participants did not include the two that had reported a negative influence of the intervention as a reason for drop-out as they both indicated that their suicidal thoughts troubled them less.

Participants could nominate up to two elements of the intervention they found helpful or appreciated. Sixty-four participants (55.2%) responded to this question. Half of these mentioned the same element twice (N = 32, 50.0%) in which case it was counted only once, and some only mentioned one element (N = 8, 12.5%). Elements most reported as helpful or appreciated were cognitive techniques used in the intervention, such as recognizing automatic thoughts and thinking patterns, reformulating negative automatic thoughts, and positive thinking exercises (N = 17, 26.6%). A number of comments were less specific and reported having appreciated the theory and/or exercises in general (N = 15, 23.4%), while several pertained specifically to appreciating the worry time exercise (N = 8, 12.5%). A further 7 (10.9%) comments indicated that making a crisis plan was helpful and important. Some appreciated the information about telephone helplines (N = 4, 6.3%) and two participants (3.1%) reported finding the openness of the intervention about suicidality helpful. The remaining positive comments (N = 34, 53.1%) related to other elements of the intervention, such as the vignettes, or did not indicate a strong preference (e.g. indicated to have liked the whole intervention). Included in this category are also comments that relate more to the study than to the intervention, such as completing questionnaires.

Similarly, participants could nominate up to two elements of the intervention that they found less helpful. Sixty-two participants (53.4%) responded to this question. Several participants mentioned the same element twice (N = 25, 40.3%), in which case it was counted only once, and a similar number only mentioned one element (N = 22, 35.5%). Elements most reported as less helpful or less appreciated were the vignettes (N = 10, 16.1%). A similar number indicated that the intervention did not contain new information and/or exercises (N = 8, 12.9%), often due to previous experiences with psychological treatment. A few indicated that worry time was too heavy or required too much discipline (N = 5, 8.1%) and some reported a need for feedback or guidance (N = 3, 4.8%). A large portion of comments (N = 46, 74.2%) related to various other elements of the intervention (e.g. that the section on reformulating negative automatic thoughts was too extensive), to the study in general (e.g. that the wording of several questions in the questionnaires was unclear), or indicated not to know what elements were less helpful. Finally, five responses stated specifically that they liked everything about the intervention (8.1%).

### 3.2.4. Suggestions for improvement

On a 1–10 scale (with 1 representing complete dissatisfaction and 10 representing complete satisfaction), the majority of participants in the intervention group ( $N = 72$ , 74.2%) rated the overall intervention  $\geq 6$ , indicating that they were more satisfied than not. Data on this was missing for 19 participants (16.45%). When asked what should be improved to increase this rating, provision of personal feedback or guidance was most frequently suggested ( $N = 7$ , 10.9%). Five participants (7.8%) advised tailoring the intervention to individual needs. A similar number ( $N = 6$ , 9.4%) indicated there was too much material and/or more time was needed per module (i.e. more than the recommended one week per module). Conversely, four participants recommended greater elaboration of the theory sections (6.3%). Another four (6.3%) indicated the intervention needed no changes. The majority did not know how the intervention may be improved ( $N = 18$ , 25.1%), or made other, less frequent, recommendations ( $N = 18$ , 25.1%) such as increasing attention to life events and adding more writing exercises. Included in this latter category were also suggestions to improve the questionnaires used in the study.

## 4. Discussion

This study sought to verify whether effects of online self-help for suicidal thoughts were maintained at 3-month follow-up and presented participant evaluation results in order to provide insight into the acceptability of the intervention. Between group effects at post-test for this study were small and have been published previously (van Spijker et al., 2014). It was found that all effects detected at post-test were maintained at 3-month follow-up. Although no other studies into online self-help for suicidal thoughts have been conducted, and results can therefore not be directly compared, these results are in line with findings from previous studies concerning online self-help interventions for depression and anxiety (Andrews et al., 2010).

Adherence to the intervention was below average. Where reviews of online depression trials have shown 50–87% adherence (Andrews et al., 2010; Christensen et al., 2009), only 21.6% of participants in the intervention group had completed all modules at post-test (see van Spijker et al., 2014), which increased to 31.0% at follow-up. It should be noted here that measures of adherence vary across studies, which influences comparability. A possible explanation for low adherence in this trial lies in the absence of guidance, as poorer adherence has previously been reported for unguided web-based treatment trials (de Graaf et al., 2009; Kenwright et al., 2005). In addition, elements inherent to the target population may play a role. For example, noncompliance has been reported as a barrier to treatment in people who attempt suicide (Lizardi and Stanley, 2010) and die by suicide (Huisman et al., 2011). However, this is not consistently reported (e.g. Sokero et al., 2008) and might therefore be subject to specific patient groups. More specifically, the severity of symptoms in the current sample (see also van Spijker et al., 2014) may have contributed to poorer adherence, as these have been linked in previous web-based intervention studies (Christensen et al., 2009). Self-reported reasons for noncompliance in this study were generally in line with common reasons for intervention drop-out, which include lack of time, lack of motivation or discipline, and improvement in condition (Christensen et al., 2009).

Participant evaluation showed that the majority (two thirds) of participants reported that their suicidal thoughts troubled them less over the course of the study. Although this was a subjective measure, it is a noteworthy result and in line with the aim of the intervention (i.e. making suicidal thoughts more manageable). Moreover, it corresponds with what may be expected in face-to-face treatments (Tarrrier et al., 2008; Brown et al., 2005). Results regarding the perceived helpfulness and appreciation of the intervention were variable. For example, worry time was listed as a helpful element by some, whereas others regarded it as less helpful. Although this was anticipated by providing optional

exercises in each module, tailoring the intervention to individual needs may increase benefits.

Overall, the majority (74.2%) of the sample was more satisfied than not with the intervention, which is in keeping with previously reported satisfactions levels of 70–100% (Andrews et al., 2010). As with adherence, different measures may be used to assess satisfaction, which may limit comparability. Suggestions for improvement primarily showed a need for more guidance, which is in line with findings from a qualitative study on patient experiences in unguided self-help for depression (Gerhards et al., 2011). In this study, the main reason for providing the intervention without guidance was to facilitate implementation and dissemination in organizations in countries with limited finances. However, when means are available, guidance is recommended. In general, the variety of suggestions for improvement further indicates that what works differs from person to person, thus supporting the argument for tailored intervention. Tailored online interventions have been found to be more effective in the treatment of severe depression with comorbidity compared to standardized online treatment (Johansson et al., 2012). Tailoring our intervention might entail participants being screened for ‘most urgent problem areas’ (e.g. controlling emotions, repetitive thinking, hopelessness, worthlessness, unlovability) and preferred therapeutic techniques (e.g. seeking distraction, mindfulness, cognitive restructuring, problem solving) upon registration. Subsequently, participants could be directed towards the most relevant module. Future research is required to inform this screening and direction process. While this approach would be time consuming, a more readily employed option to tailor the intervention would be to provide guidance (e.g. group-chat, private chat, e-mail, phone calls) and vary the frequency and intensity according to individual needs.

### 4.1. Strengths and limitations

Strengths of this study pertain to it being the first to study online self-help for suicidal thoughts. Limitations include the fact that no follow-up data was available for the control group, as they gained access to the intervention at post-test. Although this was done in the interest of ethical conduct, it would be desirable to utilize a longer waiting period in future studies for the control group. A second limitation is the relatively high number of missing values in the evaluation data, which may bias results. Finally, a longer follow-up period would be beneficial in order to capture effects beyond three months.

## 5. Conclusion

In conclusion, this study has demonstrated that effects obtained for online self-help for suicidal thoughts can be maintained for up to three months. Participant evaluation indicated that web-based self-help for suicidal thoughts is acceptable, but also that tailored intervention, with potential for personal feedback, could be beneficial. Future studies are needed to provide a better understanding of how the internet and other social media could best be utilized to help people with burdensome suicidal thinking.

### Conflict of interest statement

BvS, AK, and AvS are authors of the web-based treatment programme described in this manuscript. BvS and AK receive royalties from an adapted paper version of the self-help programme described in this manuscript, published by Boom: Amsterdam (2012) under the title “Piekeren over zelfdoding” (in Dutch).

### Acknowledgements

This study was supported by a grant from the Netherlands Health Research Council, The Hague (ZonMw) (project number 120510003).

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