Effectiveness of computerized cognitive behavior therapy in mild forms of depression

Doctoral theses

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Budapest, 2024

1. Introduction

Unipolar depression is a chronic mental state that can cause clinically significant stress and dysfunctions in work, relationships or physical health. The lifetime prevalence of major depressive disorders is estimated to be 15-18% (Malhi & Mann, 2018), and in 2019, depression was globally the second cause of disability (https://vizhub.healthdata.org/gbd-compare/#, 2021).

Recommended first line treatment for depression is pharmacotherapy, psychotherapy or combination of the two (Castro et al., 2015). According to the research of recent decades, both are equally efficient, although the majority of patients choose psychotherapy above antidepressants (McHugh et al., 2013).

Cognitive behavior therapy (CBT) has been consequently proven to be long-term effective in treatment of depression (Rohan et al., 2016). The overload of mental health institutes, the waitlists, the low number of highly qualified mental health professionals and their high prices, the stigma of mental disorders and psychotherapy and the geographical distance all can be an obstacle for

availability of mental health services (Gili et al., 2020). In order to bridge these difficulties, increasing number of clinical guidelines internationally promote the importance of low intensity psychological interventions, that can be a valuable clinical asset in decreasing depressive or anxiety symptoms (Monreal-Bartolomé et al., 2019).

One of the most prevalent low intensity interventions in treating depression is computerized cognitive behavior therapy (cCBT). The primary aim of cCBT is psychoeducation, behavioral activation and psychosocial integration. The iFightDepression® (iFD®) guided self-help tool is available free of charge for patients diagnosed with mild forms of depression. It is based on CBT techniques and is complementary to the traditional pharmaco- or psychotherapy. Its goal is to facilitate the patients' self-reflexion and activity just as to prevent exasperation of depressive symptoms and suicidal behaviors (Arensman et al., 2015). The tool follows a 6-8-week protocol and suggests working on one module per week.

The attrition rate of online self-help tools is generally high, according to some findings can reach even 38 % (Linardon & Fuller-Tyszkiewitz, 2020). Therefore, identifying the factors of commitment to the tool and staying in the program has a key role in obtaining the effectiveness of cCBT. In the field of internet-based interventions, professional help via short in-person sessions, phone calls or e-mails increase the adherence and contributes to the better outcome (Gilbody et al., 2015).

2. Aims

My doctoral dissertation examined firstly, the effectiveness of iFightDepression® guided online self-help tool and secondly, the patients' adherence with the program. The naturalistic study took place in Hungarian sample between 2017 and 2019. Our aim was to investigate whether the iFD® tool, as a complementary intervention to the treatment as usual, helps in reducing depressive symptoms and whether the additional phone call support during the 6 weeks of intervention makes the symptom reduction more effective. Our further goal was

to examine attitudes of professionals about the iFD® self-help tool after the intervention. We asked them about the difficulties of using the iFD® and what their consideration was about its simplicity and accountability. Additionally, we aimed to compare the professionals' opinion about patients' symptom changes to the changes reported through depression-screening questionnaires.

3. Methods

The data of 143 depressive patients from Hungarian psychiatric outpatient and primary health care facilities was gathered. Prior to data collection, three intervention groups were formed: 1) treatment as ususal (TAU); 2) TAU plus iFD® intervention 3) TAU plus iFD® plus weekly supportive phone calls that lasted for 20 minutes each. The TAU consisted of psychotherapy, pharmacotherapy or both of them.

The intervention protocol lasted for 6 weeks during which patients were met by their practitioner in every two weeks.

Before and after the iFD® intervention, patients filled out the PHQ-9 questionnaire that screened for depression symptoms and suicidality, the Shortened Version of Beck Depression Inventory (RBDI) and the Shortened Version of Beck Hopelessness Scale (RBRS). Professionals on a separate questionnaire also gathered information about patients' anamnestic, sociodemographic and symptoms-related data. The latter was based on professionals' own knowledge and judgement. Furthermore, a questionnaire was provided for professionals to gather their opinion about the iFD® tool after the intervention. The iFD® program registered the number of completed modules for each patient for measuring adherence.

Statistical analysis was performed by SPSS 21.0 and ROPstat (Vargha, Torma, & Bergman, 2015) softwares.

4. Results

According to our results, the rate of depressive symptoms measured by RBDI after the intervention significantly decreased (effect size: $F(1) = 115.417$, $p < 0.001$, partial

η^2 = 0.452). Besides the significant main effect size of the type of intervention ($F(2) = 10.135$, $p < 0.001$, partial η^2 = 0.126) the interaction of the type of intervention and repetition showed to be significant as well ($F(2) = 40.966$, $p < 0.001$, partial η^2 = 0.369): the greatest improvement was detected in TAU+iFD®+Phone intervention group.

Analysis of the results gathered by PHQ-9 have also shown significant reduction of depressive symptoms. Besides the significant main effect of repetition ($F(1) = 124.646$, $p < 0.001$, partial η^2 = 0.471) and type of intervention ($F(2) = 6.236$, $p = 0.003$, partial η^2 = 0.082) the interaction of the type of intervention × repetition ($F(2) = 34.657$, $p < 0.001$, partial η^2 = 0.331) is shown to be significant. The most progress in symptom reduction was measured in TAU+iFD®+Phone group. The 95% confidence interval of averages demonstrate that whilst the averages in TAU group practically haven't changed between two measure points, the both iFD® intervention groups showed significant decrease, which was larger in the phone-call support group than in the group without phone support.

Results showed that the type of intervention was significantly related to the greater odds of statistically reliable change. In comparison to TAU group, in the iFD® without phone call intervention group the statistically reliable improvement of depressive symptoms had 18 times greater odds, whilst in iFD® +Phone call group the intervention had nearly 127 times greater odds for statistically reliable improvement. The small sample size and the large number of independent variables in the model indicates an unsteadiness of estimation, although in both cases the odds ratio is significant. Out of demographics, only the place of residence showed to be a significant variable: the statistically reliable improvement appeared to have four times more odds amongst those who live in Budapest in comparison to patients who live in rural areas. Lastly, the more severe were the depressive symptoms at the baseline, the more, namely, 1.5 times, it increased the odds of statistically reliable improvement. The variance explained by the model (Nagelkerke R^2) was 62.0%. There was no significant correlation between sex, age, level of education and change of depressive symptoms in two measure points.

Comparing the two iFD® intervention groups, symptoms of depression measured by Short Version of Beck Depression Inventory were significantly decreased between two measure points (main effect size: $F(1) = 181.417$, $p < 0.001$, partial $\eta^2 = 0.645$). The interaction of repetition × intervention group showed to be significant ($F(1) = 15.577$, $p < 0{,}001$, partial $\eta^2 = 0.135$): in case of iFD® group getting the additional phone support the symptom reduction was significantly greater than in group getting only the iFD® intervention. The main effect size of the intervention group was significant ($F(1) = 10.021$, $p = 0.002$, partial $\eta^2 = 0.091$).

Comparing the two iFD® groups regarding depression measured by PHQ-9 the reduction of symptoms between two measure points was significant (main effect size: $F(1) = 179.797$, $p < 0.001$, partial $\eta^2 = 0.643$). The symptom improvement of the phone support group was significantly larger than of the group that got only the iFD® intervention (repetition × interaction of intervention group: $F(1) = 6.620$, $p = 0.012$, partial $\eta^2 = 0.062$). The main effect size of the intervention group was also significant ($F(1) = 10.699$, $p = 0.001$, partial $\eta^2 = 0.097$).

In our research, adherence was operationalized by the number of completed modules. Out of 6 modules of iFD® tool, 4.8 modules (SD = 1.73, range: = 1–6) in average were completed by participants of the two iFD® intervention groups. Participants of the additional weekly phone call support group completed significantly more modules than participants getting only the iFD® intervention (M = 5.8 [SD = 0.72] vs. M = 3.9 [SD = 1.94], Z = –5.416, p < 0.001, rank Cohen-d = – 1.267). The 88.0% of participants of the phone call support group completed all 6 modules whilst this rate was only 38.5% in the group without phone support.

There wasn't significant correlation between the number of completed modules and sex (Z = 0.991, p = 0.322, rank Cohen-d = 0.213), age (r_s = –0.14, p = 0.165) and place of residence (Z = 1.213, p = 0.225, rank Cohen-d = 0.241). At the same time, participants with higher education completed significantly more modules than participants with at most secondary level of education (M = 5.2 [SD = 1.54] vs. M = 4.5 [SD = 1.85], Z = –2.198, p = 0.028, rank Cohen-d = –0.444). With regards to depression, a weak, negative correlation was found between PHQ-9-scores at

the baseline and the completed modules (r_s = –0.22, p = 0.028).

Before the iFD® intervention, according to the professionals' opinion, 6.9% of the patients had severe, 56.9% of them moderate and 36.3% of them mild depression. Between phone call support group and group of getting only iFD® intervention there was no significant difference in incidence of severity of depression ($\chi^2(2)$ = 2.199, p = 0.333; V = 0.147). After the intervention, according to professionals' opinion, 3.9% of patients had severe, 25.5% moderate and 58.8% mild depression, whilst 11,8% of patients had no depression. In phone support group, the clinically favorable judgement was significantly more frequent than in the group without additional phone call support ($\chi^2(3)$ = 13.412, p = 0.004; V = 0.363).

After the iFD® intervention, professionals estimated the amount of change in symptoms of patients compared to the state at the baseline. According to professionals' opinion, depressive symptoms changed very much in 1.0% of participants, much in 31.4% of patients, and 55.9% of patients had minimal changes in symptoms.

Further 10.8% was estimated to have no change, and only in case of one participant (1,0%) was estimated to have a minimal deterioration. The professionals' opinion about patients' symptom changes is in large concordant with results that we got from analyzing patients' PHQ-9 responses through reliable change index (RCI).

According to professionals, 65.7% of patients completed the iFD® online self-help tool, 20.6% not yet, but planning to complete it and 13.7% quit the tool and don't plan to complete it. Professionals stated in case of patients from phone-supported group to have completed the tool in larger rate than the non-supported group ($\chi^2(2) = 15.280$, $p < 0.001$; $V = 0.387$). Clinicians' estimation was in accordance to the objective data collected from registering the number of completed modules within the iFD® program.

Based on the objectively registered data, 62.7% of participants completed the last module, namely completing the tool. It occurred significantly more often in phone-supported group than in the group without

phone-call support (88.0% vs. 38.5%, $\chi^2(1) = 26.761$, $p < 0.001$; $V = 0.512$).

In our study, the majority of professionals, that is 90.2% were in contact with their patients through personal follow-ups, 6.9% of them through e-mail, 47.1% of them through phone calls. Other channels, namely online platforms, like Skype was chosen as a contact form in 14.7% of professionals. The in-person contacts were significantly more frequent in non-phone support group than is group that partook in additional phone support.

During the iFD® intervention the amount of time used for patient guidance by professionals ($n = 97$) according to their self-report, was in average 105.9 minutes (SD = 66.48 minutes, range: 0–180 minutes). The phone-call supported group ($M = 159.6$ minutes, $SD = 31.17$ minutes) has been spent significantly more time with by their clinicians than the group of no phone-support ($M = 48.8$ minutes, $SD = 41.54$ minutes; $Z = 8.031$, $p < 0.001$, rank Cohen-$d = -2.833$).

Beyond the above, the professionals' attitudes towards the iFD® tool were significantly more positive regarding the treatment of their patients in phone-call supported group than the attitudes of professionals who treated the group of no phone-call support ($\chi^2(3) = 7.871$, $p = 0.049$; Cramér-V = 0.444). On the whole, professionals considered the iFD® tool manageable and felt confident in using it. 67.5% of them would suggest the online self-help tool again to their patients, 85% of clinicians claimed the program not to be difficult, for 42.5% of them the usage was simple, and 72.5% found it to be appropriately integrated. However, 57,5% of clinicians felt that it was difficult to take patients into the study and to invite them to use the iFD® tool.

5. Conclusions

In our naturalistic study, on the score of the effectiveness of the computerized cognitive behavior therapy, as a low intensity psychological intervention, we formulated six hypotheses: 1) As a result of the iFD® intervention,

depression decreases in larger extent than in TAU group. Our results showed that depressive symptoms measured by PHQ-9 and RBDI questionnaires significantly decreased in both iFD® intervention groups compared to the TAU group. The hypothesis is therefore confirmed. 2) The second hypothesis stated that the additional weekly 20 minutes phone call support results in significantly greater decrease in depressive symptoms compared to the group that doesn't get the additional weekly phone calls. Our research confirmed that the phone calls helped the patients to personalize the skills learned in modules, therefore, they were more capable to manage their symptoms of depression that resulted in significantly larger decrease in depression. Thus, our results confirm the second hypothesis. 3) The group of TAU+ iFD®+Phone showed significantly higher adherence, that is, completed more modules than the TAU + iFD® group. Our results confirmed the third hypothesis. 4) The demographic data (age, place of residence, sex, level of education) correlate with the program adherence. Our initial assumption was that the younger patients, those

who live in Budapest and the higher educated will show greater adherence in completing the iFD® tool. According to our data, significantly higher adherence has been detected only among the patients of higher education. This hypothesis can be confirmed only regarding the level of education. According to age, sex and place of residence no significant correlation has been found. Therefore, the part of the hypothesis that referred to the latter, may be ruled out. 5) Professionals reckoned the iFD® tool to be easily perspicuous and simply manageable. Based on our attitude questionnaire results, this hypothesis can be confirmed. 6) Changes in depressive symptoms after the intervention according to judgements of the professionals is in accordance with the results of the self-reported PHQ-9 depression screening tool. In our research, this hypothesis has been confirmed.

Predominantly, we may presume that the iFightDepression® guided self-help tool can be an effective complementary instrument to the traditional mental health care practice in reducing depressive symptoms with investing fragments of time that a

traditional psychotherapeutic care would require. For implementing the digital mental health care tool into daily practice in GP and psychiatry facilities, a positive change in professionals' attitudes towards the online self-help programs is also needed. Education about digital possibilities would assist professionals in attaining the openness towards guided online self-help tools.

6. List of publications

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