An Open Trial of the Effectiveness, Program Usage, and User Experience of Internet-based Cognitive Behavioural Therapy for Mixed Anxiety and Depression for Healthcare Workers on Disability Leave

Andrew Miki, PhD, Mark A. Lau, PhD, and Hoora Moradian, PhD

Objective: An open trial of an internet-based Cognitive Behavioural Therapy (iCBT) program for healthcare workers was conducted.

Methods: Healthcare workers on disability leave who used the iCBT program were assessed on: self-reported depression and anxiety symptoms using the Depression Anxiety Stress Scales-21; and, program usage. Healthcare workers’ experience of using iCBT was evaluated in a separate survey.

Results: Of the 497 healthcare workers referred to the iCBT program, 51% logged in, 25% logged in more than once, and 12% logged in more than once and completed at least two assessments. For the latter group, self-reported depression and anxiety symptoms significantly decreased from the first assessment. Conclusions: This iCBT program was perceived to be of benefit to healthcare workers, with program usage and effectiveness that was similar to what has been previously reported for unguided iCBT.

Keywords: anxiety, cognitive behavioural therapy, depression, healthcare workers, internet-delivered, open trial

Healthcare workers, that is, physicians, nurses, and support workers, of which there are approximately 59 million worldwide, face a multitude of stressors including heavy workloads, high and prolonged stress levels, lack of resources, sleep deprivation due to night shift work, violent situations and time pressure, to name a few. In 2007, a greater percentage of Canadian healthcare workers reported high stress (45%) than other workers (31%), which was before COVID-19 became an additional stressor that had a significant negative impact on healthcare workers’ stress and mental health. Moreover, work-related stress is linked to a wide range of mental health conditions for many healthcare workers. According to Kim et al, epidemiological studies of healthcare workers from different nations demonstrated that depression and anxiety symptom prevalence ranged from 10% to 28% and from 14% to 25%, respectively, and that 30% to 40% of healthcare workers suffer from burnout.

Importantly, mental health disorders significantly impact one’s ability to work. In Canada, mental illness related lost productivity, along with associated healthcare costs and reduced health-related quality of life, contribute to an estimated economic burden of $51 billion a year. In any given week, 500,000 Canadian workers are absent from work due to mental illness, of which 375,000 are on disability leave. In a Public Health Agency of Canada Report, 35% of workers with depression reported significant past interruptions to employment. Overall, an estimated one-third of Canadian disability claims are due to mental illness. Importantly, a mental health related disability leave costs twice that of a physical health related disability leave.

Despite recognition that healthcare workers’ mental health is a concern, and effective treatments for depression and anxiety, such as Cognitive Behavioural Therapy (CBT), do exist, there is little evidence about how to effectively deliver these treatments to workers. For example, one survey revealed that about one-half of Canadian workers with moderate to severe depression did not receive treatment. Impediments to accessing effective psychosocial services can include, for example, financial constraints, confidentiality concerns, predilection towards informal support, nescience of efficacy, stigma, geographical/transportation barriers, prohibitive waitlists, mental health professional shortages, lack of childcare, or scheduling that impedes face-to-face appointments.

Several of these access barriers may be addressed by unguided internet-based CBT (iCBT) interventions. First, they have been shown to be efficacious and cost-effective for depression and anxiety in randomized controlled trials (RCTs). Second, unguided iCBT interventions, immediately accessible with a computer/smartphone from anywhere, can be undertaken when patients are most readily available and motivated to engage with the program. Third, they can be offered anonymously, often at a reduced cost, and can be accessed by a potentially greater number of individuals in need, as compared with face-to-face treatment or guided iCBT interventions, especially when the human resources necessary to support these latter interventions are limited. Thus, iCBT can be pivotal in increasing accessibility to...
CBT, particularly when rapid deployment to meet a broad population’s increased mental health needs is required, for example, in response to the COVID-19 pandemic.

Despite the evidence supporting the efficacy of unguided iCBT interventions, their evaluation outside of non-specialized settings is scarce. Effectiveness studies conducted outside of controlled settings may result in different outcomes than those reported in RCTs. Users outside of RCTs may be less motivated to engage with, or to complete, interventions; would not benefit from assessment effects or additional face-to-face contact; and, may have more complex issues. These potential differences in the use of unguided iCBT (i.e., reduced compliance, more complex/severe presentations) in real-world settings may lead to differences in effectiveness when compared with RCT outcomes.

In 2020, the effectiveness of Return to Health (RTH), an unguided iCBT intervention that had provided mental health support to healthcare workers on disability leave since 2019, had yet to be evaluated. Moreover, there was no evidence of the effectiveness of unguided iCBT when delivered to healthcare workers, that we were aware of.

An open trial of RTH’s effectiveness for healthcare workers in a regional health authority in British Columbia, Canada was conducted. The aims of the study were to: evaluate the effectiveness of the RTH program on self-reported depression and anxiety symptoms; characterize program usage; and, survey healthcare workers’ perceptions of any benefits they derived from the RTH program. We hypothesized that RTH would reduce depression and anxiety symptoms.

**METHODS**

Data analysis was carried out between October 1 and November 30, 2020. All users provided electronic informed consent that their anonymized data could be used in routine evaluations for service monitoring and improvement. This study was classified as not requiring research review by the Research Ethics Board, Office of Research Services, University of British Columbia as it involved secondary use of deidentified quality improvement data.

**Participants**

Participants were Fraser Health Authority (FHA) healthcare workers on disability leave for mental health reasons. Potential participants were identified by a Disability Manager after an unstructured interview, which included screening in order to exclude those with more severe mental health presentations for whom a low intensity unsupported psychological intervention would not be appropriate. Healthcare workers who self-reported acute symptoms of Post Traumatic Stress Disorder, psychosis, or active suicidality were excluded from participating in the RTH program. Following the interview, the Disability Manager recommended the most appropriate resources to support the healthcare worker; RTH was one of those resources. If the healthcare worker asked for more information about RTH, the Disability Manager sent them a brochure that provided more detail. For healthcare workers who expressed interest in using the RTH program, the Disability Manager arranged for program login information to be sent to the healthcare worker via an automated email from the RTH program.

**RTH Program**

The RTH program, a web-based 40-module program, was developed by Starling Minds (SM) to teach CBT skills to treat mild to moderate depression and anxiety symptoms, to better manage stress, and to facilitate a return to work. Modules, consisting of text, video, and interactive tools, took approximately 10 to 20 minutes to complete. Modules covered fundamental CBT topics including psychoeducation on depression, anxiety, and stress; goal setting; relaxation; mood tracking; cognitive restructuring; and, relapse prevention, as well as topics specific to healthcare workers on disability leave (developing a return to work plan; an animated case study video). In April, 2020, five COVID specific modules were added to RTH that incorporated many of the aforementioned CBT topics as applied specifically to COVID, such as anxiety and related mental health symptoms. Modules also provided interactive tools including symptom assessments, a therapy workbook to record new learnings, mood tracking, goal setting, and cognitive restructuring (thought balancer). Two additional unique interactive tools to facilitate community engagement were polls and a community forum. Polls, displayed in each module, included one to four multiple choice questions to enhance healthcare workers’ engagement with the program and to test their knowledge of what they had learned. For example, the healthcare worker would be asked a question about a relevant concept presented in a video. Upon submission of a response, the healthcare worker was provided with the distribution of their fellow healthcare workers’ responses to the question and an explanation to deepen their understanding of the concept provided. The community forum provided healthcare workers with the opportunity to: post responses to questions about their experiences of the program; reflect on what they had learned; read others’ entries to normalize their experiences; and, post supportive and encouraging comments to other healthcare workers. For example, when asked if and how the RTH program had helped, the healthcare workers could respond to the question, as well as provide support in response to other healthcare workers’ comments. The community forum was presented at the end of each module. Participation in the community forum was completely voluntary and anonymous, as only their unique Starling ID was displayed. A team of Starling community forum managers and Starling’s unique algorithms monitored adherence to community forum rules and code of conduct, as well as any comments that might indicate an increased risk of suicide. Any comments that identified a critical incident, such as elevated suicide risk, were forwarded to a licensed clinical psychologist who responded directly to the user, via email, with a personalized response and list of resources and recommendations.

To approximate face-to-face sessions, whereby the patient presents with what is needed and the clinician/program provides/responds in kind with complementary support or resources, there were no requirements to complete a module before proceeding, or to complete one module component before moving on to the next, with users choosing which of the modules they engaged with and when.

**Measures**

Demographics collected were sex and age. Program usage variables were the Number of Modules Completed, Intervention (first login to last login) duration in days, Total Interaction Count, and number of Logins, with Total Interaction Count comprising any interaction with the system (clicks, a login event, workbook entries, liking a comment, viewing a video, creating a goal, etc). The latter variable was further broken down into number of: Videos Played; Polls Answered; Comments (ie, comments created/liked/updated/replied); Thought Balancing Created; Goal Setting Created; and, Mood Tracking Created. It should be noted that although the number of Modules Completed was a dependent variable, the order of engagement with modules, and module components, was participant-guided rather than sequential.

Self-reported depression and anxiety symptoms were measured with the Depression Anxiety Stress Scales (DASS), 21-item version. To permit comparison with DASS normative data, raw subscale scores were multiplied by 2. The depression (range 0 to 42) and anxiety (range 0 to 42), but not the stress, 7-item subscales were administered in this study. Severity ratings for depression are mild (10), moderate (14), severe (21), and extremely severe (28) and for anxiety are mild (8), moderate (10), severe (15), and extremely...
severe (20).45 The DASS is a valid measure of depression and anxiety.46

Healthcare worker functioning was evaluated by a Functioning Questionnaire created specifically for this study that assessed functioning across six dimensions: (1) Work or Study; (2) Hobbies or Recreation; (3) Household or Finances; (4) Relationships; (5) Regular Daily Activities; and (6) Personal Grooming. The response choices for all questions were on a five-point scale, rating the level of difficulty encountered over the past week: (0) none; (1) slight difficulty; (2) persistent difficulty; (3) moderate difficulty; and (4) serious difficulty, with dimension specific examples provided for each. Details of the questions asked and the dimension specific examples can be found in Supplemental Material, http://links.lww.com/JOM/A915. The internal consistency of the items was good (Chronbach α 0.83).

An Experience Survey was developed by the FHA and SM teams to assess users’ perceptions of the benefits derived from the RTH program. The experience survey included 31 statements about: (1) mental health and the learnings available in the SM system (n = 7); (2) healthcare worker perceptions of support they were receiving from FHA or their Disability Manager with respect to their health and well-being (n = 6); (3) how SM services may have helped workers in their therapy and with their return to work efforts (n = 5); (4) awareness, and the perceived usefulness, of four tools and strategies introduced, discussed, and practiced in the SM system (n = 8); and (5) their experiences using the RTH program (n = 5). The response choices for all statements were on a five-point scale: (1) strongly disagree; (2) disagree; (3) neutral; (4) agree; and, (5) strongly agree. For this study, the responses to statements about the perception of support workers were receiving from FHA or their Disability Manager were not specific to workers’ use of SM and not a focus of the present study so these results are not presented. The responses to statements about how SM services may have helped workers with their return to work efforts were not presented as their work status was not assessed. The internal consistency of the 20 remaining statements was good (Chronbach α 0.89).

Procedure

Upon first logging into the RTH program, users were invited, but not obligated, to provide demographic information. At module 4, or through any of the toolkits, which could be accessed at any time in the program, healthcare workers were invited, but not obligated, to complete the DASS and the Functioning Questionnaire for the first time. Upon completion of modules 15, 25, and/or 35, or through inviting them to complete the survey.

The Experience Survey was emailed on August 24, 2020 to healthcare workers who enrolled in RTH from July, 2019 to September, 2020. Healthcare workers included those from nursing (21.3%), community care facilities (6.3%), facilities management (4.5%), housekeeping management (4.5%), paramedical (4.0%), medical staff (physicians, dentists, midwives, nurse practitioners) (3.3%), and management/management support (1.8%), with the remainder not disclosing (58.8%). Healthcare workers who enrolled in RTH (n = 255) had an average age of 46.05 years. On average, this group completed 6.90 modules during 7.4 logins, with 161 overall interactions including, for example, watching 6.8 videos, answering 50 polls, and posting 6 comments in the community forum, in the 26 days between their first and last login (Table 1). Chi square analyses revealed that significantly more females (90.98%) than males (5.49%) (X²[1, N = 255] = 169.66; P < 0.001) logged into the RTH program (Table 1).

Statistical Analyses

Data were analyzed using R version 3.6.3 software.47 R packages used other than R’s base stats package48 were data.table (v.1.12.8),49 plyr (v.1.8.6),50 dplyr,50 effsize (v.0.8.0),51 psych (v.2.0.9),52 MANOVARM (v.0.3.4),53 and rcompanion (v.2.3.5).54 Chi square tests examined any sex distribution differences across groups. Means and standard deviations were calculated for participant age, program usage data, DASS depression and anxiety subscale scores, the Functioning Questionnaire six dimensions, and the Experiences Survey responses. One-way analysis of variance (ANOVA) was conducted to test the difference in mean program usage level across the three groups (Non-starters; Non-completers; and, Completers), as well as to test for any differences in mean responses on the Experiences Survey, with Tukey’s method as a post hoc test for multiple comparisons. In cases where the sample size was too small in the “Non-starters” group, independent samples t tests were conducted between “Non-completers” and “Completers” groups.

Improvement was defined as a reduction in depression/anxiety symptoms and a reduction in the Functioning Questionnaire dimensions scores, calculated using the difference between first and last assessment scores for each individual, and the effect size of the difference. Repeated measures multivariate analysis of variance (MANOVA) was conducted to account for the effect of intervention time (last vs first assessment) on depression/anxiety symptoms and Functioning Questionnaire dimensions. The Wald-type statistic was used, which is interpreted as a traditional F-statistic. Paired sample t tests were used to calculate a last versus first assessment mean difference and 95% confidence interval. Within-subject Cohen d was calculated by dividing mean difference scores by a measure of pooled sample standard deviation, which was corrected for the correlation between repeated measures. Effect sizes of 0.2, 0.5, and 0.8 were considered small, medium, and large effect sizes respectively.55

Recovery was defined by adapting the criteria from the United Kingdom (UK) National Health Services program, Improving Access to Psychological Therapies (IAPT).56,57 Participants were considered clinically depressed if they had a DASS depression scale score of 10 or higher, and were considered to have anxiety if their DASS anxiety subscale score was 10 or higher.55 Participants diagnosed at assessment with clinical depression, anxiety, or both were considered recovered at completion of the program if they scored below the clinical cut-off on both the depression and anxiety subscales. Recovery was presented as a percentage of patients who scored in the clinical range at assessment and then scored in the subclinical range at completion.

RESULTS

Participant Characteristics

FHA Disability Managers referred 497 healthcare workers to RTH from July, 2019 to September, 2020. Healthcare workers included those from nursing (21.3%), community care facilities (6.3%), facilities management (4.5%), housekeeping management (4.5%), paramedical (4.0%), medical staff (physicians, dentists, midwives, nurse practitioners) (3.3%), and management/management support (1.8%), with the remainder not disclosing (58.8%). Healthcare workers who enrolled in RTH (n = 255) had an average age of 46.05 years. On average, this group completed 6.90 modules during 7.4 logins, with 161 overall interactions including, for example, watching 6.8 videos, answering 50 polls, and posting 6 comments in the community forum, in the 26 days between their first and last login (Table 1). Chi square analyses revealed that significantly more females (90.98%) than males (5.49%) (X²[1, N = 255] = 169.66; P < 0.001) logged into the RTH program (Table 1).

Program Usage Groups

Three subgroups of healthcare workers who logged into the RTH program were defined based on their program usage level and whether a change in symptom scores over time could be determined. “Non-starters” (n = 72; 14%) were users who logged in to the RTH program only once. “Non-completers” (n = 124; 25%) were users who logged in to the RTH program more than once but did not complete two DASS assessments. “Completers” (n = 59; 12%) were users who logged in to the RTH program more than once and completed at least two DASS assessments (Fig. 1).
ANOVA results for age, dropping the 3.53% missing values, showed there were significant differences between usage subgroups at an alpha of 0.05 (Table 1). Post hoc analyses demonstrated that users in the “Non-starters” group were significantly younger than those in the “Completers” group (F (2,244) = 4.452, p = 0.0126). Chi square analyses revealed that there were significant differences between the “Non-completers” versus “Non-starters” groups for number of: Videos Played; Thought Balancing Created; Goal Setting Created; and, Mood Tracking Created (Table 1).

**First Assessment DASS and Functioning Questionnaire Scores**

One hundred and fifty users completed a first DASS/Functioning Questionnaire assessment within a median of 2.2 days from their first login. They reported moderate levels of depression and anxiety symptoms. There were no significant differences between the “Non-completers” versus “Non-starters” groups for number of: Videos Played; Thought Balancing Created; Goal Setting Created; and, Mood Tracking Created (Table 1).

**DASS and Functioning Questionnaire Outcomes**

Fifty-nine users completed at least two DASS/Functioning Questionnaire assessments with a median time of 27.0 days between completing the first versus last assessment. A repeated measures MANOVA on DASS subscale scores and the six Functioning Questionnaire dimension scores at an alpha of 0.05 (Table 1).
Post hoc analyses of the DASS subscale scores demonstrated that there were significant improvements in both depression and anxiety symptoms (Table 2). Both paired mean differences were found to be clinically important with within-subject Cohen $d$ in the medium range. When these outcomes were stratified by baseline severity, effectiveness was shown to be more prominent in healthcare workers with more severe initial symptoms (Fig. 2). For DASS depression symptoms, mean score reduction ranged from 3.14 ($d = 1.04$) in the mild depression group to 12.4 ($d = 1.39$) in the extremely severe depression group. For DASS anxiety symptoms,
mean score reduction ranged from 0.86 ($d = 0.18$) in the mild anxiety group to 11.2 ($d = 0.89$) in the extremely severe anxiety group. However, as baseline severity increased, the variability in effectiveness increased as well.

Post hoc analyses of the Functioning Questionnaire dimension scores demonstrated significant improvements in four of the six dimensions including Regular Daily Activities, Personal Grooming, Hobbies or Recreation, and Relationships (all $P$’s < 0.05), with a trend towards improvement for a 5th dimension, that is, Household or Finances ($P = 0.0799$) (Table 2).

Finally, of 52 participants who were initially depressed, anxious or both, 14 no longer showed clinical symptoms after the program, meaning an IAPT recovery rate of 27%.

Experience Survey

An email was sent on August 24, 2020 to 468 FHA healthcare workers, who had been provided RTH login information as of this date, inviting them to complete the Experience Survey. A total of 30 experience surveys (6.4%) were returned with 10 providing complete data. The remaining 20 surveys were incomplete; five users...
completed 90% to 96% of the survey; two users completed 80% of the survey, two users completed 48% of the survey; and, one completed 28% of the survey. The remaining 10 responses all had less than 5% of the questions answered in the survey (Fig. 3).

Mean response scores for the 20 statements analyzed for this study ranged from Neutral ($M = 3.0$; $SD = 1.10$) to Agree ($M = 4.32$; $SD = 0.58$). ANOVA results revealed that there were significant differences between the mean statement response scores.
(F[19,332] = 4.085, P < 0.001). Post hoc analyses revealed that there were three statements, each with significantly higher mean responses than at least four, but as many as six, other statements: the mean responses for Statement No. 4 (“After using the Starling Minds services, I learned anyone can develop mental health issues”), Statement No. 8 (“Mindfulness—Am aware of this tool/strategy”) and Statement No. 9 (“Strategic Breathing—Am aware of this tool/strategy”) were all significantly greater than Statement No. 14 (“Mood Tracking—I found this tool/strategy useful”), Statement No. 17 (“The Starling community of healthcare workers helped me feel connected with colleagues and feel less alone”), Statement No. 19 (“I got more out of my therapy sessions because of what I learned in Starling”), and Statement No. 20 (“If I were to struggle again in the future, Starling is a resource I would use”); Statements Nos. 4 and 9 had significantly higher mean responses than Statement No. 18 (“The Starling program helped to normalize my experiences”); and, Statement No. 4 had a significantly higher mean response than Statement No. 7 (“After using the Starling Minds services, I learned how to use tools that help me manage my mental health”).

DISCUSSION

Healthcare workers who completed at least two assessments and engaged with the RTH program significantly more than “Non-starters” and “Non-completers,” demonstrated significant improvements in the primary mental health outcomes of depression and anxiety with a recovery rate of 27%, and in the secondary outcome of four-out of six self-reported Functioning Questionnaire dimensions. The medium pre-post effect sizes for depression and anxiety reported in this study for the unguided iCBT RTH program were comparable to the noncontrolled medium effect sizes for depression symptoms reported in other studies of unguided iCBT including a systematic review69 and a community-based study of MoodGYM.58 Not unexpectedly, the current study’s effect sizes were smaller than the large effect sizes typically reported for guided iCBT programs.18,59 In addition, the RTH program recovery rate was lower than for larger surveys of telephone supported low intensity CBT in British Columbia, Canada (69%), and the UK (46–46%).56,57,60 While guided versus unguided low intensity interventions are typically more effective,26,38 they are often more costly to deliver. Furthermore, Klein et al61 reported that only a very small minority of participants preferred therapist-assisted versus self-guided iCBT. Importantly, iCBT has been shown to be of comparable effectiveness to face-to-face interventions in the workplace although it is important to note that the iCBT included in this meta-analysis had significant interactive components, such as email communication and telephone consultation.82 Nevertheless, the increased scalability of, and client preference for, unguided iCBT interventions (eg, for those with access to the necessary technology and who do not experience any language barriers) may facilitate increased treatment access at a reduced cost, particularly in contexts with limited human resources to support users in guided iCBT. Further cost-effectiveness evaluation of the unguided RTH program may clarify these potential benefits.

Of the majority (51%) of healthcare workers referred to RTH who logged in, 72% of this group logged in to the program more than once, with a median of 27 days between the first and last login. The completion rate of 12% is greater than that reported for community users of an unguided iCBT program, where 5.5% of participants completed a non-compulsory final assessment.86 However, the current completion rate is less than the 26% completion rate reported in a systematic review of unguided iCBT.38 Participant attrition from referral to completion for RTH differed somewhat from larger Canadian and UK surveys of telephone supported low intensity CBT.57,60 In these two reports, roughly one-third of participants were lost between referral and a first contact, and approximately 20% were lost between the first contact and more significant engagement with the program, with approximately one-third of participants completing the program. In the current study, a similar percentage (18%) of RTH program participants continued engagement after the first contact when compared with the two guided programs. However, there was greater attrition from referral to first contact (49% vs. ~33%), and a lower completion rate (12% vs. ~33%) as compared with the two guided programs. One possibility is that there were differences between the populations referred to these two programs with respect to their needs or what they were seeking from the programs.

The categorization of three subgroups of “Non-starters,” “Non-completers,” and “Completers” was supported by the demonstration of significantly greater program usage by “Completers” across all usage categories and for the “Non-completers” compared with the “Non-starters” groups for Total Interaction Count as well as number of: Modules Completed; Logins; Polls Answered; and, Comments. Interestingly, “Completers” completed on average 18 modules which is greater than the number of sessions in other well-known iCBT interventions.13 Of note, is that “Non-completers” completed on average 4.8 modules, which still represents a significant engagement with RTH. Furthermore, the mean of 35 days for “Non-completers” and almost 75 days for “Completers” compares favorably with the median retention rates at 15-days (3.9%) and 30-days (3.3%) in a recent review of mental health apps.41 While acknowledging that behavioral measures tend to capture product rather than process,65 the combined RTH usage metrics suggest frequent, sustained use of RTH by “Completers.”

One possible interpretation of the usage groupings is that some healthcare workers were: (1) curious about the program but not yet ready to engage (ie, “Non-starters”); (2) only seeking a confidential assessment of their symptoms66 (ie, “Non-completers”); or, (3) fully engaged and persisted with the program (ie, “Completers”). This is not unlike a Stages of Change model67 describing individuals in the: Contemplation stage (ie, getting ready) where they recognize they have a problem but are not ready to address it; Preparation stage (ie, ready) where they recognize they have a problem and are taking preliminary steps towards addressing it; and, Action stage where they fully engage with a treatment intervention. Alternatively, for users in the “Non-starters” and “Non-completers” groups, it may be that the program was not a good fit for their needs. Further research clarifying engagement differences across groups is needed.

For the Experiences Survey, a greater number of respondents agreed or strongly agreed with all 20 statements than those who disagreed or strongly disagreed. Thus, it appears that the impact of the intervention on users’ knowledge of mental health, and the tools provided to help users better manage their mental health, were regarded positively overall. There was some statistically significant variation in the strength of agreement between a few of the statements. Responses indicated there may have been a relatively greater awareness of two tools, that is, mindfulness and strategic breathing, as well as a relatively greater benefit attributable to the normalization of mental health issues.

Limitations

Demographic and clinical data were obtained in the context of service delivery rather than for research purposes, as healthcare workers were given the option of providing these data and completing the DASS/Functioning Questionnaire assessments. Given that users were not required to provide demographic data, the characterization of the healthcare workers in the current study is limited, as they may not represent the broader population of healthcare workers. In addition, as the timing of DASS/Functioning Questionnaire completion could occur any time after the first login, some symptom improvement could have occurred before the first assessment was completed. However, this seems unlikely as the...
median duration between first login and completion of the first DASS assessment was 2.2 days, although, it remains possible that greater improvements would be observed if the first assessment was more consistently completed at the first login.

The three groups identified for this evaluation did not permit identification of specific, clinical reasons for different user engagement with the RTH program. It is possible that those in the “Completers” group were more motivated or receptive to an iCBT therapy. Whether this was due to group differences in anxiety/depression symptom levels between “Completers” and “Non-completers” is unlikely as there were no significant differences in scores between these two groups. However, it remains possible that there were group differences in anxiety/depression symptom levels between “Completers” and “Non-starters” that may have led to differences in engagement with the RTH program as the small number of “Non-starters” who completed an initial assessment did not support testing for statistical significance between these two groups. Additional demographic/clinical data are needed to determine whether these groups perhaps differed in some significant way. Furthermore, other groupings are possible that may affect baseline characteristics and attrition patterns.55

Without outcome data for the “Non-starters” and “Non-completers” groups, it is unclear whether these two groups benefited from the RTH program or, conversely, that the program was not a good fit for their needs. One possible explanation for the different engagement levels with the RTH program is that it may be a reflection of a stepped care model.68 In this case, individuals who may have received what they needed early on in the program did not continue and did not complete a second assessment. Consistent with this explanation, there is evidence that a referral to a face-to-face CBT program, following an intake assessment did not benefit as much as those who did. Evidence from the UK IAPT program, where it is a requirement for participants to provide data on self-report measures after each session, has shown that non-completers had worse outcomes than completers.67

The 88% attrition rate reported in this study limits the conclusions with respect to the acceptability and the effectiveness of the RTH program, although, it appears that for the right person, RTH is helpful. Finally, as this was not an RCT, other reasons may account for the observed improvements.

CONCLUSIONS

Service delivery data collected over a 14-month period demonstrated the effectiveness of RTH, a fully digitalized iCBT program, specifically designed to treat depression and anxiety symptoms of healthcare workers on disability leave. In addition, healthcare workers’ perceptions of RTH’s benefits were positive. An important advantage of this unguided iCBT program is its increased scalability versus guided iCBT, which supports providing increased treatment access at minimal cost. A cost-effectiveness evaluation would further clarify the extent of these benefits. Furthermore, opportunities for increased effectiveness lie in technological advances, such as machine learning, that may permit increased customization of program delivery to the healthcare worker’s specific needs.

ACKNOWLEDGMENTS

The authors would like to acknowledge Dave Keen, Cameron Brine, and Thomas Clynne-Salley from Fraser Health Authority (FHA) for their commitment to improve the mental health of their colleagues in healthcare and for providing them with access to Starling’s programs. Also, they are thankful for the ongoing support and collaboration with Angela Israel, Leslie Allan, Melissa O’Brien, and the Workplace Health team and the Absence and Disability Management team at FHA. They are grateful for the collaborative work with Waqar Mughal for his contributions to the development and independent statistical analysis of the Experience Survey. Finally, they want to acknowledge Brandilyn Willett for her writing assistance and proofreading of this manuscript.

REFERENCES

1. Joseph B, Joseph M. The health of the healthcare workers. Indian J Occup Environ Med. 2016;20:71–72.
2. Picard A. Health-care staff close to burnout, study finds. The Globe and Mail; 2010. Available at: https://www.theglobeandmail.com/life/health-and-fitness/health-care-staff-close-to-burnout-study-finds/article4389652/. Accessed December 12, 2020.
3. Wilkins K. Work stress among health care providers. Health Rep. 2007;18:33–36.
4. Shankat N, Ali DM, Razzak J. Physical and mental health impacts of COVID-19 on healthcare workers: a scoping review. Int J Emerg Med. 2020;13:40.
5. Kim MS, Kim T, Lee D, et al. Mental disorders among workers in the healthcare industry: 2014 national health insurance data. Ann Occup Environ Med. 2018;30:31.
6. Schwenk TL, Gorenflo DW, Leja LM. A survey on the impact of being depressed on the professional status and mental health care of physicians. J Clin Psychiatry. 2008;69:617–620.
7. Sohn JW, Kim BG, Kim SH, Han C. Mental health of healthcare workers who experience needlestick and sharps injuries. J Occup Health. 2008;48:474–479.
8. Guo YQ, Pan BC, Sun W, Wu H, Wang JN, Wang L. Depressive symptoms among Chinese nurses: prevalence and the associated factors. J Adv Nurs. 2012;68:1166–1175.
9. Wang JN, Sun W, Chi TS, Wu H, Wang L. Prevalence and associated factors of depressive symptoms among Chinese doctors: a cross-sectional survey. Int Arch Occup Environ Health. 2010;83:905–911.
10. Gong Y, Han T, Chen W, et al. Prevalence of anxiety and depressive symptoms and related risk factors among physicians in China: a cross-sectional study. PLoS One. 2014;9:e103247.
11. Mealer ML, Shelton A, Berg B, Rothsbaum B, Moss M. Increased prevalence of post-traumatic stress disorder symptoms in critical care nurses. Am J Respir Crit Care Med. 2007;175:693–697.
12. Mealer M, Burnham EL, Goode CJ, Rothsbaum B, Moss M. The prevalence and impact of post traumatic stress disorder and burnout syndrome in nurses. Depress Anxiety. 2009;26:1118–1126.
13. Gómez-Urquiza JL, De la Fuente-Solana EI, Albendí García L, Vargas-Pecino C, Ortega-Campos EM, Cañadas-De la Fuente GA. Prevalence of burnout syndrome in emergency nurses: a meta-analysis. Crit Care Nurse. 2017;37:e1–e9.
14. Soler JK, Yaman H, Esteva M, et al. Burnout in European family doctors: the EGPRN study. Fam Pract. 2008;25:245–265.
15. Blanchard P, Truchot D, Albigeaz-Sauvin L, et al. Prevalence and causes of burnout amongst oncology residents: a comprehensive nationwide cross-sectional study. Eur J Cancer. 2010;46:2708.
16. Lim KL, Jacobs P, Ohinmaa A, Schopfler D, Dewa CS. A new population-based measure of the burden of mental illness in Canada. Chron Dis Can. 2008:28–92.
17. Smetanin P, Staff D, Briante C, Adair CE, Ahmad S, Khan M. The life and economic impact of major mental illnesses in Canada: 2011–2041. RiskAlytica, on behalf of the Mental Health Commission of Canada; 2011. Available at: https://www.mentalhealthcommission.ca/sites/default/files/MHCC_Report_Base_Case_FINAL_ENG_0_0.pdf. Accessed December 12, 2020.
18. Dewa CS, Chau N, Dermer S. Examining the comparative incidence and costs of physical and mental health-related disabilities in an employed population. J Occup Environ Med. 2010;52:758–762.
19. Public Health Agency of Canada. Mood and Anxiety Disorders: Fast Facts from the 2014 Survey on Living with Chronic Diseases in Canada [Internet]. 2015. Available at: http://www.healthcanadians.gc.ca/publications/diseases-conditions-maladies-affections/mental-mood-anxiety-anxieties-numeur/index-eng.php. Accessed March 8, 2020.
20. Mental Health Commission of Canada. Changing Directions. Changing Lives: The Mental Health Strategy for Canada. Calgary, (AB): Mental Health Commission of Canada; 2012. p. 28. ISBN: 978-0-9813795-2-4.
21. Cuijpers P, Cristea IA, Karyotaki E, Reijnders M, Huibers MJ. How effective are cognitive behavior therapies for major depression and anxiety disorders?
874 © 2021 The Author(s). Published by Wolters Kluwer Health, Inc. on behalf of the American College of Occupational and Environmental Medicine.