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Outcomes following a physician-led CBT skills group for anxiety and depression in primary care: a longitudinal cohort study

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Abstract

Background

Cognitive Behavioural Therapy (CBT) is an evidence-based psychotherapy used to treat a range of mental health disorders. This study aimed to evaluate the long-term impact of a novel primary care-based Cognitive Behavioural Therapy (CBT) Skills Group program on symptoms of anxiety and depression, using patient-reported outcomes at 3, 6, and 12 months post-intervention.

Methods

This study was an observational cohort study evaluating real-world outcomes of a primary-care-based CBT Skills Group program. The study followed adult patients with mild to moderate anxiety and/or depression who completed an 8-week CBT Skills Group. Participants were assessed using validated self-report measures (PHQ-8 and GAD-7) at baseline, program completion, and 3, 6, and 12-month follow-up intervals. This study is reported in accordance with the STROBE guidelines for observational studies.

Results

Symptoms of depression and anxiety (PHQ-8 and GAD-7) improved significantly between baseline and program completion and remained significantly lower at 3-month follow-up. Improvements appeared to persist to 12 months, although precision decreased because of participant attrition. Of 206 invited participants, 67 enrolled and 17 completed 12-month follow-up (25% of enrolled participants). Sensitivity analyses using multiple imputation approaches produced broadly consistent findings. Qualitative data indicated that most participants continued to apply CBT tools in their daily lives well after program completion.

Conclusions

Group-based CBT Skills training delivered in a primary care setting was associated with clinically meaningful reductions in depression and anxiety symptoms. Participants who completed the CBT Skills Group demonstrated clinically meaningful reductions in depression and anxiety scores that persisted for at least three months, with trends suggesting continued benefit up to 12 months. This model offers a scalable, accessible option for mental health support in publicly funded healthcare systems.

Introduction

Anxiety and depression are among the most common conditions encountered in primary care. Cognitive Behavioural Therapy (CBT) is an evidence-based psychotherapy used to treat a range of mental health disorders. It focuses on changing pathological cognitive patterns (e.g. thoughts/beliefs/attitudes) by introducing thought-modifying behaviours and emotional regulation. [1] As a treatment within the biopsychosocial model of care, CBT targets the interconnected biological, psychological, and social factors that can contribute to mental health disorders. It can be beneficial for many conditions, including generalized anxiety disorder (GAD), major depressive disorder (MDD), obsessive-compulsive disorder (OCD), and panic disorder, among others.[2]

CBT is a structured psychotherapy that uses cognitive and behavioural techniques to modify maladaptive thoughts and behaviours. Commonly used techniques include cognitive restructuring, which involves evaluating, challenging, and modifying a patient's dysfunctional beliefs; and behavioural activation, which encourages patients to increase positive interactions with their environment. [3] These techniques may be used alone or in conjunction with one another and have a diversity of structures, including individual, group, or online therapy. Previous studies have indicated that the effects of CBT are comparable to those of pharmacotherapy for patients with mild to moderate depression and anxiety, and CBT is recommended as a first-line treatment for both disorders in the current Canadian Guidelines. [3, 4, 5, 6, 7] Many studies have also highlighted

group-based CBT as an effective treatment method for anxiety and depression, although individual CBT has been shown to be slightly more efficacious. [8, 9] Considering factors such as accessibility, cost, and patient preference for flexibility, group-based CBT is becoming increasingly important in a resource-limited healthcare system. [5]

Despite the proven effectiveness of both individual and group-based CBT, access remains limited for patients in Canada. Although CBT is provided through the publicly funded healthcare system, its availability is limited due to resources, location, and funding. For a patient with mild to moderate symptoms (as opposed to severe symptoms), access to psychotherapies, like CBT, may be limited in the public healthcare system. These access barriers are particularly pronounced in rural and remote communities. In British Columbia (BC), treatment by primary care physicians is covered under the publicly funded BC Medical Services Plan (MSP). However, due to a shortage of family physicians, limited psychotherapy training, and a funding structure that does not support therapy delivery, CBT is often unavailable through primary care. [10, 11]

In 2015, the CBT Skills Group Program was introduced in Victoria, British Columbia with the goal of providing cost-effective and accessible CBT-based treatment in a primary care setting. The program aimed to provide equitable and timely care on a large scale, while also expanding family physicians' abilities in delivering evidence-based mental health skills for patients with mental health issues. As of 2025, the program has offered 2047 groups, with a total of 24,672 patients served. More information about the CBT Skills Group program can be found at: www.mind-space.ca

Research reviewing this specific program by Cheek et al. (2019) observed that program participants experienced a reduction of symptoms of depression and anxiety. [11] However, the effects of the program beyond 3 months have not been studied. As such, this study aimed to investigate the effectiveness of the CBT Skills Group program in decreasing symptoms of depression and anxiety, and to evaluate the extent to which its effects were sustained over 12 months. This study therefore evaluated real-world outcomes of a physician-led CBT skills program implemented within a publicly funded primary care system.

Methods

CBT Skills Group & Study Design

This is a longitudinal observational cohort study that followed patients with mild to moderate anxiety and/or depression after participation in a CBT Skills Group. The CBT Skills Group program was piloted in Victoria, BC, by a group of psychiatrists and family physicians. It was designed for primary care patients and emphasized psychoeducation and self-management skills training, drawing from CBT, mindfulness, and acceptance-based therapies, and basic neuroscience. The development of this program is outlined by Cheek et al. in their 2019 paper titled *Self-management training in cognitive-behavioural therapy skills: A project to address unmet mental health needs in Victoria, BC*. [11] This program was offered through an 8-week series of 90-minute group medical visits, with 15 patients per group. Individuals who completed the program were invited to participate in follow-up research through email contact.

The exclusion criteria for the CBT Skills Group program were:

1. Less than 18 years of age.

2. Cluster B personality disorders or strong traits

3. High severity of any psychiatric illnesses (e.g. PHQ-9 > 19)

4. Trauma history and a high potential for destabilization

5. Cognitive impairment

6. Active psychosis, mania, or impairing substance use.

7. Active suicidal ideation or behaviour

8. Social anxiety that would prohibit group participation.

9. Non-English-speaking.

Participants were recruited from the CBT Skills Groups between January and August 2017. Follow up data was obtained between February 2017 and January 2018. All participants who completed CBT Skills Groups during the recruitment period were invited by email to participate in follow-up research. The study size was determined by the number of eligible participants available from the CBT Skills Group cohorts during the recruitment period.

Questionnaires

The CBT Skills Group pilot team had previously collected and analyzed data at weeks 1 and 8 of the CBT Skills Group sessions. [11] Identical questionnaires were distributed at 3, 6, and 12 months following CBT sessions which consisted of a PHQ-8 and GAD-7. At the 12-month mark (Time-Point 5), an additional long-form question was added to the surveys to obtain a better understanding of how patients engaged with the materials after they finished their CBT Skills Group.

Before participation in the CBT Skills Group, the PHQ-9 questionnaire was used as an initial screening measure and included a measure of suicidality. These were completed by the referring primary care provider. For subsequent self-report measures used in this study, the PHQ-8 was used, which omits the question regarding "thoughts that you would be better off dead or of hurting yourself in some way." The PHQ-8, a validated version of the PHQ-9 that omits the question regarding suicidality, has been shown to have comparable diagnostic accuracy for depression screening. [12]. The PHQ-8 questionnaire is composed of 8 questions, each based on one of the symptoms of a major depressive episode described in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), and asks patients to rate the frequency of each symptom over the last two weeks from 0-3, with scores of 3 referring to greater frequency of a symptom. [13] Higher scores correspond to greater frequency of symptoms, with the maximum score (24) indicating that a patient experiences each symptom 'nearly every day'. [13]

The GAD-7 is a self-reported questionnaire that measures the frequency of symptoms associated with anxiety disorders. [14, 15] It is composed of 7 questions, with each question scored from 0-3; a higher score corresponds to greater frequency of an anxiety symptom over the last two weeks. [16] The total scale ranges from 0-21, with higher scores suggesting higher levels of anxiety symptoms. [17] It is widely considered a valid tool for screening for general anxiety disorder, and has good sensitivity and specificity as a screening tool for other anxiety disorders, including panic disorder and social anxiety disorder. [17] Although validated in various geographical locations, [18] it is also important to note that the PHQ and GAD measures may exhibit different psychometric properties across cultural and clinical contexts.

Data Analysis

We were interested if the effect of CBT skills training was sustained following the completion of the program by comparing baseline GAD and PHQ scales to the same patients' measures again in the future. However, our biggest challenge was to account for attrition in study participation. Figure 1 shows the flow of participant attrition. Figure 2 shows the proportion of respondents at each time point. At Time-Point 1, the participation proportion is just below 0.94 for both questionnaires, indicating that almost all individuals participated at that Time-Point (n = 67). Participation declined at three months and continued to fall at six and twelve months. Attrition was addressed using three approaches: complete case analysis, last observation carried forward, and Manski bounds.

Missing data in the outcome variable undermines our ability to do a direct comparison as there is a reasonable likelihood that the reason for missingness is related to the outcome. For example, patients who respond poorly to CBT may be more inclined to drop out of the study.

There are many methods for handling missing values, but no singular model is perfect.

Therefore, we conducted a sensitivity analysis using several imputation methods and definitions of outcome variable to produce seven separate comparisons for each of the two endpoints. We conducted a sensitivity analysis to test how analytic

choices might influence the main findings. Sensitivity analysis is recommended in studies where the main findings can be subject to change based on analyst decisions; for example, the chosen data imputation method, or which covariates are selected for entrance into a regression model. These decisions are often somewhat arbitrary and it is important to stress test the robustness of the study findings by exploring a range of other reasonable analysis decisions.

We used three methods to account for missingness in the data: Manski bounds –

which imputes the worst observed value for cases and the best observed value for controls (participants served as their own controls by comparing post-intervention scores to baseline scores), last observation carried forward (LOCF) and complete case analysis (CCA). We considered three different definitions of the outcome variable: baseline compared to three-month, 6-month and 12-month values. We evaluated if an improvement on each questionnaire is sustained using a one-sided T-test and consider p-values <0.05 to be statistically significant. A one-sided test was used because the direction of the effect was specified a priori and CBT is an established therapeutic intervention.

We subsequently deidentified and analyzed the data with the assistance of a trained statistician.

For reference and ease of reporting on the result presented below, the timeline of data collection has been divided into five categories:

Time-Point 1 = before CBT skills course (before Week 1)

Time-Point 2 = immediately after CBT skills course (after Week 8)

Time-Point 3 = 3 months after CBT skills course

Time-Point 4 = 6 months after CBT skills course

Time-Point 5 = 12 months after CBT skills course

Demographic characteristics

Baseline demographic characteristics were not available because the dataset originated from a program evaluation project rather than a prospectively designed research registry.

Results

Of the 206 CBT Skills Program participants invited to join the study, 67 consented at Time-Point 1. Participants were given questionnaires at Time-Points 3, 4, and 5. Some participants were lost to follow-up between these time points. Of the 67 participants enrolled at baseline, 57 provided data at 3 months, 43 at 6 months, and 17 at 12 months. [Figure 1]. After Time-Point 3, the participation rate dropped below 75% and we lost precision in our estimates.

Twenty-five participants completed the qualitative questionnaire at Time-Point 5. We were not able to establish the cause for this increased response to the qualitative questionnaire, but a potential explanation of survey fatigue, specifically related to the GAD-7 and PHQ-8 questionnaires, may have influenced the higher response rate at Time-Point 5 for the qualitative questionnaire.

1. Outcome Measure Comparison

Patient Health Questionnaire 8 (PHQ-8) and Generalized Anxiety Disorder (GAD-7)

Table 1 presents the sensitivity analysis results for the PHQ and GAD questionnaires.

Table 1. Sensitivity analysis of PHQ-8 and GAD-7 scores across follow-up time points. [1][2]

Questionnaire	Missing Data Method*	Comparison	Mean Score (pre)	Mean Score (post)	p-value	n**
PHQ-8	Manski Imputation	Pre vs 3 Months	11.49	9.82	0.0758	67
GAD-7	Manski Imputation	Pre vs 3 Months	10.54	8.39	0.0258	67
PHQ-8	Manski Imputation	Pre vs 6 Months	11.49	12.43	0.7601	67
GAD-7	Manski Imputation	Pre vs 6 Months	10.54	10.28	0.4166	67
PHQ-8	Manski Imputation	Pre vs 12 Months	11.49	17.07	1	67
GAD-7	Manski Imputation	Pre vs 12 Months	10.54	14.97	0.9997	67
PHQ-8	CCA	Pre vs 3 Months	12.51	8.23	<0.0001	
GAD-7	CCA	Pre vs 3 Months	11.27	6.4	<0.0001	55
PHQ-8	CCA	Pre vs 6 Months	12.74	7.77	<0.0001	43
GAD-7	CCA	Pre vs 6 Months	11.53	6.38	<0.0001	45
PHQ-8	CCA	Pre vs 12 Months	12.08	6.92	0.0009	26
GAD-7	CCA	Pre vs 12 Months	10.92	5.52	0.0005	25
PHQ-8	LOCF	Pre vs 3 Months	12.22	7.87	<0.0001	63
GAD-7	LOCF	Pre vs 3 Months	11.21	6.29	<0.0001	63
PHQ-8	LOCF	Pre vs 6 Months[3]	12.22	7.25	<0.0001	63
GAD-7	LOCF	Pre vs 6 Months	11.21	5.92	<0.0001	63
PHQ-8	LOCF	Pre vs 12 Months	12.22	7.05	<0.0001	63
GAD-7	LOCF	Pre vs 12 Months	11.21	5.98	<0.0001	63

[1] CCA = Complete Case Analysis, LOCF = Last Observation Carried Forward

[2] *Note that LOCF imputation yields n = 63 as 4 patients were missing baseline values and could not be recovered using LOCF*

[3] *CCA = Complete Case Analysis, LOCF = Last Observation Carried Forward
**Note that LOCF imputation yields n = 63 as 4 patients were missing baseline values and could not be recovered using LOCF
There are nine tests performed for each questionnaire. Across the nine sensitivity analyses performed for each questionnaire, statistically significant improvement ($p < 0.05$) was observed in 7 of 9 comparisons for GAD-7 and 6 of 9 comparisons for PHQ-8. Both CCA and LOCF imputation methods yield a statistically significant result for all three time point comparisons and for both questionnaires. [Figure 3] The results from applying Manski bounds, however, result in only a single test with $p < 0.05$ and another with $p < 0.10$. The remaining four t-tests from Manski imputation do not demonstrate a statistically significant difference.

Manski bounds represent a highly conservative approach and likely underestimate the treatment effect in this setting. The effect of Manski imputation is only modest at three months (where participation was 91% for PHQ and 88% for GAD) although this changes at 6 and 12 months as attrition grows much larger. For comparison, see Figure 4 for the PHQ-8.

2. Qualitative Questionnaire at Twelve Months

The results below summarize the open-ended question responses added to the 12-month (Time-Point 5) data collection point. The open-ended questionnaire used in this study was developed specifically for the purposes of this study and has not been previously published. It was designed to capture participant experiences and perceived outcomes following the CBT skills group intervention. The full questionnaire is provided in Appendix 1.

The purpose of this additional information was to better understand how patients engaged with the materials and to elaborate and clarify the answers on the survey section. Answers were reviewed by the research team and categorized by theme. For question one, a single open-ended response may be counted in more than one category if it contained more than one theme. There is a discrepancy of number of responses between questions, as not all respondents answered both questions. Please also refer to Appendix 2 for the original uncategorized open-ended responses.

1. Question: Please describe your use of CBT skills in your life now. (n=25 respondents participant count reduced due to attrition over time).

n=18 respondents indicated that they use specific CBT skills.

n=5 respondents commented that they use CBT skills/tools in general since completing the program

n=4 respondents indicated that they use the CBT skills/tools in tough or difficult situations, such as in times of heightened anxiety or depression

n=3 respondents commented that CBT has changed their outlook on life

n=3 indicated that they do not use CBT skills

n=2 respondents indicated that they use CBT skills/tools to create a more positive response or approach to a situation (and manage symptoms)

2. Question: If you continue to use skills, how frequently do you use CBT Skills (e.g., once a week, once a day, several times a day, depends on circumstances)? (n=23, participant count reduced due to attrition over time)

n=11 respondents indicated that they use CBT skills daily or several times/day

n=1 respondent indicated that they use CBT skills several times a week

n=2 respondents indicated that they use CBT skills once a week/less than once a week

n=6 respondents indicated that the frequency of their use of CBT skills depends on the circumstances

n=1 respondents indicated that they don't know how often they use CBT skills

n=1 respondent indicated that they don't use CBT skills

Discussion

This study explored whether participation in an 8-week CBT Skills Group program would affect participants' self-reported symptoms of mild to moderate anxiety and/or depression. Participants' PHQ-8 and GAD-7 scores decreased between Time-Point 1 (baseline) and Time-Point 2 (post-program). These reductions were sustained for at least 3 months, with trends suggesting continued benefit through 12 months. Qualitative responses indicated that 22 of 25 respondents continued to use CBT skills in daily life 12 months after the program, with 23 of 25 reporting that they had incorporated CBT tools into ongoing self-management. Overall, the results of this study indicate that teaching patients self-management skills based on CBT may contribute to sustained improvements in symptoms.

The observed decrease in PHQ-8 and GAD-7 scores before and after participation in the CBT Skills Group program supports previous research, which demonstrated clinically and statistically significant improvement observed over the 8-week series.[11] These reductions represent meaningful clinical change—from moderate to mild severity, or from mild symptoms to remission. This reduction in symptoms of depression and anxiety disorders aligns with current literature on the effectiveness of CBT in treating anxiety and depression, as numerous recent meta-analyses have found that CBT has clinically significant and sustained treatment effects for depression and anxiety disorders. [2, 7, 19, 23] A meta-analysis by Cuijpers et al. [20], found

both individual and group-based CBT to be more effective than waiting list, care as usual, or control conditions, and numerous recent studies have specifically found group CBT to be an effective treatment method for reducing symptoms of anxiety and depression. [9, 24, 26]

The results suggest a “decrease-and-sustain” pattern, with significant symptom reductions maintained for at least three months. Improvements in psychometric scores appeared to sustain up to 6–12 months after treatment, although statistical significance was reduced because of attrition.

The sustained improvements we noted up to the 12-month mark align with recent research: a randomized control trial by Saether et al. found that individuals who underwent CBT-based treatment reported a significantly larger reduction in anxiety and depression symptoms when compared with a treatment-as-usual group 12 months after completing treatment [21]. A separate study by Palacios et al. found that the majority of patients who achieved remission of symptoms of anxiety and depression after completing an internet-based CBT program remained in remission 9 months following treatment. [22] These results were confirmed in a 2024 meta-analysis done by Goldberg et al. [25]

Limitations: The two main limitations are small sample size and participant attrition. These are related issues, as attrition naturally reduces sample size. Small sample sizes at later stages of the study (i.e. the 6- and 12-month marks) also make it difficult to assess long-term effectiveness.

Missing outcome data can bias estimates of treatment effects. No single imputation method can guarantee unbiased findings. Therefore, for thoroughness we evaluated a range of findings through a sensitivity analysis.

Manski bounds are the most conservative, but they can be plausible if it is reasonable to assume that (a) cases drop out due to having a positive outcome and (b) controls drop out due to a negative outcome. In our scenario, it is unlikely that attrition alone would fully account for the magnitude of change observed in questionnaire scores. Therefore, the results from Manski imputation are likely the least realistic of the three imputation models used.

Cheek et al. noted that attrition may be higher among participants with anxiety or depression. [11] Symptoms such as fatigue and low motivation can make consistent attendance difficult. Attrition may not have occurred at random; individuals with worsening symptoms may have disengaged, leading to potential survivorship bias in later time points, which we were not able to capture within the parameters of this study. As outlined in the statistical analysis section, we addressed the issue of attrition by using three imputation models. The Last Observation Carried Forward model, which accounts for attrition, demonstrated sustained changes up to 12 months.

Lastly, participants self-selected into the follow-up study, which may introduce selection bias if individuals who benefited from the program were more likely to respond.

To overcome these limitations in future research, we propose three relatively low-cost modifications: 1) increase the sample size, 2) include additional survey measures to reduce attrition, 3) include second-round sampling for missing participants (e.g., email, telephone follow-up).

Moreover, the absence of a control group limits the ability to infer causality. However, this design reflects real-world implementation in primary care, and our findings are consistent with those seen in more controlled settings. In addition to the above limitations, there is no comparison in the literature between CBT Skills Groups, which emphasize psychoeducation and skill acquisition, versus formal CBT delivered in a group setting. Furthermore, it is difficult to generalize these outcomes to the broader Canadian population, as the CBT Skills program only included English-speaking participants over the age of 19. However, the applicability of these results is supported by studies that show clinical improvements in a wider variety of patients, such as adolescents and the elderly, following CBT in general. [9,26]

Because the program is delivered by trained primary care physicians using a standardized curriculum, this model offers a scalable and accessible approach to delivering evidence-based psychological skills within publicly funded primary care systems.

Conclusion

This longitudinal study extends earlier research on the CBT Skills Group program by demonstrating that improvements in anxiety and depression symptoms are not only significant at the 8-week mark but can be sustained for at least 3 months and potentially up to 12 months. These findings suggest that teaching cognitive behavioural self-management strategies within a primary care context may support sustained symptom improvement.

The CBT Skills Group model, now operating provincially as Mind Space [4](Skills for Wellbeing), represents a scalable and patient-centered approach to mental health care in Canada. Delivered by trained physicians within the public system, the program enhances accessibility, promotes peer support, and reduces the burden on specialist mental health services. Virtual delivery has shown equivalent effectiveness, safety, and attendance compared with in-person groups, while offering added benefits in equity and access. [27]

Future research should explore comparisons between group-based CBT Skills programs and alternative modalities such as internet-based or hybrid CBT, especially in underserved populations. Additional investigation is also warranted into the outcomes of the program across diverse populations, including young adults, older adults, BIPOC, and 2SLGBTQIA+ communities.

Overall, this study adds to the growing body of evidence that outpatient CBT-based skills programs are a practical and effective component of primary mental health care in Canada. These findings highlight how structured, physician-led CBT skills programs may help expand access to evidence-based care within primary practice.

[4] Author's note: To access the CBT Skills Group program, or for more information, please visit: www.mind-space.ca

Declarations

Ethics approval and consent to participate

This study was approved by the Vancouver Island Health Authority Research Ethics Board (approval number BC2016-088). Written informed consent was obtained from all participants prior to participation. All data were anonymized prior to analysis. All methods were carried out in accordance with relevant guidelines and regulations and with the principles of the Declaration of Helsinki.

Consent for publication

Not applicable

Availability of data and materials

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Competing interests

The authors declare that they have no competing interests.

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This study received no external funding.

Authors' contributions

AP conceived the study, conducted data collection, and drafted the original manuscript. AP also led manuscript revisions and

editing. GW and SN contributed to manuscript editing and critical review of the text, with GW providing additional editorial input. All authors reviewed and approved the final manuscript.

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Figures

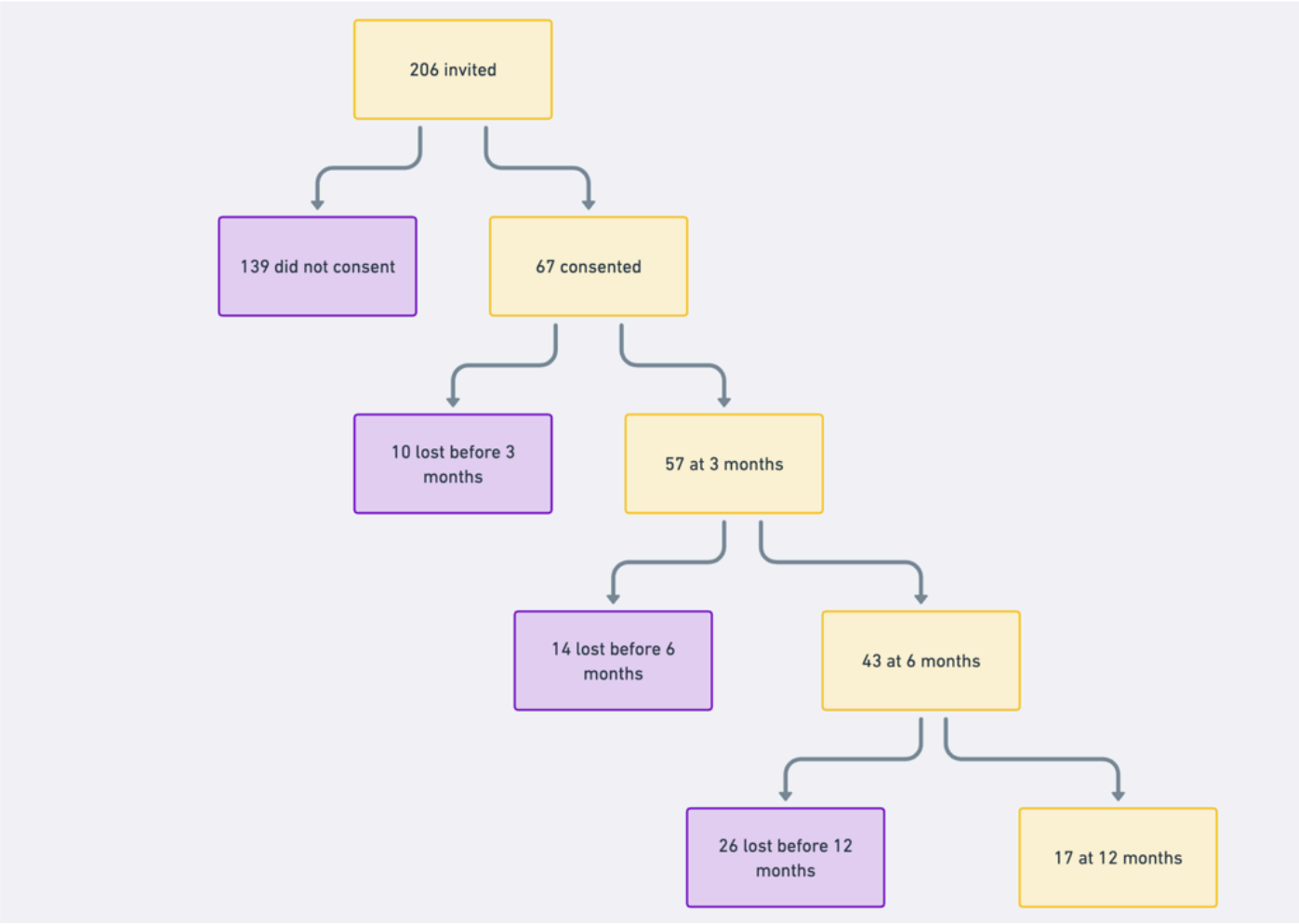

Figure 1

Participant Attrition Flow Diagram

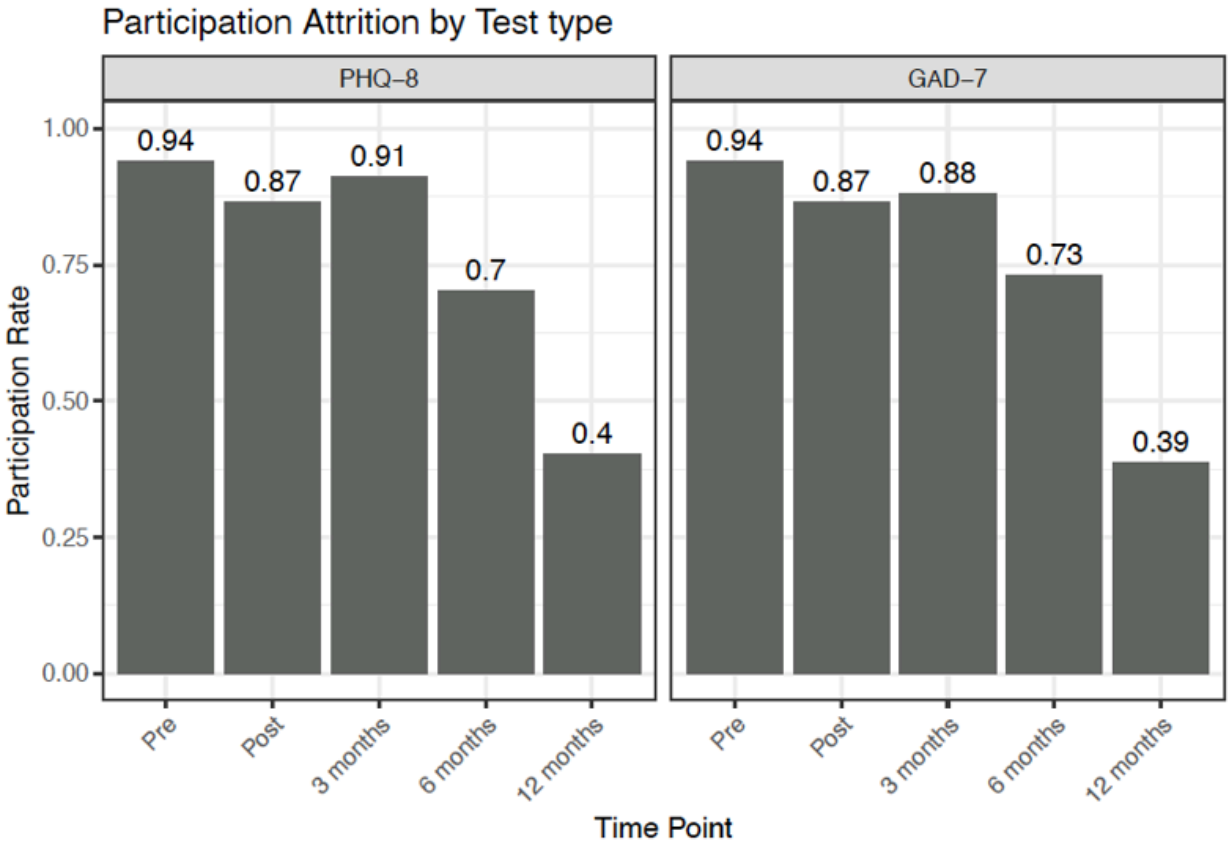

Figure 2

Participant Attrition by Test type

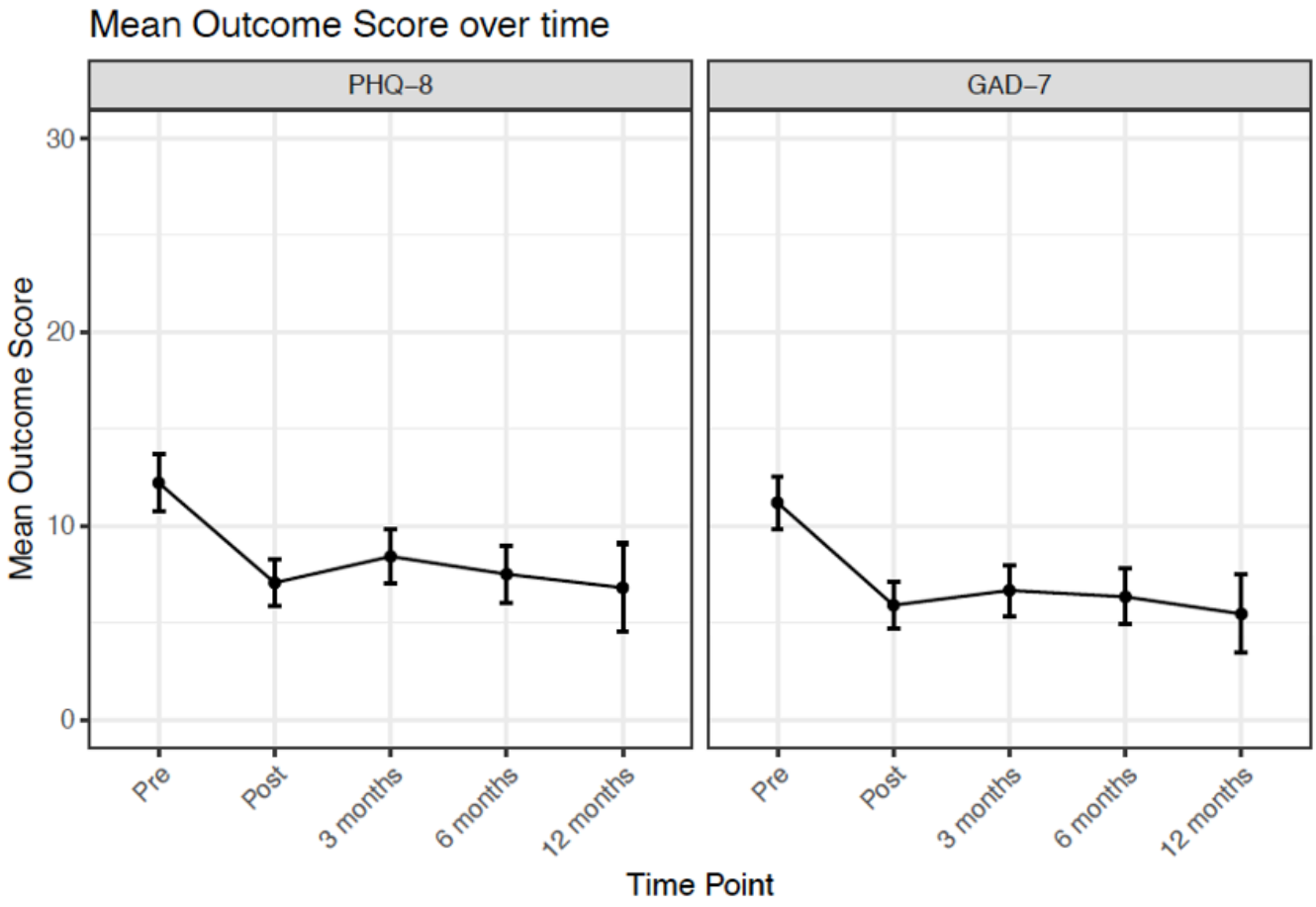

Figure 3

Mean PHQ-8 and GAD-7 scores across follow-up time points. Error bars represent 95% confidence intervals.

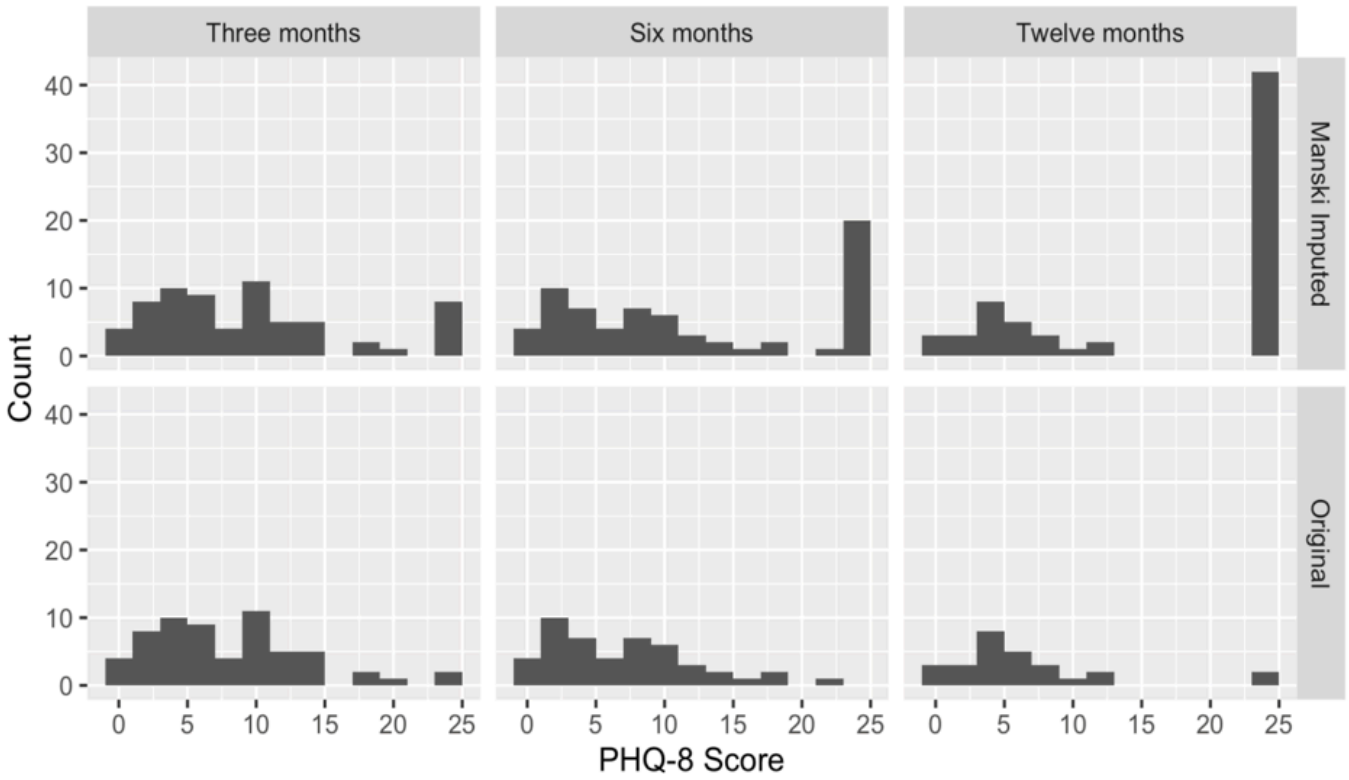

Figure 4

Distribution of Effects for PHQ-8

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- Appendix1OpenEndedQuestionnaire.docx
- Appendix2QuestionnaireResponsesRawData.docx