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An Evaluation of Cognitive Behaviour Therapy with Mindfulness (CBTm) Classes and Telepsychology Utility in Rural Community Settings

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Abstract

Background: Cognitive behaviour therapy with mindfulness (CBTm) classes are a group-based, psychoeducational, clinical service. Early research has suggested they are a promising low-intensity intervention for reducing psychiatric symptoms such as anxiety and depression (Palay in, Eur J Person Centered Healthcare 62:274, 2018; Thakur in BMC Psychiatry 19:132, 2019). Rural community members may benefit from these classes given the barriers they face in terms of available, accessible, and acceptable psychological treatment (Smalley in J Clin Psychol 66:479–385, 2010). Group-based telepsychology is one potential avenue for increasing access to psychological services in remote rural communities. **Methods:** This investigation evaluated the effectiveness of four-session weekly group CBTm classes taking place in rural Canada from November 2015 to December 2017, the impact of attendance via telepsychology (group-based videoconferencing at remote health centres closer to their homes) compared to in-person, and factors associated with class dropout. 376 CBTm class participants completed questionnaires during each class, providing a measure of their symptoms over time. **Results:** Anxious, depressive, and general psychiatric symptoms were reduced over the course of CBTm classes. Telepsychology attendance did not diminish class effectiveness. Predictors of class dropout were difficult to identify, except higher baseline anxiety, which predicted lower dropout rates. **Conclusions:** Group-based CBTm classes, whether delivered in person or via telepsychology, appear to be an effective avenue for improving mental well-being and service access among rural community members. Although encouraging, results also suggested a need for research on predictors of and reducing antecedents to class dropout in this population.

Keywords Cognitive behaviour therapy · Mindfulness · Telepsychology · Anxiety · Depression

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Introduction

Mental health problems such as anxiety and depression present a significant burden on social and occupational functioning, with the World Health Organization (2018) identifying depression as the leading cause of disability worldwide. In Canada, approximately 3.5 million individuals access health services for a primary mood or anxiety disorder each year (McRae et al., 2016). Unfortunately, access to mental health services has not matched the demand (Sunderland & Findlay, 2013), particularly in rural communities where offered services are often limited (Smalley et al., 2010). Several meta-analyses and randomized control trials have demonstrated that cognitive behaviour therapy (CBT) is an effective intervention for a wide range of mental health problems, as well as in a wide range of populations and settings (e.g., individual therapy, self-help, computer-assisted) (Hofmann et al., 2012; Twomey et al., 2015). The focus of CBT is to systematically identify and alter the individual's maladaptive cognitions and behaviours, thereby facilitating the development of personalized coping strategies and improving emotional wellbeing (Beck, 2011).

Mindfulness can be defined as non-judgmental awareness of present-moment experiences (Segal et al., 2002). It has been suggested that practice of mindfulness can facilitate detached observation of one's consciousness, reducing the impact of automatic and self-maintaining negative thoughts (Segal et al., 2002). Thus, mindfulness can in itself be considered a useful and complementary cognitive-behavioural coping strategy (Astin, 1997). Combined CBT and mindfulness interventions have been shown to help with a range of mental health problems, including, but not limited to anxiety (Evans et al., 2008; Kocovski et al., 2013; Piet et al., 2010; Thakur et al., 2019) and depressive disorders (Kenny & Williams, 2007; Manicavasgar et al., 2011, 2012; Thakur et al., 2019).

Stepped Care and Low-Intensity Psychological Interventions

Access to these empirically-supported psychological interventions is constrained by practitioners' limited time and resources (Ho et al., 2016). The stepped care model of psychological treatment provides interventions at different stages with varying intensity, allowing early stages to serve as a gateway to more intensive treatment where needed. Patients initially access low-intensity interventions–characterized by a shorter treatment period–that often include basic psychoeducation about CBT, mindfulness, and/or self-help strategies (Chan & Adams, 2014; Firth et al., 2015; Freire et al., 2015; Ho et al., 2016). Low-intensity CBT is demonstrably effective and reliable for both sub- and above-threshold anxiety and depression (Chan & Adams, 2014; Delgadillo et al., 2014; Freire et al., 2015). However, at least four therapy sessions typically are necessary for patients to achieve clinically significant improvement (Delgadillo et al., 2014). For instance, one investigation of patients with anxiety or depression found that more than 70% who experienced clinically significant improvement could be reliably identified

as early as sessions 1–3, and attrition rates were significantly associated with poor outcomes (Delgadillo et al., 2014).

Rural Mental Health

Improving dissemination of accessible, empirically supported treatments is especially relevant in rural settings. Although there is a demand for more mental health services to be offered to rural community members, multiple obstacles associated with the rural context may prevent them from accessing the treatment they require (Thomas et al., 2012), often resulting in prioritization of informal sources of help (Jameson & Blank, 2007). Research has not consistently demonstrated systematic differences in rates of mental health problems between urban and rural areas (Kelly et al., 2010; Kessler et al., 1994; Smalley et al., 2010). Instead, Smalley et al., (2010) suggest that it is the process for ameliorating mental health problems in rural areas that is more challenging, due to a three-component problem of availability, accessibility, and acceptability of mental health services.

Availability. One significant barrier to adequate provision of mental health services in rural communities is a lack of resources, institutions, and/or licensed professionals. A survey of CEOs from 228 rural hospitals in the United States found that roughly 90% reported a shortage of mental health professionals (Thomas et al., 2012). One compensatory strategy for limited resources and availability of treatment has been the extension of empirical interventions into community mental health centers, which serve as the foundation for mental health care in many rural areas (Jameson & Blank, 2007). Social workers and other professions increasingly provide services in community mental health centers that have traditionally been associated with psychologists, and contemporary research suggests that this task-sharing process fills resource gaps (Hoeft et al., 2018).

Accessibility. Due to the dearth of mental health services in rural areas, service users often travel greater distances. This problem is compounded by limited options for public transportation compared to urban areas (Thomas et al., 2012), and in turn, increased financial and time-based investments to access services, which may prove difficult for members of rural communities (Gamm et al., 2010). Furthermore, accessibility is inhibited by insufficient devotion of resources to knowledge dissemination efforts promoting mental health services (Griffiths & Christensen, 2007; Jorm, 2012), which may be lower in rural communities where open discussion of mental health and availability of services is more limited.

Acceptability. Finally, even where available and easily-accessible, use of outpatient mental health services is often found to be lower in rural versus urban environments (Gamm et al., 2010; Rost et al., 2002). Those residing in rural areas are characterized as having a strong sense of community and overlapping social networks (Jameson & Blank, 2007). Thus, shame and social stigma are often cited as reasons for not seeking mental health services (Gustafson et al., 2009; Jameson & Blank, 2007).

Overall, research has highlighted barriers relating to geographic isolation, economic disparities, limited psychoeducation, limited infrastructure and funding for

services, shortages of professionals, mental health stigma, and reliance on informal or generalized sources of help, which collectively make adequate provision of mental health services particularly challenging in rural communities (Benavides-Vaello et al., 2013; Hoeft et al., 2018; Thomas et al., 2012). To facilitate concrete changes in rural mental health care, increased research evaluating the effectiveness of specific programs and strategies is needed. Moreover, research on the rural mental health context outside the United States and Australia has been limited; obtaining Canadian data would carry the dual benefits of increasing applicability of the existing literature base to Canadian practitioners, while supplementing it by increasing diversity of perspectives surrounding rural mental health care.

Applications for Telepsychology in Rural Settings

One of the most promising opportunities for the advancement of rural mental health care has been telepsychology–the adaption of telecommunication technologies to the provision of psychological services. Examples include videoconferencing, telerobotics, interactive video, and virtual reality, all of which have enabled rural community members to enroll in otherwise inaccessible psychological services (Benavides-Vaello et al., 2013). Videoconferencing in particular is a cost-effective and user-friendly option for mental health professionals to provide treatment to individuals and communities with limited access to services (Shore, 2013).

In addition to its convenience and cost-effectiveness, research has consistently demonstrated that telepsychology is effective across ages, cultural groups, and care settings (e.g., emergency, home-based), providing an adequate and accessible alternative or complement to in-person care (Benavides-Vaello et al., 2013; Fortney et al., 2015; Hilty et al., 2013; Yellowlees et al., 2008). For instance, a review of the literature from 1996 to 2012 concluded that telepsychology was effective for intervention and psychoeducation related to multiple mental health problems (Benavides-Vaello et al., 2013). Notably, however, much of this literature focuses on the merits of individual treatment or consultation via telepsychology; the effectiveness of telepsychology-delivered group classes–particularly in rural settings, where capacity for patients and availability of treatment providers is limited–warrants further exploration.

Cognitive Behavioural Therapy with Mindfulness (CBTm) Classes

Large-group, low intensity, transdiagnostic CBT classes were developed at a tertiary care clinic in urban Manitoba, Canada in 2014 to reduce wait times for more intense group CBT treatments (Palay et al., 2018). Continual quality improvement efforts led to the development of Cognitive Behavioural Therapy with Mindfulness (CBTm) classes. This clinical service is focused primarily on psychoeducation to increase perceived accessibility and approachability by prospective participants. These classes focus on psychoeducation regarding the cognitive-behavioural model (i.e., connections between thoughts, feelings, and behaviours), common CBT techniques such as conducting behavioural experiments, mindfulness techniques, and

strengthening of other coping skills. More details about the development of these classes and previous evaluations can be found in Palay et al., 2018, Thakur et al., 2019, and at cbtm.ca.

A rural health region in Manitoba adopted these classes to help address availability, accessibility, and acceptability in a community mental health program. The health region includes a vast geographic area that can be many hours of travel to the nearest urban centre with specialized mental health services. There are various community health centers throughout the region where general mental health services are provided. However, individual sessions were infrequent (every 6–8 weeks) due to high caseloads, and the availability of trained CBT clinicians was limited. Large group psychoeducational CBTm classes were introduced throughout the rural region to increase the frequency of mental health contact, provide quick access to basic CBT and mindfulness concepts, reduce the geographic barriers to specialized services, and offer an alternative mode of service that may be more acceptable to those who see individual treatment as stigmatizing. Individuals were required to attend sessions at a community health center with provincial telepsychology equipment, however, this could reduce travel time by up to several hours.

Present Study

In the interest of addressing research gaps involving the impact of psychological treatment in rural Canada, as well as related implications for treatment delivery using the provincial telepsychology system, this research comprised a two-year chart review of participants of CBTm psychoeducation classes located in nine rural communities of Manitoba, Canada. Our study aims to expand on earlier evaluations of these classes from urban settings (Palay et al., 2018; Thakur et al., 2019) by evaluating the impact of CBTm classes among rural community members. Specifically, four primary outcomes were monitored for this study: (1) Changes in psychiatric symptoms of participants from rural communities after participating in CBTm classes; (2) The proportion of participants progressing to other mental health services after attending CBTm classes; (3) Participant characteristics predictive of class dropout; and (4) Attendance and outcomes of participants accessing classes via telepsychology.

Method

Participants

This project received approval from the University of Manitoba Human Research Ethics Board (H2018:069). Data were collected from participants of group CBTm classes in rural Manitoba, Canada. Data were obtained from $n = 376$ registrants of 17 rounds/groups of 4-session classes occurring between November 2015 and December 2017. Class registrants were provided an option to enroll in CBTm during their initial intake with the regional mental health program ($n = 205$, 54.5%), or elected to

enroll after discussing the program with their pre-existing community mental health worker ($n = 171$, 45.5%). Participants were not required to have a formal diagnosis of a mental health problem to participate in CBTm, but rather classes were offered to individuals with at least mild self-reported anxiety or depression symptoms who were interested in mental health treatment. There were no specific measures or cut offs to determine symptoms beyond their perception of difficulties. Exclusion criteria included active psychosis, suicide risk, and severe cognitive impairment. There were intentionally few limitations to participating in the classes to facilitate ease of access to this low-intensity service.

Procedure

The sample was derived from a retrospective chart review. Prior to beginning each round of CBTm classes, participants completed questionnaires collecting sociodemographic information, as well as baseline self-ratings of multiple psychiatric domains, anxiety, and depression. These measures were collected as a part of standard clinical practice and participants were informed that the information was used for their clinical planning and for ongoing quality improvement. At the beginning of each class in subsequent weeks, participants provided updated ratings of psychiatric symptoms, anxiety, and depression. Each round of CBTm classes was comprised of four weekly 90-min sessions that included psychoeducation and in session activities surrounding interrelated CBT/mindfulness modules. Participants were assigned homework each week. Participants were allowed to attend more than one round of classes if preferred and were encouraged to make up missed classes.

Many sets of classes were offered at different locations simultaneously, with up to five sites being available at one time. At each community location, there was provincial telepsychology equipment and a staff member took attendance and collected questionnaires. The class facilitator was typically in one site and the remote locations would participate solely through telepsychology. However, there were times when the staff at one site would facilitate two classes and the staff at another site would facilitate the other two classes. Therefore, participants were classified as attending in-person, via telepsychology, or "both" if they attended at least one class in-person and at least one via telepsychology.

Classes were facilitated primarily by the regional CBTm team leads: a Clinical Psychologist (second author) and a Mental Health Clinical Specialist with a Master's degree in Social Work. Community Mental Health Workers co-facilitated four of the rounds (out of 17). Before facilitating they observed all classes being taught and one of the team leads was also present. Two facilitators were present for each round of classes. Although fidelity measures were not completed, the presenters followed the materials closely for all sessions.

Intervention

Class 1. In the initial class, participants first received psychoeducation on the benefits of CBT classes to facilitate increased attendance and engagement. Participants

engaged in a brief mindfulness exercise, which included body scan, awareness of breath, awareness of five senses, and loving kindness. Most of the class involved psychoeducation about the CBT model (i.e., connections between thoughts, feelings, and behaviours), common thought distortions, and in-session practicing of a thought record. Homework assigned to participants included daily mindfulness practice, use of a thought record, and brief exploration of self-help web resources.

Class 2. Each of the subsequent classes started with a mindfulness practice and discussion of the homework including successes, challenges, and problem solving. The second class focused on psychoeducation regarding behavioural theories of anxiety and depression, as well as how to conduct behavioural experiments, engage in graduated exposure, and behavioural activation. To ensure effective self-directed practice of these techniques, participants were instructed on the importance of setting SMART (i.e., specific, measurable, attainable, relevant, and timely) goals. Homework consisted of ongoing practice of thought records and daily mindfulness exercises, as well as identifying one SMART goal to practice one of the behavioural strategies taught that class.

Class 3. In the third class, participants received psychoeducation about healthy living principles. Topics included exercise, nutrition, caffeine, guidelines for low-risk alcohol use, other substance use, and sleep hygiene strategies. Participants were assigned daily mindfulness practice, the completion of two SMART goals, and the development of at least one healthy living goal for homework.

Class 4. In the final class, participants received psychoeducation about anger, aggression, and passivity. Psychoeducation was also provided for practicing assertiveness and self-compassion skills. To conclude the program, participants learned problem-solving skills. Homework was assigned to continue daily mindfulness practice, complete a thought record related to anger/passivity, and carry out the solution generated through the in-session problem solving.

Measures

Sample Characteristics

Sociodemographic information was obtained from a combination of self-report questionnaires submitted prior to the first class and intake forms located in physical and electronic medical records in cases of missing information. Each week, participants were asked to provide a brief rating of how useful they found the CBTm class (1 = *Not very useful*, 5 = *Extremely useful*) and whether they would attend another; these outcomes were tallied and averaged across all classes due to inconsistencies in attendance. Homework completion was evaluated dichotomously and defined as participants who completed homework at least once throughout their attendance. Dropout of classes was also evaluated dichotomously and defined as participants who completed less than four classes, with the exception of those who missed an intermediate class (e.g., due to illness) but returned for the final class of the round. Finally, post-intervention outcomes were monitored to examine service use after

classes (i.e., engagement in other forms of treatment, returned to subsequent rounds of CBTm classes, or discontinued treatment).

DSM-5 Level 1 Cross-Cutting Symptom Measure (DSM-5 CC) (American Psychiatric Association [APA], 2013)

Using the 23-item DSM-5 CC, participants provided baseline and weekly self-ratings for 13 psychiatric domains: depression, anger, mania, anxiety, somatic symptoms, suicidal ideation, psychosis, sleep problems, memory, repetitive thoughts and behaviours, dissociation, personality functioning, and substance use. Each item asks how much or how often the individual has been bothered by a symptom during the past 2 weeks. The DSM-5 CC has demonstrated clinical utility, as well as satisfactory test–retest reliability in field trials conducted in adult clinical samples across the United States and Canada, with coefficients exceeding 0.7 for the domains of depression, anxiety, sleep problems, and substance use, but indicating less reliable outcomes for other domains (APA, 2013; Narrow et al., 2013).

Generalized Anxiety Disorder 7-item (GAD-7) Scale (Spitzer et al., 2006)

Changes in anxiety symptoms throughout classes were assessed using the GAD-7, which asks respondents to indicate how often they have been bothered by common symptoms of anxiety over the past two weeks. Total scores indicate level of anxiety symptom severity: minimal (0–4); mild (5–9); moderate (10–14); and severe (15–21) (Kroenke et al., 2007). Also included is a 4-point item to assess the level of difficulty that these symptoms have caused in terms of domestic, occupational, and social functioning. The GAD-7 has demonstrated good test–retest reliability and validity as a general measure of anxiety symptoms and their changes over time (Löwe et al., 2008; Spitzer et al., 2006), as well as an indicator of impairment/disability (Ruiz et al., 2011).

Patient Health Questionnaire 9-item (PHQ-9) Scale (Kroenke et al., 2001)

Changes in depressive symptoms throughout classes were evaluated using the PHQ-9, which asks the respondent to indicate how often they have been bothered by common symptoms of depression over the past two weeks. Total symptom scores indicate level of depression severity: minimal (0–4); mild (5–9); moderate (10–14); moderately severe (15–19); and severe (20–27) (Kroenke et al., 2001; Moriarty et al., 2015). As with the GAD-7, a 4-point item was also included to assess the level of difficulty that depressive symptoms have caused in terms of domestic, occupational, and social functioning. The PHQ-9 has demonstrated good test–retest reliability and validity as a general measure of depressive symptoms and their changes

over time (Cameron et al., 2008; Kroenke et al., 2001; Löwe et al., 2004; Martin et al., 2006).

Statistical Analyses

Analyses were performed using SPSS version 25. Descriptive statistics were obtained to characterize the sample, evaluate perceptions of CBTm classes, and determine their mental health service outcomes after completion of classes. Mixed-effects linear regression models were employed to evaluate mean differences in scores on primary outcome measures (DSM-5 CC/multiple psychiatric domains, GAD-7/anxiety, PHQ-9/depression) over the course of all classes that participants attended. Fixed effects included time point, telepsychology classification (i.e., in-person, telepsychology, combined), and the intercept. The intercept was also included as a random effect. Participants' form of class attendance was included in this model to determine the impact of participation via telepsychology. This method of analysis was selected due to its robustness to missing data and inconsistencies in participant attendance compared to traditional repeated measures approaches. Finally, to explore factors associated with class dropout, a logistic regression model was employed to evaluate predictors of class completion (age, sex, attendance via telepsychology, as well as baseline DSM-5 CC, GAD-7, and PHQ-9 scores).

Results

Descriptive Statistics

Table 1 provides a list of descriptive statistics. Due to some gaps in participants' health records and inconsistencies in the amount of data they submitted, the number of participants contributing data across sample characteristics and psychiatric measures varied. In particular, most participants did not complete a full set of classes, and available data decreased linearly for each class beyond baseline. Further, missing data for at least one of the three primary symptom outcome measures (DSM-5 CC, PHQ-9, GAD-7) for at least one time point was common for participants who attended multiple classes. The mean age of participants was 42.5 and 77.1% were female. Of the 376 participants who were registered, 117 (31.1%) did not attend any classes, 47 (12.5%) attended one class, 28 (7.4%) attended two classes, 67 (17.8%) attended three classes, and 117 (31.1%) attended four or more classes. Approximately two-thirds (68.9%) of participants were identified as having dropped out. In terms of method of class attendance, 43.9% of participants attended in-person, 40.4% attended via telepsychology, and 15.7% attended via both methods (note: these statistics also include participants who were registered for classes in a certain modality but did not attend). Of those participants who attended at least one class, 14.1% brought a support person at least once.

Participants' outcomes were monitored after their enrolment in the CBTm program was concluded, with a small portion of participants having multiple outcomes:

Table 1 Sample characteristics

Variable	N	M	SD	Min	Max
Age	376	42.45	16.43	17	83
Sex	376				
Male	86 (22.9%)				
Female	290 (77.1%)				
Marital status	190				
Current relationship	99 (52.1%)				
No current relationship	55 (28.9%)				
Previous relationship	36 (18.9%)				
Education	90				
Less than high school	13 (14.4%)				
High school	41 (45.6%)				
More than high school	36 (40%)				
Employment Status	109				
Employed	66 (60.6%)				
Unemployed	19 (17.4%)				
Retired	19 (17.4%)				
Other	5 (1.3%)				
# of Classes attended	376				
0	117 (31.1%)				
1	47 (12.5%)				
2	28 (7.4%)				
3	67 (17.8%)				
4+	117 (31.1%)				
Mental health service outcome	376				
File closed	192 (51.1%)				
Community mental health worker	173 (46%)				
MDE classes[a]	29 (7.7%)				

[a]MDE classes = Managing Difficult Emotions (based on Dialectical Behaviour Therapy skills) classes

192 (51.1%) of participants' files were closed (often due to lack of response or attendance at classes), 173 (46%) continued or began to access support from a community mental health worker, and 29 (7.7%) continued on to group Managing Difficult Emotions (MDE) classes (based on dialectical behaviour therapy skills) offered in the same region. A short follow-up survey was sent to participants who stopped attending classes to discern their reasons for early dropout, but the response rate was poor. Overall, participants expressed relatively positive ratings of the usefulness of classes ($M = 3.88/5$) and most indicated they would be interested in attending another session (96.8%).

Table 2 Symptoms at baseline and after CBTm classes

Outcome	Baseline		Class 2		Class 3		Class 4	
	N	M (SD)	N	M (SD)	N	M (SD)	N	M (SD)
Psychiatric symptoms (DSM-5 CC)[a]	167	33.45 (15.64)	124	30.62 (14.39)	99	27.31 (13.22)	70	25.31 (12.45)
Anxiety (GAD-7)[a]	189	11.96 (5.46)	114	10.57 (5.27)	96	9.4 (4.74)	73	9.1 (4.53)
Anx. Funct. (GAD-7)[b]	179	1.46 (.86)	106	1.33 (.85)	88	1.4 (.87)	64	1.22 (.83)
Depression (PHQ-9)[a]	181	13.77 (6.74)	114	12.09 (5.41)	92	11.24 (5.32)	71	10.4 (4.79)
Dep. Funct. (PHQ-9)[c]	178	1.51 (.8)	105	1.33 (.86)	82	1.35 (.87)	62	1.21 (.77)

[a]Means and standard deviations displayed are based on estimated marginal means from linear mixed model analyses (see Table 3). [b]Impact of anxiety on functioning. [c] Impact of depression on functioning

DSM-5 CC = DSM-5 Level 1 Cross-Cutting Symptom Measure. GAD-7 = Generalized Anxiety Disorder-7 Scale. PHQ-9 = Patient Health Questionnaire-9 Scale

Class Outcomes

Table 2 presents participants' mean baseline psychiatric characteristics, as well as the means of participants at the time of their completion of two, three, or four classes. Given that relatively few participants (5.9%) participated in more than four classes (i.e., more than one round), and rounds of classes were structured in sets of four, mean scores beyond the fourth class were excluded from present analyses. Prior to conducting linear mixed model analyses aimed at evaluating changes in

Table 3 Mean differences in outcome scores and linear mixed model summaries

Outcome	N	Time (I)	Time (J)	Mean Diff. (I–J)	SE	df	95% C.I. for EXP (B)	
							Lower	Upper
Psychiatric symptoms (DSM-5 CC)[a]	203	Baseline	2	2.84*	.93	145.87	.36	5.32
			3	6.15**	1.08	150.96	3.27	9.03
			4	8.14**	1.3	89.06	4.64	11.64
Anxiety (GAD-7)[b]	207	Baseline	2	1.86**	.38	151.44	.84	2.88
			3	2.56**	.41	135.31	1.45	3.67
			4	2.86**	.48	86.3	1.58	4.14
Depression (PHQ-9)[c]	203	Baseline	2	1.68**	.42	152.04	.57	2.79
			3	2.53**	.48	142.95	1.25	3.81
			4	3.37**	.49	124.18	2.05	4.68

[a]Model summary: $F(3, 139.21) = 15.42$, $p < .001$. [b] Model summary: $F(3, 135.15) = 17.9$, $p < .001$. [c] Model summary: $F(3, 110.97) = 17.05$, $p < .001$

*$p < .05$. ** $p < .001$

DSM-5 CC = DSM-5 Level 1 Cross-Cutting Symptom Measure. GAD-7 = Generalized Anxiety Disorder-7 Scale. PHQ-9 = Patient Health Questionnaire-9 Scale

symptoms from baseline, testing of statistical assumptions necessary for this analytic strategy revealed no problems with multicollinearity between variables, significant outliers, or non-normality. Heterogenous first-order autoregressive covariance structures were selected for each linear mixed model in consideration of best fit based on Akaike's Information Criterion. A Bonferroni correction for multiple comparisons was applied when calculating confidence intervals for mean differences across participants' symptom trajectories. Cohen's *d* effect sizes were calculated for the mean differences between baseline and class four while accounting for the correlation between time points (Lakens, 2013).

Table 3 displays mean comparisons for each class attended, as well as linear mixed model summaries for the trajectory of participants' DSM-5 CC (general psychiatric symptoms), GAD-7 (anxiety), and PHQ-9 (depression) scores, respectively. For general psychiatric symptoms, results suggested a significant linear decrease as participants completed CBTm classes, $F(3, 139.21) = 15.42$, $p < 0.001$. Between baseline and class four, the mean difference in general psychiatric symptoms was 8.14 (95% CI, 4.64 to 11.64), while the Cohen's *d* effect size was 0.78, indicating a medium-to-large effect. Degree of symptom reduction between classes varied, with the largest reductions observed earlier in classes (*M Diff* = 2.84–3.31), and the smallest being between class three and class four (*M Diff* = 2). For anxiety symptoms, results also suggested a significant linear decrease as participants completed CBTm classes, $F(3, 135.15) = 17.9$, $p < 0.001$. Between baseline and class four, the mean difference in anxiety symptoms was 2.86 (95% CI, 1.58 to 4.14), while the Cohen's *d* effect size was 0.68, indicating a medium-to-large effect. Degree of anxiety symptom reduction decreased as classes progressed, with the largest difference being between class one and class two (*M Diff* = 1.86), and the smallest difference being between class three and class four (*M Diff* = 0.3). Finally, for depressive symptoms, results also suggested a significant linear decrease as participants completed CBTm classes, $F(3, 110.97) = 17.05$, $p < 0.001$. Between baseline and class four, the mean difference in depressive symptoms was 3.37 (95% CI, 2.05 to 4.68), while the Cohen's *d* effect size was 0.71, indicating a medium-to-large effect. Degree of depression symptom reduction was largest between class one and class two (*M Diff* = 1.68), with similar reductions between remaining timepoints (*M Diff* = 0.84-0.85). For all three mixed models, form of class attendance (i.e., in-person, via telepsychology, or both) did not meaningfully contribute to changes in their general psychiatric ($F(2, 195.6) = 0.85$, $p = 0.43$), anxiety ($F(2, 198.82) = 0.98$, $p = 0.38$), and depression ($F(2, 196.54) = 1.93$, $p = 0.15$) symptoms.

Class Dropout

Dropout did not differ based on attendance in-person or via telepsychology, $p > 0.05$. Due to notable challenges with missing data for participants' marital status, education, and employment status, these variables were removed from the logistic regression model predicting class dropout. $N = 139$ participants were included in this analysis due to partial missing data and the need for casewise deletion for logistic regression analysis. Testing of necessary statistical assumptions revealed no

Table 4 Logistic regression results: Predictors of CBTm class dropout

Predictor	B	SE_B	Wald	df	Exp(B)	95% C.I. for EXP (*B*)	
						Lower	Upper
Age	.02	.01	3.13	1	1.02	1	1.05
Sex	−.57	.46	1.58	1	.56	.23	1.38
In-person attendance[a]			2.87	2			
Telepsychology attendance	.11	.41	.07	1	1.11	.5	2.5
Combined attendance	.83	.51	2.66	1	2.3	.85	6.25
Psychiatric Symptoms (DSM-5 CC)	−.03	.02	1.88	1	.97	.94	1.01
Anxiety (GAD-7)	.12	.05	4.77*	1	1.13	1.01	1.25
Depression (PHQ-9)	−.01	.04	.04	1	.99	.91	1.08

*$p < .05$

[a]Reference category for dummy coded variable

$N = 139$ cases included in analysis. Model summary: $\chi^2(8) = 9.87$, $p = .27$, Nagelkerke $R^2 = .13$. DSM-5 CC = DSM-5 Level 1 Cross-Cutting Symptom Measure. GAD-7 = Generalized Anxiety Disorder-7 Scale. PHQ-9 = Patient Health Questionnaire-9 Scale

issues with multicollinearity between predictors, significant outliers, or non-linearity of the continuous variables with respect to the logit of the class dropout variable. Table 4 presents the results of the logistic regression analysis, which suggests that the included set of predictors did not significantly predict class attendance as a whole, $\chi^2(8) = 9.87$, $p = 0.07$, Nagelkerke $R^2 = 0.13$. Further inspection revealed no significant contributions for most of the individual predictors (age, sex, method of attendance, psychiatric symptoms, and depression scores), with the exception of higher baseline anxiety scores predicting a reduced likelihood to dropout, $B = 0.12$, $W = 4.77$, $p < 0.05$, Exp(B) = 1.13, CI = 1.01, 1.25. This suggests a challenge with predicting CBTm class dropout and that other factors unaccounted for in the present study are at play in facilitating dropout. For instance, dropout may have varied based on distance required for participants to travel to their service site, or time of year of their participation.

Discussion

Consistent with previous research (Delgadillo et al., 2014; Evans et al., 2008; Kenny & Williams, 2007; Kocovski et al., 2013; Manicavasgar et al., 2011, 2012; Palay et al., 2018; Piet et al., 2010; Thakur et al., 2019), this study demonstrated that large-group, low dose CBT can be effective in reducing mental health problems, including anxiety, depression, and psychiatric symptoms in general among rural community members. Participants showed a significant linear decrease in all of these symptoms over the course of classes attended, with a medium-to-large effect. This effect was larger than found for participants of CBTm classes in Manitoba offered in an urban hospital setting, who also displayed slightly higher baseline GAD-7 ($M = 12.6$) and

PHQ-9 ($M = 15.2$) scores (Thakur et al., 2019) compared to the present study (GAD-7, $M = 12$; PHQ-9, $M = 13.8$). This difference from the urban hospital-based cohort is likely largely attributable to a poor response rate on questionnaires obtained in the present study; completion of questionnaires in the rural CBTm classes may have been more skewed toward those who were more motivated to attend classes and complete homework (i.e., at more advanced stages of readiness for change).

Our programming faced challenges with class dropout, as well as inconsistent attendance, with approximately one-third of class registrants not attending any classes, and two-thirds identified as having dropped out, which was higher than previous CBTm evaluations (Palay et al., 2018; Thakur et al., 2019). Notably, a recent evaluation of CBTm classes provided in an urban tertiary care setting found lower education and greater depression severity to be associated with class dropout (Thakur et al., 2019). Unfortunately, the present research did not reproduce these findings and was largely unable to identify predictors of class dropout that could be addressed in future programming. Results showed that higher baseline anxiety decreased the odds that participants would drop out of classes, but additional research would be necessary to determine the veracity of this finding. Examining systems changes (e.g., requiring attendance at 4 classes before moving on to other services) or interventions aimed at engagement such as motivational interviewing calls prior to the start of classes could also be a valuable step in understanding and addressing drop out.

In addition, our findings showed that the largest symptom reductions were generally observed earlier in treatment. For instance, the largest reductions for symptoms of both anxiety and depression were observed between class one and class two. These findings suggest potential benefit from reducing treatment length, thereby reducing likelihood of dropout as well as wait times for other rural community members who may be facing limited treatment opportunities. However, the majority of participants who dropped out did so early in the program (i.e., prior to or after one class), suggesting a need to explore other potential explanations for this challenge with dropout. Future research aimed at determining key treatment and dropout thresholds for these and similar class-based treatments would be valuable for increasing treatment benefits as well as service access.

Overall, considering that the CBTm classes were low-intensity, they demonstrated promise for symptom reduction in the face of the personnel and resource limitations inherent to the rural context (Gamm et al., 2010; Ho et al., 2016). The classes also demonstrated promise as a potential gateway to more intensive intervention within the stepped care model of psychological treatment, which is needed given the low use of outpatient mental health services in rural settings (Gamm et al., 2010; Rost et al., 2002). Approximately half of participants accessed another form of treatment (i.e., individual treatment with a community mental health worker or MDE classes) after attending CBTm classes. Furthermore, despite some challenges with having participants attend a full round of classes, attendance at two or more classes within a 4-week period can still be considered an increased accessing of services relative to typical time spent with a community mental health worker within the rural health region that classes were offered. Most importantly, participants accessing classes via telepsychology did not differ significantly in terms of the impact on their symptom

trajectory. Thus, as noted in previous literature (Fortney et al., 2015), this study supports low-intensity telepsychology-based mental health programming as an avenue for offering remote rural community members access to services. As has been previously suggested (Delgadillo et al., 2014; Ho et al., 2016), continued research involving antecedents for class dropout and potential solutions for increasing participant engagement and retention is sorely needed, given that these low-intensity interventions may be one of the best options available for reaching more rural community members looking for mental health services (Chan & Adams, 2014; Firth et al., 2015; Freire et al., 2015).

Limitations

The primary limitation to this research involved missing data, due to limitations in available demographic information (which was obtained from a handful of sources in participants' health records and intake packages) and inconsistent receipt of class outcome information from participants (i.e., participants not completing or submitting requested documentation). Missing data was not uniquely problematic for participants attending in-person, via telepsychology, or a combination thereof. Despite the robustness of the linear mixed model approach to missing data points, a larger and more evenly distributed sample across evaluation time points would have been preferred, increasing statistical power and enabling a more precise estimation of the trajectory of class outcomes. Thus, the outcomes of this research should be interpreted with discretion and warrant replication.

A related but distinct limitation was the large dropout rate for classes and the present study's challenge with identifying predictors of dropout. Other sociodemographic and psychosocial factors unaccounted for in the present study (e.g., socioeconomic status, cultural background, social stigma) may have played an important role in preventing participants from attending a full round of classes, which was associated with the strongest potential outcomes. As a result, while perceptions of CBTm classes appeared to be generally positive, it is likely that participants who were already motivated to attend and/or who had noticed early benefits from attending comprised a large portion of the sample for classes beyond the first, potentially skewing the trajectory of class outcomes favorably to some degree. In addition, 77.1% of the sample was female, which was not associated with class dropout, but some previous research has demonstrated that women may respond differently to short-term group treatments (Ogrodniczuk et al., 2004; Sikkema et al., 2004), potentially contributing to the larger effect sizes found in this research compared to past similar investigations with more balanced distributions of participants' sexes (e.g., Thakur et al., 2019).

Notably, the exclusion of a control group for comparison (such as waitlisted individuals) due to feasibility/resource limitations compounds the reduced generalizability of these results. For instance, improvements in participant outcomes may have occurred in part due to regression to the mean (e.g., external life events, receiving general care and attention from clinicians, the natural passage of time). Further,

all outcomes in this study were based on participant self-report data, which may have reduced reliability compared to clinician-administered measures. Finally, this research did not include a follow-up of participant outcomes after their completion of CBTm classes; participants provided data at the beginning of each class attended. Thus, the full-scale, long-term impact on participants' symptoms is unknown; however, the medium-to-large effect of CBTm classes on symptoms for measured time points is promising, warranting further clinical exploration and supplementary research.

Conclusion

This research adds a Canadian perspective to the limited literature base surrounding the effectiveness of mental health programming in the rural context. Overall, the results of this research demonstrated that CBTm classes can be effective in reducing various psychiatric symptoms, including anxiety and depression, in rural communities. Moreover, compared to in-person CBTm classes, attendance via telepsychology was not related to participants' outcomes, suggesting that it has utility for bridging the accessibility gap for those living in remote locations. Notably, the longevity of participants' class outcomes is unknown. Further, identifying predictors of class dropout was difficult to achieve in this research. Thus, the results of this research, though promising, suggest a need for future literature focused intently on predicting and reducing antecedents to the discontinuation of treatment. Given the challenges that rural community members face in terms of the accessibility, availability, and acceptability of mental health services, it falls to clinicians and researchers alike to ensure these individuals receive treatment opportunities and outcomes on par with those observed in the urban context, and ideally, tailored to fit the unique needs of this population.

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Declarations

Conflict of Interest None.

Availability of Data Data available upon request.

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