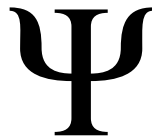**DET PSYKOLOGISKE FAKULTET**

Ψ

Guided Self-Help via Internet for Panic Disorder in Adults:
A Pilot Study

HOVEDOPPGAVE

profesjonsstudiet i psykologi

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Sammendrag

Denne studien undersøker effektiviteten av et veiledet selvhjelpsprogram via internett for panikklidelse. Til sammen 27 deltakere med panikklidelse med eller uten agorafobi fikk et selvhjelpsprogram basert på prinsipper fra kognitiv adferdsterapi fordelt over 10 moduler/uker, samt ukentlig telefonkontakt med en psykolog. Deltakerne ble vurdert før, ved avsluttet behandling og ved 6 måneder oppfølging. Resultatene viste signifikant bedring med hensyn til panikksymptomer og andre symptomer og problemer (depresjon, søvn og interpersonlige problemer) fra før til etter behandlingen, effekten var også opprettholdt etter 6 måneder. Halvparten av de som fullførte behandlingen oppfylte ikke kriteriene for panikklidelse ved oppfølgingen. Deltakerne var svært fornøyde med behandlingen de hadde fått. De fleste effektstørrelsene var store for gruppen som fullførte behandlingen, men de ble redusert til middels når vi inkluderte dem som ikke fullførte behandlingen. I denne studien fant vi ingen sterke prediktorer for effekten av den behandlingen som ble gitt. Resultatene fra denne studien støtter fortsatt bruk av veiledet selvhjelp via internett for behandling av panikklidelse. Oppgaven er skrevet etter retningslinjene for publisering i Journal of Consulting and Clinical Psychology, men har overskredet lengden med cirka 7 sider.

Running head: GUIDED SELF-HELP VIA INTERNET FOR PANIC DISORDER

Guided Self-Help via Internet

for Panic Disorder in Adults:

A Pilot Study

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Abstract

The present study examines the effectiveness of a guided self-help program via Internet on panic disorder (PD). Totally 27 participants with a confirmed PD diagnosis, either with or without agoraphobia, received treatment. The treatment consisted of a weekly 10-module program based on Cognitive Behavioural Therapy principles and weekly telephone contact with a psychologist. Participants were assessed pre-treatment, post-treatment, and 6 months after the completion of the treatment. The results showed significant improvements on PD-symptoms and other symptoms and problems (depression, sleep, and interpersonal problems) during the treatment period. These effects were maintained at a 6 months follow-up. Half of the treatment completers did not fulfil the criteria for a PD diagnosis at the follow-up. The participants were very satisfied with the treatment they received. Most of the effect sizes were high for treatment completers, but were reduced to medium when including those who did not complete the treatment. The present study did not find strong predictors for the treatment effects. The results from this study support continued use of guided self-help via Internet for the treatment of PD.

Keywords: Panic disorder; Guided self-help; Internet

Introduction

Many suffer from panic disorder (PD), resulting in substantial costs both for those with the diagnosis and for society in general. There are several effective treatments for PD, but there is a challenge in making these available for those in need of treatment. Guided self-help via Internet, based on Cognitive Behavioural Therapy (CBT), is a new and possibly promising way of helping PD-patients.

Epidemiology and Costs

The 12 month prevalence rate of PD, as defined by DSM-IV criteria, is estimated to be 1-2% (*DSM-IV-TR*, 2000; Goodwin et al., 2005; Grant et al., 2006). Lifetime prevalence estimates have varied in different studies, but 1-5% has been suggested (*DSM-IV-TR*, 2000; Grant et al., 2006; Roy-Byrne, Craske, & Stein, 2006). Women have a higher risk for developing PD than men, and onset is mostly at 20 years+. Co-morbidity, e.g. depression (Roy-Byrne et al., 2006), other anxiety disorders (Taylor, 2006), and alcohol/drug abuse (Goodwin et al., 2005); is high.

Having PD within the last year has an strong, negative impact on a person's quality of life (Cramer, Torgersen, & Kringlen, 2005). The economic and social costs of mental disorders are also substantial, and anxiety is evaluated as the most costly psychiatric disorder. In a Dutch sample, the annual cost per capita of PD was higher than any other mental disorder studied (Batelaan et al., 2007). People with PD are also more frequent users of medical services than other groups (Deacon, Lickel, & Abramowitz, 2008), something which adds to the economical expenses for the society. As an example, Dammen (1999) found that PD (38.2%) was much more common than cardiac disease (16.1%) in a sample referred for cardiac diagnostic evaluation.

A Cognitive Behavioural Therapy (CBT) Model for Panic Disorder

As documented by several clinical trials during the last two decades, there are highly effective psychological treatments for PD, and CBT is the recommended treatment for PD

according to established clinical guidelines (Roy-Byrne et al., 2006; Taylor, 2006).

According to Clark's (1986) CBT model, PD is understood as the result of catastrophic misinterpretations of bodily sensations aroused by trigger stimuli. Anxiety is a normal reaction to signs of dangerous or catastrophic outcomes, e.g. death, severe illness, or loosing control. Misinterpretations of ordinary stimulus as danger signals may make a person with PD alert and attentive to the environment and unnecessarily activate the complex pattern of fight-flight behavioural reactions. The cognitive element comprises the misinterpretation of bodily sensations as more threatening than they really are. The autonomic nervous system is activated by misinterpretation of stimuli, leading to increased intensity and variations in bodily sensations, and establishing a vicious circle which increases the catastrophic cognitions (Clark, 1986; Clark et al., 1997).

Availability of Treatment

Meta-analyses show that CBT generally has larger effect sizes and lower relapse rates among PD-patients than the use of medication (Roy-Byrne et al., 2006). Despite the existence of effective treatments, more than 70% of those with anxiety disorders (including PD) go untreated each year (Przeworski & Newman, 2006). PD patients also tend to suffer for a long period before receiving adequate help. In Norwegian clinical studies, the participants have had PD for more than 10 years before they take part in a treatment study (Hoffart & Hedley, 1997; Martinsen, Raglin, Hoffart, & Friis, 1998). A low-cost and easily available treatment is therefore needed to reach more PD-patients at the earliest possible stage of the disorder.

Self-Help: Programs for Anxiety and Other Disorders

"Self-help" is a global term that includes a wide range of methods, and there are also different ways of organizing and administrating self-help. For a more extensive discussion, see Andersson, Carlbring, & Grimund (2008).

Self-help methods are based on self-guided efforts to change and improve symptoms and psychological problems (VandenBos, 2007). More than 2000 self-help books are published worldwide each year, of varying quality (Meyers, 2008). In an American survey, a majority of psychologists recommend self-help books to their clients (Norcross, 2000).

There have been several attempts to develop cost-effective and readily available treatment for PD and other psychological disorders in the field of self-help. Self-help via Internet has been used to successfully treat several psychological disorders, including PD (Carlbring, 2004), social phobia (Tillfors et al., 2008), depression (Andersson, Bergstrom, Hollandare et al., 2005), and posttraumatic stress (Lange et al., 2003).

The focus of this study is on module-based, guided Internet-delivered self-help, based on principles from CBT (guided self-help via Internet). "Guided" means the therapist is actively involved in the therapy but to a lesser extent than in traditional therapy. There is a growing body of evidence supporting the use of guided self-help for PD via Internet (Carlbring, 2004), and findings indicate that self-help, or minimal contact therapy, is sufficient for a large proportion of those suffering from PD (Newman, Erickson, Przeworski, & Dzus, 2003).

Previous Studies on Guided Internet-Delivered Self-Help for Panic Disorder

Studies examining the effect of computerized CBT for the treatment of PD have generally shown good results (Titov, 2007). There are not many studies done on guided self-help via Internet and PD; however, in the following, we will give a short overview of the main studies in this field.

Carlbring, Andersson and colleagues (Carlbring et al., 2006; Carlbring, Ekselius, & Andersson, 2003; Carlbring et al., 2005; Carlbring, Westling, Ljungstrand, Ekselius, & Andersson, 2001) have done several randomized, controlled studies in which modules of CBT were delivered via Internet, and contact with a therapist was via email or telephone. These studies

showed good results for self-referred PD-patients (Titov, 2007). Klein, Richards and colleagues

(Klein, Richards, & Austin, 2006; Richards & Alvarenga, 2002; Richards, Klein, & Austin, 2006)

have also in a series of studies shown that when CBT was delivered via Internet, PD-symptoms

were reduced. One weakness of these studies is that the developers of the self-help programs also

carried out the studies. Findings indicate that the treatment results can be strongly influenced by

the therapist's commitment to the treatment program (Luborsky et al., 1999), and it would be

valuable to see if the effects hold up with less experienced and more "neutral" therapists.

Most studies on guided self-help via Internet have focused on improvement in those PD-

symptoms that are the target of treatment, even though most studies have included depression as

a secondary outcome measure (Carlbring, 2004; Carlbring et al., 2006; Carlbring et al., 2003;

Carlbring et al., 2005; Carlbring et al., 2001; Klein et al., 2006; Richards & Alvarenga, 2002;

Richards et al., 2006). In addition, secondary outcome on sleep and interpersonal problems

should be of interest, as these are two domains in which PD-patients often report problems

(Hoffart, Hackmann, & Sexton, 2006; Overbeek, van Diest, Schruers, Kruizinga, & Griez, 2005).

This would also be a stronger test of whether or not the self-help program has a "spill-over"

effect on other problems.

Earlier studies have not succeeded in identifying predictors that may have a prognostic

value for the treatment outcome for CBT offered via Internet for PD. Some studies indicate that

personality disorders may lead to a poorer outcome of self-directed treatment (Andersson,

Bergstrom et al., 2008; Hecker, Losee, Fritzler, & Fink, 1996; Hecker, Losee, Roberson-Nay, &

Maki, 2004), but there is disagreement in the literature on this point (Hecker et al., 2004). In the

present study, we included predictors commonly used as prognostic factors in psychotherapy

research: sociodemographic factors (Dobson, 1989; Jarret, Eaves, Grannemann, & Rush, 1991),

illness- and treatment-history (Wade, Treat, & Stuart, 1998), co-symptoms and co-morbidity

(Beutler, Moleiro, Malik, & Harwood, 2000), social support (Beutler et al., 2000; Luborsky, Barber, & Beutler, 1993), life events (Deloof, Zandbergen, Lousberg, Pols, & Griez, 1989), motivation (Gaston, Marmar, Gallagher, & Thompson, 1989), and compliance (Marmar, Gaston, Gallagher, & Thompson, 1989).

Main Research Questions

This study is an investigation of the following research questions:

1) What is the amount and durability of change in primary outcomes? Are the participants satisfied with the treatment?

2) What is the treatment's effect on secondary outcomes?

3) Are the prognostic predictors associated with outcome in traditional psychotherapy found in this type of treatment?

4) Can such a program be successfully transferred from one culture to another, and can it be used by others with no previous experience with these types of programs?

Method

Recruitment and Inclusion

The participants were recruited through a newspaper advertisement, and the project was also presented in local radio and TV. Those who took contact were first screened through a telephone interview. To be accepted for the inclusion interview, the potential participant had to have access to the Internet, answer affirmative on two out of three main screening questions regarding PD in Structured Clinical Interview for DSM-IV Axis-I Disorders (SCID-I, Version 2.0) (First, Spitzer, Gibbon, & Williams, 1995), and fulfil inclusion criterion d, g, and h – see below.

Module F from the SCID-I (First et al., 1995) was used to diagnose PD with and without

agoraphobia.

In the assessment interview, the following inclusion criteria were used: a) fulfilling the DSM-IV criteria for PD with or without agoraphobia, b) having PD for at least half a year, c) having PD as the main problem, d) being 18 to 65 years of age, e) having no other disorder in acute need of treatment, including alcohol dependency, f) having a score on Beck Depression Inventory (BDI) $<= 26$ and a maximum score of 1 on BDI-question 9, g) use of SSRI-medication was allowed but had to be stable for the last three months, and the patient had to be willing to remain on a stable dose during treatment, h) not using anxiety reducing medication more than an average of once a month, and only for special occasions (dentist, travel by plane etc.) i) PD having a severity of at least 4 on the Clinical Severity Rating.

Procedure

The participants were interviewed and filled out questionnaires at T1: before treatment, T2: after treatment, and T3: at 6 months follow-up. Interviews were done by four psychologists at T1, three of whom were also therapists in the study and did the assessment at T2. The present authors did all assessments at T3.

The Guided Self-Help Program

The self-help program comprised ten modules, delivered one per week. The participants could access the modules with a unique user name and password, via a homepage on the project-server. The modules comprised an average of 13.4 pages (range 5-25) of written text and pictures. They comprised information about PD, description and instruction for exercises, and work-sheets to set up at least 30 exercises and home assignments. The exercises and home assignments covered different topics central for CBT and panic, e.g. identifying and challenging negative thoughts, provoking bodily sensations, exposure to agoraphobic situations, and exercises in attention training. The modules ended with two to five essay questions in which the

participants were asked to explain in their own words the most important part of the module they had just read, and describe the experience of and result of the exercises. A multiple choice quiz was also included at the end of each module. The modules comprised different topics: modules 1-2: psychoeducation; module 3: exercises for breathing and hyperventilation; modules 4-5: cognitive restructuring; modules 6-7: interceptive exposure; modules 8-9: exposure in vivo, and module 10: relapse prevention and general information on anxiety and stress, sleep, diet, and exercise.

Before inclusion, all were informed as to the length and scope of the self-help program, what the modules were comprised of, and how much time (3 to 5 hours) they were expected to spend on the modules on a weekly basis.

The self-help program is a Norwegian translation of a program developed by Carlbring and colleagues (Carlbring et al., 2001). The program was translated into Norwegian by professional translators and the translation was further edited and improved by the four project psychologists.

Therapist Guidance

The participants were informed before starting that there would be a pre-scheduled weekly telephone contact with one of three psychologists. These psychologists also had participated in the pre-treatment assessment, and as a rule, they continued the contact with the same patients they had assessed. An exception was the fourth psychologist, who was on leave during the active treatment period.

The aim of the telephone contact was to give positive feedback and to answer questions regarding the modules or any technical questions the participant might have. The participants also had the possibility to bring up additional problems in the telephone contacts. The contacts were

done according to written guidelines. The length of the telephone contacts was to be

approximately 10 minutes. The length was noted, and it was kept records of the main topics.

The therapists had not used Internet based self-help programs before, but had participated

in a one-day course given by Carlbring.

Outcome Measures

Primary Outcomes

The following primary outcome measures were used:

Clinical rating. Clinical Severity Rating (CSR) (Brown, DiNardo, & Barlow, 1994)

measures the severity and consequences of PD, ranging from free of symptoms (0) to extremely

severe: totally disabling, all aspects of life are affected (8). A score at 4 or above indicates need

for treatment, whereas a score at 2 or below indicates that the diagnosis of PD is no longer

fulfilled.

Questionnaires. The Agoraphobic Cognitions Questionnaire (ACQ) (Chambless, Caputo,

Bright, & Gallagher, 1984) (19 items rated on a 5-point scale) measures catastrophic thoughts as

a consequence of experiencing anxiety (Chambless et al., 1984). The reliability of ACQ,

estimated by Cronbach's alpha, was T1: 0.69, T2: 0.87, and T3: 0.92.

The Body Sensations Questionnaire (BSQ) (Chambless et al., 1984) (16 items rated on a

5-point scale) measures frightening bodily sensations associated with autonomic arousal.

Cronbach's alpha; T1: 0.81, T2: 0.93, and T3: 0.96.

The Mobility Inventory (MI) (Chambless, Caputo, Jasin, Gracely, & Williams, 1985) (24

items rated on a 5-point scale) measures agoraphobic avoidance behaviour when alone in

different situations or when accompanied by another person. In this study we used the total

avoidance score when alone (MIA). Cronbach's alpha; T1: 0.93, T2: 0.89, and T3: 0.94.

Global evaluation and satisfaction. SLUTTP is a questionnaire developed in the "Norwegian Multisite Project for Studies of Process and Outcome in Psychotherapy" (Havik et al., 1995) and adapted for the present study. SLUTTP comprises global ratings of change, satisfaction with the treatment, evaluation of the importance of different aspects of the program, and how demanding the program was. There were also open-ended questions in which the participants could elaborate their answers.

Secondary Outcomes

The following self-report secondary outcome measures were used:

Beck Depression Inventory (BDI) (Beck, Erbaugh, Ward, Mock, & Mendelsohn, 1961) (21 items rated on a 4-point scale) measures depressive symptoms during the last week. Cronbach's alpha; T1:0.87, T2: 0.90, and T3: 0.91.

The Bergen Insomnia Scale (BIS) (Pallesen et al., In press) (6 items rated on a 8-point scale) measures sleep and tiredness during a week. Cronbach's alpha; T1: 0.87, T2: 0.81, and T3: 0.79.

Inventory of Interpersonal Problems (IIP-64) (Horowitz, Rosenberg, Baer, Ureño, & Villaseñor, 1988; Monsen, Hagtvet, Havik, & Eilertsen, 2006) (64 items rated on a 5-point scale) is based on a circumplex model and measures different types of distress and problems arising from interpersonal sources. In the present study the average total score was used as an indicator of global interpersonal distress. Cronbach's alpha; T1: 0.95, T2: 0.98, and T3: 0.95.

Baseline Predictors (T1) of Outcome

Due to the fact that this is an explorative pilot study for estimating effects, we choose to include a larger number of predictors than usually recommended, given the size of the sample. The following predictors were included:

Socio-demographic factors. Age, gender (1=male and 2 = female), education (1=low

(only primary school), and 5=high (University college/University)), employment status (0=not employed, and 1=employed) and civil status (1=single, and 2=cohabitant).

Illness- and treatment history. Agoraphobia (1=no, and 2=yes), duration of PD (years since debut of PD), help-seeking PD (sought help for PD during the last two years: 0=no, 1=yes), help-seeking other (sought help for other complaints during the last two years: 0=no, 1=yes), and medication (number of different types of medication used the last two years).

Co-symptoms and co-morbidity. The total sum-scores of BDI, BIS, and IIP-64.

Social support and life event. The Interpersonal Social Support Evaluation List (ISEL) (Cohen, Mermelstein, Kamarch, & Hoverman, 1985) (30 items rated on a 4-point scale) measures perceived availability of social support. The average total sum score of ISEL was used in the present study. Cronbach's alpha at T1: 0.90. Life events (Havik et al., 1995) (24 items rated on a 7-point scale) measures life events occurring within the last year before treatment. Two sum scores were derived: number of negative life events (NLE), and number of positive life events (PLE).

Motivation and compliance. Nijmegen Motivation List-2 (NML-2) (Keijsers, Schaap, Hoogduin, Hoogsteyns, & de Kemp, 2000) (25 items rated on a 5-point scale) measures the participant's motivation for the treatment and for the tasks and demands of the treatment. Cronbach's alpha at T1: 0.45. Compliance: Time (time spent on the program per week), and phone (phone time spent with the therapist each week). Number of completed modules could not be included as a predictor because almost all participants had completed all modules.

Statistical Analysis

Significance testing of group differences between treatment completers versus drop-outs included chi-square and t-tests for independent groups. Pre-, post and follow-up changes on outcome measures were tested with t-tests for dependent samples. McNemar's test for change

was used to determine whether the change in frequencies on SLUTTP at T2 and T3 were significant. Within-group effect size was estimated with pooled standard deviation (Kazdin, 2003) (Appendix A). In the analyses of predictors of improvement, two different approaches were used. First the predictors were correlated (Pearson correlations) with status of the outcome measures at the 6 months follow-up, that is, the raw score for the outcome measures, and the average Z-scores for the three outcome measures at T3. This was done to evaluate predictors of long term status. Second, residual change scores (RCS), representing the amount of change from T1 to T3 when correcting for the T1 status and the correlation between T1-T3, were calculated (Beutler & Crago, 1983) (Appendix B). The predictors were also correlated (Pearson correlation) with the residual change scores, both for each outcome measure and for the averaged Z-score, to evaluate predictors' association with the changes from T1 to T3. The predictor analyses were restricted to bivariate, zero-order correlations. Due to the small sample with high risk for multicollinearity and very unstable results, we did not include the predictors in multiple regression analyses. All *p*-values were based on two-tailed tests.

Clinical significant change was calculated as Reliable Change Index (RCI) (Christensen & Reick, 1983) (Appendix C). A reliable change is defined as RCI > ± 1.96, that is, when the individual changes more than ±1.96*the standard error of measurement (SE) from T1 to T3. Individual changes of this magnitude would occur by random variation only in 5% of the cases.

Because this is a pilot study, we wished to assess the optimal effectiveness of the program. The main analyses are therefore performed on the treatment completers, i.e. those who completed the program. However, we have also calculated the more conservative effect sizes for intention-to-treat that included the drop-outs. Here the missing data at the end of treatment and at follow-up were replaced with the individual's pre-treatment scores on the relevant measures.

When an individual answered less than 40% of the questions on a given questionnaire, the

score for this questionnaire was not included in our analyses.

All statistical analyses were done by SPSS version 15.0.1.

Ethics

Participation was based on informed and written consent. The study was approved by the

Regional Committee for Medical Research Ethics, Western Norway.

Results

Study Sample

A total of 87 persons took contact after being informed about the project, and 38 were

invited to the inclusion interview after the telephone screening. Among these, 27 were included.

Eight dropped out before or during the treatment period, and one person dropped out from T2 to

T3. The main reasons for exclusion and drop-out are given in Figure 1.

Insert Figure 1 about here

The only significant difference between the treatment completers and the drop-outs was

that the latter reported more positive life events (PLE) during the last year (t (25) = -2.632,

p=.014) (Table 1). Participants that were male, without a partner, who had not used medications

for the last two years, and with a lower socioeconomic background, had higher drop-out rates, but

due to the sample size, these differences were not significant (*p*-values: .206-.658) (Table 1).

Insert Table 1 about here

More than two thirds of the participants were female. They had relatively high levels of

education, were co-habiting, and over 40 years of age. A majority was emloyed. They reported

that the first panic attacks started more than 12 years ago, a majority had agoraphobia, two thirds had been using medication the last two years, and most had sought help, either for the PD or for other problems during the last two years (Table 1).

At baseline, there were no significant differences between the treatment completers and the drop-outs on the primary and secondary outcome measures. The lowest t-value was -0.218 (p=0.83) and the highest t-value was -1.066 (p=0.30).

Compliance

The treatment completers had visited almost all the modules and had used on the average about 3.5 hours per week with the program. On the average, the weekly telephone contact lasted less than 10 minutes. Thus, the participants spent substantially more time working with the anxiety program on their own than with the therapist (Table 2).

Insert Table 2 about here

Primary Outcome

Statistically significant changes on the primary outcome measures were found during the active treatment period and remained stable during the 6 months follow-up (Table 3). All primary outcome measures showed statistically significant change from T1 to T2 and T3 respectively, whereas no significant changes were observed from T2 to T3 (all $ps > .501$). For the group of treatment completers 3 out of 4 effect sizes were large, and 1 was medium. In the intention-to-treat analyses, 1 out of 4 effect sizes was large and 3 were medium. At T3, 52.9% of treatment completers scored 2 or lower at CSR, indicating that they no longer fulfilled the diagnostic criteria for PD. In addition, 29.4% of the treatment completers scored between 2 and 4 on the CSR at T3 and were therefore no longer in need of treatment. The remaining 17.7% of the

treatment completers had a CSR-score of 5 and still had residual symptoms in need of treatment.

Insert Table 3 about here

Reliable Chance Index

For the primary outcome measures, we found that less than half of the treatment

completers had a reliable change index (RCI) indicating reliable improvement from T1 to T3,

with the strongest positive effect observed on BSQ (52.9%). Two of the treatment completers had

reliable negative change, i.e. showed deterioration, on BSQ from T1 to T3 (Table 4).

Insert Table 4 about here

Secondary outcome

There were significant changes from T1 to T2 and from T1 to T3 in all secondary

outcome measures. The average score on IIP-64 also showed a statistically significant change

from T2 to T3. For the group of treatment completers, 2 out of 6 effect sizes were large, 3 were

medium and 1 was small. In the intention-to-treat analyses, all effect sizes were small (Table 5).

Insert Table 5 about here

Satisfaction with treatment

The treatment completers were satisfied with the treatment, and most of them reported

that they were satisfied with the change in symptoms, even though the satisfaction seems to have

reduced at the 6 months follow-up (Table 6). These reductions are, however, not statistically

significant (all *ps*>.125). In contrast to the findings from the RCI on BSQ, none of the treatment

completers reported a negative impact from the treatment at T3. Finally, the treatment completers

rated the self-help program as suitable for their problems. None of the completers brought up

additional problems in the telephone contacts.

Insert Table 6 about here

When evaluating the different components of the program at the 6 months follow-up,

almost all of the treatment completers emphasized the importance of the written material

(100.0%), the assignments (94.4%) and the exercises (94.4%). They tend to view the quizzes

(89.0%) and the phone calls (77.8%) as being less important than the other components of the

program.

At the interview at T3 most of the treatment completers stated an overall satisfaction with

the program, but some mentioned that they had been more motivated at the beginning of the

program. This was usually explained as due to their perception of the program as extensive and

time consuming. Most of the treatment completers were still using the program or the

methods/principles learned. Among the factors that the treatment completers mentioned to be of

help, were the psychoeducational materials, e.g. the explanations of anxiety symptoms and panic

disorder. Other factors frequently mentioned as helpful were breathing and relaxation exercises.

Suggested improvements to enhance the usefulness of the program were more time to complete

the modules and more contact with the therapist.

Predictors: Correlations with Primary Outcome Measures

Predictors were correlated with two different aspects of outcome at T3. First, with the raw

score or status on the primary outcome at T3, second, with the residual change score at T3 after

controlling for T1 level. The main finding was that very few of the included predictors correlated with the outcome measures at T3 after adjusting for T1 level (Table 7).

The significant correlations indicate that being female was significantly related to higher levels of agoraphobic cognitions (ACQ) and more frightening bodily sensations (BSQ) at 6 months follow-up, but these relationships became insignificant when we in the residual change score corrected for the T1-levels of ACQ and BSQ. However, being a female was associated with significantly lesser change from T1 to T3 in agoraphobic avoidance behaviour when alone (MIA).

Using more medication was significantly related to higher levels of agoraphobic cognitions (ACQ) and more agoraphobic avoidance behaviour when alone (MIA) at the follow-up. However, the relationship between medication at baseline and ACQ at T3 became insignificant when we corrected for the T1-level. The relationship with MIA was maintained, indicating that those with more medication at baseline had less change in agoraphobic symptoms from T1 to T3.

Having sought help for other problems at baseline was significantly related to a large change in frightening bodily sensations (BSQ) from T1 to T3.

Problems sleeping (BIS) at baseline was significantly related to more agoraphobic avoidance behaviour when alone (MIA) at the follow-up, and the relationship remained significant after correcting for the T1-level.

Insert Table 7 about here

Discussion

Findings

The results from the study indicate that guided self-help via Internet gives statistically significant improvement in PD-symptoms, and that it also contributes in improving co-symptoms which are not in the focus of the treatment. The changes also remain over 6 months, where half of the completers did not fulfil the PD-diagnosis, and the treatment completers are satisfied with the treatment.

Improvement was observed in a wide range of outcome indicators. The primary outcomes: agoraphobic cognitions, frightening bodily sensations, agoraphobic avoidance behaviour when alone, and clinician's severity rating; and secondary outcomes; depression, problems sleeping and interpersonal problems were all significantly reduced in the active treatment period, and the changes lasted to the 6 months follow-up. The improvements in the secondary outcomes indicate an overall change of the participants' general psychological condition in addition to the improvement in PD-symptoms. One interpretation of the generalizing effect of this PD treatment is that guided self-help via Internet may enhance an experience of mastery and self-efficacy that has been seen as the core of the global or non-specific factors in psychological treatments (Frank, 1989; Menchola, Arkowitz, & Burke, 2007).

Interpersonal problems were further reduced in the period from the end of treatment to 6 months follow-up. One reason for this may be that the interpersonal problems are not the focus of the treatment. The change may therefore appear slower than for the primary outcomes, and probably have not reached a peak of change through the treatment period.

When evaluating the components of the program, treatment completers were most satisfied with the psychoeducation and the exercises. This is in accordance with Frank's (1989)

meta-model for change, who argues that for psychotherapy to work, the therapist must give the patient an acceptable explanation for how the problems have developed, and a feasible procedure for changing the problems.

Overall, the average scores on the primary outcomes resemble what is found in earlier studies, both before treatment and at follow-up (Carlbring et al., 2006; Carlbring et al., 2003; Carlbring et al., 2005; Carlbring et al., 2001). When comparing to norms, the levels on ACQ and BSQ before treatment resembled that of a clinical sample (Chambless, 1985, cited in (Bouchard, Pelletier, Gauthier, Cote, & Laberge, 1997) and were close to a non-clinical sample at follow-up (Bibb, 1988, cited in (Bouchard et al., 1997). The average levels on MIA, however, are considerably lower than a clinical sample before treatment, and resemble a non-clinical sample at the follow-up (Craske, Rachman, & Tallman, 1986). This might suggest that patients with severe agoraphobic symptoms were not reached in our study, possibly because the participants had to meet in person for the inclusion interviews. Avoidance may also be considered a general trait for agoraphobics, and therefore make them less likely to seek treatment.

The effect sizes observed in the present study resemble those found in earlier studies when considering only treatment completers. For intention to treat, our effect sizes are smaller than in most later studies, and they are more in line with Carlbring and colleagues earlier studies (Carlbring et al., 2006; Carlbring et al., 2003; Carlbring et al., 2005; Carlbring et al., 2001).

The present study had a drop-out rate of about 30%. This is higher than for other comparable self-help studies (Titov, 2007), but is lower than for therapist delivered psychotherapy (Wierzbicki & Pekarik, 1993). Participants with more life events, in particular positive, have a higher drop-out rate in this study. Total number of life events, both positive and negative, have been shown to contribute to negative evaluation of treatment effects on traditional

psychotherapy (Bergslien & Ottesen, 2006). The high number of life events might reflect instability in the lives of these people; this might make it harder to commit to a time-consuming treatment program. It is also possible that the positive life events make the PD-problems seem smaller, or that the participants wish to concentrate on the positive events in their lives instead of their PD.

The predictors selected for this study had low correlation with the outcome measures, despite the fact that the included predictors have prognostic values in "ordinary" psychotherapy research (Lambert, 2004). No single predictor could predict change on more than one measure, indicating that the predictors included are not relevant to be used to identify persons suitable for this kind of treatment. This may indicate that the positive and homogenous evaluation of the content of the program, i.e. explanations and exercises, and telephone contacts, overrules the possible effects of the prognostic factors. However, one should note that high values and less change at T3 on agoraphobic symptoms (MIA) were involved in 5 of the 9 significant predictors. This may indicate that the less than expected change in agoraphobic symptoms are related to pre-treatment characteristics (being female, using medication, and having problems sleeping), and thus the content of the self-help program show less effectiveness for patients with agoraphobic symptoms.

A possible explanation to why there were few significant predictors is that all participants in this study received the kind of treatment they wanted and had applied for, thus reducing the impact of pre-treatment individual differences. Poor reliability of the predictor variables could be a possible reason for the low correlations with the outcome, but all predictors except Njimegen Motivation List had good or very good reliability. It is also possible that we have chosen the wrong predictors. The predictors we used, however, were in line with what traditionally are used in psychotherapy research. It may be, as suggested by other research, that the prognostic factors

for treatment delivered via the Internet are different from the predictors of the outcome in face to face treatment (Andersson, Bergstrom et al., 2008). In sum, the findings from this study indicate that there are few prognostic factors for this kind of treatment, indicating that the program can be used successfully by most self-referred individuals with a PD-diagnosis.

Two of the treatment completers showed a negative outcome at the 6 months follow-up with respect to frightening bodily sensations, i.e. a reliable increase on the BSQ score. One of these had a very low score on BSQ before treatment and a score on BSQ similar to the other treatment completers at the follow-up. An explanation could be that this person had a possible under-reporting of the symptoms at the start of treatment. This person may have had a lot of safety behaviour, and thus the exposure during treatment gave the participant a normalized relationship to bodily symptoms. The other person showing a negative outcome on the BSQ also had a relatively low score on the BSQ at the start of treatment, but was considerably higher than the others at the 6 months follow-up. This person reported a severe negative life event in the period between the end of treatment and the follow-up. This may explain the worsening in the BSQ-score, as it is assumed that PD-symptoms tend to reoccur in stressful times. One should also consider it possible that the exposure done by these two participants had wrong focus or was too extensive. However, the two did not report any global negative changes at the follow-up.

Participants in the present study are about 8 years older than in previous studies on guided self-help via Internet (Carlbring et al., 2006; Carlbring et al., 2003; Carlbring et al., 2005; Carlbring et al., 2001). This may indicate that older women, traditionally thought to be reserved with regard to the use of computer, also can also utilize Internet-based self-help programs.

The improvement on PD-symptoms and related problems and the reported satisfaction with the treatment indicate that the Swedish program can be successfully transferred to Norway.

If the improvement can be attributed to the program, the changes are of great significance

for the treatment completers. These people have had PD for an average of 12 years and have sought help earlier, but now they have participated in a program they are satisfied with and that helps them with their problem. In fact, at the 6 months follow-up, 52.9% of treatment completers no longer fulfilled the diagnostic criteria for PD, and less than 20% was seen as in need of more treatment. This is lower than for other comparable studies which have reported that around 80% of participants no longer qualified for the diagnosis at the follow-up (Carlbring et al., 2006; Carlbring et al., 2005; Klein et al., 2006).

Limitations of the Study

With regard to statistical validity, the main limitation of our study is the low N (n=18). With such a low N, we can only expect to document strong effects. An increased N might have lead to significant findings for some of the predictors (e.g. diagnosis, help-seeking for other problems, positive life-events, BIS, BDI and ISEL). On the other hand, half of the predictors had low correlations with both status and residual change outcome on this study ($r < \pm.20$), indicating that we probably would not have found significant predictors even with a larger N.

Another weakness with the study is the use of many predictors, possibly leading to random findings. With this large number of predictors, one would expect to find 5 significant correlations merely due to random variation. However, due to the lack of studies in this field, we found it justifiable to include a large number of predictors in this explorative phase of research.

With regard to the internal validity, it is worth noting that we did not include any alternative treatment or a wait list control for comparison. It is not possible to conclude that the positive outcomes found in the study were in fact due to the treatment, since change may occur merely by the passing of time. However, most of the participants had had their PD for a long period and had previously received medical and/or psychological treatment, reducing the likelihood of spontaneous recovery.

Another problem with the present study is the possible bias arising from the fact that the assessors at T1 and T2 are the ones treating the participants. It could be that the therapists assess the participants as healthier at the end of treatment, due to the therapists' commitment to the program. This is however corrected for by using independent assessors that were blind for the T1 and T2 assessments at the 6 months follow-up.

A threat to the external validity of the study is that the participants are recruited via advertisements. Thereby one may recruit people sharing common features (e.g. high motivation), which in turn may lead to similar responses, and thereby biasing the sample toward individuals with more resources (Andersson, Bergstrom, Carlbring, & Lindefors, 2005).

The participants in this study are in fact in many ways more resourceful than other PD-patients; they have a high education, are employed, are cohabitant, and have fewer additional problems. This makes it difficult to say anything certain about how the program would work for the average PD-patient with fewer resources. The program is demanding and requires a considerable amount of reading, possibly making it more available to individuals with higher levels of education. Event though the participants differ from other PD-patients with regard to socio-demographic variables and co-symptoms, they resemble the typical PD-patients with respect to duration and treatment history. This indicates that the program is suitable for the PD-symptomatology as such. At the present time, the program is being included in a study in "ordinary" out-patients clinics in Western Norway, and this may give information about the feasibility of the guided self-help model for patients seen in ordinary mental health services.

Implications for Clinical Work and Further Research

The present findings may have implications for both clinical work and further research. One way of implementing guided self-help via Internet in clinical practice is to use it as a

component of a stepped care approach. Haaga (2000) points out that not all patients need the same type and intensity of treatment. From a cost-effective point of view, one should therefore consider giving the patient the amount of treatment he/she needs. In a stepped care approach, relatively low intensity interventions, such as brief and/or single-strand treatment modalities, are provided initially, and more intensive, costly interventions are provided only if required (Lovell & Richards, 2000). Providing care in a stepped manner has received increased attention. The arguments in favour of this method of delivery are that brief and/or single-strand treatment modalities seem to work for many people, and that it can be made more available than traditional mental health care. It may also be argued that by providing therapy in a stepped care manner, the entry level for therapy is set lower than when one only provides "traditional" therapy (Lovell & Richards, 2000). One possible way of using guided self-help via Internet for PD as part of a stepped care approach is by offering the clients initially a session of psychoeducation, something which has proven to be sufficient for about 10% of clients with PD (L.G. Öst, personal communication, 2008). The ones not being helped from psychoeducation alone could then be offered guided self-help via Internet. If there is still someone not helped after this, he/she may receive therapist delivered CBT or other more resource demanding treatments. An interesting research question could be whether or not those who had not responded on a CBT-based self-help program would respond better to other psychotherapeutic models, e.g. insight-oriented or relational-oriented psychotherapy.

Another clinical implication of this study might be to consider the possibility of including psychoeducation and home assignments as part of other anxiety treatments. The present participants emphasised the importance of these aspects of treatment, in line with earlier studies on anxiety (Clark & Fairburn, 1997; McIntosh et al., 2004).

The ones dropping out of the present study did so early in the treatment period. This is in line with the central finding in all psychotherapy, that the first hours are of great importance for the course of treatment, perhaps due to the early forming of a therapeutic alliance (Safran & Muran, 2000). If this is the case, one could attempt to reduce drop-outs in clinical settings by increasing the relational focus, i.e. by lengthening the first telephone contacts, or starting with a psychoeducational session with the therapist. Our findings also indicate that the first exercises were experienced as challenging. One should perhaps take extra care to debrief the participants at this stage, or possibly making the first exercises less challenging to reduce the drop-out rate.

Further studies need to be carried out to establish the effectiveness of guided self-help via Internet on PD-patients, and to identify possible predictors of improvement. There is also a need to include more heterogeneous patients' samples in studies of guided self-help via Internet, both to investigate whether this intervention is suitable for other groups, and to possibly optimize the intervention for individuals with agoraphobic symptoms.

Conclusions

This study gives further support to the findings that guided self-help via Internet is a useful treatment for PD. The improvement in PD-symptoms seems to last. Half of the sample did not fulfil the PD-diagnosis 6 months after treatment. There also seems to be a spill-over effect of improvement in other symptoms. Participants are satisfied with the treatment. There is, however, a need for further studies to determine the factors that can predict changes from this type of treatment.

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Appendix A

Effect sizes were calculated using the following formula:

$$ES = \frac{M_{post} - M_{pre}}{\sqrt{(SD_{post}^2 - SD_{pre}^2)/2}}$$

where M is mean and SD is the standard deviation.

Appendix B

Residual change score (RCS) were calculated using the following formula:

Residual change = $Z_t - r_{it}Z_i$

where Z_t is the score at T3, Z_i is the score on T1, and r_{it} is the correlation between the score on T1

and T3.

Appendix C

Reliable Change Index (RCI) was calculated using the following formula:

$$RCI = \frac{Mean_{pre}-Mean_{post}}{SE}$$

where SE is the standard error, calculated using the following formula: $SE_{diff} = \sqrt{((SD\sqrt{1-r_{pre}})^2+(SD\sqrt{1-r_{post}})^2)}$.

Author Note

Table 1.

Treatment completers and drop-outs. Socio-demographic variables, treatment history, social support, and life events.

	Treatment completers (n=19)		Drop out (n=8)		Total (N=27)	
	M/%	SD	M/%	SD	M/%	SD
Age	42.1	11.4	36.3	15.0	40.5	12.4
Females (%)	73.7		62.5		70.4	
Higher education (%) [a]	73.7		57.1		69.2	
Employed (%)	78.9		57.1		73.1	
Cohabitant (%)	84.2		57.1		76.9	
Agoraphobic (%)	63.2		62.5		63.0	
Duration of PD (years)	12.4	10.9	10.0	13.0	11.8	11.2
Help-seeking for PD (%)	78.9		100.0		84.6	
Help-seeking other (%)	68.4		87.5		74.1	
Used medication (%)	68.4		37.5		59.3	
ISEL	3.3	0.4	3.0	0.6	3.2	0.5
NLE	1.7	1.4	2.6	2.6	2.0	1.8
PLE	0.6	0.9	2.1	2.1	1.1	1.5

[a] higher education refers to education at the level of University college/University

Table 2

Number of modules visited, length of telephone calls, and time used on program by the

treatment completers.

	M	SD	Minimum	Maximum
Modules visited	9.8	0.7	7.5	10.0
Phone contact (minutes)	7.7	2.6	4.3	15.0
Time per week (minutes)	218.9	194.5	45.0	840.0

Table 3.

Mean, standard deviations and effect sizes on primary outcome for treatment completers and effect sizes for intention to treat.

| | T1 | | T2 | | p | T3 | | p | Effect size[b] TC | | | ITT | |
	M	SD	M	SD	T1-T2	M	SD	T2-T3	T1-T2	T1-T3		T1-T2	T1-T3
ACQ	2.39	0.48	1.81	0.67	.00	1.81	0.69	.69	1.00	0.98		0.74	0.68
(n=19/18)[a]													
BSQ	2.75	0.69	2.02	0.80	.01	2.00	0.88	.65	0.98	0.95		0.60	0.51
(n=18/17)[a]													
MIA	2.16	0.75	1.69	0.49	.01	1.73	0.72	.50	0.74	0.58		0.56	0.44
(n=19/18)[a]													
CSR	4.71	1.05	2.65	0.86	.00	2.65	1.32	.72	2.15	1.73		0.98	1.07
(n=17/16)[a]													

Note. TC = based on treatment completers. ITT = based on intention-to-treat.

[a] The n refers to the number of participants from T1 to T2 and from T2 to T3, respectively. [b] Cohen's d

Table 4

Reliable Change: individual change greater than ± 1.96 SE$_f$.

Outcome measure	Change T1 to T3		
	Stable	Positive	Negative
ACQ (n=18)	66.7 %	33.3 %	0.0 %
BSQ (n=17)	35.3 %	52.9 %	11.8 %
MIA (n=18)	77.8 %	22.2 %	0.0 %

Table 5.

Mean, standard deviations and effect sizes on secondary outcome for treatment completers and effect sizes for intention to treat.

| | T1 | | T2 | | | T3 | | | Effect size[b] | | | |
| | | | | | | | | | TC | | ITT | |
	M	SD	M	SD	p T1-T2	M	SD	p T2-T3	T1-T2	T1-T3	T1-T2	T1-T3
IIP-64 (n=19/18)[a]	1.05	0.59	0.80	0.57	.01	0.61	0.38	.03	0.43	0.89	0.28	0.40
BIS (n=19/18)[a]	2.84	1.75	1.79	1.40	.02	1.60	1.25	.98	0.66	0.82	0.35	0.34
BDI (n=19/18)[a]	12.04	7.48	7.79	7.13	.02	7.83	7.47	.84	0.58	0.56	0.30	0.27

Note. TC = based on treatment completers. ITT = based on intention-to-treat.

[a] The n refers to the number of participants from T1 to T2 and from T2 to T3, respectively.

[b] Cohen's d

Table 6.

Satisfaction with treatment, evaluated with SLUTTP.

	T2	T2 ITT	T3	T3 ITT
	(n=19)	(N=27)	(n=18)	(N=27)
	Yes	Yes	Yes	Yes
Satisfied with the treatment	100.0 %	70.4 %	77.8 %	51.9 %
Positive change	73.7 %	51.9 %	50.0 %	33.3 %
Satisfied with change	73.7 %	51.9 %	55.6 %	37.0 %
Negative impact[a]	5.3 %	5.3 %	0.0 %	0.0 %
Suitability for their problems	100.0 %	70.4 %	94.4 %	63.0 %

Note. Intention- to-treat: We have assumed that the drop-outs were not satisfied and that they did not see any of the components of the treatment program as important.

[a] We have not calculated a percentage based on intention-to-treat because of no available information about the negative impact experienced by the drop-outs.

Table 7.

Predictors: Correlations with status at T3 and residual change scores T1-T3

	T3: Status (n=18)				T1-T3:Residual change score(n=18			
	ACQ	BSQ	MIA	Total	ACQ	BSQ	MIA	Total
Gender (0=male, 1=female)	**.47**	**.53**	.47	**.54**	.06	.16	**.53**	.15
Age	-.11	-.16	-.33	-.22	.04	.10	-.33	.10
Education	-.02	.04	-.21	-.07	.23	.34	-.21	.25
Employed	-.10	-.11	-.30	-.19	-.02	.02	-.32	-.09
Co-habit	-.16	-.26	-.40	-.31	-.06	-.09	-.31	-.09
Agoraphobic (1=no, 2=yes)	.41	.47	.34	.45	.16	.26	.15	.19
Duration of PD	.35	.34	.11	.30	.23	.31	.20	.27
Medication	**.48**	.47	**.57**	**.56**	.22	.22	**.53**	.25
Help-seeking	.22	.32	.11	.24	.09	.13	.15	.11
Help-seeking other	-.30	-.36	-.07	-.27	-.45	**-.56**	-.14	**-.49**
BDI	.37	.29	.34	.37	-.08	.09	.40	.03
BIS	.27	.33	**.51**	.41	.27	.23	**.54**	.30
IIP_64	.23	.12	.19	.20	-.12	.01	.16	-.04
ISEL	-.32	-.31	-.38	-.38	.02	-.12	-.28	-.12
NML2	.13	.29	.13	.20	.19	.21	-.06	.17
NLE	-.03	.09	.05	.04	.32	.16	.16	.22
PLE	.16	.28	.36	.30	.44	.34	.32	.40
Time per week	.06	.16	.21	.16	-.10	-.10	.17	-.11
Phone Contact	.22	.31	.30	.30	-.05	.10	.20	.04

Note. A negative correlation with residual change score indicates change greater than expected.

Bold figures: $p<.05$. Total refers to the averaged Z-scores for the three measures. Because of the rounding off to two decimals, some of the .47-correlations are not statistically significant.

Figure Caption

Figure 1. Inclusion and selection

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┌──────────────┐      ┌────────────────────────────────────────────────┐
│ Took contact │      │ Excluded (n=49):                               │
│ (N=87)       │─────▶│ Did not meet diagnostic criterias (n=14)       │
│              │      │ Use of medication (n=4)                        │
│              │      │ Could not be reached by phone (n=12)           │
│              │      │ Could not come to interview (n=4)              │
│              │      │ Too old (n=1)                                  │
│              │      │ Other (n=14)                                   │
└──────────────┘      └────────────────────────────────────────────────┘
       │
       ▼
┌──────────────┐
│ Eligble for  │      ┌────────────────────────────────────────────────┐
│ assessment   │─────▶│ Did not meet for assessment interview (n=2)    │
│ interview    │      └────────────────────────────────────────────────┘
│ (n=38)       │
└──────────────┘
       │
       ▼
┌──────────────┐      ┌────────────────────────────────────────────────┐
│ Assessment   │      │ Excluded (n=8):                                │
│ interview    │─────▶│ Other anxiety disorders (n=4)                  │
│ (n=36)       │      │ Use of anxiety reducing medication (n=2)       │
│              │      │ Use of alcohol (n=1)                           │
│              │      │ Did not have enough time (n=1)                 │
└──────────────┘      └────────────────────────────────────────────────┘
       │
       ▼
┌──────────────┐      ┌────────────────────────────────────────────────┐
│ Included     │─────▶│ Droppet out because of change of therapist (n=1)│
│ (n=28)       │      └────────────────────────────────────────────────┘
│              │
└──────────────┘
       │
       ▼
┌──────────────┐      ┌────────────────────────────────────────────────┐
│ Started      │      │ Dropped out (n=8)                              │
│ treatment    │─────▶│ Felt better (n=1)                              │
│ (n=27)       │      │ Did not have enough time (n=1)                 │
│              │      │ Could not be reached by phone (n=1)            │
│              │      │ Not motivated (n=1)                            │
│              │      │ Other (n=4)                                    │
└──────────────┘      └────────────────────────────────────────────────┘
       │
       ▼
┌──────────────┐
│ Completed    │
│ treatment    │
│ (n=19)       │
│              │
└──────────────┘
       │
       ▼
┌──────────────┐      ┌────────────────────────────────────────────────┐
│ 6 months     │─────▶│ Could not be contacted (n=1)                   │
│ follow up    │      └────────────────────────────────────────────────┘
│ (n=18)       │
│              │
└──────────────┘
```