Online administration of a pilot mindfulness-based intervention for adolescents: Feasibility, treatment perception and satisfaction

Morica Hutchison[1,3] · Beth S. Russell[1,3] · Kim M. Gans[1,3] · Angela R. Starkweather[2]

Abstract

Adolescents may be more vulnerable to COVID-19-related impacts and require long-term mental health care. Services that bolster emotion regulation, such as mindfulness-based interventions (MBIs) promote positive impacts on psychosocial outcomes and have high acceptability. No studies have assessed feasibility, treatment perceptions and satisfaction of online MBIs with adolescents. 56 moderate- and high-risk adolescent (m = 14.5 years, 66.1% female, 26.8% LatinX) participants tested the feasibility, treatment perceptions and satisfaction of an 8-session online MBI focused on observing non-judgmentally, attending to positivity, and self-soothing. The study achieved acceptable feasibility with high attendance (m = 5.75) and retention rates (87.5%). The moderate- vs. high-risk group reported significantly higher ratings of treatment perceptions (t = 2.03, $p < .05$, d = 0.60). Significant associations were found between increased pre-test depression and anxiety symptomology and reduced intervention utility (rs = -0.34 and -0.32, ps < .05). This study demonstrated feasibility, treatment perceptions and satisfaction of an online MBI for adolescents presenting with two risk levels. Higher-risk adolescents may need a higher-touch intervention than moderate-risk, who may be more likely to find online MBIs acceptable. The impact of adjunctive MBIs for adolescents on treatment attendance and mental health outcomes over longer periods is necessary to understand patterns in effective adolescent treatment options.

Keywords Adolescents · Coping · Mental health · Mindfulness-based interventions · Telepsychotherapy

Introduction

Services that significantly bolster targeted emotion regulation skills are central to supporting adaptive adolescent mental and physical health during times of stress. Emotion regulation is a procedural and effortful process that consists of intentional intrinsic and extrinsic strategies to identify, understand, and modulate the type and degree of emotional experiences and their expression (e.g., Gross & Thompson, 2010). Distress during adolescence can be managed by regulating emotions through strategies considered adaptive or maladaptive. Maladaptive emotion regulation during adolescence includes emotion suppression, rumination, or catastrophizing (Garnefski & Kraaij, 2006) and may produce or maintain somatic symptoms (e.g., fatigue; Garnefski et al., 2017), suggesting specific targets for intervention. Alternatively, adaptive strategies include awareness and acceptance of emotions and use of goal-directed coping (Chervonsky & Hunt, 2019). Adolescents who employ a greater variety of adaptive coping strategies report reduced anxiety and depression, and increased self-efficacy (Suhr et al., 2017). Distress tolerance and mindfulness skills are two adaptive coping strategies that aim to regulate emotional experiences (Russell & Park, 2018; Lazarus & Folkman, 1987).

Distress tolerance is an individual's ability to continually engage in goal-directed behaviors despite discomfort (Simons & Gaher, 2005), with those considered high in distress tolerance more likely to approach negative emotions and aversive contexts by modulating their behavioral and emotional responses to reduce distress (O'Neill Rodriguez and Kendall, 2014). Difficulties with distress tolerance, in contrast, may increase maladaptive responses and negative affect through use of avoidance-oriented coping strategies

✉ Morica Hutchison
morica.hutchison@uconn.edu

1 Human Development and Family Sciences, University of Connecticut, Storrs, CT 06269-1058, USA

2 School of Nursing, University of Connecticut, Storrs, CT 06269-1058, USA

3 Department of Psychiatry, University of Rochester Medical Center, 14620, Rochester, NY, USA

(Jefferies et al., 2015). Adolescence is a salient time to develop distress tolerance skills, given the developmental trajectory for the metacognitive skills required to monitor low-level distress and evaluate the effectiveness of one's attempts to remedy it; further, adolescence as a maturational period is well-documented as the time when both internalizing and externalizing psychological symptoms often emerge (Daughters et al., 2005). For example, evidence indicates consistent linkages between adolescent distress tolerance and attempts to regulate negative affect through behavioral coping strategies, some of which can be maladaptive (e.g., self-harm or substance use) (Daughters et al., 2005; Nock & Mendes, 2008).

A second construct highly salient to developing targeted emotion regulation skills is mindfulness, defined as a state, dispositional trait, and skill of nonjudgmental awareness created by purposefully paying attention to each moment of an experience (Kabat-Zinn, 2003). This skill development can help reach the goal of reducing distress by observing feelings and engaging in the social world non-judgmentally (Linehan & Wilks, 2015), with mindfulness practice linked with reduced emotional distress, increased positive mindset and self-efficacy (Carmody & Baer, 2008).

Mindfulness-Based Interventions for Adolescents

Emotion regulation interventions aim to build capacity to manage psychological discomfort and increase goal-directed behavior via adaptive coping strategies (e.g., Russell & Park, 2018). Mindfulness-based interventions (MBI) are one of the evidence-based approaches designed to strengthen emotion regulation and have demonstrated efficacy for a variety of adolescent samples. MBI programs leverage individuals' attention and observation skills to bolster the ability to discriminate between events in a given moment and the mental representations of past events and imagined contingencies that may lay ahead (Williams, 2010). When coupled with a focus on increasing attention of positive elements in the present situation (rather than ruminations on the past or anxieties about the future), these skills can build individual self-competence in managing stressful situations and any corresponding negative affect that may arise. Evidence from adolescent MBIs demonstrates increases in mindfulness, use of observation skills and self-efficacy, and reductions in cannabis use, mental health symptoms (e.g., depression, anxiety), and maladaptive coping strategies (Lyvers et al., 2014; Zoogman et al., 2015). Further, positive impacts have been seen for psychosocial outcomes of subjective well-being, self-regulation and awareness, as well as high acceptability, with positive attitudes towards group experiences and treatment (Biegel et al., 2009; DePlus et al., 2016; Fortuna et al., 2018).

Despite promising results of MBIs with adolescents, additional intervention development efforts are necessary to increase the availability and engagement of effective MBIs for vulnerable youth, particularly during the COVID-19 pandemic as intervention facilitation has shifted from in-person to online formats.

COVID-19 Impacts on Adolescent Mental Health

Since the COVID-19 pandemic began in early 2020, significant disruptions to education and work schedules have been noted across the US, as children and families have been impacted by school closures and the transition to distance learning (Golberstein et al., 2020). Within the context of COVID-19 pandemic responses, adolescents have faced substantial disruptions to their developmental milestones, such as identity development and peer connection (Hawke et al., 2021). Early research on impacts of the COVID-19 pandemic suggests that adolescents may be more vulnerable to adverse mental and physical health impacts due to immature cognitive and emotion regulation systems, requiring additional support from social, school, and family systems (Zhou, 2020).

Extensive evidence prior to the COVID-19 pandemic supports the utility of mental health treatment to address mental and physical health symptoms. However, in 2019, only 15.3% of adolescents received outpatient treatment services (Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality, 2020). Frequently reported challenges to help-seeking for adolescents include personal barriers such as lack of emotional competence and negative beliefs about mental health treatment (Gulliver et al., 2010), in addition to structural barriers of cost and transportation (Reardon et al., 2017), with prolonged wait times to receive services increasing refusal of services (Westin et al., 2014). Of those who enroll in treatment, those with the lowest retention present with more severe psychiatric problems and/or substance use (Roedelof et al., 2013).

Early evidence during the COVID-19 pandemic suggests symptoms associated with mental health difficulties (e.g., increased emotional distress) and physical health (e.g., headache) may further reduce help-seeking and engaging behaviors (Aguirre et al., 2020). The inaccessibility of social supports (Jung & Jun, 2020) and mental health services during the COVID-19 pandemic (Golberstein et al., 2020), particularly for adolescents with severe mental illnesses (Guessoum et al., 2020), were significantly related to poorer adjustment and increased depression (Ellis et al., 2020). The psychological impact of COVID-19 on adolescents may require long-term mental health care (Onyeaka et al., 2020), including telepsychotherapy. Once limited to a peripheral practice in mental health treatment, telepsychotherapy has become

necessary to deliver care during the COVID-19 pandemic (Zhou et al., 2020). Best practices to sustain mental and physical health symptom reduction for adolescents remain inconclusive, with treatment engagement as a notable barrier, particularly during the COVID-19 pandemic as treatment modalities have shifted to online platforms. Recent recommended interventions targeting psychological distress include online facilitation of psychoeducation and psychological interventions (i.e., cognitive-behavioral therapy, emotion regulation), in addition to providing a support network for those deemed at-risk of adverse mental and behavioral health outcomes (Wind et al., 2020).

The most recent systematic review examining the current state of feasibility, acceptability and efficacy of online MBIs (Moulton-Perkins et al., 2020) focused on known barriers to in-person interventions, such as transportation, limited rural availability, and perceived stigma (Sustrans, 2012), and the benefits of online facilitation including increased convenience by providing access to individuals who may not otherwise have access to treatment (Chakrabarti, 2015). Despite online facilitation reducing some barriers to engagement, challenges still exist, such as: potential reduced efficacy due to program length variability, time allotted for between-session mindfulness practice, group dynamics management, and technical difficulties (Spijkerman et al., 2016). While this review provided insight into the benefits and challenges faced by online group facilitation, selected studies only focused on adult general or chronic pain populations, and no clinical mental health populations specifically. To date there are no studies assessing the feasibility, treatment perceptions or satisfaction of online MBIs with adolescents. This gap suggests the need for implementation studies that examine modification and adaptation of existing MBIs to online formats for adolescents, which the current study sought to address.

Current Study

The Promoting Resilience in Self-Management (PRISM) curriculum (Russell, Hutchison & Fusco, 2019) is a small-group didactic MBI that focuses on three core mindfulness tenets: observing non-judgmentally, attending to positivity, and self-soothing. Previous findings revealed significantly reduced depression for adolescents in substance use recovery following a 6-session version of PRISM (Russell et al., 2019). PRISM has since expanded to 8-sessions to allow additional practice of mindfulness and distress tolerance strategies (See Fig. 1 for intervention components).

The current study extends these findings to a new clinical population and provides preliminary data on feasibility (attendance and retention), treatment satisfaction and utility of PRISM's online facilitation. Given the significant gap in

our understanding of online MBI administration for adolescents, we pose the following research questions: What would retention and attendance be for PRISM during COVID-19 among this population? Are there associations between mental health symptomology (anxiety or depression symptoms) and treatment retention and attendance for PRISM? How do treatment retention and attendance differ for adolescents of different risk levels (e.g., moderate risk versus high risk)? How do adolescents report treatment satisfaction of PRISM? Further, how do adolescents report utility of the online intervention format? Are there associations between mental health symptomology, treatment satisfaction and utility of the online intervention format? How do treatment satisfaction and utility of the online intervention format differ for adolescents of different risk levels (e.g., moderate risk versus high risk)? We hypothesized that adolescents would report high attendance and retention (H1) and positive treatment satisfaction and utility of the online intervention format (H2). Given the link between symptom severity and service engagement (e.g., Gulliver et al., 2010), we expected to see elevated levels of mental health symptoms associated with reduced treatment retention and satisfaction (H3). Finally, we hypothesized that adolescents in the moderate-risk group would report increased treatment retention and satisfaction (H4).

Methods

Data presented here include survey results for adolescents receiving therapy at two community mental health clinics in rural New England who enrolled in the study piloting the online version of PRISM, guided by reporting criteria for non-randomized pilot and feasibility studies (Lancaster & Thabane, 2019).

Procedures

All study protocols and materials were approved by the BLINDED FOR REVIEW IRB (H20-0062). Recruitment took place at the community mental health clinic, with adolescents aged 12 to 17 years old, English-speaking, and actively engaged in treatment deemed eligible to participate. Participants were recruited via flyers, email to clinicians, and by word of mouth. Participants and parents attended the first session to complete consenting procedures and an anonymous pre-test assessment. Immediately following the PRISM intervention was a post-test assessment. The average completion time for the pre-test assessment was 26.8 min (sd = 13.9; range = 9.1–57.3), and the post-test survey was 29.2 min (sd = 12.9; Range = 10.3–64.1). All participants

Fig. 1 PRISM Intervention Content

Week	Intervention Skills & Foci
1	Pre-Intervention assessment Intro to Stress Management and Awareness of mind (Emotional Mind, Reasonable Mind and Wise Mind)
2	Distress Tolerance Improving the Moment Soothing with the 5 Senses
3	Develop Wise Mind skills Observing Emotions Protection Against Negativity
4	Revisit Self-care Calming Statements One Mindedness
5	Revisit Distress Tolerance Accepting Reality
6	Self-care in Action Observing Emotions in Social Context Revisit Protection Against Negativity
7	Revisit Observing Emotions (Understanding Felt Emotions, Reducing Emotional Vulnerability)
8	Self-soothing Post-intervention assessment

were eligible to receive a gift card up to $30 provided at random intervals during the intervention as compensation for their time.
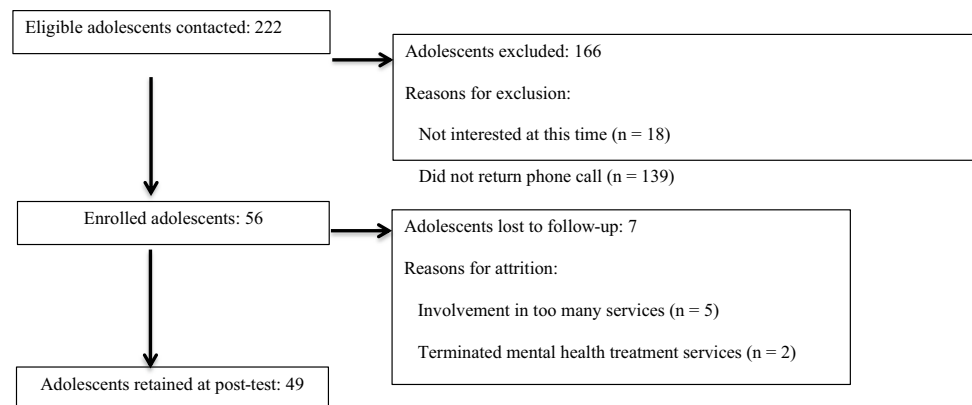
Intervention Facilitation

The intervention consisted of 8 one-hour sessions held in a group format (group range = 4–8 participants) online via a HIPAA-compliant videoconferencing system. During each session ample time was provided for conversation and skill building, focusing on psychoeducation of relevant topics (e.g., distress tolerance, radial acceptance and self-soothing), experiential activities to practice relevant topics (e.g., thought diffusion and refocusing on positivity in the present moment), and a guided meditation. Groups were led by a

doctoral level researcher who had been trained in the 6-session PRISM curriculum and aided in the development of the extended 8-session curriculum presented here.

Participants

Participants were adolescents ages 12–17 years old recruited from a community mental health clinic (See Fig. 2 for a study flow diagram). All adolescents in the current sample presented with some degree of risk due to engagement in mental health treatment, however, some indicated more severe risk. For this study, moderate-risk was defined as adolescents who were engaged in outpatient therapy only, ranging from weekly to monthly sessions, and had no prior treatment history of referrals to a higher level of care.

Fig. 2 Flow diagram of study recruitment


```
Eligible adolescents contacted: 222
          |
          v                          Adolescents excluded: 166
                                     Reasons for exclusion:
                                        Not interested at this time (n = 18)
                                     Did not return phone call (n = 139)
Enrolled adolescents: 56
          |
          v                          Adolescents lost to follow-up: 7
                                     Reasons for attrition:
                                        Involvement in too many services (n = 5)
                                        Terminated mental health treatment services (n = 2)
Adolescents retained at post-test: 49
```

Conversely, participants were categorized as high-risk if they had prior, current or forthcoming treatment of a higher level of treatment. Higher levels of treatment included Intensive In-home Child and Psychiatric Service (II-CAPS; Intensive In-Home Services, n.d.) and Functional Family Therapy (FFT; Functional Family Therapy, n.d.).

Measures

Measures presented here center on the feasibility, treatment perception and satisfaction indicators identified in our research questions. Evidence of efficacy on reducing mental health symptoms and strengthening adaptive coping skills are presented elsewhere (Hutchison, Russell, Starkweather, Gans, under review).

Demographics

Adolescents' self-reported demographic characteristics, including: age, gender, sexual orientation, ethnicity, race, grade level, and services received (i.e., health/medical provider, see Table 1). Additionally, descriptives of treatment history were included to provide context to level of risk (i.e., referrals to additional support services, safety plans for suicidal behaviors).

Participant Attendance

Participant attendance (dose) across sessions, ranging from 1–8, was tracked as an indicator of feasibility, with attendance in more than half of the PRISM sessions (62.5%, or 5 sessions) considered an indication that the program is feasible for a given population.

Retention Rates

Participant retention was defined as completion of both pre- and post-test assessments. Those with assessments only at

pre-test completion were considered lost to follow-up. Feasibility was defined as at least an 80% retention rate.

Treatment Satisfaction

The Treatment Perception Questionnaire (TPQ; Marsden et al., 1998) is a 10-item scale that assesses participant's ratings of their general satisfaction and acceptability of mental health services. Items are scored on a 5-point Likert scale (0 = strongly agree, 4 = strongly disagree). Items are summed to create a global score, such that lower scores indicate greater satisfaction. The TPQ has acceptable reliability of 0.83 (Marsden et al., 1998), however, performed poorly in the current sample, with an alpha of 0.56. "Acceptable" was defined as scores above 20.

Online Intervention Utility

The Internet Evaluation and Utility Questionnaire (IEUQ; Ritterband et al., 2008) is a 15-item scale that assesses the ease of use, convenience, engagement, privacy, satisfaction and acceptability of an Internet intervention. To increase item-wording relevance to the current sample, the word "web program" was replaced with "online group" for each question (i.e., How worried were you about your privacy in using this *online group*). Items are scored on a 5-point Likert scale (0 = not at all, 4 = very), with two open-ended items requesting participants to identify the most and least helpful parts of the Internet intervention. Items are summed to create a global score, such that higher scores indicate greater utility. The IEUQ has acceptable reliability of 0.69 (Ritterband et al., 2008), and was excellent in the current sample (α = 0.90). "Acceptable" was defined as scores above 30.

Component Favorability

At post-test participants responded to a question regarding which PRISM components they liked best by ranking components on a scale of 1–15 (1 being the most liked). Example

Table 1 Participant demographics

	Total Sample (n=56) μ (SD)	Moderate-risk (n=30) μ (SD)	High-risk (n=26) μ (SD)
Age	14.5 (1.6)	14.3 (1.5)	14.6 (1.7)
	N (%)	N (%)	N (%)
Gender			
Male	10 (17.9%)	5 (16.7%)	5 (19.2%)
Female	37 (66.1%)	18 (60.0%)	19 (73.1%)
Transgender	3 (5.4%)	2 (6.7%)	1 (3.8%)
Gender Fluid	1 (1.8%)	1 (3.3%)	– (–)
Other	5 (8.9%)	4 (13.3%)	1 (3.8%)
Sexual Orientation			
Heterosexual	23 (41.1%)	13 (43.3%)	10 (38.5%)
Homosexual	3 (5.4%)	2 (6.7%)	1 (3.8%)
Bisexual	17 (30.4%)	6 (20.0%)	11 (42.3%)
Other	13 (23.2%)	9 (30.0%)	4 (15.4%)
Grade Level			
5th	1 (1.8%)	– (–)	1 (3.8%)
6th	1 (1.8%)	– (–)	1 (3.8%)
7th	10 (17.9%)	7 (23.3%)	3 (11.5%)
8th	8 (14.3%)	3 (10.0%)	5 (19.2%)
9th	13 (23.2%)	10 (33.3%)	3 (11.5%)
10th	11 (19.6%)	5 (16.7%)	6 (23.1%)
11th	8 (14.3%)	2 (6.7%)	6 (23.1%)
12th	4 (7.1%)	3 (10.0%)	1 (3.8%)
Ethnicity			
White/Caucasian	47 (83.9%)	25 (83.3%)	22 (84.6%)
Black/African American	9 (16.1%)	4 (13.3%)	5 (19.2%)
Asian/Asian American	– (–)	– (–)	– (–)
Native Hawaiian/Other Pacific Islander	1 (1.8%)	– (–)	1 (3.8%)
American Indian/Alaska Native	4 (7.1%)	3 (10.0%)	1 (3.8%)
Other	7 (12.5%)	5 (16.7%)	2 (7.7%)
Race			
LatinX	15 (26.8%)	10 (33.3%)	5 (19.2%)
Non-LatinX	41 (73.2%)	20 (66.7%)	21 (80.8%)
Employment (Past 12 months)			
Yes	11 (19.6%)	6 (20.0%)	5 (19.2%)
No	45 (80.4%)	24 (80.0%)	21 (80.8%)
Current Permanent Housing			
Yes	44 (78.6%)	23 (76.7%)	21 (80.8%)
No	12 (21.4%)	7 (23.3%)	5 (19.2%)
Service Involvement (past 12 months)			
Foster Home	1 (1.8%)	1 (3.3%)	– (–)
Court/Legal	5 (8.9%)	3 (10.0%)	2 (7.7%)
Department of Children and Families	13 (23.2%)	7 (23.3%)	6 (23.1%)
Domestic violence provider	– (–)	– (–)	– (–)
Faith-based organization	5 (8.9%)	3 (10.0%)	2 (7.7%)
Family resource support center	4 (7.1%)	4 (13.3%)	– (–)
Health/Medical provider	23 (41.1%)	14 (46.7%)	9 (34.6%)
Home visiting provider	3 (5.4%)	2 (6.7%)	1 (3.8%)
Mental health services	38 (67.9%)	17 (56.7%)	21 (80.8%)
Cognitive behavior services	5 (8.9%)	1 (3.3%)	4 (15.4%)

Table 1 (continued)

	Total Sample (*n* = 56) *μ (SD)*	Moderate-risk (*n* = 30) *μ (SD)*	High-risk (*n* = 26) *μ (SD)*
Mindfulness programs	4 (7.1%)	2 (6.7%)	2 (7.7%)
Parenting program	2 (3.6%)	1 (3.3%)	1 (3.8%)
Unknown	10 (17.9%)	6 (20.0%)	4 (15.4%)
Other	4 (7.1%)	2 (6.7%)	2 (7.7%)

components include: guided meditations, one-mindedness, radical acceptance, calming statements with breath, self-soothing with the five senses, trigger thought diffusion, and the "what" and "how" skills of wise mind. This question was included to provide feedback on the acceptability of treatment components and to inform possible adaptations of PRISM to tailor skills taught to increase adolescent application of strategies.

Depression Symptomology

The Center for Epidemiologic Studies Depression Scale (CES-D; Eaton et al., 2004) is a 20-item measure that assesses current levels of depressive symptomology for the general public. Items are scored on a 4-point Likert scale (0 = Rarely or none of the time (< 1 day), 3 = most or all of the time (5–7 days)). Total scores are calculated by summing all 20-items together; higher scores indicate increased depressive symptoms. Scores 16 or greater indicate risk for clinical depression. The CES-D has acceptable reliability scores ranging from 0.85 to 0.90 in the general population and clinical samples, respectively (Eaton et al., 2004), as in the current clinical sample 0.91.

Anxiety Symptomology

The Generalized Anxiety Disorder 7-item (GAD-7; Spitzer et al., 2006) is a 7-item measure that assesses the frequency of symptoms associated with GAD diagnosis over the last 14 days. Items are scored on a 4-point Likert scale (0 = not at all sure, 3 = nearly every day). Total scores are calculated by summing all 7 items, such that higher scores indicate more severe anxiety symptoms. A score of 8 or greater provides a cut-off indicative of likely GAD diagnosis, with the following severity categories provided to aid interpretation of scores: 0–4 = Minimal; 5–9 = Mild; 10–14 = Moderate; 15 + = Severe. The GAD-7 has excellent reliability of 0.92 (Spitzer et al., 2006), as in the current sample 0.90.

Analytic Plan

Data was collected using Qualtrics and then exported into SPSS 27 for cleaning and analysis procedures. Unique participant IDs allowed for the linkage of pre- to post-test assessments. Data was examined for normalcy using Q-Q plots. Of those participants who completed assessments, there was 0% item-level missingness at pre- and post-test. Subsequent to cleaning procedures, the following statistical tests addressed each aim. First, we present descriptive results on self-reports of feasibility (retention rates, attendance rates) (H1), followed by descriptive results of treatment satisfaction and utility of the online intervention format (H2). We then present bivariate correlations between mental health symptoms and treatment retention and satisfaction (H3). Finally, we present independent samples t-tests to explore any group differences in retention or satisfaction by level of risk (H4).

Results

Participants

Participants (*n* = 56; 66.1% female, 17.9% male) were recruited from the community mental health clinics. The average age of participants was 14.5 years old (sd = 1.6, range = 12–17). The majority of participants identified as Caucasian (*n* = 47, 83.9%) and 26.8% (*n* = 15) identified as LatinX. The majority of participants were in ninth (*n* = 13, 23.2%) grade (range = 5th-12th grade). The three most common diagnoses reported were: depressive disorders (*n* = 28), anxiety disorders (*n* = 21) and attention-deficit hyperactivity disorders (*n* = 18).

Thirty participants (53.6%) were in the moderate-risk group. During their treatment history, participants attended an average of 29.5 therapy appointments (sd = 30.3, range = 1–101), 11 (36.7%) attended a psychiatric evaluation for medication management, 11 (36.7%) had at least one safety plan in their treatment history (m = 2.8, sd = 2.4, range = 1–11), and 4 participants (13.3%) had referrals to Emergency Medical and Psychiatric Services (EMPS; range = 1–3).

Twenty-six participants (46.4%) were in the high-risk group. Over the course of their treatment history, participants attended an average of 73.9 therapy appointments (sd = 59.1, range = 8–191), 15 (57.7%) had attended a

psychiatric evaluation, 16 participants (61.5%) had at least one safety plan in their treatment history (m = 3.1, sd = 3.1, range = 1–14), and 14 participants (53.8%) had referrals to EMPS (range = 1–4). Nearly 80% of participants (n = 20) had engaged in II-CAPS (range = 1–5), 61.5% (n = 16) had engaged in FFT (range = 1–3), 19.2% (n = 5) had engaged with partial hospitalization programs, and 15.4% (n = 4) had prior hospitalizations for self-harm and suicidal behaviors. See Table 1 for further details.

Descriptive Results: Feasibility—Attendance and Retention (H1)

The overall sample had good indicators of feasibility, with a retention rate of 87.5% (n = 49) of participants completing both pre- and post-test assessments. Retention rates were comparable in the moderate- and high-risk groups, 27 (90%) and 22 (84.6%), respectively. The second indicator of feasibility, attendance rates, was met with an average attendance rate of 5.75 of the 8 sessions (sd = 2.31, range = 1–8), with the moderate-risk group reporting slightly higher attendance (m = 6.10, sd = 2.23) than the high-risk group (m = 5.35, sd = 2.38). Twenty participants (35.7%) attended all 8 sessions, of which 13 (65%) were in the moderate-risk group. Thirty-nine participants (69.6%) attended at rates above the dose cutoff to indicate feasibility (5 or more sessions), with 23 (60.0%) of these in the moderate-risk group.

Descriptive Results: Treatment Satisfaction and Internet Intervention Utility (H2)

The intervention also achieved high acceptability. The average score on the TPQ was 18.53 (sd = 3.89, range = 7–33), with the moderate-risk group reporting higher treatment perceptions (m = 19.58, sd = 4.04) than the high-risk group (m = 17.33, sd = 3.41). For the IEUQ, the mean score for the overall group was 35.58 (sd = 9.14, range = 9.49), with comparable average scores by level of risk subgroup (moderate-risk = 35.76, sd = 7.22; high-risk = 35.35, sd = 11.29). Participants rated how much they liked the skills taught during the PRISM curriculum on a scale of 1–15 (1 = most liked). The highest ranked skill for the overall group was the guided meditation (n = 19), followed by self-soothing with the five senses (n = 14), and observing emotions in a social context and trigger thought diffusion (both n = 12). While both risk-level groups rated the guided meditation as their most-liked component, there were differences in how the second and third-best liked components were ranked: For the moderate-risk group, the guided meditation was followed by self-soothing with the five senses and the trigger thought diffusion (n = 9 for both). For the high-risk group, the guided meditation was followed by positive affirmations, and the what/how skills of wise mind (n = 6 for both).

Associations of Mental Health with Treatment Satisfaction and Internet Intervention Utility (H3)

Pearson's bivariate correlations were run to examine associations between baseline mental health symptomology, treatment perceptions and internet intervention utility at post-test (see Table 2). Two statistically meaningful associations were found: increased baseline depression and anxiety symptomology were both significantly associated with lower internet intervention utility (rs = -0.34 and -0.32, ps < 0.05).

Differences by Level of Risk (H4)

Independent samples T-tests were conducted to examine group differences by level of risk for treatment perceptions and internet usability, and feasibility (attendance rates and retention rates) (see Table 3). Adolescents in the moderate-risk group reported significantly higher ratings of treatment perceptions indicating they were more satisfied with the intervention than those in the high-risk group (t = 2.03, p < 0.05, d = 0.60). No significant differences were seen in internet usability, attendance or retention rates.

Table 2 Pearson's Correlations among key variables of interest

	1	2	3	4	5	6	7	8
Treatment Satisfaction	–							
Internet Usability	0.13	–						
Depression (pre-test)	-0.13	-0.34*	–					
Anxiety (pre-test)	0.01	-0.32*	0.73**	–				
Somatic Symptoms (pre-test)	0.01	-0.26	0.63**	0.68**	–			
Depression (post-test)	-0.17	-0.19	0.61**	0.45**	0.61**	–		
Anxiety (post-test)	-0.16	-0.21	0.48**	0.54**	0.46**	0.79**	–	
Somatic Symptoms (post-test)	0.02	-0.12	0.48**	0.47**	0.67**	0.65**	0.61**	–

p < .05, p < .01**

Table 3 Group differences among key variables of interest

Variable	Overall Sample μ (SD)	Moderate-Risk μ (SD)	High-Risk μ (SD)	T-test Differences (effect size)
Acceptability Items				
Treatment Perceptions	18.53 (3.89)	19.58 (4.04)	17.33 (3.41)	t = 2.03, p < .05*, d = 0.60
Internet Usability	19.42 (8.83)	19.70 (7.47)	19.10 (10.37)	t = 0.21, p = 0.83, ns
Feasibility Items				
Attendance Rates	5.75 (2.31)	6.10 (2.23)	5.35 (2.38)	t = 1.22, p = 0.23, ns
	N (%)	N (%)	N (%)	
Retention Rates	49 (87.5%)	26 (86.7%)	23 (88.5%)	t = 0.20, p = 0.84, ns

Discussion

The current study built on existing literature by providing data on feasibility, treatment satisfaction and utility of an internet intervention for an online MBI during the COVID-19 pandemic with moderate and high-risk adolescents engaged in treatment at a community-based mental health clinic. Previous evidence supports the utility of MBI approaches to alleviate psychological symptoms, improve emotion regulation, self-awareness and coping in youth through teaching of core mindfulness components, such as observing emotions in a nonjudgmental context (Russell et al., 2019; Kabat-Zinn, 2003; Linehan & Wilks, 2015). However, best practices to sustain improvements in symptom reduction remain inconclusive, with treatment engagement as a notable barrier (Greeson et al., 2015). Prior results indicate that MBIs may be an important step to reduce this barrier, with high acceptability by adolescents who report positive attitudes towards group experiences and treatment (Deplus et al., 2016; Zoogman et al., 2015). However, to our knowledge, this is the first study to date to examine the acceptability and feasibility of an online MBI for adolescents.

The current study echoes prior results and extends support for an online MBI with our first and second hypotheses that indicated high feasibility and acceptability via data on attendance and retention rates, treatment satisfaction, and utility of the internet intervention. Following completion of PRISM, participants reported increased comfort with sharing emotional experiences due to receiving feedback and support from other group members, and paying attention to how they felt in the moment by focusing on their five senses to prevent emotion escalation over time. These are indicative of cognitive shifts in awareness and observation of emotions to implement adaptive responses during distress, a core component of mindfulness, suggesting increased mindfulness skills following the intervention that may with time lead to reduced emotional distress (Kabat-Zinn, 2003; Linehan & Wilks, 2015). Future online MBIs should integrate repeated practice of observing emotions during periods of both calm and distress, and cognitive reframing of thoughts

(i.e., "I messed everything up" reframed as "I see what didn't work well and how I can do things differently next time"), as these skills are integral in reducing distress during periods of stress. These skills are particularly important during the ongoing COVID-19 pandemic, which is characterized by long periods of unprecedented stress, particularly for adolescents (Zhou, 2020). For further information on intervention impacts on emotion regulation and mental health outcomes, please refer to (Hutchison et al., under review).

A recent systematic review examining online MBIs for adults reported study completion rates from 27–100%, with only three studies reporting completion rates below 75% (Moulton-Perkins et al., 2020). Comparable retention rates were seen in the current study, with 87.5% of participants completing post-test assessments, 36% of participants completing all eight sessions, and 62.5% of participants completing five or more sessions. Further, a recent meta-analysis found the average rate of attrition was 29% for MBIs, and reached as high as 63% (Nam & Toneatto, 2016). Despite this being a known limitation, the current sample saw low-rates of attrition, with only 12.5% of participants lost to follow-up. These findings are the first to indicate initial feasibility of an online MBI for adolescents. High retention in the current study may be due to facilitator engagement strategies with families of participating adolescents. Specifically, both text message and email reminders were sent to parents the day before and day of sessions. This strategy may be useful for future iterations of online MBIs to sustain improved retention similar to in-person appointments, which often use automated session reminders.

Prior research indicates that adolescents with reduced help-seeking behaviors and the lowest retention presented with more severe psychiatric problems, compared to those with moderate symptom levels who sustain engagement long enough to see beneficial impacts (Aguirre et al., 2020; Roedelof et al., 2013). Our results found similar associations to support our third hypothesis, that increased pre-test depression and anxiety symptomology was significantly associated with reduced utility of the online intervention. Successful interventions need to retain participants throughout their duration to increase the chance of creating

anticipated beneficial impacts. This underscores the importance of identifying which participants may either not be ready to engage in intervention activities or require additional strategies of engagement specific to facilitation modalities. These findings highlight the importance of paying attention to treatment engagement for those deemed at higher-risk, with additional concerns noted during online interventions, particularly the ease of software use and privacy concerns, as individuals may become frustrated with the online format or have concerns about the privacy of their comments with an internet-based group that may impact their engagement and could have been avoiding if the intervention had been facilitated in person. In-person MBIs have demonstrated beneficial impacts and positive attitudes towards treatment for high-risk samples of adolescents presenting with both psychiatric and substance use diagnoses (Biegel et al., 2009; DePlus et al., 2016; Fortuna et al., 2018), suggesting a possible adaptation of online MBIs with high-risk adolescents could incorporate a higher-touch intervention via more frequent sessions and video check-ins. Adolescents in the moderate-risk group, however, may be more likely to prefer online MBIs that meet once a week for skill acquisition to manage symptoms of distress throughout the week, and therefore are more likely to attend, as indicated by higher attendance rates to PRISM in the moderate-risk group.

Examination of group differences by feasibility cutoffs for attendance/dose found that participants above the 5-session cutoff reported significantly reduced use of catastrophizing and increased distress tolerance. This points to the importance of sustained engagement in treatment to bolster adaptive coping strategies compared to those who initially engage and then reduce attendance during treatment. Moulton-Perkins and colleagues (2020) found better outcomes for interventions with at least 8 sessions and smaller group sizes, which echo the current study's design (8-sessions, group size range = 4–8). We saw support of our fourth hypothesis similar to prior reports (Roedelof et al., 2013): those with the lowest engagement in the current study were in the high-risk group, who reported significantly lower rates of treatment satisfaction, and had lower treatment attendance and retention rates than those in the moderate-risk group. This finding points to the continued need for future research to examine how to best sustain engagement for the most at-risk youth, particularly following the COVID-19 pandemic as we continue to integrate online and in-person formats. Specifically, not all modalities (i.e., in-person versus online facilitation) may be well suited to all levels of need in their current frequency of sessions (i.e., once-weekly versus twice-weekly meetings) or focus of taught strategies (i.e., mindfulness strategies of describing emotions versus non-judgmental acceptance of emotions).

Limitations

The first limitation is the loss of 7 (12.5%) participants. The most common reasons for loss to follow-up were involvement in too many services (i.e., intensive in-home services, PRISM), transition to a higher level of care (i.e., hospitalization), and/or termination of mental health treatment services. The COVID-19 pandemic and inability to meet in-person may limit therapeutic relationship building, which could partly explain the lower retention rates for higher risk participants. This echoes prior studies that indicated difficulty with retention to online facilitation due to increased need for group dynamics management, and safety issues to disclose personal experiences and feelings (Spijkerman et al., 2016). Future studies could address this issue by approving direct forms of contact (i.e., phone, email) beyond caregivers to the adolescents themselves to expand opportunities for relationship building. Therapeutic alliance is a salient component of in-person treatment engagement in high-risk adolescents, with early alliance predicting continuation of therapy (Donaldson et al., 2010; Shirk et al., 2008), and could reduce potential barriers impacting engagement strategies, attendance rates and retention in online interventions.

This is the first study to utilize the Treatment Perceptions Questionnaire (TPQ; Marsden et al., 1998) in an adolescent sample during an online intervention. The measure did not reveal any associations with other variables of interest (i.e., anxiety, depression), despite noted associations in the literature (e.g., Olsson et al., 2021). Reasons for this lack of association may be due to the measure performing poorly, with low internal consistency, and may indicate this tool is not a good fit for online group settings as some of the items inquire about staff availability (e.g., "There has always been a member of staff available when I have wanted to talk"). Additionally, it may indicate a need for measure refinement prior to further use among younger populations, perhaps including item-level content, readability review and cognitive assessment testing. Numerous studies debate the widely used cut-offs for Cronbach's alphas and its utility overall (Yang & Green, 2011); thus, reliance on this indicator of the scale's reliability may not be sufficient. Despite acceptability that worked well in adult populations, additional assessments of acceptability would provide needed validity to the TPQ's use in younger populations.

The COVID-19 pandemic required online facilitation for all participants as opposed to intended in-person intervention methods. At this time, it is unclear whether we will be able to generalize help-seeking behavior seen during the COVID-19 pandemic to the future when social distancing has eased, but access to traditional delivery modalities remain limited. Recent evidence suggests that treatment seeking was low during COVID-19, despite indicators of

high mental health symptomology (Tambling, Russell, Tomkunas, Horton, & Hutchison, 2021). Many US state-level governments have approved telepsychotherapy as an option for mental health treatment for the next two years. This provides ample time for additional investigation of the acceptability and feasibility of online MBIs, in addition to the inquiry of differential efficacy of in-person and online MBIs for at-risk adolescents.

Conclusions and Future Directions

The current study found preliminary evidence that adolescents with moderate needs may be more accepting of a once-weekly online format MBI compared to those presenting with higher-risk, who may find an in-person modality or online format with a higher-touch frequency (i.e., twice-weekly) more acceptable. A study conducted during the COVID-19 pandemic (Golberstein et al., 2020) found that mental health care systems that incorporated both in-person and online modalities of care provided greater access to care for patients. Providing both modalities reduced structural (i.e., transportation, wait-times) and personal barriers (i.e., stigma), by increasing access to specific clinical specialties that patients had limited access to via local providers. Further, the flexibility to alternate between in-person and online modalities reduced barriers of patient motivation and increased engagement. Given the known barriers for adolescent engagement in services due to negative beliefs about mental health treatment, waiting times and transportation (Gulliver et al., 2010; Reardon et al., 2017), future studies should examine how flexibly offering both in-person and online formats of varying frequency (i.e., once-weekly versus twice-weekly) could reduce barriers and increase engagement in MBIs, particularly for those deemed high-risk.

The current sample demonstrated different indicators of risk compared to those sampled during the first 6-session pilot study of PRISM (Russell et al., 2019). For example, participants in the first pilot were adolescents (m = 17.3 years) engaged in an abstinence-only recovery high school, and thus had significant substance use histories in addition to presentation of comorbid psychiatric diagnoses. Participants in the current study, however, were younger (m = 14.5 years), and presented with clinically significant psychiatric diagnoses, but minimal to no prior or current substance use. Prior evidence supports the utility of in-person MBIs across adolescents (i.e., 12–18 years old), and those who present with both mental health and substance use diagnoses (Lyvers et al., 2014; Zoogman et al., 2015), suggesting that MBIs may be useful to address challenges across developmental period and diagnosis presentation. However,

future research is necessary to understand how populations of varying developmental periods differentially favor specific components of PRISM, and online MBIs more broadly. Additionally, possible differences by primary diagnoses (i.e., substance use versus mental health) need to be examined to increase our understanding of which MBI components taught create the most significant change for adolescents presenting with varying diagnoses.

Online facilitation of the MBI in the current study reduced both structural and personal barriers; particularly among those who reported during the intervention that their social anxiety would have prevented them from joining an in-person group. This study is the first to provide preliminary feasibility, treatment satisfaction and utility of an online MBI for adolescents presenting with two different risk levels, an important Stage 1 implementation step to establish initial efficacy with the target audience. Future research is necessary to advance the implementation science on this intervention by experimental testing of a randomized control trial of efficacy during Stage II (Lancaster & Thabane, 2019). This next stage of implementation efficacy should focus on the differential impacts on treatment attendance, retention and satisfaction for those presenting with more severe psychiatric diagnoses and treatment histories, as those adolescents had the lowest engagement and acceptability rates. Higher levels of needs may warrant a combination of more frequent contact (e.g., twice weekly) and a more direct, in-person approach than an online delivery mode (e.g., hybrid or flexible options that blend virtual and in vivo contact with service providers). Further investigation of the impacts of an adjunctive MBI for adolescents on treatment attendance and mental health outcomes over longer periods of time is necessary to understand patterns in effective adolescent mental health treatment options.

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

References

Aguirre, A. V., Cruz, I. S. S., Billings, J., Jimenez, M., & Rowe, S. (2020). What are the barriers, facilitators and interventions targeting help-seeking behaviours for common mental health problems in adolescents? A systematic review. *BMC Psychiatry, 20*, 293–315.

Biegel, G. M., Brown, K. W., Shapiro, S. L., & Schubert, C. M. (2009). Mindfulness-based stress reduction for the treatment of adolescent psychiatric outpatients: A randomized clinical trial. *Journal of Consulting and Clinical Psychology, 77*, 855–866. https://doi.org/10.1037/a0016241

Carmody, J., & Baer, R. A. (2008). Relationships between mindfulness practice and levels of mindfulness, medical and psychological symptoms and well-being in a Mindfulness-Based Stress Reduction program. *Journal of Behavioral Medicine, 31*, 23–33.

Chakrabarti, S. (2015). Usefulness of telepsychiatry: A critical evaluation of videoconferencing-based approaches. *World Journal of Psychiatry, 5*, 286–304. https://doi.org/10.5498/wjp.v5.i3.286

Chervonsky, E., & Hunt, E. (2019). Emotion regulation, mental health and social wellbeing in a young adolescent sample: A concurrent and longitudinal investigation. *Emotion, 19*, 270–282.

Daughters, S. B., Lejuez, C., Kahler, C. W., Strong, D. R., & Brown, R. A. (2005). Psychological distress tolerance and duration of most recent abstinence attempt among residential treatment-seeking substance abusers. *Psychology of Addictive Behaviors, 19*, 208.

Daughters, S. B., Gorka, S. M., Rutherford, H. J., & Mayes, L. C. (2014). Maternal and adolescent distress tolerance: the moderating role of gender. *Emotion (Washington, D.C.)*, *14*(2), 416–424. https://doi.org/10.1037/a0034991

Deplus, S., Billieux, J., Scharff, C., & Philippot, P. (2016). A mindfulness-based group intervention for enhancing self-regulation of emotion in late childhood and adolescence: A pilot study. *International Journal of Mental Health and Addiction, 14*, 775–790.

Donaldson, D., Spirito, A., & Boergers, J. (2010). Treatment Engagement with Adolescent Suicide Attempters. American Psychological Association.

Eaton, W. W., Muntaner, C., Smith, C., Tien, A., & Ybarra, M. (2004). Center for Epidemiologic Studies Depression Scale: Review and revision (CESD and CESD-R). In M. E. Maruish (Ed.), *The Use of Psychological Testing for Treatment Planning and Outcomes Assessment* (3rd ed., pp. 363–377). Lawrence Erlbaum.

Ellis, W. E., Dumas, T. M., & Forbes, L. M. (2020). Physically isolated but socially connected: Psychological adjustment and stress among adolescents during the initial COVID-19 crisis. *Canadian Journal of Behavioural Science, 52*, 177–187. https://doi.org/10.1037/cbs0000215

Fortuna, L. R., Porche, M. V., & Padilla, A. (2018). A treatment development study of a cognitive and mindfulness-based therapy for adolescents with co-occurring post-traumatic stress and substance use disorder. *Psychology and Psychotherapy: Theory, Research and Practice, 91*, 42–62.

Functional Family Therapy. (n.d.). Retrieved from: https://www.fftllc.com/about-fft-training/clinical-model.html

Garnefski, N., & Kraaij, V. (2006). Relationships between cognitive emotion regulation strategies and depressive symptoms: A comparative study of five specific samples. *Personality and Individual Differences, 40*, 1659–1669.

Garnefski, N., van Rood, Y., de Roos, C., & Kraaij, V. (2017). Relationships between traumatic life events, cognitive emotion regulation strategies, and somatic complaints. *Journal of Clinical Psychology in Medical Settings, 24*, 144–151. https://doi.org/10.1007/s10880-017-9494-y

Golberstein, E., Wen, H., & Miller, B. F. (2020). Coronavirus disease 2019 (COVID-19) and mental health for children and adolescents. *Journal of the American Medical Association Pediatrics*. Advance online publication. https://doi.org/10.1001/jamapediatrics.2020.1456

Greeson, J. M., Smoski, M. J., Suarez, E. C., Brantley, J. G., Ekbald, A. G., … & Wolever, R. Q. (2015). Decreased symptoms of depression after Mindfulness-Based Stress Reduction: Potential moderating effects of religiosity, spirituality, trait mindfulness, sex, and age. *Journal of Alternative and Complementary Medicine, 21*, 166-174.

Gross, J. J., & Thompson, R. A. (2010). Emotion regulation: Conceptual foundations. In J. J. Gross (Ed.), *Handbook of emotion regulation* (pp. 135–158). Guilford Press.

Guessoum, S. B., Lachal, J., Radjack, R., Carretier, E., Minassian, S., Benoit, L., & Moro, M. R. (2020). Adolescent psychiatric disorders during the COVID-19 pandemic and lockdown. *Psychiatry Research, 291*, 113264. https://doi.org/10.1016/j.psychres.2020.113264

Gulliver, A., Griffiths, K., & Christensen, H. (2010). Perceived barriers and facilitators to mental health help-seeking in young people: A systematic review. *BMC Psychiatry, 12*, 81.

Hawke, L. D., Hayes, E., Darnay, K., & Henderson, J. (2021). Mental health among transgender and gender diverse youth: An exploration of effects during the COVID-19 pandemic. Psychology of Sexual Orientation and Gender Diversity. Advance online publication.

Hutchison, M., Russell, B. S., Starkweather, A. R., & Gans, K. M. (under review, 2022). Outcomes From a Pilot Mindfulness Based Intervention: A Comparison by Categories of Risk.

Intensive In-Home Services (IICAPS). (n.d.). Retrieved from: https://www.bgvillage.org/programs/behavioral-health/intensive-in-home-services-iicaps

Jefferies, E. R., McLeish, A. C., Kraemer, K. M., Avellone, K. M., & Fleming, J. B. (2015). The role of distress tolerance in the use of specific emotion regulation strategies. *Behavior Modification, 40*, 439–451.

Jung, S. J., & Jun, J. Y. (2020). Mental health and psychological intervention amid COVID-19 outbreak: Perspectives from South Korea. *Yonsei Medical Journal, 61*, 271–272.

Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology, 10*, 144–156.

Lancaster, G. A., & Thabane, L. (2019). Guidelines for reporting non-randomised pilot and feasibility studies. *Pilot and Feasibility Studies, 5*, 114. https://doi.org/10.1186/s40814-019-0499-1

Lazarus, R. S., & Folkman, S. (1987). Transactional theory and research on emotions and coping. *European Journal of Personality, 1*, 141–169.

Linehan, M. M., & Wilks, C. R. (2015). The course and evolution of dialectical behavior therapy. *American Journal of Psychotherapy, 69*, 97–110.

Lyvers, M., Makin, C., Toms, E., Thorberg, F. A., & Samios, C. (2014). Trait mindfulness in relation to emotional self-regulation and executive function. *Mindfulness, 5*, 619–625.

Marsden, J., Bacchus, L., Stewart, D., Griffiths, P., Clarke, K., Gossop, M. & Strang, J. (1998) The Treatment Perceptions Questionnaire (TPQ): A brief questionnaire for assessing service satisfaction (unpublished manuscript). London: National Addiction Centre. Available: http://www.emcdda.europa.eu/html.cfm/index4322EN.html

Moulton-Perkins, A., Moulton, D., Cavanagh, K., Jozavi, A., & Strauss, C. (2020). Systematic Review of Mindfulness-Based Cognitive Therapy and Mindfulness-Based Stress Reduction via Group Videoconferencing: Feasibility, Acceptability, Safety, and Efficacy.

Journal of Psychotherapy Integration. Advance online publication. https://doi.org/10.1037/int0000216

Nam, S., & Toneatto, T. (2016). The influence of attrition in evaluating the efficacy and effectiveness of mindfulness-based interventions. *International Journal of Mental Health Addiction, 14*, 969–981. https://doi.org/10.1007/s11469-016-9667-1

Nock, M. K., & Mendes, W. B. (2008). Physiological arousal, distress tolerance, and social problem-solving deficits among adolescent self-injurers. *Journal of Consulting and Clinical Psychology, 76*, 28.

O'Neill Rodriguez, K. A., & Kendall, P. C. (2014). Suicidal ideation in anxiety-disordered youth: Identifying predictors of risk. *Journal of Clinical Child and Adolescent Psychology, 43*, 51–62.

Olsson, N. C., Juth, P., Ragnarsson, E. H., Lundgren, T., Jansson-Frojmark, M., & Parling, T. (2021). Treatment satisfaction with cognitive-behavioral therapy among children and adolescents with anxiety and depression: A systematic review and meta-synthesis. *Journal of Behavioral and Cognitive Therapy, 31*, 147–191.

Onyeaka, H. K., Zahid, S., & Patel, R. S. (2020). The unaddressed behavioral health aspect during the coronavirus pandemic. *Cureus, 12*, e7351. https://doi.org/10.7759/cureus.7351

Reardon, T., Havery, K., Baranowska, M., O'Brien, D., Smith, L., & Creswell, C. (2017). What do parents perceive are the barriers and facilitators to accessing psychological treatment for mental health problems in children and adolescents? A systematic review of qualitative and quantitative studies. *European Child and Adolescent Psychiatry, 26*, 623–647.

Ritterband, L. M., Ardalan, K., Thorndike, F. P., Magee, J. C., Saylor, D. K., Cox, D. J., Sutphen, J. L., & Borowitz, S. M. (2008). Real world use of an Internet intervention for pediatric encopresis. *Journal of Medical Internet Research, 10*, e16.

Roedelof, A. J. M., Bongers, I. L., & van Nieuwenhuizen, C. (2013). Treatment engagement in adolescents with severe psychiatric problems: A latent class analysis. *European Child and Adolescent Psychiatry, 22*, 491–500. https://doi.org/10.1007/s00787-013-0385-y

Russell, B. S., Hutchison, M., & Fusco, A. (2019). Emotion regulation outcomes and preliminary feasibility evidence from a mindfulness intervention for adolescent substance use. *Journal of Child and Adolescent Substance Abuse, 28,* 21–31. https://doi.org/10.1080/1067828X.2018.1561577

Russell, B. S., & Park, C. (2018). The role of emotion regulation in chronic pain self-management. *Topics in Pain Management: Current Concepts and Treatment Strategies, 33,* 1–10.

Tambling, R., Russell, B. S., Tomkunas, A. J., Horton, A. L., & Hutchison, M. (2021). Factors contributing to parents' psychological and medical help seeking during the COVID-19 global pandemic. *Family & Community Health, 44,* 87–98.

Shirk, S. R., Gudmundsen, G., Kaplinski, H. C., & McMakin, D. L. (2008). Alliance and outcome in cognitive-behavioral therapy for adolescent depression. *Journal of Clinical Child and Adolescent*

Psychology, 37, 631–639. https://doi.org/10.1080/15374410802148061

Simons, J. S., & Gaher, R. M. (2005). The distress tolerance scale: Development and validation of a self- report measure. *Motivation and Emotion, 29*, 83–102.

Spijkerman, M. P., Pots, W. T. M., & Bohlmeijer, E. T. (2016). Effectiveness of online mindfulnessbased interventions in improving mental health: A review and meta-analysis of randomised controlled trials. *Clinical Psychology Review, 45*, 102–114.

Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Lowe, B. (2006). A brief measure for assessing generalized anxiety disorder. *Archives Internal Medicine, 166*, 1092–1097.

Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality (2020). *Results from the 2019 National Survey on Drug Use and Health: Detailed Tables.* Retrieved from https://www.samhsa.gov/data/nsduh/reports-detailed-tables-2019-NSDUH

Suhr, M., Risch, A. K., & Wilz, G. (2017). Maintaining mental health through positive writing: Effects of a resource diary on depression and emotion regulation. *Journal of Clinical Psychology, 73*, 1586–1598.

Sustrans. (2012). *Locked out: Transport poverty in England.* Retrieved from https://bit.ly/2SHC6wg

Westin, A. M., Barksdale, C. L., & Stephan, S. H. (2014). The effect of waiting time on youth engagement to evidence based treatments. *Community Mental Health Journal, 50*, 221–228.

Williams, J. M. (2010). Mindfulness and psychological process. *Emotion, 10*(1), 1–7. https://doi.org/10.1037/a0018360

Wind, T. R., Rijkeboer, M., Andersson, G., & Riper, H. (2020). The COVID-19 pandemic: the 'black swan' for mental health care and a turning point for e-health. *Internet Interview, 20*, 100317.

Yang, Y., & Green, S. B. (2011). Coefficient Alpha: A reliability coefficient for the 21st Century? *Journal of Psychoeducation and Assessessment, 29*, 377–392.

Zhou, X. (2020). Managing psychological distress in children and adolescents following the COVID-19 epidemic: A cooperative approach. *Psychological Trauma: Theory, Research, Practice and Policy, 12*, S76–S78. https://doi.org/10.1037/tra0000754

Zhou, X., Snoswell, C. L., Harding, L. E., Bambling, M., Edirippulige, S., Bai, X., & Smith, A. C. (2020). The role of telehealth in reducing the mental health burden from COVID-19. *Telemedicine Journal and e-Health*. Advance online publication. https://doi.org/10.1089/tmj.2020.0068

Zoogman, S., Goldberg, S. B., Hoyt, W. T., & Miller, L. (2015). Mindfulness interventions with youth: A meta-analysis. *Mindfulness, 6*, 290–302.