

# Individually tailored internet treatment in routine care: A feasibility study

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## ARTICLE INFO

### Keywords:

Internet treatment  
Guided self-help  
Disorder-specific treatment  
Individually tailored treatment  
Assessment  
Implementation

## ABSTRACT

**Introduction:** Disorder-specific internet treatment, based on cognitive-behavioral therapy, has been a part of routine psychiatric care in Sweden since 2007, provided at the Internet Psychiatry Clinic in Stockholm. Individually tailored treatments, with the opportunity to target more than one condition within the same treatment, has since then been evaluated in randomized trials with promising results. To introduce an individually tailored treatment into a clinical setting originally designed for disorder-specific processes creates challenges, such as how to choose the optimal treatment type for each patient.

**Methods:** The feasibility of a proposed new routine for assessment and initiation of either a disorder-specific or an individually tailored treatment was tested on patients self-referring to the Internet Psychiatry Clinic during three weeks ( $N = 66$ ), by exploring the match between comorbid problem areas and patients' preferred treatments with available disorder-specific treatment options, as well as presenting these patients' preferred problem areas to work with in individually tailored treatment, and evaluating any problems with the proposed routine. The feasibility (i.e. satisfaction, credibility, treatment activity, adherence, and preliminary symptom reductions) in the individually tailored treatment were also explored on a smaller subgroup of eight patients.

**Results:** A majority (65%) of patients screened had at least 2 comorbid problem areas, although 25% of these comorbid patients that were allocated with the help of the proposed routine still initiated disorder-specific treatment. The proposed assessment routine functioned satisfactorily within the up and running internet clinic. The individually tailored treatment was promising regarding satisfaction, credibility, adherence, and preliminary reductions in symptoms. A notable challenge encountered was that the platform was not set up to assist with assessment process or outcome monitoring for individually tailored treatment.

**Conclusions:** It seems feasible to combine individually tailored internet treatment and disorder-specific internet treatment within the same internet clinic. The addition of tailored treatment may prove to increase the number of patients included in treatment.

## 1. Introduction

### 1.1. Background

Anxiety disorders and major depression are prevalent disorders causing a major health burden globally (World Health Organization, 2017). Psychological treatments are important tools to restore mental health but psychotherapists are often inaccessible. Internet-delivered psychological treatment is an alternative that when implemented may

offer effective, cost-effective and accessible treatment for these disorders (Titov et al., 2015a). The Internet Psychiatry Clinic in Stockholm, Sweden, is the first of its kind (Titov et al., 2018) and has been running as a routine care service since 2007. From the beginning, the clinic has been based on disorder-specific interventions with therapist-guided treatment programs for major depression (Hedman et al., 2014), panic disorder (Hedman et al., 2013) and social anxiety disorder (El Alaoui et al., 2015), joined later by other disorder-specific programs for conditions such as insomnia (Kaldø et al., 2015), irritable bowel

**Abbreviations:** DS, disorder-specific; SD, standard deviation; PHQ-9, Patient Health Questionnaire - 9 item; MADRS-S, Montgomery-Åsberg Depression Rating Scale - Self-rated; GAD-7, Generalised Anxiety Disorder 7-item scale; PDSS-SR, Panic Disorder Severity Scale - Self-Report; SPIN, Social Phobia Inventory; PSS-10, Perceived Stress Scale - 10 item; ISI, Insomnia Severity Index; EQ-5D, EuroQol five-dimensional questionnaire; WHODAS-2, World Health Organization Disability Assessment Schedule 2 - 12-item; CSQ-8, Client Satisfaction Questionnaire - 8 item version

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<https://doi.org/10.1016/j.invent.2019.100263>

Received 28 April 2019; Received in revised form 19 July 2019; Accepted 23 July 2019

Available online 15 August 2019

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syndrome (Ljótsson et al., 2010) and health anxiety (Hedman et al., 2011).

However, depressive and anxiety disorders are highly intertwined and comorbid with other mental health problems. In a Swedish register study of a primary care population ( $N = 5,397,675$ ) a majority of patients with major depression also fulfilled criteria for anxiety disorders or adjustment disorder (Sundquist et al., 2017). To better handle comorbid conditions within one treatment, internet-based treatments have been developed with transdiagnostic content, i.e. where all patients receive the same content that aims to handle several disorders (Titov et al., 2017) and/or individually tailored content, i.e. where the content is selected from a content library to specifically match the patient's disorder profile (Berger et al., 2014; Johansson et al., 2012). Even though many of these studies focus on patients with depression as their main concern, the results of programs for people with primarily anxiety are also promising (Păsăreanu et al., 2017). No consistent differences have been found compared to disorder-specific treatments (Titov et al., 2015b), they seem to be cost-effective (Kraepelien et al., 2018b), and there are possibly even advantages of individually tailored treatments for patients with a high degree of comorbid conditions (Johansson et al., 2012).

An individually tailored treatment program, that was developed on the same technical platform used at the Internet Psychiatry Clinic, showed positive effects also after one year in a large randomized controlled trial (Hallgren et al., 2016, 2015). This therapist-guided treatment was similar in length and format to the disorder-specific treatments already in routine care, and had non-inferior effects on depressive symptoms in a non-randomized comparison with a disorder-specific treatment for depression (Kraepelien et al., 2018a).

The possible advantages of using an individually tailored treatment in routine care include the ability to include more patients than earlier, provide them with a treatment that possibly have a positive effect on a broader range of symptoms, and to lessen the need for multiple serial treatments. Also, the individually tailored treatment may be perceived as more personalized. The prospect of introducing an individually tailored treatment into a well-established clinic with an up and running disorder-specific work process though creates some challenges. Examples of such challenges are how to assess patients and then choose the optimal treatment type for each patient and how to measure progress for a range of different conditions during treatment.

## 1.2. Aims

The aims of this study are thus to develop a clinical routine capable of allocating patients to disorder-specific or individually tailored treatment, to explore the feasibility of this routine, and to explore the feasibility of the individually tailored treatment, all within the context of the Internet Psychiatry Clinic, originally designed only to deliver disorder-specific internet treatments.

Specifically, we wanted to answer the following questions. Among patients completing screening at the Internet Psychiatry Clinic, what will be the:

- applicability of the proposed routine for patient recruitment and allocation to disorder-specific or individually tailored treatment? (i)
- comorbidity profiles and patient prioritization of problem areas? (ii)

Among patients receiving individually tailored treatment within the proposed routine, what will be the:

- characteristics of these patients? (iii)
- problem areas included in their individually tailored treatment plans? (iv)
- treatment activity in individually tailored treatment benchmarked against disorder-specific treatment? (v)
- organizational and technical challenges of giving individually

tailored treatment within the technical platform originally adapted to disorder-specific treatments? (vi)

- ratings of treatment satisfaction and credibility? (vii)
- change in symptom levels in comparison to benchmarks? (viii)

## 2. Methods

### 2.1. Recruitment, screening measures and treatment allocation

The participants in this study all gave written consent. The study of these participants was approved by the Regional Ethics Review Board in Stockholm, Sweden (2011/2091-31/3 and 2018/2550-32). Recruitment was open to all who signed up for treatment for major depression, panic disorder, social anxiety disorder or insomnia at the Internet Psychiatry Clinic from January 22 to February 12, 2018. These participants ( $N = 66$ ) followed approximately the same screening routine as usual that is described elsewhere (Hedman et al., 2014; Titov et al., 2018), with some additional elements. The screening questionnaires were added with short clinical vignettes of the six problem areas included in the individually tailored treatment: depression, worry, panic, social anxiety, stress and insomnia, and also a description of health anxiety that was going to be launched as a new disorder-specific treatment at the clinic later in 2018. After reading the vignettes, the participants rated their recognition of each of these problem areas from 0 to 4, as well as how much they would want to work with that problem area in a psychological treatment from 1 to 4. The participants were also asked to name their two preferred problem areas to work with in treatment. This procedure with vignettes, recognition- and preference ratings were also used in the earlier version of the individually tailored treatment (Kraepelien et al., 2019).

The screening procedure was also complemented with questionnaires measuring the disorder-specific symptoms corresponding to the six problem areas. The screening questionnaires, and each respective cut-off score to indicate at least mild problems, were as follows:

- Depressive symptoms were assessed with the Patient Health Questionnaire - 9 item scale (PHQ-9; Kroenke et al., 2001), cut-off for depression,  $PHQ-9 \geq 5$
- Worry symptoms were assessed with the Generalised Anxiety Disorder 7-item scale (GAD-7; Spitzer et al., 2006, p. 7), cut-off for worry,  $GAD-7 \geq 5$
- Panic symptoms with the Panic Disorder Severity Scale – Self-Report (PDSS-SR; Houck et al., 2002), cut-off for panic symptoms,  $PDSS-SR \geq 6$
- Social anxiety symptoms with the Social Phobia Inventory (SPIN; Connor et al., 2000), cut-off for social anxiety,  $SPIN \geq 21$
- Symptoms of stress with the Perceived Stress Scale – 10 item (PSS-10; Cohen and Janicki-Deverts, 2012), cut-off for stress,  $PSS-10 \geq 13$
- Insomnia symptoms with the Insomnia Severity Index (ISI; Bastien et al., 2001), cut-off for insomnia,  $ISI \geq 8$ .

Participants who rated at least moderate recognition and willingness to work with a problem area ( $\geq 3$  out of 4 points) while also having a symptom score above the cut off for that problem area were marked by the study administrator (MK) as probably having that specific problem (probable depression, probable worry, etc.). For these calculations a weighing algorithm was standardized and performed via a separate spreadsheet in Excel. Those participants having more than one mark in the problem areas of depression, worry, panic, social anxiety or insomnia were deemed as possibly suitable for individually tailored treatment. A mark representing difficulties with stress did not suffice as an indicator for inclusion in individually tailored treatment. The reason for this was that although stress seems to be an important component in the individually tailored treatment program (Kraepelien

et al., 2019) the treatment was not labeled as a program for stress reduction, but only as a program for depression, anxiety and insomnia. Additionally, the Internet Psychiatry Clinic's ordinary treatment offerings are for depression, anxiety and insomnia, but not for stress in general.

The ordinary routine at the clinic is that patients are assessed by a clinician (usually a psychiatrist or resident in training) face to face before they are included in a disorder-specific treatment program or referred elsewhere. The new assessment procedures were adopted during the period between January 22 and February 12, 2018. Suitable patients, according to the criteria above, and who had visits to the clinician during the period between February 8 and 28 were allocated to a new routine where they together with the clinician at the face to face visit decided if to start twelve weeks of therapist-guided individually tailored or equally long disorder-specific treatment. These periods of data collection were chosen for pragmatic reasons depending on for how long the residents and psychologists in training would stay at the clinic. The study administrator introduced the new routine to the clinicians responsible for assessment visits during the period of recruitment and handled the procedure of marking patients who would potentially benefit from individually tailored treatment. Clinicians were instructed to offer individually tailored treatment if the patient fulfilled DSM-criteria for at least two diagnoses and deemed suitable for internet-delivered treatment.

For patients who had their visit to the clinician before or after February 8 to 28, the old routine was followed which implied that clinicians were not alerted about patients' preferences and possible individually tailored treatment. Patients following the old routine would only be included in disorder-specific treatment, if found suitable for internet-delivered treatment by the clinician. Participants following any of the routines would be referred elsewhere if not found suitable for internet treatment by the clinician.

## 2.2. Measures during treatment

Patients included in individually tailored treatment completed the following measures at the pre-treatment and post-treatment (12 week) time points, online within the treatment platform: PHQ-9 measuring depressive symptoms; GAD-7 measuring generalised anxiety and worry symptoms; PDSS-SR measuring panic symptoms; SPIN measuring social anxiety symptoms; PSS-10 measuring symptoms of stress; ISI measuring insomnia symptoms; Montgomery-Åsberg Depression Rating Scale – Self-rated (MADRS-S; Svanborg and Asberg, 1994) measuring depressive symptoms and suicidality; The EuroQol EQ-5D Index and VAS scales (Rabin and de Charro, 2001) measuring health-related quality of life; the World Health Organization Disability Assessment Schedule 2 - 12-item (WHODAS 2.0-12; Axelsson et al., 2017; Üstün, 2010) measuring general disability. Treatment credibility was assessed at two weeks and five weeks into treatment with the Treatment Credibility Scale (Borkovec and Nau, 1972) and satisfaction with treatment was assessed post treatment with Client Satisfaction Questionnaire – 8 item version (CSQ-8; Attkisson and Zwick, 1982).

A weekly measurement battery consisting of very brief symptom scales was also used to help the therapist follow the patient's progress through the individually tailored treatment. This battery consisted of the 2-item PHQ-2 (Löwe et al., 2005), the 2-item GAD-2 (Löwe et al., 2010), 2 items from PDSS-SR (Forsell et al., 2019), the 3-item mini-SPIN (Connor et al., 2001), 2 items from PSS-10, 2 items from ISI, and the suicidal ideation item from MADRS-S. Information on potential problems with the routine or technical platform was based on the clinical impressions and experiences of the clinicians involved in the study, gathered by the first author (MK) at the recurring supervision meetings.

## 2.3. Statistical considerations

Due to the descriptive and exploratory aim of this study, descriptive statistics were mostly used. For the preliminary within-group symptom reductions, dependent *t*-tests were performed.

## 2.4. Treatment content

The individually tailored treatment was a modified version of an earlier treatment program that also included modules for pain symptoms. The pain modules were excluded from the current version of the treatment due to an apparent lack of effects on either pain or depression symptoms (Kraepelien et al., 2019). The three introductory weeks in the current treatment were mandatory and transdiagnostic and focused on trying out a couple of exercises related to values and goals, healthy habits, problem solving, behavioral activation, rumination management and cognitive restructuring. After trying out these exercises, the participant was encouraged to keep practicing on just the exercises that worked for them, and could receive guidance from the therapists in deciding what exercises to keep using. In between the introduction and last week there were two blocks of individually tailored content focusing on different problem areas. Each block consisted of four modules on the problem area in question to be completed during four weeks. The first two modules in each block presented new material and the second two was for continued practice. If any of the last two practice modules of a block were unfinished after 4 weeks had passed, the participant would still start the next individual block, in order to experience at least some content from both individual blocks. When inactive for a week the patient would get an encouraging message from the therapist to log in and engage with the treatment again. In this part of treatment, the key components were based on successful disorder-specific treatments for that problem area. That meant mainly more behavioral activation and thought management in the depression block, exercises related to exposure (but with different problem-specific rationales) for the worry, panic and social anxiety blocks, planned recovery for the stress block, and sleep restriction and stimulus control in the insomnia block. The content in the individually tailored blocks would also, when useful, use key components from the introductory weeks such as problem solving. The module of the last week of treatment aimed at summary and relapse prevention. The patient would be able to access their individual treatment plan during the treatment but they could not see the exact components used in future modules. The therapist-support would mostly be written, focus on encouraging the patient to engage with key components, and aim for a total of 15 min per patient per week. Therapists were instructed to reply on demand as well as to remind patients inactive for a week.

## 2.5. Tailoring procedure in treatment

According to the individually tailored treatment program each patient received two tailored problem areas in their individual treatment plan that were finalized during the introduction period. The therapists (psychologists LL & VS) would use the information from the weighing algorithm about symptom scores and the rated recognition and willingness to work with the different problem areas and put this together with diagnoses resulting from the face to face assessment and information hold during the first transdiagnostic modules. The weighing was done with the help of a spreadsheet to facilitate reliable decisions on recommended problem areas, but each recommendation was also a point on the agenda at a weekly supervisory meeting since the recommendations were a clinical decision. The therapist would then present the patient with two recommended problem areas to work with, but the patient had the final word and could change to the two preferred problem areas of his or her choice. There was no measure of how often the patient chose to focus on other problem areas than the recommended. The discussion between patient and therapist was done

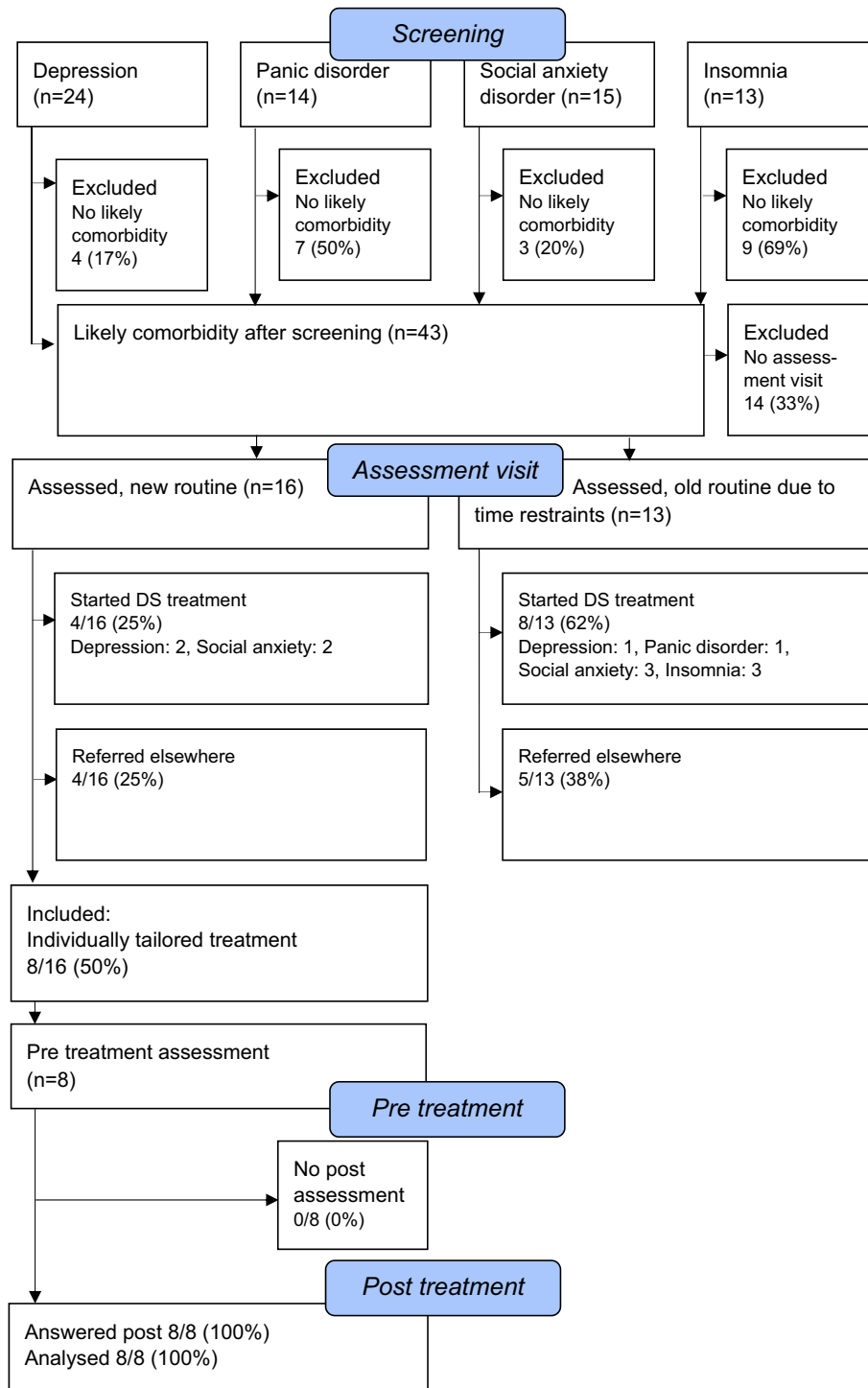


Fig. 1. Flow chart of study. DS, Disorder-specific treatment.

with messages in the treatment platform, but the therapist could call the patient by phone if needed.

### 3. Results

#### 3.1. Patient recruitment and allocation to type of treatment (i)

During the recruitment period 66 people signed up for depression-, panic disorder-, social anxiety disorder-, or insomnia treatment, via the self-referral procedure at the clinic web site. Following the proposed procedure, 65% of participants were initially considered suitable for

individually tailored treatment by having significant difficulties in at least two relevant problem areas, as described above. Depression was the most common reason for signing up to treatment and participants signing up for depression treatment was the most likely of being marked as suitable for treatment. Please see Fig. 1 for a flow chart of study participants. Due to a time constraint for this study, only 16 participants followed the new routine at the face to face assessment. Of these 16, 50% started individually tailored treatment, 25% started disorder-specific treatment and 25% were referred elsewhere. The total rate of inclusion was therefore 75% in the new routine compared with 62% in the old routine.

**Table 1**  
Problem areas at screening, for participants who signed up for treatment for depression, panic disorder, social anxiety disorder or insomnia.

Problem areas, n (%)	All screened (n = 66)	Signed up for depression (n = 24)	Signed up for panic disorder (n = 14)	Signed up for social anxiety (n = 15)	Signed up for insomnia (n = 13)
Probable depression	37 (56%)	21 (88%)	4 (29%)	9 (60%)	3 (23%)
Probable worry	33 (50%)	18 (75%)	6 (43%)	7 (47%)	2 (15%)
Probable panic	14 (21%)	1 (4%)	7 (50%)	6 (40%)	0 (0%)
Probable social anxiety	20 (30%)	4 (17%)	2 (14%)	14 (93%)	0 (0%)
Probable stress	34 (52%)	19 (79%)	7 (50%)	5 (33%)	3 (23%)
Probable insomnia	30 (46%)	9 (38%)	6 (43%)	2 (13%)	13 (100%)
> 1 probable problem area	43 (65%)	20 (83%)	7 (50%)	12 (80%)	4 (31%)
Number of problem areas, m (SD)	2.55 (1.33)	3.00 (0.93)	2.29 (1.68)	2.87 (1.41)	1.62 (0.96)

**Table 2**  
Participants preferred problem areas to work with in treatment, as stated at screening.

Preferred problem area after reading the clinical vignettes	All screened (n = 66)	Signed up for depression (n = 24)	Signed up for panic disorder (n = 14)	Signed up for social anxiety (n = 15)	Signed up for insomnia (n = 13)
Depression					
1st choice	14 (21%)	14 (58%)	0 (0%)	0 (0%)	0 (0%)
2nd choice	19 (29%)	7 (29%)	4 (29%)	3 (20%)	5 (39%)
Worry					
1st choice	8 (12%)	7 (29%)	1 (7%)	0 (0%)	0 (0%)
2nd choice	28 (42%)	10 (42%)	5 (36%)	8 (53%)	5 (39%)
Panic					
1st choice	10 (15%)	0 (0%)	9 (64%)	1 (7%)	0 (0%)
2nd choice	4 (6%)	0 (0%)	2 (14%)	2 (13%)	0 (0%)
Social anxiety					
1st choice	16 (24%)	1 (4%)	1 (7%)	14 (93%)	0 (0%)
2nd choice	3 (5%)	2 (8%)	0 (0%)	1 (7%)	0 (0%)
Stress					
1st choice	4 (6%)	1 (4%)	3 (21%)	0 (0%)	0 (0%)
2nd choice	9 (14%)	5 (21%)	0 (0%)	0 (0%)	3 (23%)
Insomnia					
1st choice	13 (20%)	0 (0%)	0 (0%)	0 (0%)	13 (100%)
2nd choice	3 (5%)	0 (0%)	3 (21%)	0 (0%)	0 (0%)
Health anxiety					
1st choice	1 (2%)	1 (4%)	0 (0%)	0 (0%)	0 (0%)
2nd choice	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)

3.2. Comorbidities and prioritization of problem areas (ii)

The participants signing up for depression and social anxiety treatment had a mean number of three concurrent problem areas. Those who signed up for treatment of panic disorder treatment or insomnia treatment, had less comorbid problems. Please see Table 1 for estimated comorbidity and Table 2 for preference.

3.3. Characteristics of patients receiving individually tailored treatment (iii)

Eight participants were finally included in the new individually tailored treatment. They had a mean age of 26.1 (SD = 5.9) years, 6 of 8 (75%) were female, and 5 of 8 (63%) were married or cohabiting. These patients had a mean number of problem areas of 2.9 (SD = 1.0). The participants had a higher mean of depressive symptoms than patients in ordinary depression treatment at the clinic: MADRS-S, 27.9 compared to 22.0; PHQ-9, 17.6 compared to 15.4 (Hedman et al., 2014).

3.4. Problem areas included in the individual treatment plans (iv)

After the tailoring procedure, these patients' treatment plans included tailored content for depression in 7 (88%) cases, worry in 3

(38%) cases, social anxiety and stress in 2 (25%) of cases, and insomnia and panic in 1 (13%) case each. The two patients with the highest comorbidity scores both came to work with stress as their second problem area.

3.5. Treatment activity in individually tailored treatment benchmarked against disorder-specific treatment (v)

The participants accessed a mean of 9 modules out of 12 planned (75%, SD = 4, min-max = 3–12, median = 11). This can be benchmarked against the ordinary depression treatment at the clinic where patients access a mean of 7 modules out of 10 (70%) (Hedman et al., 2014). The mean number of sent messages to the therapist per patient was 26 (SD = 10, min-max = 11–42, median = 26.5), which was high compared to the mean of 14 (SD = 9) sent messages in the ordinary depression treatment.

3.6. Organizational and technical challenges (vi)

Spreadsheets in Excel were used for calculations relating to initial screening and individual tailoring of treatment content. Separate spreadsheets also had to be utilized for visualization (for the therapist) of weekly symptom scores since the technical platform could not visualize data from both full (e.g., PHQ-9) and brief (e.g., PHQ-2) versions of symptom scales. There was also no function for visualizing the individual treatment plan on the patient's hub-screen in treatment. A separate work sheet that was managed by the therapist had to be used. Another artifact of the technical platform being created for disorder-specific treatments was that all patients had a sleep diary, regardless if they had insomnia in their individual treatment plan or not. However, this sleep diary was optional to use and an explanation was added that it was intended for participants with insomnia in their individual treatment plan.

3.7. Patients' ratings of treatment satisfaction and credibility (vii)

The participants' mean treatment satisfaction score on the CSQ-8 was 24.9 (SD = 2.6) which can be compared to the proposed cut off scores of 20–25 meaning good and 26–32 meaning excellent treatment satisfaction (Smith et al., 2014). The score can also be compared to the mean CSQ-8-score from the clinic's ordinary depression treatment of 24.5 (Hedman et al., 2014). The participants mean credibility ratings were 31.1 (SD = 5.7) at week 2 and 30.7 (SD = 6.9) at week 5. This can be compared to the mean credibility score of the clinic's ordinary depression treatment of 33.0 (Hedman et al., 2014).

3.8. Change in symptom levels in comparison to benchmarks (viii)

The mean levels of the symptom scales for depression and anxiety were significantly lower after treatment with large effects. The mean health-related quality of life was on the other hand significantly higher



**Table 3**  
Preliminary within-group effects of individually tailored treatment.

N = 8	Pre M (SD)	Post M (SD)	Percentual change	Sign. p	Effect size Hedge's g	[95% confidence interval for difference]
PHQ-9	17.3 (2.6)	9.0 (4.4)	-48%	<b>0.001</b>	2.15	[-4.8; -11.7]
MADRS-S	27.4 (2.6)	17.0 (7.5)	-38%	<b>0.003</b>	1.75	[-4.8; -16.0]
GAD-7	13.4 (5.1)	7.8 (3.8)	-42%	<b>0.033</b>	1.19	[-0.6; -10.6]
PDSS-SR	5.6 (5.8)	4.4 (6.2)	-22%	0.384	0.20	[+1.9; -4.4]
SPIN	30.8 (18.3)	21.9 (15.7)	-29%	0.073	0.49	[+1.1; -18.8]
PSS-10	27.8 (4.3)	20.6 (7.9)	-26%	0.057	1.06	[+0.3; -14.5]
ISI	11.9 (5.8)	8.4 (3.3)	-29%	<b>0.028</b>	0.70	[-0.5; -6.5]
EQ-5D index	0.44 (0.28)	0.66 (0.32)	+50%	<b>0.024</b>	0.69	[+0.40; +0.04]
EQ-5D VAS	39.5 (18.9)	53.8 (25.6)	+36%	<b>0.037</b>	0.60	[+27.3; +1.2]
WHODAS-2	13.0 (6.3)	7.6 (5.8)	-42%	<b>0.003</b>	0.84	[-2.5; -8.2]

Bold values are statistically significant  $p < 0.05$ ; PHQ-9, Patient Health Questionnaire - 9 item; MADRS-S, Montgomery-Åsberg Depression Rating Scale - Self-rated; GAD-7, Generalised Anxiety Disorder 7-item scale; PDSS-SR, Panic Disorder Severity Scale - Self-Report; SPIN, Social Phobia Inventory; PSS-10, Perceived Stress Scale - 10 item; ISI, Insomnia Severity Index; EQ-5D, EuroQol five-dimensional questionnaire; WHODAS-2, World Health Organization Disability Assessment Schedule 2.0 - 12-item.

after treatment (see Table 3).

Some of the effect sizes can be compared to benchmarks from the 2018 annual report of the Internet Psychiatry Clinic, where disorder-specific treatment for depression varied quarterly between Cohens  $d'$  of 0.96 and 1.16 (based on PHQ-9) and 0.94 and 1.27 (based on MADRS-S), for panic disorder between 0.80 and 1.44 (based on PDSS-SR), for social anxiety disorder between 0.81 and 1.33 (based on SPIN), and for insomnia between 1.54 and 2.25 (based on ISI).

#### 4. Discussion

This feasibility study has demonstrated that individually tailored treatment could be a valuable complement in the context of an up and running clinic offering disorder-specific internet treatments. The patients already self-referring to the clinic have high degrees of comorbidity, especially those who sign up for depression or social anxiety treatment. There were at the time of the study no disorder-specific treatments for generalised anxiety, health anxiety or stress-related disorders like adjustment disorders at the clinic. The majority of patients chose the problem area corresponding to the disorder they had signed up for as their first choice from the longer list of preferred contents that were included in the screening procedure, but not all. Especially those who signed for depression or panic disorder had chosen another problem area as their first choice. It is worth noting that about 42% of all patients had chosen worry as their second preferred problem area to work with. Between 29% had chosen depression as their second preferred area. (See Table 2).

The adding of individually tailored treatment to disorder-specific treatments could potentially increase uptake to treatment by lessen the need of matching the patient with the right disorder-specific treatment program. Today with only diagnosis-specific programs, a typical situation is to judge whether the patient would benefit most to start with the depression program or for example the social phobia program. Some patients are deemed too complex for inclusion and therefore excluded. In this small study only 25% of participants following the new proposed routine were referred elsewhere, suggesting a higher inclusion to treatment than the historical rate of the Internet Psychiatry Clinic around 50% (Titov et al., 2018).

The participants in individually tailored treatment also rated treatment satisfaction and treatment credibility similar to patients in disorder-specific internet treatment for depression. Preliminary effects on symptoms of depression and anxiety were large. Since depression was the most common problem in the current study, it is not surprising that the effects on depression were high compared to benchmarks. The participants had high initial depressive symptoms on average. The comparably low effect sizes for panic disorder, social anxiety disorder, and insomnia most likely reflect the fact that they are calculated on the

whole group and few of the eight patients had high initial levels of these problems. In a previous analyses of the individually tailored treatment, were sub-groups of patients deemed to have one of these conditions as their primary problem, the effects were markedly higher (Kraepelien et al., 2019).

The fact that worry was a prominent feature, both at inclusion and in the small group who received individually tailored treatment, may indicate a need for larger considerations for this problem area in routine care. An individually tailored treatment has the opportunity to target the fact that worry is a symptom in almost all psychiatric conditions, although with different content of the worry related thoughts. At the very least it implies that components for handling worry are important to include in an individually tailored treatment program. In future studies, it would be important to fully document clinician assessed comorbid diagnoses, and to disentangle this from worry as a symptom.

The study administrator's procedures of marking patients suitable for tailored treatment would probably gain from being automated, or handled by ordinary clinic administrators, in case of implementation. In general, the procedure for inclusion and individual tailoring seems to work well, yet since no modifications were made to the technical treatment platform, that was originally made for disorder-specific treatments, there were some functions where the therapists had to utilize workarounds that were potentially time consuming. The treatment participants were on the other hand quite active in treatment despite having more severe depressive symptoms than the regular depression treatment which may indicate that the treatment content was well adapted to the patients' capabilities. It was also a clinical observation that the cooperation between patient and therapist regarding the decisions on problem areas to address seemed to work out well, with patients having the power to influence the content of their own treatments possibly being encouraging.

Due to the general limitations of the study however, no conclusions except preliminary feasibility can be drawn. Limitations of the study are the lack of experimental manipulation and the low number of participants. A logical next step to investigate the eventual merits of individually tailoring in routine care would for example be to evaluate individual tailoring as a component of treatment in a factorial experiment in an optimization framework (Collins et al., 2005) or to randomize patients to either individually tailored or disorder-specific treatment in a study that includes a non-inferiority design (Lesaffre, 2008). This new approach of an individually tailored program includes a basic transdiagnostic block of CBT skills, combined with two blocks of interventions tailored for comorbid conditions. Further studies are warranted to evaluate if this type of program has equal effects on the main diagnosis compared to disorder-specific programs and if comorbid diagnoses are better treated simultaneously or not.

A general challenge for an Internet clinic with several disorder-specific programs is how to screen for all conditions, while not overloading patients with too many questionnaires. Including programs that target several conditions implies that all conditions need to be monitored during treatment, which also can result in overload. We handled this by using short-form versions of well-established questionnaires. The usability and reliability of such adaptations need further research, which is another line in our group's current projects.

## 5. Conclusions

This study demonstrates that by using a structured routine for assessment and tailoring, individually tailored internet treatment can be a feasible addition to an internet clinic, already operating within a disorder-specific paradigm. A program with basic CBT skills combined with individually chosen disorder-specific components may raise the rate of patients suitable for internet treatment. This hypothesis and the outcome compared to disorder-specific programs need to be tested in controlled studies.

## Funding

This work was fully funded by SLSO Psykiatri Sydväst, Stockholm County Council, Sweden.

## Declaration of competing interest

None.

## Acknowledgements

Nina Lind and everybody at the Internet Psychiatry Clinic for supporting this research. Lise Bergman Nordgren for excellent supervision.

## References

- Attkisson, C.C., Zwick, R., 1982. The client satisfaction questionnaire. Psychometric properties and correlations with service utilization and psychotherapy outcome. *Eval. Program Plann.* 5, 233–237.
- Axelsson, E., Lindsäter, E., Ljótsson, B., Andersson, E., Hedman-Lagerlöf, E., 2017. The 12-item self-report World Health Organization Disability Assessment Schedule (WHODAS) 2.0 administered via the internet to individuals with anxiety and stress disorders: a psychometric investigation based on data from two clinical trials. *JMIR Ment. Health* 4, e58. <https://doi.org/10.2196/mental.7497>.
- Bastien, C.H., Vallières, A., Morin, C.M., 2001. Validation of the Insomnia Severity Index as an outcome measure for insomnia research. *Sleep Med.* 2, 297–307.
- Berger, T., Boettcher, J., Caspar, F., 2014. Internet-based guided self-help for several anxiety disorders: a randomized controlled trial comparing a tailored with a standardized disorder-specific approach. *Psychotherapy* 51, 207–219. <https://doi.org/10.1037/a0032527>.
- Borkovec, T.D., Nau, S.D., 1972. Credibility of analogue therapy rationales. *J. Behav. Ther. Exp. Psychiatry* 3, 257–260. [https://doi.org/10.1016/0005-7916\(72\)90045-6](https://doi.org/10.1016/0005-7916(72)90045-6).
- Cohen, S., Janicki-Deverts, D., 2012. Who's stressed? Distributions of psychological stress in the United States in probability samples from 1983, 2006, and 2009: psychological stress in the U.S. *J. Appl. Soc. Psychol.* 42, 1320–1334. <https://doi.org/10.1111/j.1559-1816.2012.00900.x>.
- Collins, L.M., Murphy, S.A., Nair, V.N., Strecher, V.J., 2005. A strategy for optimizing and evaluating behavioral interventions. *Ann. Behav. Med.* 30, 65–73. [https://doi.org/10.1207/s15324796abm3001\\_8](https://doi.org/10.1207/s15324796abm3001_8).
- Connor, K.M., Davidson, J.R.T., Churchill, L.E., Sherwood, A., Weisler, R.H., Foa, E., 2000. Psychometric properties of the Social Phobia Inventory (SPIN). *Br. J. Psychiatry* 176, 379–386. <https://doi.org/10.1192/bjp.176.4.379>.
- Connor, K.M., Kobak, K.A., Churchill, L.E., Katzelnick, D., Davidson, J.R.T., 2001. Mini-SPIN: a brief screening assessment for generalized social anxiety disorder. *Depress. Anxiety* 14, 137–140. <https://doi.org/10.1002/da.1055>.
- El Alaoui, S., Hedman, E., Kaldo, V., Hesser, H., Kraepelien, M., Andersson, E., Rück, C., Andersson, G., Ljótsson, B., Lindefors, N., 2015. Effectiveness of internet-based cognitive-behavior therapy for social anxiety disorder in clinical psychiatry. *J. Consult. Clin. Psychol.* 83, 902–914. <https://doi.org/10.1037/a0039198>.
- Forsell, E., Kraepelien, M., Blom, K., Isacson, N., Jernelöv, S., Svanborg, C., Rosén, A., Kaldo, V., 2019. Development of a very brief scale for detecting and measuring panic disorder using two items from the Panic Disorder Severity Scale-Self report. *J. Affect. Disord.* <https://doi.org/10.1016/j.jad.2019.07.057>.
- Hallgren, M., Kraepelien, M., Ojehagen, A., Lindefors, N., Zeebari, Z., Kaldo, V., Forsell, Y., 2015. Physical exercise and internet-based cognitive-behavioural therapy in the treatment of depression: randomised controlled trial. *Br. J. Psychiatry* 207, 227–234. <https://doi.org/10.1192/bjp.bp.114.160101>.
- Hallgren, M., Helgadóttir, B., Herring, M.P., Zeebari, Z., Lindefors, N., Kaldo, V., Öjehagen, A., Forsell, Y., 2016. Exercise and internet-based cognitive-behavioural therapy for depression: multicentre randomised controlled trial with 12-month follow-up. *Br. J. Psychiatry* 209, 414–420. <https://doi.org/10.1192/bjp.bp.115.177576>.
- Hedman, E., Andersson, G., Andersson, E., Ljótsson, B., Rück, C., Asmundson, G.J.G., Lindefors, N., 2011. Internet-based cognitive-behavioural therapy for severe health anxiety: randomised controlled trial. *Br. J. Psychiatry* 198, 230–236. <https://doi.org/10.1192/bjp.bp.110.086843>.
- Hedman, E., Ljótsson, B., Rück, C., Bergström, J., Andersson, G., Kaldo, V., Jansson, L., Andersson, E., Andersson, E., Blom, K., El Alaoui, S., Falk, L., Ivarsson, J., Nasri, B., Rydh, S., Lindefors, N., 2013. Effectiveness of internet-based cognitive behaviour therapy for panic disorder in routine psychiatric care. *Acta Psychiatr. Scand.* 128, 457–467. <https://doi.org/10.1111/acps.12079>.
- Hedman, E., Ljótsson, B., Kaldo, V., Hesser, H., El Alaoui, S., Kraepelien, M., Andersson, E., Rück, C., Svanborg, C., Andersson, G., Lindefors, N., 2014. Effectiveness of internet-based cognitive behaviour therapy for depression in routine psychiatric care. *J. Affect. Disord.* 155, 49–58. <https://doi.org/10.1016/j.jad.2013.10.023>.
- Houck, P.R., Spiegel, D.A., Shear, M.K., Rucci, P., 2002. Reliability of the self-report version of the panic disorder severity scale. *Depress. Anxiety* 15, 183–185. <https://doi.org/10.1002/da.10049>.
- Johansson, R., Sjöberg, E., Sjögren, M., Johnsson, E., Carlbring, P., Andersson, T., Rousseau, A., Andersson, G., 2012. Tailored vs. standardized internet-based cognitive behavior therapy for depression and comorbid symptoms: a randomized controlled trial. *PLoS One* 7, e36905. <https://doi.org/10.1371/journal.pone.0036905>.
- Kaldo, V., Jernelöv, S., Blom, K., Ljótsson, B., Brodin, M., Jörgensen, M., Kraepelien, M., Rück, C., Lindefors, N., 2015. Guided internet cognitive behavioral therapy for insomnia compared to a control treatment - a randomized trial. *Behav. Res. Ther.* 71, 90–100. <https://doi.org/10.1016/j.brat.2015.06.001>.
- Kraepelien, M., Forsell, E., Karin, E., Johansson, R., Lindefors, N., Kaldo, V., 2018a. Comparing individually tailored to disorder-specific internet-based cognitive-behavioural therapy: benchmarking study. *BJPsych Open* 4, 282–284. <https://doi.org/10.1192/bjo.2018.41>.
- Kraepelien, M., Mattsson, S., Hedman-Lagerlöf, E., Petersson, I.F., Forsell, Y., Lindefors, N., Kaldo, V., 2018b. Cost-effectiveness of internet-based cognitive-behavioural therapy and physical exercise for depression. *BJPsych Open* 4, 265–273. <https://doi.org/10.1192/bjo.2018.38>.
- Kraepelien, M., Blom, K., Lindefors, N., Johansson, R., Kaldo, V., 2019. The effects of component-specific treatment compliance in individually tailored internet-based treatment. *Clin. Psychol. Psychother.* <https://doi.org/10.1002/cpp.2351>.
- Kroenke, K., Spitzer, R.L., Williams, J.B., 2001. The PHQ-9: validity of a brief depression severity measure. *J. Gen. Intern. Med.* 16, 606–613.
- Lesaffre, E., 2008. Superiority, equivalence, and non-inferiority trials. *Bull. NYU Hosp. Jt. Dis.* 66, 150–154.
- Ljótsson, B., Falk, L., Vesterlund, A.W., Hedman, E., Lindfors, P., Rück, C., Hursti, T., Andréewitch, S., Jansson, L., Lindefors, N., Andersson, G., 2010. Internet-delivered exposure and mindfulness based therapy for irritable bowel syndrome – a randomized controlled trial. *Behav. Res. Ther.* 48, 531–539. <https://doi.org/10.1016/j.brat.2010.03.003>.
- Löwe, B., Kroenke, K., Gräfe, K., 2005. Detecting and monitoring depression with a two-item questionnaire (PHQ-2). *J. Psychosom. Res.* 58, 163–171. <https://doi.org/10.1016/j.jpsychores.2004.09.006>.
- Löwe, B., Wahl, I., Rose, M., Spitzer, C., Glaesmer, H., Wingenfeld, K., Schneider, A., Brähler, E., 2010. A 4-item measure of depression and anxiety: validation and standardization of the Patient Health Questionnaire-4 (PHQ-4) in the general population. *J. Affect. Disord.* 122, 86–95. <https://doi.org/10.1016/j.jad.2009.06.019>.
- Påsåreli, C.R., Andersson, G., Bergman Nordgren, L., Dobrea, A., 2017. Internet-delivered transdiagnostic and tailored cognitive behavioral therapy for anxiety and depression: a systematic review and meta-analysis of randomized controlled trials. *Cogn. Behav. Ther.* 46, 1–28. <https://doi.org/10.1080/16506073.2016.1231219>.
- Rabin, R., de Charro, F., 2001. EQ-SD: a measure of health status from the EuroQol Group. *Ann. Med.* 33, 337–343. <https://doi.org/10.3109/07853890109002087>.
- Smith, D., Roche, E., O'Loughlin, K., Brennan, D., Madigan, K., Lyne, J., Feeney, L., O'Donoghue, B., 2014. Satisfaction with services following voluntary and involuntary admission. *J. Ment. Health Abingdon Engl.* 23, 38–45. <https://doi.org/10.3109/09638237.2013.841864>.
- Spitzer, R.L., Kroenke, K., Williams, J.B.W., Löwe, B., 2006. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch. Intern. Med.* 166, 1092. <https://doi.org/10.1001/archinte.166.10.1092>.
- Sundquist, J., Ohlsson, H., Sundquist, K., Kendler, K.S., 2017. Common adult psychiatric disorders in Swedish primary care where most mental health patients are treated. *BMC Psychiatry* 17 (235). <https://doi.org/10.1186/s12888-017-1381-4>.
- Svanborg, P., Asberg, M., 1994. A new self-rating scale for depression and anxiety states based on the Comprehensive Psychopathological Rating Scale. *Acta Psychiatr. Scand.* 89, 21–28.
- Titov, N., Dear, B.F., Staples, L.G., Bennett-Levy, J., Klein, B., Rapee, R.M., Shann, C., Richards, D., Andersson, G., Ritterband, L., Purtell, C., Beuzidenhout, G., Johnston, L., Nielssen, O.B., 2015a. MindSpot clinic: an accessible, efficient, and effective online treatment service for anxiety and depression. *Psychiatr. Serv.* 66, 1043–1050. <https://doi.org/10.1176/appi.ps.201400477>.
- Titov, N., Dear, B.F., Staples, L.G., Terides, M.D., Karin, E., Sheehan, J., Johnston, L., Gandy, M., Fogliati, V.J., Wootton, B.M., McEvoy, P.M., 2015b. Disorder-specific versus transdiagnostic and clinician-guided versus self-guided treatment for major depressive disorder and comorbid anxiety disorders: a randomized controlled trial. *J.*

- Anxiety Disord. 35, 88–102. <https://doi.org/10.1016/j.janxdis.2015.08.002>.
- Titov, N., Dear, B.F., Staples, L.G., Bennett-Levy, J., Klein, B., Rapee, R.M., Andersson, G., Purcell, C., Bezuidenhout, G., Nielsen, O.B., 2017. The first 30 months of the MindSpot clinic: evaluation of a national e-mental health service against project objectives. *Aust. N. Z. J. Psychiatry* 51, 1227–1239. <https://doi.org/10.1177/0004867416671598>.
- Titov, N., Dear, B., Nielsen, O., Staples, L., Hadjistavropoulos, H., Nugent, M., Adlam, K., Nordgreen, T., Bruvik, K.H., Hovland, A., Repål, A., Mathiasen, K., Kraepelien, M., Blom, K., Svanborg, C., Lindefors, N., Kaldo, V., 2018. ICBT in routine care: a descriptive analysis of successful clinics in five countries. *Internet Interv.* 13, 108–115. <https://doi.org/10.1016/j.invent.2018.07.006>.
- Üstün, T.B., 2010. *Measuring Health and Disability: Manual for WHO Disability Assessment Schedule WHODAS 2.0*. World Health Organization, Geneva.
- World Health Organization, 2017. *Depression and Other Common Mental Disorders: Global Health Estimates*.