SilverCloud mental health feasibility study: who will it benefit the most?

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Abstract

Introduction: This study examines the feasibility of SilverCloud therapy for anxiety and/or depression. Findings may help determine SilverCloud effectiveness based on patients' profiles.
Methods: Participants were randomly assigned to the immediate or later therapy groups. GAD-7, PHQ-9, and WHO-5 scores were measured at baseline and pre/post therapy. A mixed-methods approach was used.
Results: GAD-7, PHQ-9, and WHO-5 scores improved significantly from pre- to post-therapy ($p < 0.05$) for social, behavioral, and economic reasons for anxiety and/or depression.
Conclusions: This SilverCloud study shows feasibility for participants who had moderate to severe anxiety and/or depression due to social, behavioral, or economic reasons.

Key words: anxiety, depression, online CBT-based.

The global COVID-19 pandemic has had a profound impact on the mental health of individuals globally [1–3]. Factors such as the uncertainty of the future, emotional isolation, stigma related to infection, insecurity regarding societal resources, and insufficient medical services have contributed to the rise in mental health conditions during this challenging period [4].

In response to these circumstances, the COVIDsmart study was launched as a statewide survey in Virginia and aimed at gaining a comprehensive understanding of the pandemic's impact on residents' health, behavior, and economic status. Early results from COVIDsmart revealed alarming figures, with 21% of participants experiencing moderate to severe anxiety, and 25% reporting moderate to severe depression, indicating a significant increase in mental health conditions due to the COVID-19 pandemic [5, 6].

To address the urgent need for mental health support, we introduced the SilverCloud study as part of COVIDsmart. SilverCloud is an evidence-based and CBT-based digital mental health therapy. SilverCloud programs for anxiety and/or depression include Space from Anxiety, Space from Depression, and Space from Anxiety and Depression. These programs encourage the development of awareness and understanding of emotions, while increasing daily enjoyable activities and motivation. CBT is used to understand thoughts, feelings, behaviors, and to make positive changes to overcome anxiety and/or depres-

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sion. Programs comprise of 10 modules: Getting Started, Understanding Depression and Anxiety, Noticing Feelings, Boosting Behavior, Spotting Thoughts, Challenging Thoughts, Managing Worry, Core Beliefs (unlockable by coach), Facing Your Fears (unlockable by coach), and Bringing It All Together. Coaches who are experts in the behavioral health field provide weekly encouragement and support to motivate users to engage in the SilverCloud programs, set daily and weekly goals, and apply learnings in everyday life. Programs are recommended to users based on PHQ-9 and GAD-7 scores. Within each program, there are validated tools to help manage symptoms. For example, one of the preferred tools by users is the Progressive Muscle Relaxation tool, designed to guide users to contract and consciously relax each muscle to reduce tension, sleep difficulties, worries, and irritability [7].

The emergence of online digital health platforms, specifically internet-based CBT (iCBT), has garnered attention as an effective means of delivering mental health treatment [8–10]. With the disruption of traditional in-person appointments during the pandemic, iCBT has emerged as an alternative, providing accessible and flexible treatment options for individuals, particularly those residing in remote areas or with limited means of transportation. Although the mental health digital landscape is replete with CBT-based apps and other digital interventions, outcomes for users are not always favorable. Implementation science highlighting specialized needs, resources, and training to operate digital services, is necessary for the success of digital therapeutics in healthcare. SilverCloud Health has achieved global reach by using implementation science strategies [11]. Compared to other traditional digital platforms, SilverCloud offers self-guided programs, coach guidance, assessment and progress tracking tools and mobile accessibility in a secure environment [7].

The primary objective of this study is to assess the feasibility of implementing the SilverCloud program within the context of the COVID-19 pandemic. By identifying the specific patient profiles that are likely to benefit the most from online CBT-based mental health therapy for anxiety and/or depression, our findings can assist clinicians in maximizing the benefits of this innovative approach.

Methods. *Study design.* COVIDsmart participants who expressed willingness to be approached for future studies and who had moderate to severe anxiety and/or depression were invited to participate in the SilverCloud study. A needs assessment was conducted to determine eligibility to participate in the SilverCloud study and to collect baseline data such as self-reported mental illness comorbidities, reasons for anxiety and/or depression, use of coping strategies, prescribed medications, or mental healthcare services for anxiety and/or depression.

Eligible participants included COVIDsmart participants aged 18 to 75 years who had moderate to severe anxiety and/or depression. COVIDsmart participants who had a positive screening score based on the Ask Suicide Questions (ASQ) tool were excluded. Those excluded were encouraged to seek immediate medical attention and were provided a list of mental health care institutions and hotlines they could access. COVIDsmart participants who were receiving CBT-based or other psychological therapies were excluded.

Of those who were invited, 18 were eligible, consented, and were randomly enrolled in either "immediate therapy group" ($n = 10$) or in the "later therapy group" ($n = 8$). Due to loss to follow-up, the immediate therapy group had five participants and the later therapy group had six participants ($n = 11$) who completed the study. Each participant was invited to the SilverCloud platform to complete 8 weeks of CBT-based therapy guided by a SilverCloud coach. The immediate therapy group began the intervention at the start of the study, whereas the later therapy group began after completing an 8-week waiting period. Generalized Anxiety Disorder-7 (GAD-7), Patient Health Questionnaire-9 (PHQ-9), and the World Health Organization 5-item (WHO-5) quality of life questionnaires, were measured at baseline, and pre- and post-therapy (8 weeks and 16 weeks) for the later therapy group. The same measures were taken at pre- and post-therapy (8 weeks) for the immediate therapy group.

Mixed methods analysis. A content analysis was performed to examine the reported reasons for anxiety and/or depression among participants. A priori themes derived from the multiple-choice question "What are some reasons that may be causing you to experience anxiety and/or depression during COVID-19? Please select all that apply" included social, economic, psychological, clinical, and behavioral categories. Additionally, emergent themes from open-ended responses led to the inclusion of a political category. The content analysis aimed to enhance the quantitative analysis. PHQ-9, GAD-7, and WHO-5 score patterns were analyzed qualitatively from pre- to post-SilverCloud therapy to understand whether SilverCloud is beneficial in reducing anxiety and/or depression regardless of reason reported for anxiety and/or depression.

Descriptive statistics were utilized to explore GAD-7, PHQ-9, and WHO-5, having a diagnosed medical condition such as diabetes or cancer (yes or no), having a diagnosed comorbid men-

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tal illness (yes or no), medication use for anxiety and/or depression (yes or no), and use of coping skills such as exercising or joining a social support group (yes or no). A Mixed Methods Repeated Measures test was conducted to assess if there are significant differences in outcomes before and after therapy and differences between groups. We conducted analysis using SAS 9.4 and *p*-values < 0.05 were considered significant.

Results. During the 8-week period, there were no significant changes in GAD-7, PHQ-9, and WHO-5 scores, $p > 0.05$. However, significant improvements in GAD-7 ($F = 9.01$), PHQ-9 ($F = 12.58$), and WHO-5 ($F = 30.97$) scores were observed from pre- to post-therapy intervention for both the immediate and later therapy groups, $p < 0.05$.

Following the completion of the SilverCloud therapy, the majority of participants in both groups experienced reductions in anxiety (82%), depression (91%), and improvements in WHO-5 (73%) scores. The most commonly reported reasons for anxiety and/or depression were social in

nature, such as feelings of isolation or difficulty staying connected with important activities, hobbies, and family and friends. On the other hand, political reasons were reported less frequently as causes for anxiety and/or depression. A detailed breakdown of all reported reasons for anxiety and/or depression can be found in Table I.

Participants who reported a psychological reason such as death of a loved one or fear of contracting COVID-19 alongside with comorbid mental illness or physical chronic medical conditions, showed limited or no improvement, and in 1 case, even experienced worsening of GAD-7, PHQ-9, and WHO-5 scores, despite using anxiety and/or depression medications and coping techniques. However, one participant who reported a diagnosed mental illness comorbidity, social reasons for anxiety and depression, and did not receive mental health services but utilized coping techniques, demonstrated improvements in GAD-7, PHQ-9, and WHO-5 from baseline to the end of SilverCloud therapy. Overall, improvements were

Table I. Reasons for reported anxiety/depression by study group (*n* = 11)

Participant	Reported reasons
Immediate therapy group (*n* = 5):	
1	Prefer not to answer
2	Clinical chronic medical conditions (non-COVID-19) Social isolation/Trouble keeping up with important hobbies/activities and with family/friends Behavioral trouble keeping up with exercise
3	Social isolation/Trouble caring for people who depend on you/Trouble staying connected with people/Trouble keeping up with important hobbies/activities and with family and friends Behavioral trouble keeping up with exercise/Daily routine changed due to COVID-19 Psychological someone important died (not COVID-19-related)
4	Social isolation/Trouble staying connected with people/Trouble keeping up with religious/spiritual activities/Trouble staying involved with family and friends Behavioral trouble keeping up with exercise/Not trusting CDC Political "Autonomy taken away in regards to COVID vaccinations even though I support vaccines/Ineptness of government to deal with pandemic/Needing a test/mask to go places/do things" Psychological fear caused by media
5	Clinical chronic medical conditions (not COVID-19 related) Behavioral trouble keeping up with exercise/Daily routine changed because of COVID-19 Psychological fear of getting COVID-19
Late therapy group (*n* = 6):	
1	Prefer not to answer
2	Prefer not to answer
3	Clinical chronic medical conditions (non-COVID-19) Social trouble keeping up with important hobbies/activities
4	Social trouble caring for people who depend on you
5	Social trouble staying connected with people/Trouble keeping with religious/spiritual activities/Trouble staying involved with family/friends
6	Behavioral trouble keeping up with exercise Economic trouble paying for dental/health insurance and other bills/Participant or someone important lost a job Social trouble keeping up with important hobbies/activities/Trouble staying involved with family/friends Psychological someone important died (not COVID-related)/Fear of getting COVID-19

Table II. Qualitative results for participants in the SilverCloud study by group, n = 11

Qualitative result	Immediate therapy group	Later therapy group
Taking medication for anxiety and/or depression	80% (4/5)	33% (2/6)
Has a mental illness comorbidity	40% (2/5)	16.67% (1/6)
Has a physical chronic medical condition	40% (2/5)	16.67% (1/6)
Uses coping techniques to relieve anxiety and/or depression	80% (4/5)	50% (3/6)
GAD-7 improved from pre- to post-therapy	60% (3/5)	100% (6/6)
PHQ-9 improved from pre- to post-therapy	80% (4/5)	100% (6/6)
WHO-5 improved from pre- to post-therapy	40% (2/5)	100% (6/6)

observed in social, behavioral, and economic factors that were reported as causes for anxiety and/or depression (Table II).

Discussion. Qualitative analysis of PHQ-9, GAD-7, and WHO-5 score patterns based on reasons reported for anxiety and/or depression, indicate that anxiety and depression improved for individuals with social, behavioral, and economic reasons for anxiety and/or depression regardless of mental or physical illness comorbidities. However, anxiety and depression did not improve for participants with physical/mental illness comorbidities who reported psychological reasons for their anxiety and/or depression.

An important finding from this study is the observation of a participant who exhibited unchanged results in GAD-7 scores and worsened results in PHQ-9 and WHO-5 scores. This participant reported having a chronic medical condition and taking medication for anxiety and depression. In this study, there were three participants with chronic medical conditions. It is worth noting that out of the three participants with chronic medical conditions, only two showed improvements in GAD-7, PHQ-9, and WHO-5 scores, despite having similar social and behavioral reasons for anxiety and/or depression. The participant who did not experience improvements in GAD-7 scores and had worsened PHQ-9 and WHO-5 scores indicated "fear of contracting COVID-19" as a reason for anxiety and depression. Another participant who reported a diagnosed mental illness comorbidity and experienced the loss of someone significant, demonstrated improvement in PHQ-9 and WHO-5 but not in GAD-7 scores. These findings suggest that psychological factors may significantly impact the outcomes of SilverCloud online therapy.

Overall, the results of this study, both quantitative and qualitative, indicate that SilverCloud online mental health therapy led to improved GAD-7, PHQ-9, and WHO-5 scores for individuals with anxiety and/or depression regardless of medication use, coping techniques, or mental illness comorbidities. However, it is important to consider the impact of psychological factors on individuals with physical or mental chronic comorbid conditions, as these individuals exhibited less favorable outcomes after completing the SilverCloud therapy. An important limitation for this study is that we could not determine which module in particular had the greatest impact on the overall PHQ-9, GAD-7, and WHO-5 scores after the 8-week SilverCloud therapy. In addition, this study is limited due to lack of power (42–59%) for statistical analysis. Nevertheless, this study sets the stage for future studies to explore the relationship between psychological factors and individuals with physical/mental comorbid conditions. An important strength of this paper is the measurement of quality of life (WHO-5), an important metric to assess clinical effectiveness according to the World Health Organization [12].

In conclusion, this study highlights the potential of SilverCloud online therapy for individuals experiencing moderate to severe anxiety and/or depression due to social, behavioral, or economic reasons. Nevertheless, within the current pandemic context, SilverCloud does not appear to improve anxiety, depression, or quality of life for individuals with chronic medical conditions who have psychological reasons for their anxiety and/or depression. It is recommended that researchers validate these findings with a larger sample size, as future findings could have important implications for specialized care tailored to individuals with physical/mental comorbid conditions who report psychological factors contributing to their feelings of anxiety and/or depression.

Conflict of interest

The authors declare no conflict of interest.

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