Moodpep: description and evaluation of an online self-help program for young adults with feelings of depression

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Abstract

There is a high prevalence of mental health problems in young adulthood. At the same time, these problems seem to be undertreated. Barriers to seeking help include: stigma, costs and time issues. eHealth interventions could be a promising solution. Moodpep was developed in 2019 as a guided online self-help program for young adults (18+) with depressive symptoms. It is based on Cognitive Behavioral Therapy and includes 8 lessons and 4 themes: activation, relaxation, changing negative cognitions, and goal attainment. The aims of the present article were: giving a detailed description of Moodpep and evaluating the program. The latter was done by analyzing pre-post data and studying participant satisfaction. In total, 31 participants started with the intervention of whom 23 completed it. The results showed that depressive symptoms significantly reduced after following the program, with large effect sizes. At post-test almost all participants scored in the categories of minimal or mild depression. In addition, program and coaching were valued by the participants. In conclusion, Moodpep could provide effective low-threshold help to young people; they could work on mental health at their own time and place, in relative anonymity, and against no or low costs.

Keywords mental health; depressive symptoms; young adulthood; eHealth; cognitive behavioral therapy

Young adulthood - the age group between approximately 18 and 30 years - is an important period in life, with some crucial developmental tasks to fulfill, such as completing education, establishing meaningful social relationships and finding and keeping work (Arnett, Zukauskiene, & Sugimura, 2014). At the same time, there is a high prevalence of mental health problems in this period, which endangers the fulfilment of such tasks (Veldman, Reijneveld, Ortiz, Verhulst, & Bultmann, 2015). A recent large scale study investigating the prevalence of mental health disorders among more than 10,000 college students in 8 countries reported that no less than 31% of the students screened positive on 12 month incidence of one or more mental disorder(s), of which depression was the most prevalent disorder (Auerbach et al., 2018). The authors argue, that if sub-clinical distress would also have been taken into account, far more than 31% would have been found to suffer from mental health problems (Auerbach et al., 2018). Although the study – being an online survey - had limitations which makes it difficult to determine whether the figures reflect true prevalence of disorders, it definitely shows that mental health problems are common among college students. At the same time, it has been established that mental health problems of young people are undertreated (Radez, Reardon, Creswell, Lawrence, Evdoka-Burton, & Waite, 2021). The results of a study in the UK among young adults of 18 years and older pointed to the most common barriers to seeking help for mental health problems. A first category of identified barriers referred to stigma (for example: feeling embarrassed or shamed or being concerned that people may find out). A second category of barriers could be traced back to general treatment ideas (for example: wanting to solve the problem on their own or disliking of talking about their feelings). And a third category of barriers referred to more practical issues (like not being able to afford the costs or difficulty to take time off work) (Salaheddin & Mason, 2016).

Self-help eHealth interventions may provide the opportunity to overcome a number of these barriers, as people can work on the interventions at their own time and place, stigma-free in relative anonymity, and against no or low costs (Bennett, Ruggero, Sever, & Yanouri, 2020). In their review of 24 review studies and meta-analyses on the effectiveness of web-based (and app-based) interventions, Bennett et al. (2020) concluded that eHealth interventions (mostly based on CBT) consistently helped to significantly reduce depression severity. This was also true for the group of young adults. Another finding was that most (but not all) of the meta-analyses that included data regarding the availability of guidance, concluded that guided interventions (referring to all kinds of supportive activities, ranging from a single meeting with a clinician to receiving text messages to increase adherence) resulted in better outcomes than unguided interventions. In addition, shorter interventions - i.e. fewer than nine sessions - seemed to have larger effects than longer ones. Bennet et al. (2020) also presented results about attrition rates. High attrition rates were found for interventions aimed at reducing depression (reported attrition rates averaged between 26 and 57%), with the caveat that – according to two of the included meta-analyses - attrition rates were found to be much higher for unguided interventions (44 and 74%) than for guided ones (26% and 28%). Another meta-analysis investigated potential differences in dropout rates between online interventions and face-to-face interventions. Their results showed no significant difference between the two treatment formats with regard to dropout rate (Carlbring, Andersson, Cuijpers, Riper, & Hedman-Lagerlof, 2018). They also found that online and face-to face treatments were equally effective in treating depressive symptoms.

Moodpep was developed in 2019 as an online *guided* self-help program for young adults of approximately 18 to 30 years of age with depressive symptoms. The content of the program is not entirely new though. It is an adaptation of the existing online self-help program 'Living positive', initially developed for people with HIV and depressive symptoms (Garnefski & Kraaij, 2019a). 'Living positive' is a 6-8 week program based on Cognitive Behavioral Therapy, including 8 lessons linked to four main components: activation, relaxation, changing negative cognitions, and goal attainment. The results of a large-scale Randomized Controlled Trial showed that 'Living Positive' was effective in decreasing depressive symptoms in the target group, compared to a control condition that received attention only (van Luenen, Garnefski, Spinhoven, & Kraaij, 2018). The evidence-based program was adapted to the needs of a young general population group. The main components and lessons of the program were left intact, while examples and exercises were refreshed and tailored to the new target new group by including content related to concerns and goals that are important for this age group, such as failing exams, getting good grades, finding a good job, worries about friendships and the future.

There are many other eHealth programs that are also based on CBT and that are also used for young people of this age. However, these are often not based on scientific evidence and not specifically developed for this target group (Achilles, Anderson, Subotic-Kerry, Parker, & O'Dea, 2020). What is new about this program is that the basis for this program is evidence-based and that examples and exercises in Moodpep are really aimed at this specific age group.

The aim of the present article is to give a detailed description of Moodpep and to present the results of the first evaluation. For this purpose, the article is split into three parts. In part 1, Moodpep is described. Information is given about the online environment in which the program is offered and about the content of the lessons. In part 2, results on the effectiveness of the program are presented. For that purpose, pre-post data regarding depressive symptoms was analyzed. In part 3, post-test data with regard to participant satisfaction is presented.

Part 1. Description of Moodpep: online program for young adults (18+) with depressive symptoms

Moodpep is an online self-help program that provides participants with tools to deal with mild to moderate depressive feelings, which can help them to improve their mood. There are 8 lessons in which participants learn different skills by psychoeducation, exercises and assignments. The self-help program is based on the principles of Cognitive Behavioral Therapy and has four key components: starting new activities, improving relaxation, changing negative thoughts and working towards concrete, personal goals. The program can be followed at home (it can be accessed from a computer or tablet) at times that suit the participant. The program can be completed in approximately 6-8 weeks and it takes about 1 to 2 hours a week to work on it. Although young adults can follow the program all by themselves, without any coaching, it is advised to work with (minimal) support from a coach. The main task of the coach is to check how participants are doing and to provide motivation to continue with the program, by using motivational interviewing techniques. In the original Moodpep setting coaching was done by means of a weekly phone call with the participant by a graduate psychologist in training. However, it is also possible to deliver the

coaching via other formats, for example by means of a video call or online via chat or mail.

In the original Moodpep setting, pre-and posttests with the Patient Health Questionnaire-9 (PHQ-9; Kroenke, Spitzer, & Williams, 2001) have been applied to assess the severity of the mood problems at the start and end of the program to be able to quantify the progress and to be able to refer to other forms of intervention or therapy if required. Other validated depression screeners could be used for the same purpose.

The online environment of the original Moodpep setting and the content of the program will be described below. The program can be followed in Dutch or English. The program has also been included in other platforms, such as Caring Universities, a free online service to improve student's mental wellbeing which was set up as a joint venture of universities in the Netherlands (Vrije Universiteit Amsterdam, 2020).

The Online Environment

The online program is offered in a secure web environment (Garnefski & Kraaij, 2019b). If people go to the website they will find the information page. Here it is explained that the online program has been developed for young adults suffering from mood problems and that the aim of Moodpep is to help cope better with daily struggles and to improve their mood. In addition, the page provides information about the content of the program, time investment, confidentiality, empirical evidence for self-help programs in general, and the steps people have to take if they want to participate.

After participants have received their login details, they get access to the 'home page', where they find further information about symptoms of depression and the program. On the home page they get the opportunity to fill in a depression screener (PHQ-9), after which they receive their score with relevant advice. They can fill in this questionnaire again while working with the program to see whether their symptom level is changing. They are encouraged to share thoughts and possible worries about the scores and advices with their coach.

To start with the lessons they have to go to the 'Dashboard'. The 'dashboard' is the online page where all the information, links to the lessons, exercises and other materials are brought together. In addition, it provides information for technical problems, account and contact details, crisis situations and a privacy statement. It is also the place where participants can view their (previous) assignments and use a notepad to write down observations.

The Lessons

Before Getting Started. Before starting with lesson 1, the participant is supposed to follow a 'pre-lesson' that is called 'Before you get started. This lesson provides encouraging words for starting with the program, guidelines on how to work on the program (for example participants get the advice to try to complete the program in 6-8 weeks and to divide the lessons evenly over the weeks) and some explanations about the flow of the website and the lessons.

Before describing the content of lessons 1-8, it is important to note that all lessons consist of a mixture of psychoeducation, examples, exercises and assignments, illustrating video's and case descriptions. At the end of each lesson, there is reflection on the most important learning points from present and previous lessons, and suggestions on how to proceed with them.

Lessons 1-8.

Lesson 1: Breaking the Vicious Circle (and Starting with a (Positive) Activity). This lesson starts by giving psychoeducation about the CGT model to the participants. It is shown how thoughts, emotions, behaviors and physical reactions are interconnected and how these elements influence each other. It is explained that if they see all these aspects as components of a vicious circle, changing one small component can have large consequences for the other components of the circle. It is explained that a first (behavioral) step on the road to breaking through the vicious circle and change is: starting a (positive) activity. The assignment of this lesson is about finding a small activity that people can add to their daily routine or something small that they can change in their daily routine. People are guided to find such an activity by means of socratic questions. The lesson ends with suggestions how to go on with the activity, a preview of the next lesson and the advice to make a plan and schedule time for working on the program in the upcoming weeks.

Lesson 2: Physical relaxation. In this lesson the focus is on the physical component in the vicious circle, and this is done by working on physical relaxation. Again, this lesson starts with psychoeducation. For example it is explained that, in daily life, people encounter situations that are stressful and cause tension and that people's body responds to this. It is also explained to participants that experiencing a lot of tension in their body over a long period of time will have a negative impact on their emotions and mood. In this lesson, people will learn to recognize tension and to relax better. The lesson includes a relaxation exercise that can be downloaded, a registration form to register the times and places where the relaxation exercise is done and how relaxed one feels before and after the exercise. The lesson ends by explaining that it is important to proceed with the relaxation exercise including registration and by giving suggestions on how one could do that.

Table 1. Descriptives of PHQ-9 Scores (Pre-Test, Post-Test, Pre-Post Differences; Completers and Intention-to-Treat)

	N	Possible range	Actual range	Mean	Sd
1. PHQ Pre-test	31	0-27	3-20	12.16	3.94
2. PHQ Post-test (C)[a]	23	0-27	0-17	6.00	4.30
3. PHQ Post-test (ITT)[b]	31	0-27	0-20	8.06	5.42
4. PHQ pre-post (C)[a] difference score	23	(-27)-(+27)	(-2)-(+13)	5.52	4.20
5. PHQ pre-post (ITT)[b] difference score	31	(-27)-(+27)	(-2)-(+13)	4.10	4.35

Note. [a]C: completers; [b]ITT: Intention to treat; [c]Difference score was calculated by subtracting the post-test score from the pre-test score; higher scores reflect more improvement.

Lessons 3 and 4: Changing Negative Thoughts. In these lessons the focus is on the cognitive component of the vicious circle and that is done by teaching participants how to recognize and change their own negative, irrational thoughts.

In the psychoeducation part (lesson 3) it is explained that how people feel is primarily determined by their thoughts and that by changing their thoughts, people can positively influence their emotions. To illustrate how it works examples are given of irrational, negative thoughts, with a special focus on disaster thinking (catastrophizing), and black-and-white (all-or-nothing) thinking. It is explained that such thoughts might play an important role in people's lives and determine their emotions, but at the same time that the thoughts might not (entirely) be true and that they definitely do not help them to feel good. It is also explained that people can learn to recognize their own negative, irrational thoughts, and replace them with more rational, well-balanced, thoughts (which will make them feel better). To illustrate this, examples of negative, irrational thoughts are provided as well as more rational, well-balanced alternatives.

In the practical part (lesson 4) people work on finding and changing their most common negative (irrational) thought. They will do that by a stepwise exercise. In the first step of the exercise they are guided (with examples and questions) to find their own negative, irrational thought. In the second step they learn to ask themselves a number of critical, but friendly questions about their thought (for example: Imagine that it is not you who is having this thought, but a good friend. What would you say to your friend (and which argument would you give) to help him/her see that the thought is not (entirely) true?. In the third step they are guided (again with examples and questions) to change their negative thought into a more helpful one. And in the final step they will learn to consolidate the new thought by creating a help card. At the end of the lesson they are encouraged to repeat this exercise in the upcoming period at times that suit them.

Lesson 5: Evoking a Positive Feeling. This lesson is also focused on changing negative thoughts, but now by using principles of counterconditioning. This is a technique by which unwanted responses are changed through forming new associations with stimuli that are incompatible with the expression of the originally learned response (Keller, Hennings, & Dunsmoor, 2020). In the psychoeducation part it is explained (with examples) that people cannot simultaneously experience two contradictory emotions at the same time (for example people cannot feel anxious and relaxed at the same time) . Against that background an exercise is introduced in which people are guided to 'push away' negative feelings, images and thoughts with the help of a positive image or feeling. The exercise starts with asking people to identify a negative feeling, image or thought they want to get rid of. Subsequently people are asked to recall a positive experience from their life that is characterized by a positive, relaxed, strong or proud feeling. Then they are guided to adopt posture, facial expression and a word associated with that positive experience. In the next step they will learn to evoke the positive feeling associated with this experience. Subsequently they are taught how to push the negative feelings into the background with the help of that positive feeling. In the final step they will create a help card to consolidate the positive feelings.

Lesson 6 and 7. In these two lessons, participants will be working on finding new, concrete personal goals and on increasing their self-confidence in order to achieve these goals. In the psychoeducation part (lesson 6) it is explained that there is a strong connection between actively spending time doing things that people find important and their mood. It is also taught that if you want to formulate a (new) personal goal that it has to meet some important criteria, as your goal needs to be formulated in a concrete way, it has to be feasible, it needs to have a clear time perspective and it has to be meaningful and close to one's basic life goals. Against that background

Table 2. Detailed Pre- Post-Test Scores According to PHQ-9 Categories (Completers)

		Post-test score			
Pretest score		0-4 (minimal depression)	5-9 (mild depression)	10-14 (moderate depression)	15-19 (moderately severe depression)
	N=23	N=11	N=8	N=3	N=1
0-4 (minimal depression)	N=2	2[a]			
5-9 (mild depression)	N=3	2[b]	1[a]		
10-14 (moderate depression)	N=13	6[b]	5[b]	2[a]	
15-19 (moderately severe depression)	N=5	1[b]	2[b]	1[b]	1[a]

Note. [a]Score category remained the same; [b]score category improved; [c]score category deteriorated

an exercise is introduced (lesson 6) that helps people to formulate a concrete and feasible personal goal and to make an action plan that describes how, where and when they will be working towards achieving this goal. Another exercise is introduced in lesson 7, in which people are guided to identify any hindering thoughts or supposed obstacles when they think about achieving their personal goal. Subsequently the techniques of lessons 3 and 4 are used again in order to challenge and change their most important hindering thought into a more helping thought. In addition, lesson 7 offers a second exercise intended to help people gain more self-confidence to achieve their goal. The exercise consists of a technique of asking yourself a number of questions, that are based on techniques from motivational interviewing (some sample questions: On a scale of 0 to 10, indicate where you are right now, with 0 being at the start of your goal and 10 having achieved your goal; and: What made you give this score on the scale? How did you get there? How did you manage to do it? What did you find most helpful? What skills do you have that help you to achieve your goal?). The lesson ends with some reflections on the lesson and some reminders associated with previous lessons.

Lesson 8. Lesson 8 is a concluding lesson, where participants get a summary of what has been taught and some advice on how to proceed. It is also emphasized that they can be proud of the steps they have taken and words of encouragement are provided for the future. In addition, words of reassurance are provided, for example about that it is not always easy to change habits and that people may fall back into their old patterns from time to time. It is also added that it is important to realize how much they have already learnt. In addition, it is discussed that as this is a self-help program, it may be that this program does not provide

them with sufficient help at the moment and that they may need more intense help or coaching. Some advises are given how to proceed if that is the case (like going to the GP).

Part 2. Evaluation of the effectiveness of Moodpep

The aim of this part is to evaluate the effectiveness of Moodpep. Below, the method and results of this study are presented. The analyses concerned pre-post data related to depressive symptoms.

Method

Participants. Participants were young people aged 18+ who responded to a call to participate in Moodpep if they suffered from (mild to moderate) depressive symptoms in the period between February 2020 and July 2020. Moodpep was introduced to them as an online self-help program with coaching for young people with feelings of depression. Potential participants found the information via study advisors, at the university website or via other social media. Moodpep was offered in the context of the Mental Health facility of Leiden University. Inclusion criteria for participants were: age 18+, mastery of the Dutch or English language, self-rated psychological complaints being mild to moderate, being available and able for the next eight to ten weeks to work on the intervention, having internet, e-mail and a telephone number.

The study was approved by the ethics committee of the Institute of Psychology, Leiden University (number 2020-06-26-2445).

Procedure. After potential participants had showed their initial interest by sending an email, they were

Table 3. Paired t-tests Pre-Post PHQ-9 Scores (Completers and Intention-to-Treat).

	Mean difference[c]	SD difference	t	df	p	Effect size (Cohen's d)
PHQ Pre-post (C)[a] (N=23)	5.52	4.20	6.31	22	.000	1.31
PHQ Pre-post (ITT)[b] (N=31)	4.10	4.35	5.24	30	.000	0.94

Note. [a]C: completers; [b]ITT:Intention to treat; [c]Difference score was calculated by subtracting the post-test score from the pre-test score; higher scores reflect more improvement.

called by one of the coaches. The purpose of this telephone call was to get acquainted, to get a picture of the severity of their psychological complaints (including suicidality), to determine whether participating in a guided online program matched their needs, and to answer possible questions. If there was a match, more practical information was provided, among others about the coaching and the time schedule. If the nature of the problems suggested that more guidance was needed than the program could offer, a visit to the general practitioner in order to be referred to a face-to-face psychologist was advised to the person concerned.

Subsequently, the participants received a link to the pre-test as part of Routine Outcome Monitoring and an appointment was made for the first coaching telephone call. After they had filled in the pre-test, participants received login details for the secured website of the intervention and could start with the program. Before they filled in the pre-test they had to sign an informed consent form. After they completed the program they filled in the post-test as part of Routine Outcome Monitoring. Changes in depression scores were discussed during the final coaching session. The last post-test of the last participant was completed in October 2020.

All participants received telephone coaching, which included that they were called by their personal coach once per week for about 15 minutes. They were asked how they were doing and how they proceeded with the intervention. Motivational Interviewing techniques were applied to enhance motivation, in order to prevent attrition. Part of the procedure of coaching was monitoring depressive symptoms and suicidal thoughts during the period of working at the program and referring to the general practitioner if symptoms would increase or become severe.

Coaches were Master students in clinical psychology who provided coaching under supervision of registered psychologists. In addition to their regular clinical skills courses, the coaches were trained in providing coaching via an online e-learning module.

Measurement. Primary outcome was depressive symptoms, which was measured with the Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001). The total score of the PHQ-9 ranges from 0-27 with higher scores indicating more symptoms. With regard to the (categorical) cut-off scores of the PHQ-9: scores of 0–4 indicate no depressive symptoms, 5–9 mild depressive symptoms, 10–14 moderate depressive symptoms, 15–19 moderately severe depressive symptoms and 20–27 severe depressive symptoms. Previous studies have shown PHQ-9 to be a reliable instrument, with Cronbach's alpha around .90 (Kroenke et al., 2001).

Statistical Analysis. The study has a pre-post study design. Power-analysis (G-power) showed that in order to obtain an estimated medium effect size of 0.50, an alpha of .05 and a power of 0.80, 26 participants had to be included in the study. With an expected attrition rate of 15%, we aimed to include 31 participants.

All analyses were conducted in SPSS version 25. First, descriptive results of pre-, post- and difference scores are presented. Secondly, a contingency table is presented with pre-test scores crossed with post-test scores, based on PHQ-9 cut-off scores. Thirdly, paired t-tests were performed to test the significance of differences from pre-test to post-test and Cohen's d was calculated as a measure of effect size, based on PHQ-9 total scores. Analyses were carried out with and without intention to treat (ITT).

Results

In total, 31 participants started with the intervention and coaching, of whom 24 were female (77.4%). The mean age was 24.71 (Sd=4.22). With regard to their living situation, 25.8% were still living with their parents, 12.9% were living with a partner, 45.1% were living on their own, and 6.4% had another non-

Table 4. Frequency Distributions of the Questions Regarding Evaluation of the Program

Question	Answer categories	N	%
1. How satisfied are you with the self-help program Moodpep?	Not at all satisfied	0	0
	Hardly satisfied	0	0
	A little satisfied	4	17.4
	Quite satisfied	16	69.6
	Very satisfied	3	13.0
2. How useful has this self-help program been for you?	Not at all useful	0	0
	Hardly useful	0	0
	A little useful	6	26.1
	Quite useful	14	60.9
	Very useful	3	13.0
3. Would you recommend other persons to follow this program?	Certainly not	1	4.3
	Maybe	4	17.4
	Certainly	18	78.3
4. To what extent do you have the intention to start with more activities in the upcoming period?	Certainly not	0	0
	Maybe	8	34.8
	Certainly	15	65.2
5. To what extent do you have the intention to continue with the physical relaxation exercises?	Certainly not	1	4.3
	Maybe	9	39.1
	Certainly	13	56.5
6. To what extent do you have the intention to continue applying the technique "recognizing and changing your negative thoughts"?	Certainly not	0	0
	Maybe	6	26.1
	Certainly	17	73.9
7. To what extent do you have the intention to continue applying the technique "evoking a strong and positive feeling"?	Certainly not	1	4.3
	Maybe	9	39.1
	Certainly	13	56.5
8. To what extent do you have the intention to continue applying the technique "making an action plan to achieve your goal"?	Certainly not	0	0
	Maybe	6	26.1
	Certainly	17	73.9

specified living situation. With regard to education level, most participants were higher educated (92.5% were following or completed a Bachelor or Master education program). For 58.1% the main daily activity was education, for 19.1% that was work, for 9.6% a combination of tasks, and 13.8% indicated to do 'none of the two'. Of the 31 participants who started with the intervention, 23 participants completed the program. There were no significant differences between completers and non-completers with regard to depression severity (PHQ-9) at pretest and age. There were no male participants among the non-completers.

The descriptive results (N, range, mean score and standard deviation) of the PHQ-9 pre- and posttest are presented in table 1. Pre- and post-test questionnaires were completed by all participants that completed the intervention (N=23). The first and second row of table 1 give the results for the pre-test and post-test, respectively, for those who completed the intervention (N=23). The post-test results in the third row also include the participants that had started with the program, but did not complete it (N=31; ITT or intention to treat). Their missing post-test score was replaced by their score on the pre-test. The fourth and fifth row provide the figures regarding pre-post difference scores, for completers and non-completers respectively. Difference scores were calculated by subtracting the post-test score from the pre-test score. Positive (mean) difference scores reflect improvements.

Table 2 depicts the contingency table in which PHQ-9 pre-test scores were crossed with PHQ-9 post-test scores, based on the PHQ-9 cut-off scores. At post-test, 17 participants showed categorical improvements, 6 participants remained in the same 'cut-off' category and no participant deteriorated. At post-test, 19 participants scored in one of the categories of minimal or mild depression, compared to 5 participants at pre-test.

Table 3 displays the results of the paired t-tests, for completers and for non-completers (ITT). The pre-post difference score of 5.52 reflects a significant average improvement on the PHQ total score for completers. The ITT pre-post difference score of 4.10 for the whole group endorses the average improvement. Both pre-post mean difference scores were significantly different from 0, with large effect sizes (Cohen, 1988).

Table 5. Frequency Distributions of the Questions Regarding Evaluation of the Coach

Question	Answer categories	N	%
1. How satisfied are you with the support of the coach?	Not at all satisfied	0	0
	Hardly satisfied	0	0
	A little satisfied	0	0
	Quite satisfied	10	43.5
	Very satisfied	13	56.5
2. Did you think it was pleasant that coaching was offered by telephone?	Yes	20	87.0
	A little	2	8.7
	No	1	4.3
3. Would you have preferred another way of coaching?	Like it was (telephone)	16	69.6
	Like it was + chat	1	4.3
	Other preference:		
	- Video call	4	17.4
	- Video call + chat	1	4.3
	No matter how	1	4.3
	No coaching at all	0	0.0
	Otherwise	0	0.0

Part 3. Evaluation of Moodpep: Analyses of Post-Test Participant Satisfaction

In this part, post-test data with regard to participant satisfaction are presented. Detailed information on participants and procedures was already given in Part 2. Below it is first explained how participant satisfaction was measured. Subsequently the results are presented.

Measurement of Participant Satisfaction.
Participant satisfaction was measured with a self-designed questionnaire at post-test (N=23). Both the satisfaction with the program and the coach were assessed.

With regard to the program evaluation, participants were asked 'If you would evaluate the self-help program with a grade, on a scale of 0 to 10, what number/mark/grade would you give it? (0 = very bad program and 10 = very good program)'. Also eight (categorical) questions were asked about satisfaction with and usefulness of the program, their intentions to continue with the techniques, and the likeliness that they would recommend the intervention to others. For the wording of the questions see table 4.

With regard to the evaluation of the coach, participants were asked: 'If you would evaluate your coach with a grade, on a scale of 0-10, what number/mark/grade would you give your coach? (0 = very bad support from the coach and 10 = very good

support from the coach)'. Also, three categorical questions were asked about what they thought about the coaching per telephone and whether they would have preferred other modalities. For the wording of the questions see table 5.

Results
    Satisfaction with the Program. The mean grade that was given to the program itself was 7.65 (Sd=0.88; range 6-9). Table 4 presents the answers on the categorical questions about the evaluation of the program. The frequency distributions show that most participants are quite to very satisfied with the program, that the program has been quite to very useful for most of them, that most of them would certainly recommend the program to other people, and that the intention of most participants is to continue applying the techniques taught in the program.
    Satisfaction with the Coach. The mean grade that was given to the coach was 8.48 (Sd=1.04; range 7-10). Answers on the categorical questions about the evaluation of the coach are presented in table 5. The frequency distributions show that most participants were quite to very satisfied with the support of the coach. In addition, most participants found it pleasant that coaching was offered by telephone and most of them would not have preferred another modality of coaching.

Discussion

The aim of the present article was to describe Moodpep, an online self-help program for young adults (18+) with depressive symptoms, and to present the first results on the evaluation of the program. By following Moodpep participants are provided with tools to help them improve their mood. The program has eight lessons, techniques from Cognitive Behavioral Therapy (CBT) are applied and four main components are included: starting new activities, improving relaxation, changing negative thoughts and working towards concrete, personal goals. In addition, participants receive guidance of a coach, consisting of weekly 15 minute phone calls, aimed at providing motivation. With regard to the results, both completer and intent-to treat analyses showed that depressive symptoms of participants significantly reduced after following the program, with large effect sizes. In addition it was found that at post-test almost all participants scored in the categories of minimal or mild depression (whereas only five did at pre-test). With regard to participant satisfaction with program and coaching, the results showed that both were valued by the participants. They also appreciated the fact that the coaching was provided by telephone.

With regard to the limitations: although the initial sample size corresponded with the desired sample size calculated from the power analysis, the attrition rate was a bit higher than expected. Fortunately, this was compensated by the fact that the actual effect sizes were higher than the estimated effect size that was used for the power analysis. Therefore, the study still had sufficient power to detect the changes in the outcome measure. A limitation of the present study was the lack of control group. It cannot be ruled out that the reduced depression rates after following the program are to be attributed to the elapsed time or to other factors outside of the intervention. The results therefore need to be viewed with some caution and a large-scale Randomized Controlled Trial (RCT) should be performed in order to be able to draw conclusions regarding the effectiveness of the program. Nevertheless, the present study has been an important first step towards demonstrating the value of the program. It is also reassuring that the results do confirm the research results of 'Living positive', the self-help program on which Moodpep was originally based. In a large RCT 'Living positive' had been found to be effective in reducing depressive symptoms in the intervention group, compared to a control condition that received attention only (Luenen et al., 2018). The present results also confirm the results of the meta-analysis of Bennett et al. (2020) who concluded that eHealth interventions based on CBT could significantly reduce depression severity. Also, the answers on the evaluative questions confirmed that program and techniques were seen by the participants as useful.

Another limitation was that in the current study only Routine Outcome Measurement pre-post data was available. Although the PHQ-9 is a well-evaluated screening tool, multiple forms of assessment, clinical and diagnostic data should be added in future studies, including instruments that could help to answer questions with regard to mediation and moderation.

In the present study coaching by telephone was provided, which was highly appreciated by the participants. This could be useful information for other (future) self-help programs, when choices have to be made for the modality of coaching. The study of Bennett et al. (2020) suggested that attrition would be lower if guidance is added to a self-help program. The attrition rate of the present study was 25.8%, which indeed was on the lower side when compared to the range of attrition rates mentioned in the meta-analysis of Bennett et al. (2020), where rates ranged between 26 and 57%. In addition, the coaching (by telephone) had been appreciated by the participants with an average grade of 8.5. It would be interesting to investigate, whether this is a consistent finding. To investigate the question whether participants value coaching by telephone more than other forms of coaching (for example by mail or chat), different forms of coaching could be included (and compared) in one and the same study. In addition it could be explored whether there is a subgroup that would prefer to do the program independently, without any kind of guidance. Another interesting question would be to study whether attrition rates would vary across the coaching formats.

Taking these limitations and future challenges into account, Moodpep could be a promising online program, that might provide help to thousands of young people, who could work on it at their own chosen time and place. It could overcome long waiting lists and fill in the treatment gap for young people, as mental health problems of young people are still undertreated (Radez et al., 2021). Shame, embarrassment, need for anonymity, cost and time issues were among the most important treatment barriers indicated by Salaheddin & Mason (2016). Bennett et al. (2020) already suggested that self-help eHealth interventions could provide the solution, as they would give people the opportunity to work on their well-being at their own time and place, stigma-free in relative anonymity, and against no or low costs. The program can be used internationally; it has already been translated into English and can be translated into other languages.

The most important challenge is to achieve successful implementation and to secure continuation of the program. Some steps have already been set towards successful implementation of Moodpep. For

example, Moodpep has been implemented in Caring Universities, an online platform developed by four Universities in the Netherlands that offers free online services (with coaching) to improve student's mental wellbeing (Vrije Universiteit Amsterdam, 2020). The online platform of Caring Universities will be expanded in time to other universities in countries within and outside Europe. It is interesting to investigate whether Moodpep could also be added to other online eHealth platforms in order to reach as many young people as possible.

Additional Information

Conflict of Interest
The authors report no conflict of interest.

Ethical Approval
The study was approved by the ethics committee of the Institute of Psychology, Leiden University (number 2020-06-26-2445).

Data Availability
Data is not available.

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