Research Article

Effectiveness of Telephone-Based Therapy in the Management of Depression: A Systematic Review and Meta-Analysis

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Abstract

Background: There are a couple of independent studies examining the effectiveness of telephone based therapy for the treatment of depression. However, up-to-date systematic reviews are lacking.

Objective: To evaluate the effectiveness of telephone-based therapy in the management of patients suffering from depression compared with the usual care.

Methods: A systematic review and meta-analysis of randomized controlled trials was conducted that compared telephone-based therapy with usual care for depression. We searched MEDLINE, EMBASE, PsycINFO, CINAHL, and CENTRAL (up to August 28, 2012) to identify eligible studies. The primary outcome was depression level at the end of the intervention. We pooled the mean depression level data from the studies using standardized mean difference using the random-effects model.

Results: A total of 11 studies met the inclusion criteria. Nine of these studies was considered for the pooled analysis. Comparison of depression levels in the immediate post-intervention period from the seven studies included in the pooled analysis was in favour of telephone-based therapy (standardized mean difference = -0.43; 95% CI: -0.74-0.12). In the remaining two studies, telephone-based therapy resulted in a statistically significant improvement in clinical outcomes and patient satisfaction. A longer duration of intervention and the presence of known medical comorbidity was positively associated with the effectiveness of telephone-based therapy. The overall effect was stable when studies with extreme characteristics were excluded. Intervention results were found to be sustained throughout the follow-up period.

Conclusion: Telephone-based therapy could be more effective than face-to face therapy in reducing the symptoms of depression. However, further research is required to establish the applicability and cost-effectiveness of telephone-based therapy for routine depression management in health systems.

Background

Depression is a common disease that affects more than 350 million people globally [1]. It causes greater functional disability than diabetes, chronic lung disease, hypertension, and back pain [2,3]. It is also associated with significant social impairment, as well as high direct and indirect health care costs [4].

The prevalence of depression varies across age, sex, regions, years and medical comorbidities. Studies in the United Kingdom reported a 10% community prevalence of depression, while in the United States the lifetime prevalence of depression was 25% in women and 12% in men [5,6]. On average, one in five women and one in eight men experience depression in their lifetime [7]. Studies have also revealed that the prevalence of depression in people with traumatic brain injuries ranges from 15.3% to 42% [8].

Although various psychotherapies in healthcare facilities are available for the effective treatment of depression, less than half of the people with depression receive the services they need [9]. This is mostly due to lack of resources, untrained health care professionals and social stigma [9]. Furthermore, in many countries, fewer than 10% of those affected by depression receive treatment. Attrition rates are also high due to access related barriers such as structural and time constraints, availability of services, transportation problems, and service costs [10,11]. Usual care, counselling in the treatment of depression is constrained by all these factors.

Cognitive-Behavioral Therapy (CBT) is a short-term psychological therapy that attempts to change dysfunctional patterns of thinking and non-adaptive behaviors in order to prevent the development of symptoms of depression or anxiety [12]. Most research on the effectiveness of CBT showed that it is effective in treating mild to moderate depression and a variety of anxiety disorders [12-15]. However, an insufficient number of trained therapists, both in primary and specialist mental health settings, can limit its widespread use. Therefore, alternative delivery methods, such as telephone-based therapy, have been investigated as a possible solution.
health care services, are found to be the key barrier to CBT [12]. On the other hand, with the advancement of telecommunication technology, Telephone-Based Therapy (TBT) has started to play a significant role in the management of numerous mental disorders [16,17]. Studies have demonstrated that TBT not only addresses the health problems of patients, but also reduces the rates of treatment attrition as compared to usual care interventions [17]. It usually includes a pre-determined number of telephone counselling sessions where each session starts with a brief structured assessment of depressive symptoms, medication use and adverse effects [18]. TBT is usually delivered by a qualified therapist who has adequate qualification and experience in outpatient psychotherapy of depression. The therapist may receive training from a psychologist and psychiatrist on various issues of depression counselling [18].

Several Randomized Controlled Trials (RCTs) have assessed the effectiveness of telephone-based treatments of depression in different settings. Three previous systematic reviews of such RCTs exist; though these reviews are limited in their scope [9,19,20]. The literature search in these reviews was conducted before May 2008. In addition, those RCTs was also confounded by high variability in patient characteristics, scales of depression measurement, and context-specific nature of the treatment protocols. Consequently, the previous reviews concluded that there was insufficient evidence regarding the effectiveness of information and communication technology, although telephone-based interventions may benefit people with depression. Therefore, the aim of this systematic review was to produce an up-to-date synthesis of the results of RCTs that evaluated the effectiveness of TBT in the management of patients with depression as compared to usual care.

**Materials and Methods**

**Study eligibility criteria**

The eligibility criteria used in this study were the following:

**Participants**: People aged 18 years or older with a diagnosis of depression were included. Depression was diagnosed by a clinician according to Diagnostic and Statistical Manual (DSM) criteria or based on any of the commonly used depression measurement scales, including Hamilton Rating Scale for Depression (HRSD), Quick Inventory of Depressive Symptomatology Short Form (QIDS-SR), Patient Health Questionnaire (PHQ-9), Beck Depression Inventory (BDI-II), and Zung Self-Rating Depression Scale (SDS).

| First Author, Year | Sample size | Depression level for inclusion | Intervention group (n) | Control group (n) | Intervention/ Treatment | Duration of Intervention | No of Counselling Sessions | Depression Measurement Scale | Timing for Outcome assessment | Qualification of the Therapists |
|--------------------|-------------|-------------------------------|------------------------|------------------|------------------------|-------------------------|---------------------------|-----------------------------|-------------------------------|--------------------------------|
| [58]               | 393         | HSCL>0.05                     | 198                    | 195              | Structured CBT         | 12 months               | 8 core 2-4 booster       | HSCL, PHQ-9 (12&18month)   | 6 week, 3, 6, 9, 12, 15, 18 months | Master level psychotherapists with 1 year experience |
| [55]               | 339         | PHQ>11; BDI>14                | 145                    | 146              | CBT                    | 12 months               | 12 (intensive) 9 (booster) | BDI                         | 12 months                      | CBT trained nurses with psychiatry and primary care training |
| [54]               | 499         | QIDS-SR>5                     | 234                    | 242              | Telephone care management | 12 months               | Average 9 (SD=6.0) contacts | QIDS-SR                     | 6 months; 18 months             | Trained Masters level licensed clinicians |
| [62]               | 325         | Ham-D>16                      | 163                    | 162              | Telephone administered CBT | 18 weeks               | 18 sessions               | Ham-D, PHQ-9                | 4, 9, 14, 18 weeks; 3, 6 months follow up | PhD level psychologists |
| [53]               | 118         | BDI-II>10                     | 58                     | 60               | Telephone based CBT + employee assistance program | 8 weeks               | 8 sessions               | BDI-II                      | 4 months; 8months (only for waitlist) | At least masters level psychologists, social workers and nurses |
| [56]               | 48          | CES-D>16                      | 24                     | 24               | Telephone interpersonal counselling | 6 weeks               | 6 sessions               | CES-D                      | 6 weeks and 1 month FU       | MSc psychiatric mental health nurses |
| [17]               | 600         | SCL>0.5                       | 172                    | 178              | Telephone psychotherapy; telephone care management | 20 weeks              | 8 sessions (TPT)         | HSCL scale; PHQ9 at 3mo and 6mo | 6 weeks, 3 months and 6 months after randomization | Psychotherapists with Masters degree and one year experience |
| [18]               | 32          | POMS>15                       | 16                     | 16               | Telephone administered CBT | 8 weeks               | 8 sessions               | POMS                       | 4 months FU                   | Doctoral and postdoctoral students in psychology |
| [59]               | 101         | PHQ>10                        | 50                     | 51               | Culturally tailored CBT | 8 weeks               | 8 sessions               | SCL and PHQ9                | 6 weeks, 3 months and 6 months after randomization | Masters of social work students and experienced therapists |
| [61]               | 54          | Hamilton scale: 11-26         | 18                     | 13               | problem solving and stress management | 6 weeks               | 6 sessions               | Ham: (baseline and end-line); BDI and Duke (at end-line) | 6 weeks | Registered nurses with experience in family practice |
| [57]               | 126         | Not available                 | 85                     | 86               | Scheduled telephone intervention | 9 months              | 7 sessions               | BSI-D                       | 1 year | Research care managers |

**Table 1**: The characteristics of the included studies.

*HSCL*: Hopkins Symptom Checklist; *CBT*: Cognitive Behavioural Therapy; *PHQ*: Patient Health Questionnaire; *BDI*: Beck Depression Inventory; *QIDS-SR*: Quick Inventory of Depressive Symptomatology Self-Report; *Ham-D*: Hamilton Rating Scale for Depression; *CES-D*: The Center for Epidemiologic Studies Depression Scale; *SCL*: The Symptom Checklist; *POMS*: Profile of Mood States; *BSI-D*: Brief Symptom Inventory-Depression

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[21], Beck’s Depression Inventory (BDI) [22], and the Patient Health Questionnaire (PHQ-9) [23] checklists. The study settings were primary care facilities, mental health centers and psychiatric clinics.

**Intervention:** TBT of at least four sessions based on a treatment manual was considered as the intervention. Treatment duration was determined to be at least four sessions to ensure that the effect of the proposed treatment had sufficient time to be eventuated [24]. TBT was accompanied by a therapist manual and a patient workbook containing didactic materials, therapeutic concepts, in-session exercises, and written homework exercises for completion between sessions. The therapist/counsellor who delivered the intervention was either a primary care physician or a counsellor with adequate experience in outpatient psychotherapy of depression.

**Comparison:** Usual care (usual treatment) management of depression.

**Outcome:** The primary outcome was the depression score as measured by common depression measurement scales. If trials reported data for more than one depression scale, results from all the scales were considered. The common scales used were: (i) HRSF, (ii) Montgomery-Asberg Depression Rating Scale (MADRS [25]), (iii) BDI, (iv) other. The primary outcome measurement time point was at completion of the intervention. Any outcome data reported during follow-up period were considered as secondary outcomes.

**Study design:** Only randomized controlled trials were included. Studies had to be described by the authors as randomized controlled trials.

Studies with the following characteristics were excluded: (i) studies targeting children (under the age of 18 years), (ii) studies with less than four sessions of telephone-based therapy; and (iii) studies with intervention that used additional information and communication technology (i.e. videoconference, the Internet, email and integrated computer-telephone system).

**Search strategy**

We searched for eligible studies from the following electronic databases: Ovid MEDLINE, EMBASE, PsycINFO, CINAHL, and the Cochrane Central Register of Controlled Trials (CENTRAL) (from database inception to August 28, 2012). The search was limited by language of publication (English only). We also reviewed the reference lists of included RCTs and relevant systematic reviews [26-28] to identify any additional studies.

**Study selection**

After the database search, records were de-duplicated. Two authors (OC and TN) independently reviewed the titles and abstracts of the identified studies to assess their eligibility. For those articles not excluded from screening of titles and abstracts, the full text was retrieved, and two authors (OC and TN) independently assessed the full text using the eligibility criteria. Any discrepancies in the selection were resolved via discussion or, when necessary, adjudication by the third reviewer (MRI).

**Data extraction and management**

Two investigators (OC and TN) independently extracted data from the full texts of the selected studies using the data extracted checklist. Any discrepancies in the data extracted were resolved through discussion, before entering into the Revman 5.1 software. The data extracted included study characteristics, population profiles, details of the intervention, and details of comparison groups, outcomes, study design and risk of bias.

Data on sample size, depression level for inclusion, numbers of intervention and control groups, intervention or treatment type, duration of intervention, number of counselling sessions, depression measurement scale, timing for outcome assessment and qualification of the therapists were extracted (Table 1).

**Figure 1:** Study flow diagram.

![Figure 1: Study flow diagram.](image)

**Figure 2:** Risk of bias summary: review authors’ judgements about each risk of bias item for each included study.

![Figure 2: Risk of bias summary.](image)
Assessment of risk of bias in included studies

The included studies were assessed for risk of bias using the Cochrane’s risk of bias assessment tool [29], that takes into account selection bias (random sequence generation and allocation concealment), performance bias (blinding of participants and personnel), detection bias (blinding of outcome assessment), attrition bias (incomplete outcome data), reporting bias (selective reporting) and other biases (any other bias not covered by the earlier forms of bias). Each domain was rated as ‘low risk’, ‘high risk’ or ‘unclear risk’. Discrepancies in risk of bias assessment were settled through discussion.

Statistical analysis

Depression scores were analyzed using the Standardized Mean Difference (SMD) with 95% confidence intervals (95% CIs). The SMD was preferred as the RCTs used different measurement scales of depression. End of intervention values, rather than change from baseline values, were included in the meta-analyses. We reported the proportion of participants with adverse events using narrative summaries. We adopted an intention-to-treat analysis approach where all participants who were randomized were analyzed. We conducted meta-analyses according to the guidance provided in the Cochrane Handbook for Systematic Reviews of Interventions [30]. We recognized high level of heterogeneity in the content of interventions, participants’ depression level at entry, duration of interventions and time points of outcome assessment in the included studies. For this reason, we used a random-effects meta-analysis model. Statistical heterogeneity among the studies was assessed using the I² statistic [31].

We performed two exploratory post-hoc sub-group analyses: (i) for duration of intervention of less than six months versus more than six months; and (ii) for RCTs including participants with a medical comorbidity versus without a medical comorbidity. We also carried out with sensitivity analyses based on extreme improvement as an outcome and sample size of less than 50 participants. We assessed publication bias using funnel plots [32].

Results

The total number of articles identified through the electronic search was 560. Of these, 200 duplicates were removed. Three hundred twenty eight articles were excluded after initial screening of titles and abstracts. A comprehensive review of full texts of the remaining 32 articles was then conducted. Nineteen studies [33–51] were excluded after the detailed review of their full text. The major reasons for exclusion were the nature of the intervention and the measurement of outcomes. Eleven full text publications and 2 conference abstracts were considered eligible for inclusion. The two conference abstracts [52,53] did not report sufficient information that enables extraction of data and assessment of risk of bias. One study focused on sub-threshold depression [54] while another on Medicaid beneficiaries [55]. Therefore, 11 RCTs were included in the current review (Figure 1).

Characteristics of studies

The main characteristics of the included studies are shown in Table 1. The total number of participants included in all the included studies was 1593. Participants had different types and stages of depression. Four studies [18,56–58] included participants with known medical comorbidities, such as, diabetes, breast cancer, multiple sclerosis and brain injury while the rest of the studies included participants without knowing medical comorbidities. In one study, at least one study TBT and telephone care management were administered in patients under antidepressant treatment [17]. Six studies used cognitive-behavioral orientation as they intervention approach while the other five studies used care management, interpersonal counselling, and psychotherapy, problem solving and scheduled telephone-based intervention approaches. A baseline depression level that was used for the inclusion of participants in the studies was measured using different scales across the studies. Four studies delivered interventions with duration of more than six months. In most of the studies, the duration of each telephone counselling session ranged from 30–50 minutes. On average, telephone counselling sessions were conducted on a weekly basis. All studies used structured manuals to guide the telephone-based intervention. Most of the studies audio taped their counselling sessions for quality check.

Risk of bias of included studies: The results of the risk of bias assessment are shown in risk of bias graph. All 11 studies have used an adequate random sequence generation, 5 studies used adequate allocation concealment, 1 study used blinding of both participants and personnel, 6 studies used blinding of outcome assessment, 9 studies had low risk of attrition bias and 7 studies had low risk of selective reporting (Figure 2).

Effects of interventions

Overall intervention effect: Nine studies reported a mean level of depression as depression scores at the completion of treatment. The other two studies reported a proportion of patients who had improved depression rather than a mean depression level in individual patients at the end of the intervention. Comparison of depression levels in the immediate post-intervention period from the nine studies included in the pooled analysis was in favor of TBT. The pooled SMD was -0.43 (95% CI: -0.74, -0.12) (Figure 3). This was found to be statistically significant (p = 0.007). However, the heterogeneity among the studies as estimated by the I² statistic was substantial (88%). The two studies that were not included in the pooled analysis [17,59] have reported that TBT had resulted in a statistically significant improvement in clinical outcomes and patient satisfaction as compared to usual care.

Sub-group analysis: Comparison of the effectiveness of TBT between studies with duration of intervention less than six months and more than six months showed that TBT was not better than usual.
care in those seven studies with treatment duration of less than six months (SMD=-0.42; 95% CI:-1.03, 0.19). In the two studies with an intervention duration of more than six months, TBT was significantly better in reducing depression as compared to usual care. A telephone-based intervention was significantly better than usual care in those studies having participants with known medical comorbidity. However, the TBT was not significantly better as compared to usual care for those studies having participants without knowing medical comorbidity.

Sensitivity analysis: To evaluate the effect of withholding a study in which "highest improvement" was reported with TBT, we excluded one study (60) from the pooled analysis. The overall effect was still statistically significant when this study was excluded (SMD=-0.29; 95% CI: -0.54-.04; P=0.02). Similarly, exclusion of three studies with a sample size of less than 50 participants in the treatment arm [18,61,62] improved the overall effectiveness of TBT (SMD=-0.55; 95% CI: -0.92-0.18). This was not significantly different from the overall effect of the nine studies included in the pooled analysis.

Secondary outcome during the follow up period

Four studies [17,59,60,63] had depression measurements in the post-treatment follow up period. In the study by Ludman EJ, the results obtained at 12 months (post-treatment) were maintained for 18 months (follow up). In this study, there were booster sessions during the follow up period. In the study by Mohr DC (2012), the depression levels were significantly lower in the TBT group than in the usual care group. In the fourth study that involved follow up [60], inconsistent results were found. In this study, there was no statistically significant difference of mean SCL depression score at 6 months follow up period between the intervention and control group. However, the PHQ-9 mean depression score at 6 month follow up was significantly lower in the intervention group.

Discussion

Our meta-analysis found a statistically significant effect of TBT in reducing depression levels as compared to usual care. However, the statistical heterogeneity was substantial.

In subgroup analyses, we found that TBT in studies having more than fifty participants, more than six months of duration of intervention and participants with known medical comorbidities (e.g. Multiple sclerosis, breast cancer, traumatic brain injuries) had a significant effect in reducing depression. TBT had no significant benefit over usual care when subgroup analysis was conducted by a type of randomization (individual randomization versus block randomization).

The findings regarding the effect of TBT are not applicable to people aged less than 18 years, as we have explicitly excluded such trials from the review. Therefore, the results of this review would only be interpreted for the adult population. This review indicated that TBT is important in reducing depression. These findings are consistent with the findings from other reviews. Mohr DC found that telephone-administered psychotherapy can produce significant reductions in depressive symptoms [26]. This study also found that TBT reduces the attrition rates as well as depressive symptoms in the analyses of pre-treatment to post-treatment change, which were not investigated in this review.

Telephone-based interventions, as an accessible and convenient method of health service delivery to manage depression, can be applied to communities and primary health care facilities in settings where the infrastructure is available [64]. All the studies included in this review have used the structured approach with clear outlines of materials on cognitive behavioral component, telephone, interpersonal counselling, psychotherapy, problem solving and stress management covered in each session of the TBT followed by therapist manual and a patient workbook. This should be carefully considered in applying TBT in other contexts. The content of telephone interventions should be adapted depending on type of medical disorders that depressive patients suffer. It is highly recommended that therapists or telephone counselors delivering telephone interventions should be experienced in outpatient psychotherapy of depression and CBT. TBT could be a readily applicable intervention to improve the quality of care for depression. If the conditions necessary for telephone-based interventions was created, TBT could help patients and primary care providers in maximizing treatment choices.

There were some limitations associated with this study. First, there was a significant level of heterogeneity among the studies and this need to be considered in the interpretation of the findings of this review. Second, subgroup analysis by study settings (primary care setting vs. psychiatric settings) was not possible due to the limited number of studies. Third, comparison of the effectiveness of TBT in the two treatment groups (with specific psychological treatment and with nonspecific treatment) was not conducted as the number of the studies is not sufficient for this analysis. Finally, this study focused on whether TBT is more effective than usual care or not. Further studies are needed to explore why TBT is more effective and the different factors that have contributed to its effectiveness.

Conclusion

The findings of this review support that telephone-based therapy could be more effective than face-to face therapy in reducing the symptoms of depression and improving access to care. However, there is a large level of heterogeneity that could possibly affect this conclusion. Therefore, more research is required to establish the applicability and cost-effectiveness of telephone-based therapy for routine depression management in healthcare systems.

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