Wysa Research

Publications and works in progress

Updated December 2022

Peer-Reviewed Scientific Publications

(Published/Under Review)

Peer-Reviewed Scientific Publications (Published/Under Review)

Clinical Efficacy across Domains

An Empathy-Driven, Conversational Artificial Intelligence Agent (Wysa) for Digital Mental Well-Being: Real-World Data Evaluation Mixed-Methods Study

Key points

- The high engagement users of a digital mental health app (Wysa) had significantly higher improvement in depression compared with the low engagement users group indicating promising results on the effectiveness of Wysa.
- User feedback on Wysa also indicated that using the app was helpful and encouraging.
- This study demonstrates how digital mental health apps could act as a supplementary or intermediate support system.

Synopsis

This study used a mixed-methods approach to evaluate the impact and engagement levels among these users of Wysa. The results indicated that the high usage group users showed significantly more improvement (mean 5.84 [SD 6.66]) in Depression (as measured on Patient Health Questionnaire 9) compared with the low engagement users group (mean 3.52 [SD 6.15]) with moderate effect size of 0.63. Qualitative analysis of the user feedback that 67.7% feedback indicated that the app experience was helpful and encouraging. The real-world data evaluation findings on the effectiveness and engagement levels of Wysa app on users with self-reported symptoms of depression show promise.

Citation: Inkster, B., Sarda, S., & Subramanian, V. (2018). An empathy-driven, conversational artificial intelligence agent (Wysa) for digital mental well-being: real-world data evaluation mixed-methods study. JMIR mHealth and uHealth, 6(11), e12106.

Evaluating a digital mental health intervention (Wysa) for Workers' Compensation claimants: Pilot feasibility study

Key points

- The study examined the feasibility and acceptability of an AI-led digital mental health intervention in a Workers' Compensation (WC) program, Wysa for Return to Work.
- The data demonstrated a high need for psychosocial interventions amongst injured workers.
- Those screened for psychosocial risk factors had a higher rate of onboarding, retention, and engagement; and those with severe injuries had higher retention.

Synopsis

This pilot study explored the feasibility and acceptability of an AI-led digital psychosocial intervention, Wysa for Return to Work, which was intended to facilitate and expedite recovery for individuals with a work-related injury and receiving a WC claim in an accessible and affordable way. This study highlights the ability to attain high retention and engagement among injured workers with an app that uses a digital CA, and offers the potential to improve recovery outcomes for injured workers in a manner that is feasible and scalable to deliver in a WC program.

Citation: Iglesias, M; Sinha, C; Vempati, R; Grace, SE; Roy, M; Chapman, WC; Rinaldi, ML Evaluating a digital mental health intervention (Wysa) for Workers' Compensation claimants: Pilot feasibility study. Journal of Occupational and Environmental Medicine.

Digital mental health intervention for orthopedic patients with symptoms of depression and/or anxiety: Pilot feasibility study

Key Points

- This pilot study indicated feasibility with high engagement and retention rates within the app.
- To a clinically meaningful degree, the patients who used Wysa reported improvement in Depression, Anxiety, Pain Interference, and Physical Function at the two-month follow-up

Synopsis

This study was to assess the feasibility of introducing a digital mental health intervention (Wysa) within an outpatient orthopedic setting to patients with chronic pain and coexisting symptoms of depression and/or anxiety and to assess the preliminary effectiveness of this intervention, as a secondary objective. The intervention had a high engagement and retention rate. High engagement users showed greater improvement compared to low users, on Patient-Reported Outcomes Measurement Information System (PROMIS) Anxiety (between-group difference -4.2 points [95% CI -8.1 to -0.2], P=.044) and on PROMIS Depression (-3.2 points [-7.5 to 1.2], P=.15) at two-month follow-up and on Pain Interference (-2.3 points [-6.3 to 1.7], P=.26). PROMIS Physical Function differences were comparable between groups. Delivery of a digital mental health intervention within the context of orthopedic care is feasible and demonstrates potential to improve mental health and pain-related impairment to a clinically meaningful degree. Participants' engagement and retention rates exceeded industry standards.

Citation: Leo, A. J., Schuelke, M. J., Hunt, D. M., Metzler, J. P., Miller, J. P., Areán, P. A., ... & Cheng, A. L. (2022). Digital mental health intervention for orthopedic patients with symptoms of depression and/or anxiety: Pilot feasibility study. JMIR Formative Research.

Digital mental health intervention Plus Usual Care Compared to Usual Care Only and Usual Care Plus In-Person Psychological Counseling for Orthopedic Patients with Symptoms of Depression and/or Anxiety: Cohort Study

Key Points

- Among 153 patients (mean age 55 (SD 15) years, 128 (83.7%) female, n=51 patients per cohort), patients who received a digital mental health intervention made clinically meaningful improvements at two-month follow-up in all PROMIS measures assessed (mean longitudinal improvement 2.8-3.7 points, P=.02).
- After controlling for age and body mass index, the improvements in PROMIS Depression, Pain Interference, and Physical Function were meaningfully greater than longitudinal changes made by patients who received usual orthopedic care (mean between-group difference |2.6-4.8| points, P=.04).
- Improvements in PROMIS Physical Function were also meaningfully greater than longitudinal changes made by patients who received in-person psychological counseling (mean between-group difference 2.4 points, P=.04).

Synopsis

This is a single-center, retrospective cohort study involving ancillary analysis of a pilot feasibility study, where two-month self-reported health changes were compared between three cohorts of patients: Control Cohort than the control (of users who received only standard Orthopedic care), Wysa Cohort (users who received only standard Orthopedic care and used Wysa for Pain), and Gold Standard Cohort (users who received only standard Orthopedic care and in-person psychiatric care). In this study, patients who received a digital mental health intervention (Wysa cohort) made greater mean improvements on PROMIS Anxiety (-3.7 points), Pain Interference (-2.8 points), and Physical Function (+3.5 points) scores at the two-month follow-up than any other cohort. Improvements on PROMIS Depression scores were also clinically significant and comparable to the Gold Standard Cohort. As such, this retrospective cohort study provides evidence that Wysa for Chronic Pain could effectively reduce anxiety, depression, pain interference, and improve physical function.

Citation: Leo AJ, Schuelke MJ, Hunt DM, Miller JP, Areán PA, Cheng AL Digital Mental Health Intervention Plus Usual Care Compared to Usual Care Only and Usual Care Plus In-Person Psychological Counseling for Orthopedic Patients with Symptoms of Depression and/or Anxiety: Cohort Study JMIR Form Res 2022;6(5):e36203

Evaluating the Therapeutic Alliance with a Free-text CBT Conversational Agent (Wysa): A Mixed-Methods Study

Key Points

- Users were able to establish therapeutic alliance with the conversational agent Wysa and the bond levels increased over time, and were comparable to the therapeutic bond levels in human-delivered face-to-face psychotherapy with clinical populations.
- Content analysis of users' texts indicated perceived positive impact and described the nature of the alliance.
- This study provides support that digital mental health interventions can establish therapeutic bonds, and free-text conversations support a stronger bond.

Synopsis

The present study aims to examine whether users perceive a therapeutic alliance with an AI conversational agent (Wysa), as well as examine changes in the therapeutic alliance over time. In a sample of new users (N=1205), within five days of initial app use, the mean WAI-SR score was 3.64 (SD 0.81) and the mean bond subscale score was 3.98 (SD 0.94). Three days later, the mean WAI-SR score increased to 3.75 (SD 0.80) and the mean bond subscale score increased to 4.05 (SD 0.91). The mean bond subscale scores were found to be comparable to the scores obtained in recent literature on traditional, outpatient-individual CBT and group CBT (scores of 4.0 and 3.8, respectively). The content analysis of the anonymised transcripts of users' conversations with Wysa revealed unprompted elements of bonding between the user and Wysa (N=950) such as gratitude and impact of the bond. Thus, users' therapeutic alliance with the conversational agent scores improved over time and were comparable to ratings from previous studies on alliance in human-delivered face-to-face psychotherapy with clinical populations. This study also provides critical support for the utilization of digital mental health services, like Wysa, based on the evidence of the alliance that is created between a user and the conversational agent.

Citation: Beatty C, Malik T, Meheli S and Sinha C (2022) Evaluating the Therapeutic Alliance With a Free-Text CBT Conversational Agent (Wysa): A Mixed-Methods Study. Front. Digit. Health 4:847991.

User Feedback Analysis of an AI-Enabled CBT Mental Health Application (Wysa)

Key Points

- User feedback indicated that the app (Wysa) was positively reviewed and demonstrated users' experiences of acceptability, usability, usefulness and integration.
- Digital mental health apps have the potential to expand mental health access to those unable to access traditional forms of mental health support and treatments.

Synopsis

This study analyzed feedback content to understand the user's experiences of engaging with a digital mental health app (Wysa) and captured the types of mental health app users. Utilizing a user-led approach to understanding factors for engagement and helpfulness in digital mental health by analyzing feedback (n=7,929) reported on Google Play Store about Wysa for a one year period, the user feedback was categorized the user experience into the core domains of acceptability, usability, usefulness, and integration. The study also captured key deficits and strengths of the app. The analysis of user feedback found the app to be overwhelmingly positively reviewed (84.4% 5-star rating). The themes of engaging exercises, interactive interface and AI-conversational ability indicated the acceptability of the app, while the non-judgementality and ease of conversation highlighted its usability. The app's usefulness was portrayed by improvement in mental health, convenient access and cognitive restructuring exercises. Themes of Privacy and Confidentiality underscored users' preference for the integrated aspects of the app. Further analysis revealed 4 predominant types of individuals who shared app feedback on the store. This study provides evidence that digital mental health apps may expand mental health access to those unable to access traditional forms of mental health support and treatments.

Citation: Malik T, Ambrose AJ, Sinha C. Evaluating User Feedback for an Artificial Intelligence-Enabled, Cognitive Behavioral Therapy-Based Mental Health App (Wysa): Qualitative Thematic Analysis. JMIR Human Factors. 2022 Apr;9(2):e35668.

Understanding People With Chronic Pain Who Use a Cognitive Behavioral Therapy–Based Artificial Intelligence Mental Health App (Wysa): Mixed Methods Retrospective Observational Study

Key points

- Users with chronic pain engage with the app seeking support for health concerns, socioeconomic concerns and pain management concerns.
- Users with chronic pain showed significantly greater app engagement than users without chronic pain.
- In a pre-post analysis, Wysa users were found to have significant improvements in group means on both PHQ-9 (assessing depression) and GAD-7 (assessing anxiety) symptom scores, with medium effect size, indicating effectiveness.

Synopsis

This study aimed to evaluate the perceived needs, engagement and the effectiveness of Wysa on mental health outcomes among real-world users with chronic pain. The themes emerging from the conversations of users with chronic pain (N=2,194) included Health Concerns, Socioeconomic Concerns, and Pain Management Concerns. The quantitative analysis indicated that users with chronic pain showed significantly greater app engagement (p value <2.2e-16) than users without chronic pain, with a large effect size (Vargha and Delaney's A- 0.76 -0.8). Furthermore, the sample of users with pre-post assessments during the study period were found to have significant improvements in PHQ-9 and GAD-7 symptom scores, with medium effect size (Cohens'd, 0.6-0.61). The findings indicate that users look for tools that can help them address their concerns related to mental health, pain management, and sleep issues. The study findings also indicated the breadth of needs for users with chronic pain and the lack of support structures, suggesting that Wysa can provide effective support to bridge the gap.

Citation: Meheli, S., Sinha, C. & Kabada, M. Understanding People With Chronic Pain Who Use a Cognitive Behavioral Therapy–Based Artificial Intelligence Mental Health App (Wysa): Mixed Methods Retrospective Observational Study JMIR Hum Factors 2022;9(2):e35671

Adherence and Engagement with a Cognitive Behavioral Therapy Based Conversational Agent (Wysa) in Adults with Chronic Pain: Survival Analysis

Key Points

- This study evaluated the engagement and retention of users of Wysa for chronic pain and survival analysis of findings indicated that median user retention period (i.e., time to complete disengagement) of 51 days
- The usage of a morning check-in was found to have a statistically significant impact on retention ($p = .001$).
- The findings indicate a high engagement and retention within this app, indicating utility and efficacy of the solution.

Synopsis

The study evaluated user retention and engagement with an artificial intelligence (AI)-led digital mental health app that was customized for individuals managing mental health symptoms and coexisting chronic pain (Wysa for Chronic Pain). In this ancillary survival analysis of a clinical trial, participants included 51 adults who presented to a tertiary care center for chronic musculoskeletal pain, who endorsed coexisting symptoms of depression and/or anxiety (PROMIS Depression and/or Anxiety score ≥ 55), and initiated onboarding to an 8-week subscription of Wysa for Chronic Pain. Users engaged in a mean of 4.0 (SD 0.9) sessions per week, and a cumulative mean of 33.3 sessions during the eight-week study period. The survival analysis depicted a median user retention period (i.e., time to complete disengagement) of 51 days, with the usage of a morning check-in feature statistically significant in its relationship with a longer retention period ($p = .001$). Thus the findings have clear implications for addressing issues of suboptimal engagement of digital health interventions and improving access to care for chronic pain.

Citation: Sinha, C., Cheng, A. L., & Kadaba, M. (2022). Adherence and Engagement With a Cognitive Behavioral Therapy–Based Conversational Agent (Wysa for Chronic Pain) Among Adults With Chronic Pain: Survival Analysis. JMIR Formative Research, 6(5), e37302.

Mental Health Treatment for Chronic Pain Delivered Through an AI-enabled Conversational Agent (Wysa): Protocol for a Pilot Study

Key points

- This pilot study aims to examine the efficacy and usage of an AI-CBT intervention for chronic pain (Wysa for Chronic Pain app), using only a digital conversational agent.
- AI-driven mental health conversational agents could be effective in helping patients with chronic pain learn to self-manage their pain and deal with common comorbidities like depression and anxiety.

Synopsis

This pilot study aims to examine the efficacy and usage of an AI-CBT intervention for chronic pain (Wysa for Chronic Pain app), using a conversational agent (with no human intervention). Participants with self-reported chronic pain (N = 500) will be recruited online on a rolling basis from February 2022 through internet communities. The Wysa intervention is delivered remotely for 8 weeks. Outcome measures including NPRS, PROMIS PI, GAD-7, and PHQ-9 questionnaires will be administered to test the effectiveness of the intervention on reducing levels of pain intensity, interference, depression, and anxiety. The therapeutic alliance created with the conversational agent will be assessed through the WAI-SR. Retention and usage statistics will be observed for adherence and engagement. The study will open for recruitment in February 2022 and data collection is expected to be completed by June 2022. The results for the primary outcomes are expected to be published by late-2022. AI-driven mental health chatbots could be effective in helping patients with chronic pain learn to self-manage their pain and deal with common comorbidities like depression and anxiety.

Citation: Gupta M, Malik T, Sinha C Delivery of a Mental Health Intervention for Chronic Pain Through an Artificial Intelligence–Enabled App (Wysa): Protocol for a Prospective Pilot Study JMIR Res Protoc 2022;11(3):e36910

Understanding the impact of an AI-enabled Conversational Agent (Wysa) on users with a self-reported maternal event: A mixed method real-world data study

Key Points

- This study examined data from real-world users who self-reported a maternal event while engaging with Wysa for emotional support. The study had two objectives: (1) comparing changes in self-reported depressive symptoms between users who were engaged more and users who were engaged less. (2) deriving qualitative insights into the behaviors exhibited among higher engaged maternal event users based on their conversations on the app.
- Results revealed a significant reduction in symptoms of self-reported depression among the higher engaged user group compared to lower engaged user group (M-W P=.004, CL= 0.736). Furthermore, the top themes that emerged from the qualitative analysis revealed users expressed concerns, hopes, need for support, reframing their thoughts and expressing their victories and gratitude.

Synopsis

Parenthood is a challenging life transition with varied implications for mental health and wellbeing. While different maternal mental health treatments exist, the implementation of care can be variable and with limited accessibility. Digital interventions can play an important role in looking after maternal mental health. This study examined data from real-world users who self-reported a maternal event while engaging with Wysa for emotional support. The study had two objectives: (1) comparing changes in self-reported depressive symptoms between users who were engaged more and users who were engaged less. (2) deriving qualitative insights into the behaviors exhibited among higher engaged maternal event users based on their conversations on the app. Real-world anonymised data from 2,037 women users who reported going through a maternal event during their conversation with the app was analyzed using a mixed-method approach. For the first objective, users who completed two PHQ-9 self-reported assessments (n=51 of 2,037) were grouped as either higher engaged users or lower engaged users based on their number of active session-days with the conversational agent between two screenings. Feedback on the app was also explored. Results revealed a significant reduction in symptoms of self-reported depression among the higher engaged user group compared to lower engaged user group (M-W P=.004, CL= 0.736). Furthermore, the top themes that emerged from the qualitative analysis revealed users expressed concerns, hopes, need for support, reframing their thoughts and expressing their victories and gratitude. These findings provide preliminary evidence of the effectiveness and engagement and comfort of using an AI-based emotionally intelligent mobile app to support mental health and wellbeing across a range of maternal events.

Citation (under review): Inkster B, Kadaba M, Subramanian V. Understanding the impact of a digital mental health and well-being AI application (Wysa) on users with a self-reported maternal event: A mixed method real-world data study.

Digital Health Management During and Beyond the COVID-19 Pandemic: Opportunities, Barriers, and Recommendations

Key points

- This study raises five concerns to ensure safety for digital technology in the context of the pandemic: due diligence in removing unsafe apps, using data insights to develop appropriate tools, transitioning from offline to digital services, making resources freely available and population level management.

Synopsis

This study raises five concerns to ensure safety for digital technology in the context of the pandemic: (1) due diligence: remove harmful health apps from app stores; (2) data insights: use relevant health data insights from high-quality digital tools to inform the greater response to COVID-19; (3) freely available resources: make high-quality digital health tools available without charge, where possible, and for as long as possible, especially to those who are most vulnerable; (4) digital transitioning: transform conventional offline mental health services to make them digitally available; and (5) population self-management: encourage governments and insurers to work with developers to look at how digital health management could be subsidized or funded and carried out at the population level, rather than at a prescription level.

Citation: Inkster, B., O'Brien, R., Selby, E., Joshi, S., Subramanian, V., Kadaba, M., ... & Mateen, B. A. (2020). Digital health management during and beyond the COVID-19 pandemic: Opportunities, barriers, and recommendations. JMIR Mental Health, 7(7), e19246.

Understanding Digital Mental Health Needs and Usage with an AI-led Mental Health App (Wysa) during the COVID-19 Pandemic: Retrospective Analysis

Key Points

- The results indicate that app engagement was higher during the COVID period compared to the pre-pandemic period.
- Positive correlation between the increase in installs of mental health app Wysa and the peaks of COVID-19 case numbers in the UK and India was observed.
- The PHQ-9 and GAD-7 pre-post assessments indicated statistically significant improvement with medium effect size (P= 0.569 for PHQ-9 and P=0.562 for GAD-7)

Synopsis

This study used a retrospective observational design to examine the connection among COVID-19 case numbers, mental health distress, and digital health uptake. The study also looked at the relationship between app engagement and COVID-19 case numbers and the efficacy of the app in improving the mental health state of the users during the pandemic. This study demonstrated that emotional distress increased substantially during the pandemic prompting increased uptake of an AI led mental health app, Wysa, in the UK (P=.018) and India (P=.0001), and also offered evidence that the app Wysa could support its users and lead to a significant reduction in symptoms of anxiety and depression (P= 0.569 for PHQ-9 and P=0.562 for GAD-7)

Citation (Under Review): Sinha, C., Meheli, S. & Kabada, M. Understanding Digital Mental Health Needs and Usage with an AI-led Mental Health App (Wysa) during the COVID-19 Pandemic: Retrospective Analysis

Mental Wellness Self-care in Singapore with mindline.sg: A Framework for the Development of a Digital Mental Health Platform for Behaviour Change

Key Points

- The COVID-19 pandemic created a surge in mental healthcare needs in Singapore. This prompted the Singaporean government to launch mindline.sg, a digital mental health resource website.
- Website received over 447,000 visitors (about 15% of the target population of three million), 62% of which explore the site or engage with resources, and about 10% of those engaged users return.
- A key insight from the implementation is that consistent digital marketing campaigns and outreach partnerships are crucial to reach a wide audience when initiating a platform of this kind.

Synopsis

The COVID-19 pandemic created a need for mental health support in Singapore and an acceleration in the receptiveness to digital mental health platforms the Singaporean government launched mindline.sg, a digital mental health resource website in June 2020. The platform has grown to include over 500 curated local mental health resources, a novel self-assessment tool, an AI chatbot from Wysa designed to deliver digital therapeutic exercises, and a tailored version of the website for working adults called mindline at work. The platform was successful in reaching a larger population. Two years following the launch, the website received over 447,000 visitors (about 15% of the target population of three million), 62% of which explore the site or engage with resources, and about 10% of those engaged users return. The growth rate of the number of visitors has been strong and has gone to show that consistent digital marketing campaigns and outreach partnerships are crucial to reach a wide audience when initiating a platform of this kind.

Citation (in prep): Mental Wellness Self-care in Singapore with mindline.sg: A Framework for the Development of a Digital Mental Health Platform for Behaviour Change.

Short Text Intent Classification for Conversational Agents

Key Points

- This study examined intent classification within the mental wellness and therapy chatbot, Wysa, to give improved responses to free-text user input. Text samples were classified into 4 categories - assertions, refutations, clarifiers and transitions.
- It introduced a technique to generate custom stop words that give a significant gain in performance (10 percentage points). The best pipeline, using these techniques together, gave an accuracy of 95 percent.

Synopsis

This paper explores the performance of various models and techniques for short text intent classification in the context of chatbots or conversational agents. The problem was explored for use within the mental wellness and therapy chatbot application, Wysa, to give improved responses to free-text user input. The authors looked at classifying text samples in-to 4 categories - assertions, refutations, clarifiers and transitions. For this, the suitability of the following techniques was evaluated: count vectors, TF-IDF, sentence embeddings and n-grams, as well as modifications of the same. Each technique was used to train a number of state-of-the-art classifiers, and the results have been compiled and presented. This is the first documented implementation of Arora's modification to sentence embeddings for real world use. It also introduces a technique to generate custom stop words that give a significant gain in performance (10 percentage points). The best pipeline, using these techniques together, gave an accuracy of 95 percent.

Citation: Kuchlous, S., & Kadaba, M. (2020, December). Short Text Intent Classification for Conversational Agents. In 2020 IEEE 17th India Council International Conference (INDICON) (pp. 1-4). IEEE.

Grant-Funded Research in Progress

Chronic Pain in Orthopedic Settings - Usability Evaluation

Partner: Washington University School of Medicine in St. Louis

Synopsis

Ongoing pilot work demonstrated promise that an established digital mental health intervention (Wysa) can improve orthopedic patients' mental health symptoms, but we also encountered implementation barriers related to discussing mental health in an orthopedic setting. The long-term goal of this line of research is to enable the provision of true comprehensive care to improve both the physical and mental health of orthopedic patients. The goals of this project are to address the implementation barriers we encountered in our ongoing pilot work and to prepare for a definitive trial to assess the effectiveness of a digital mental health intervention in the context of orthopedic care. The specific aims are to: 1) identify the contextual determinants of implementation success for addressing patients' mental health in the context of orthopedic care; 2) conduct usability testing for two mental health interventions which can feasibly be implemented in a real-world orthopedic setting: a digital mental health intervention (Wysa) and a novel printed resource guide; and 3) identify the intermediate mechanisms through which a digital mental health intervention (Wysa) improves mental health symptoms in orthopedic patients.

Status: Recruitment complete; analysis ongoing.

Chronic Conditions, Arthritis and Diabetes (Secondary MH Conditions)

Partner: University of New Brunswick

Synopsis

The purpose of this RCT is to evaluate whether an artificial intelligence (A.I.) mental health chatbot can be used to reduce negative mental health symptoms within this population. A total of 120 individuals with a chronic health condition (diabetes or arthritis) will be recruited across groups and randomly assigned to either a treatment group or a control group. Those assigned to the treatment group will use the mental health chatbot Wysa over a period of four weeks. Those assigned to the control group will receive no chatbot. Participants will complete measures of depression, anxiety, stress, and life satisfaction at the outset of the study, two weeks into the study, and four weeks into the study.. Results may be used to inform policy decisions about the use of these programs for healthcare delivery, and to provide practical insight into how these programs can be best integrated into healthcare settings.

Status: Recruitment complete; analysis ongoing.

Waitlist Management for Therapy Pathways

Partner: NHS: National Institute of Health Research (UK)

Synopsis

Wysa won the first ever AI Award in digital mental health, a UK Govt program deploying $200m funding to support adoption of technologies in the NHS. This award funds a multi-site clinical adoption trial with the NHS North-West London Foundation Trust, and the University of Plymouth to test the impact of introducing Wysa into IAPT (the NHS mental health treatment pathway) to manage self-referrals, triage and patient outcomes while on a waitlist.

Status: Public-patient involvement studies completed; study recruitment started in October 2022.

Evaluating Support for Covid-19 Anxiety

Partner: Cincinnati Children's Hospital

Synopsis

Wysa's COVID anxiety tool pack was co-developed with the Child Psychiatry Department of Cincinnati Children's Hospital who evaluated the effectiveness of the toolpack with 1000 pediatric patients. In the study done with the patients (unpublished) at Cincinnati, over 90% of them reported a reduction in distress and found the tools helpful.

Status: Study complete; manuscript in progress

Adolescent Mental Health Support - NHS Schools

Partner: NHS-Funded Study in UK Schools, as part of the Digital Health London Digital Pioneer Fellowship

Synopsis

This project aimed to evaluate the potential impact of AI as a digital tool to support emotional wellbeing in adolescence. Wysa was introduced as an early stage intervention across 5 schools in London, covering about 6,000 students. 87% found the intervention helpful, and 92% felt it was important to have access to apps like this when they needed help. Seeking creative solutions to contemporary clinical issues, amongst potentially hard to reach research participants has proven engaging and challenging and we report here on early findings from this small fellowship study.

Status: Study complete; manuscript in progress

iWellness Study with College Students

Partner: Harvard Medical School and Harvard University Health Services

Synopsis

This study aims to evaluate the effectiveness of utilizing a mobile mental health app to improve symptoms of depression and anxiety for students compared to treatment as usual through an RCT. This study will help evaluate mediators of change, and provide understanding of how an innovative tool such as a CBT-based mobile app can be used to improve access to care for college students in need of services who are not engaged in treatment at the student counseling center.

Status: Study complete; manuscript in progress

Feasibility Study with Adolescents

Partner: Columbia Population Research Center

Synopsis

This RCT aims to pilot test a mobile mental health app (Wysa) to assess feasibility and acceptability and obtain preliminary estimates of effects on levels of depression and anxiety among adolescents. This pilot will recruit a general population of 50 adolescents to evaluate the Wysa app over 1 month of usage. All participants will complete surveys at baseline and post-intervention periods. In addition, adolescents will complete brief daily diary surveys containing information about mood.

Status: Study complete; manuscript in progress

Papers Discussing Wysa

Systematic assessment of the quality and integrity of popular mental health smartphone apps using the American Psychiatric Association's app evaluation model

Key Points

- The most visible 100 apps for “depression”, “anxiety” and/or “mood” on the Google Play and Apple App stores were selected for assessment using the American Psychiatric Association App Evaluation model. The model assessed the apps across five broad steps: accessibility, integrity, clinical and research evidence base, user engagement and interoperability.
- App quality was also assessed. Following aspects were looked at in the assessment of quality: psychoeducation, monitoring or tracking, prevention, intervention and treatment.
- Wysa was one of the top three apps (from an original pool of 92 apps) at the end of the systematic assessment. Through the systematic assessment, only three apps weren’t strained out and remained at the end, indicating that they met the required criterias. Wysa was one of the three apps.

Synopsis

Mobile phones are playing an increasingly important role in supporting mental health, by providing confidential, accessible and scalable support for individuals who may not seek or have means of accessing professional help. This paper assesses the quality and integrity of these apps by employing systematic assessment. The most visible 100 apps for “depression”, “anxiety” and/or “mood” on the Google Play and Apple App stores were selected for assessment using the American Psychiatric Association App Evaluation model. The model assessed the apps across five broad steps: accessibility, integrity, clinical and research evidence base, user engagement and interoperability. App quality was also assessed. Following aspects were looked at in the assessment of quality: psychoeducation, monitoring or tracking, prevention, intervention and treatment. The assessment carried out was hierarchical. With every step, apps that didn’t meet the criteria were strained out. Of the 92 apps assessed, only three of the 10 apps most visible on app stores met the criteria for research/clinical base and engagement/ease of use. One of these three apps was Wysa. The findings of this review highlight the need for greater accountability of app developers to meet, and report, at least minimum quality and integrity standards for their apps.

Citation: Rickard, N.S., Kurt, P., & Meade, T. (2022) Systematic assessment of the quality and integrity of popular mental health smartphone apps using the American Psychiatric Association's app evaluation model. Front. Digit. Health 4:1003181. doi: 10.3389/fdgth.2022.1003181

A review of popular smartphone apps for depression and anxiety: Assessing the inclusion of evidence-based content

Key Points

- Wysa has the highest number of evidence based treatments
- These include behavioral activation, cognitive restructuring, psychoeducation, relaxation, meditation, and mindfulness.

Synopsis

Smartphone applications for the treatment of depression and anxiety have acquired millions of users, yet little is known about whether they include evidence-based therapeutic content. Researchers examined the extent to which popular mental health applications (MH apps) for depression and anxiety contain treatment elements found in empirically supported psychotherapy protocols (i.e., “common elements”). Psychoeducation, relaxation, meditation, mindfulness, and assessment were the most frequent elements, whereas several elements (e.g., problem solving) were not found in any apps. Cognitive restructuring was more common in depression protocols than in depression apps, as was problem solving. For anxiety, exposure, cognitive restructuring, and problem solving were more common in protocols than apps. Overall, the findings highlight empirically supported treatment elements that are poorly represented in current MH apps. The absence of several core treatment elements underscores the need for future research, including randomized trials testing the effectiveness of popular MH apps.

Citation: Wasil, A. R., Venturo-Conerly, K. E., Shingleton, R. M., & Weisz, J. R. (2019). A review of popular smartphone apps for depression and anxiety: Assessing the inclusion of evidence-based content. Behaviour research and therapy, 123, 103498.

Is There an App for That? A Review of Popular Apps for Depression, Anxiety, and Well-Being

Key Points

- Wysa's conversations target specific problems and goals (e.g., building confidence, managing anxiety)
- Offers an "SOS" tab of resources (e.g., grounding exercises for panic attacks, domestic and international hotlines)
- Notifications can be enabled to remind the user to use the app and notify the user when new exercises are available

Synopsis

Smartphone apps for mental health (MH apps) and wellness reach millions of people and have the potential to reduce the public health burden of common mental health problems. Thousands of MH apps are currently available, but real-world consumers generally gravitate toward a very small number of them. An overview of the content within these apps could be an important resource for users, clinicians, researchers, and experts in digital health. This paper offers summaries of the content within highly popular MH apps. They describe a small number of highly popular MH apps in three common categories: meditation and mindfulness, journaling and self-monitoring, and AI chatbots. The authors downloaded the two most popular apps in each of these categories (respectively: Calm, Headspace; Reflectly, Daylio; Replika, Wysa). These six apps accounted for 83% of monthly active users of MH apps. For each app, they summarize information in four domains: intervention content, features that may contribute to engagement, the app's target audience, and differences between the app's free version and its premium version. In the years ahead, rigorous evaluations of highly popular MH apps will be needed.

Citation: Wasil, A. R., Palermo, E. H., Lorenzo-Luaces, L., & DeRubeis, R. J. (2021). Is There an App for That? A Review of Popular Apps for Depression, Anxiety, and Well-Being. Cognitive and Behavioral Practice.

Can Your Phone Be Your Therapist? Young People's Ethical Perspectives on the Use of Fully Automated Conversational Agents (Chatbots) in Mental Health Support

Key Points

- 3 conversational agents were reviewed, including Wysa.
- Wysa provides evidentiary support about the techniques it utilizes.
- Most important difference identified by users is that Wysa is only available as an app, which gives users the possibility to chat anonymously.
- Wysa's confidentiality is maintained by it offering privacy information during our first conversation.

Synopsis

Over the last decade, there has been an explosion of digital interventions that aim to either supplement or replace face-to-face mental health services. More recently, a number of automated conversational agents have also been made available, which respond to users in ways that mirror a real-life interaction. What are the social and ethical concerns that arise from these advances? In this article, we discuss, from a young person's perspective, the strengths and limitations of using chatbots in mental health support. We also outline what we consider to be minimum ethical standards for these platforms, including issues surrounding privacy and confidentiality, efficacy, and safety, and review three existing platforms (Woebot, Joy, and Wysa) according to our proposed framework. It is our hope that this article will stimulate ethical debate among app developers, practitioners, young people, and other stakeholders, and inspire ethically responsible practice in digital mental health.

Citation: Kretzschmar, K., Tyroll, H., Pavarini, G., Manzini, A., Singh, I., & NeurOx Young People's Advisory Group. (2019). Can your phone be your therapist? Young people's ethical perspectives on the use of fully automated conversational agents (chatbots) in mental health support. Biomedical informatics insights, 11, 1178222619829083.

Conversational agents and the making of mental health recovery

Key Points

- Wysa is built around principles of CBT, dialectical behavioral therapy, meditation practices and motivational interviewing.
- Wysa documentation makes clear links to AI and outlines how the chatbot was designed by a wide group of people – which includes therapists, coaches, users and individuals in AI.
- Wysa contains safety disclaimers that it cannot and will not offer medical advice.

Synopsis

AI-based technologies and techniques are now considered to have uses in almost every domain of mental health care: including decision-making, assessment and healthcare management. This paper explores the ways official online materials explain and make sense of chatbots, their imagined functionality and value for (potential) users. They focus on three chatbots for mental health: Woebot, Wysa and Tess. Ultimately, they argue that alongside more traditional forms of recovery, chatbots may be shaped by, and shaping, an increasingly individualized form of a "personal recovery imperative".

Citation: Meadows, R., Hine, C., & Suddaby, E. (2020). Conversational agents and the making of mental health recovery. Digital health, 6, 2055207620966170.

Evaluating Commercially Available Mobile Apps for Depression Self-Management

Key Point

- Wysa offers real-time interactions with an artificial intelligence (AI) enabled chatbot to collect and record daily mood.
- Wysa scored 4.2/5 for MARS App Quality.
- After factoring in the MARS score, IMS Institute for Healthcare Informatics functionality score, and depression self-management features, the highest performing apps included Wysa.

Synopsis

The authors conducted a systematic review of apps for depression by searching in three major app stores. Apps were selected using specific inclusion and exclusion criteria. The final apps were downloaded and independently evaluated using the Mobile Application Rating Scale (MARS), IMS Institute for Healthcare Informatics functionality score, and six features specific to depression self-management. Mobile health apps for depression self-management exhibit a wide range of quality, but more than half (74%) of the apps had acceptable quality, with 32% having MARS scores ≥ 4.0 out of 5.0. These high scoring apps indicate that mobile apps have the potential to improve patient self-management, treatment engagement, and mental health outcomes.

Citation: Myers, A., Chesebrough, L., Hu, R., Turchioe, M. R., Pathak, J., & Creber, R. M. (2020). Evaluating Commercially Available Mobile Apps for Depression Self-Management. In AMIA Annual Symposium Proceedings (Vol. 2020, p. 906). American Medical Informatics Association.

Early Warning Signs of a Mental Health Tsunami: A Coordinated Response to Gather Initial Data Insights From Multiple Digital Services Providers

Key Points

- Wysa witnessed a 77% increase in new users during February to March 2020, as compared with the same period in 2019.
- Users found utility and continued returning to Wysa to manage their distress in this difficult time.

Synopsis

The immediate impact of coronavirus 2019 (COVID-19) on morbidity and mortality has raised the need for accurate and real-time data monitoring and communication. The aim of this study is to document the initial observations from multiple digital services providers during the COVID-19 crisis, especially those related to mental health and well-being. This study provides proof-of-concept of the viability for researchers and private companies to work collaboratively toward a common good. Digital services providers reported a diverse range of mental health concerns. A recurring observation is that demand for digital mental health support has risen, and that the nature of this demand has also changed since COVID-19, with an apparent increased presentation of anxiety and loneliness.

Citation: Inkster, B. (2021). Early warning signs of a mental health tsunami: A coordinated response to gather initial data insights from multiple digital services providers. Frontiers in Digital Health, 2, 64.