



DMHW Conference Proceedings 2024

Ennis, E., McAllister, P., & Gorman, C. (2024, Oct). DMHW Conference Proceedings 2024. Ulster University. <https://doi.org/10.21251/dee52a42-262c-4bb6-b81a-e6d8ddcdbc5>

[Link to publication record in Ulster University Research Portal](#)

Publication Status:

Published (in print/issue): 01/10/2024

DOI:

[10.21251/dee52a42-262c-4bb6-b81a-e6d8ddcdbc5](https://doi.org/10.21251/dee52a42-262c-4bb6-b81a-e6d8ddcdbc5)

Document Version

Publisher's PDF, also known as Version of record

Document Licence:

CC BY

General rights

The copyright and moral rights to the output are retained by the output author(s), unless otherwise stated by the document licence.

Unless otherwise stated, users are permitted to download a copy of the output for personal study or non-commercial research and are permitted to freely distribute the URL of the output. They are not permitted to alter, reproduce, distribute or make any commercial use of the output without obtaining the permission of the author(s).

If the document is licenced under Creative Commons, the rights of users of the documents can be found at <https://creativecommons.org/share-your-work/ccllicenses/>.

Take down policy

The Research Portal is Ulster University's institutional repository that provides access to Ulster's research outputs. Every effort has been made to ensure that content in the Research Portal does not infringe any person's rights, or applicable UK laws. If you discover content in the Research Portal that you believe breaches copyright or violates any law, please contact pure-support@ulster.ac.uk



Conference Proceedings

Second International Digital Mental Health & Wellbeing Conference

19-21 June 2024

Ulster University, Derry-Londonderry campus, Northland Road, Derry-Londonderry

<https://www.ulster.ac.uk/conference/digital-mental-health-and-wellbeing>

Editors / Chairs: Dr Edel Ennis, Dr Patrick McAllister, Dr Colin Gorman

The content in this Conference Proceedings is licensed under the terms of the Creative Commons Attribution 4.0 International Licence (CC BY 4.0) which permits unrestricted use, distribution and reproduction, provided the original work is properly cited. To view a copy of this license, visit <https://creativecommons.org/licenses/by/4.0/>

DOI: <https://doi.org/10.21251/dee52a42-262c-4bb6-b81a-e6d8ddcdbc5>

This conference has also received sponsorship and support from the HSC R&D office in Northern Ireland and Pneuma Healthcare. Conference was hosted by Ulster University, Derry~Londonderry Campus.



Table of contents

- Summary..... 6
- Conference Topics..... 8
- Conference Programme Committee..... 9
- Editorial..... 11
- Keynotes..... 13
 - Keynote 1..... 14
 - Open notes meets open AI: Mental health documentation in the era of generative AI 14
 - Keynote 2..... 15
 - Using digital interventions with people with severe mental health problems: Current practices and future directions..... 15
 - Keynote 3..... 16
 - Mind the theoretical gap: integrating theory and practice in digital youth mental health 16
- Peer Reviewed Abstracts..... 17
 - Session 1 Employee Wellbeing..... 18
 - Applying Association Rule Mining to Employee Wellbeing Platform Event Logs - Gillian Cameron, Maurice Mulvenna, Raymond Bond, Edel Ennis, Siobhan O’Neill, David Cameron 19
 - Proactive Support for Employee Mental Health: Implementing a Stress Detection Algorithm in the Workplace - David W. Vinson, Mihael Arcan, David-Paul Niland, Fionn Delahunty 20
 - Analysis of police service client presentations to psychological therapy services - Byron Graham, Maurice Mulvenna, Raymond Bond, Anne Moorhead, Courtney Potts, Norry McBride 22
 - Session 2 Digital Transformation and Co-Design of Mental Health Services 24
 - Developing a National Strategy for Digital Mental Health in Ireland: A Thematic Analysis of Stakeholder Focus Group Discussions - Robyn Fitzgerald, Sarah Kennedy, Ruth Melia 25
 - Forming Public Patient Involvement (PPI) Groups: Lessons from a Systematic Literature Review - Shannon Aisling Forde, Tara Coppinger, Susan Rea..... 27
 - Co Designing an Affective Computing solution for Anxiety Disorders: blending Signals and Self-Reported Data in Clinical Pathways - Luigi A. Moretti, Miles Thompson, Michael Loizou, Paul Matthews, David Western..... 29

Co-production of an app to support the mental health and wellbeing of people with Parkinson’s disease: a PERCEPT and person-based approach - Cathryn Pinto, Angeliki Bogosian, Jennie Brown, Ricardo Volpato, Catherine Hurt, Lance McCracken, Sam Norton, Patricia Cubi-Molla, Sulayman Chowdhury, Simone Stumpf 31

Utilising Lived Experience Data to Establish a Patient-Centric Digital Wellbeing Solution for People Living with Dementia - Imtiaz Khan, Emma Wootten, Sion Brown, Imtiaz Hussain Khan, Affan Bin Hasan, Chaminda Hewage, Steve Kinsey..... 33

Public Perception of the Risks and Benefits of Digital Mental Health Technologies; A Regulatory Perspective - Holly Coole, Francesca Edelmann, Gareth Hopkin, Richard Branson, Paul Campbell, Sophie Cooper, Mark Salmon, James Humphreys, Mark Gill 35

Session 3 Usability Evaluation of Digital Interventions 37

Assessing the uses, benefits, and limitations of digital technologies in supporting obesity and mental healthcare communication: a scoping review - Amanda Kearns, Anne Moorhead, Maurice Mulvenna, Raymond Bond..... 38

Mental health and illness privacy concerns: Web based service or Mobile app? - Neenu Garg, Eunice Anteh, Tariq Elahi..... 40

Strong personalisation improves the relevance of self-help content in an anxiety app - a simulation study using interaction log data - Clemence Rhodes-Maquaire, Paul Matthews . 41

Ascertaining the acceptability and feasibility of using digital health technologies to assess and understand challenging to manage behaviours in neurorehabilitation - Alistair Teager, Anna Lee, Kerry Watts, Rachel Burgon, Thomas Handy, Abigail Methley, Nick Alderman..... 42

Probing the Acceptance of Automated Timely Interventions to Enhance Cognitive Behavioural Therapy for Obsessive Compulsive Disorder - David Western, Miles Thompson, Fiona Brimblecombe, Luigi A. Moretti, Faith Martin 44

A rapid health response to COVID-19 lockdowns in rural Victoria: assessing factors influencing change in mental health outcomes - Darryl Maybery, Denise Azar, Tim Campbell, Elizabeth Craig, Michaela O’Regan, Rochelle Hine, Eleanor Mitchell, Anton Isaacs, Keith Sutton, Shane Bullock, Michael Naughton 46

A Mixed-Methods Investigation into Youth Experiences with a Digital Mental Health Helpline During and After COVID-19 - Shyn Wei Phua, Leslie Gutman..... 47

eTaz Children's Mental Health assessment tool: Evaluating Usability and Acceptance in CAMHS and Paediatric settings - Aisling Mulligan, Anne Coffey, Elena Tan, Kim Hopkins, Pauline Carroll, Alfonso Rodriguez-Herrera 49

Session 4 Sensors and Wearable Technologies in Mental Health..... 51

Conference Proceedings: 2nd International Digital Mental Health & Wellbeing Conference
 Ulster University, Derry-Londonderry

Exploring Major Depressive Disorder through Clustering of Objective Sleep Markers Measured by Fitbit Devices - Carolin Oetzmann, Yuezhou Zhang, Ewan Carr, Lamers Femke, Faith Matcham, Sara Siddi, Katie M White, Sara Simblett, Josep Maria Haro, Vairavan Srinivasan, Qingqin Li, Brenda WJH Pennix, Amos Folarin, Richard Dobson, Vaibhav A Narayan, Matthew Hotopf, Nicholas Cummins..... 54

The UL-aid Depression Project: Exploring Depression, Residual Symptoms, and Stress Using Network Models and Wearable Technology - Aoife Whiston, Eric R. Igou, Donal G. Fortune, Maria Semkovska 56

Exploring the Interplay of Physiological Signals and Emotions Using Wearables and Machine Learning - Yuexin Liu, Amir Tofighi Zavareh, Ben Zoghi 57

Session 5 Health apps, web apps, and Software in Mental Health..... 58

Performance results from app-based mental health assessment using machine learning on voice biomarker data - Philip Donaghy, Edel Ennis, Maurice Mulvenna, Raymond Bond, Niamh Kennedy, Mike McTear, Henry O’Connell, Nate Blaylock, Raymond Brueckner 59

Mobile Phone Mood Tracking, Inference and Prediction: A Literature Review - Fiona Hegarty, Dr. Liadh Kelly, Professor Thomas J. Naughton 61

Predicting and Monitoring Symptoms in Diagnosed Depression Using Mobile Phone Data: An Observational Study - Arsi Ikäheimonen, Nguyen Luong, Ilya Baryshnikov, Richard Darst, Roope Heikkilä, Joel Holmen, Annasofia Martikkala, Kirsi Riihimäki, Outi Saleva, Erkki Isometsä, Talayeh Aledavood..... 63

Development of a Digital Therapeutic Alliance Scale in the Context of Fully Automated Mental Health Apps - Fangziyun Tong, Reeva Lederman, Simon D’Alfonso, Katherine Berry, Sandra Bucci..... 65

Connecting young people digitally to improve their mental health - Becca Randell..... 67

Getting Older Adults Online: What Predicts Online Psychotherapy Use Among Over 50s? - Siofra McCrum, Dr. Jemma McGourty, Dr. Orla Moran 68

A randomized controlled trial to assess the efficacy of a mobile app-based Cognitive Bias Modification (CBM) therapy for Paranoia called STOP (Successful Treatment for Paranoia) - Jenny Yiend, Rayan Taher, Carolina Fialho, Chloe Hampshire, Che-Wei Hsu, Thomas Kabir, Jeroen Keppens, Philip McGuire, Elias Mouchlianitis, Emmanuelle Peters, Tanya Ricci, Sukhwinder Shergill, Daniel Stahl, George Vamvakas, Pamela Jacobsen 70

Digital mental health interventions for university students with mental health difficulties: systematic review and meta-analysis - Alba Madrid Cagigal, Gary Donohoe 72

Session 6 Digital Mental Health Interventions 73

Clinicians and Users Views and Experiences of a Tele-Mental Health Service Implemented Alongside the Public Mental Health System during the COVID-19 Pandemic - Darryl Maybery, Anton Isaacs, Eleanor Mitchell, Keith Sutton, Michael Naughton, Rochelle Hine, Shane Bullock, Denise Azar 74

A Chat-Based therapy for emotional support: exploring the impact on psychological distress and goal attainment - Armin Rez, Cristina Van Nood, Gili Hoter Ishay, Cristina Gil-Lopez 75

Innovating a Telegram Bot for Harmonizing Parent-Child Relationships; an Emotionally Focused Family Therapy (EFFT) approach - Morteza Rezaei-Zadeh, Mohammad-Ali Mazaheri-Tehrani, Hamideh Mohammadi-Nasab 76

Online synchronous chat counselling for young people: A systematic review - Maria Tibbs, Maeve Dwan-O'Reilly, Aileen O'Reilly, Amanda Fitzgerald 77

Using Conversational Media to Support Delivery of the Verbal Wellbeing Digital Mental Health Intervention - Dr Natalie Divin, Dr Iman Naja, Dr Siobhan Campbell, Dr Francesca Benatti, Dr Alessio Antonini; Sarah Coward 79

Psychological Implications of Employment Status and Social Media Use among Higher Educated Youth: A Study in Kolkata City - Mohai Menul Biswas..... 81

A randomized controlled trial of an online CBT based guided intervention for students with depression and/or anxiety: Findings from the cross-border Student Psychological Intervention Trial (SPIT) - Margaret McLafferty, Natasha Brown, John Brady, Rachel McHugh, Caoimhe Ward, Louise McBride, Anthony J. Bjourson, Siobhan M. O'Neill, Colum P. Walsh, Elaine K. Murray 82

Session 7 Gamification, Virtual Reality (VR), and Augmented Reality 84

Acceptability, Feasibility, and Preliminary Evaluation of an Animated Virtual Reality Game for Reducing Mental Health Stigma in Healthcare Students and Trainees - Raul Szekely, Oliver Mason, David Frohlich, Elizabeth Barley 85

Evaluating a Virtual Reality Solution in Addiction Recovery for Marginalized Communities - Daithi Conlon, Dominic Holmes..... 87

Virtual Resilience: Exploring the Efficacy of Digital Tools and Strategies in Countering Stigmatisation of Mental Health among African Refugee Women - Eunice Anteh 89

Addressing Mental Health Stigma with Serious Games in Virtual Reality - Oliver Mason 90

Session 8 Conversational Interfaces for Mental Health 91

Exploring Large Language Models in Digital Mental Health: Unlocking the Potential and Navigating the Pitfalls - Michael McTear..... 92

Development of an artificial intelligence chatbot to analyse challenging to manage behaviours - Prem Deep Mareedu, Thomas Handy, James Chapman, James Burch, Alistair Teager	93
Establishing User Needs for Conversational Agents in the Suicide Prevention Ecosystem - Sarah Z. Mbawa, Shakila Shayan, Aletta Smits, Dennis Nguyen, Tishana Brooks, Nynke Brandsma, Koen Van Turnhout	95
Session 9 Machine Learning and Natural Language Processing in Mental Health	97
Language Models to identify mental health topics in conversations - Cristina Luna-Jimnez, Zoraida Callejas, David Griol	98
Towards robust protocols for longitudinal mHealth speech analysis in mental health: an investigation of practice effects - Judith Dineley, Roberts Tamaris, Tian Pan, Lauren L. White, Zahia Rahman, Catriona Lucas, Ewan Carr, Faith Matcham, Johnny Downs, Richard Dobson, Nicholas Cummins.....	100
Understanding Depression's Multifaceted Effects in Outpatient Settings - Mihael Arcan, David-Paul Niland, Sean Gordon, Anne Doherty, Fionn Delahunty	102
The Feasibility and Acceptability of a Mobile-based Safety Planning App to Address Suicidality with Young People Accessing Secondary Level Mental Healthcare - Robyn Fitzgerald, Ruth Melia, Kady Francis, Jim Duggan, John Bogue, Mary O’Sullivan, Karen Young, Derek Chambers, Shane J McInerney, Edmond O’Dea, Rebecca Bernert	104
Developing interfaces for a reliable Spanish chatbot focused on providing information about suicide - Pablo Ascorbe, María S. Campos, César Dominguez, Jonathan Heras, Magdalena Pacrez, Ana Rosa Terroba-Reinares	106
Session 10 Digital Interventions and Suicide Prevention.....	108
The Application of Artificial Intelligence to Ecological Momentary Assessment Data in Suicide Research: A Systematic Review - Ruth Melia, Katherine Musacchio Schafer, Megan L. Rogers, Emma Wilson-Lemoine, Thomas Joiner	109
Digital Wellbeing Care and Access to Mental Health Services - Melia Formento.....	111

Summary

Mental ill health is prevalent, and citizens need more support to prevent mental ill health as well as supporting their treatment and management of their mental health and wellbeing. With traditional services being under pressure, there is a need for more research to investigate the use of digital technologies to support the mental health and wellbeing of people. However, we must also bear in mind that the implementation of digital technologies cannot solve all our problems. Nevertheless, digital technologies often come with benefits such as being somewhat sustainable, ubiquitous and being accessible 24/7.

This conference attracted novel work involving digital mental health interventions, e.g. mental healthcare apps, chatbots, web apps, wearables, sensors, and virtual or augmented reality tools to support a person's mental health and wellbeing. It also attracted data science, machine learning and AI research that is applied to the mental health domain - especially given the wealth of real-world mental health data that is available, which can provide new knowledge discoveries and insights. The conference featured keynotes and talks from leading academic researchers and service providers.

Conference Topics

- Digital mental health interventions
- Health apps, web apps, and software in mental health
- Data science, analytics, and machine learning in mental health
- Speech analytics, Natural Language Processing (NLP) and smart speaker applications for mental health
- Conversational user interfaces and chatbots for mental health
- Artificial Intelligence (AI) applications in mental health
- Web technologies in mental health
- Virtual Reality (VR) and Augmented Reality (AR) applications in mental health
- Digital Transformation of mental health services
- Digital mental health service co-design and modelling
- Sensors and wearable technologies in mental health
- Affective computing and positive computing
- Databases and datasets in mental health
- Cyber-psychology and digital wellbeing
- Digital mental health care models
- Large Language Models (LLMs) in mental health
- Digital citizenship in mental health
- Ethics in digital mental health
- Digital mental health employee wellbeing
- Co-production and co-creation of digital mental health services
- Digital mental health as adjunctive therapy
- Digital mental health and social prescriptions
- Addressing engagement and retention in digital mental health services
- Using gamification approaches in digital mental health interventions
- Evidence-based approaches for mental health services
- Developing policy and practice around digital mental health interventions
- Regulation, compliance, quality assurance and standards in digital mental health service design
- Design and evaluation of digitally supported content, therapies and interventions
- Digital mental health interventions for marginalised groups
- Digital storytelling, design fictions, interaction design, graphic design for mental health service co-creation

Conference Programme Committee

- Dr Lu Bai, Queen's University Belfast
- Dr Andrea Bickerdike, Munster Technological University
- Dr Paul Best, Queen's University Belfast
- Prof Raymond Bond, Ulster University
- Dr Kyle Boyd, Ulster University
- Dr Con Burns, Munster Technological University
- Prof Zoraida Callejas, University of Granada
- Gillian Cameron, Inspire Wellbeing
- Prof Luke Chen, Ulster University
- Prof Gennaro Cordasco, Università degli Studi della Campania
- Dr Edward Coughlan, Munster Technological University
- Philip Donaghy, Ulster University
- Dr Edel Ennis, Ulster University
- Prof Anna Esposito, Università della Campania
- Dr Liadh Kelly, Maynooth University
- Dr Matthias Kraus, University of Augsburg
- Dr Jun Liu, Queen's University Belfast
- Dr Jorge Martinez Carracedo, Ulster University
- Dr Patrick McAllister, Ulster University
- Dr Grainne McAnee, Ulster University
- Gavin McConvey, Action Mental Health
- Dr Orla McDevitt-Petrovic, Ulster University
- Prof Sinéad McGilloway, Maynooth University
- Dr Margaret McLafferty, Ulster University
- Prof Mike McTear, Ulster University
- Dr Kristel Miller, Ulster University
- Dr Anne Moorhead, Ulster University
- Prof Maurice Mulvenna, Ulster University
- Dr Elaine Murray, Ulster University
- Prof Siobhan O'Neill, Ulster University
- Courtney Potts, Ulster University
- Jonathan Smyth, Action Mental Health
- Kate Turley, Chroma Lighting
- Dr Maria Wolters, University of Edinburgh
- Prof Huiru Zheng, Ulster University

Editorial

The programme for the Second International Digital Mental Health & Wellbeing Conference included 56 talks and attracted over 120 delegates. The conference included a free pre-conference public event entitled “*Young People - Nurturing our Mental Health in a Digital Age*” which focused on the use of digital tools and technologies to support young people's mental health. This event was chaired by Professor Maurice Mulvenna (Ulster University).

Young people, teachers, parents, youth workers came to Ulster University's Derry~Londonderry Campus for a half-day event filled with insightful discussions. The event was supported and sponsored by Atlantic Futures¹. This was an opportunity to learn from experts in the field about the importance of digital technologies in empowering young people and discover innovative ways to support them in this digital age. The event started with PhD researcher on the Atlantic Futures project, Jamie McNulty, speaking about how to support your friends, providing tips and guidance for young people on how to help and support friends with their mental health and wellbeing. Two clinicians from Western Trust and Donegal HSE provided their perspectives on mental health and digital technologies and focused discussion around young people's mental health and the potential role of digital technologies from the professionals' perspective. This section was chaired by Mental Health Champion Prof Siobhan O'Neill. After a break, there was a very insightful session by young people as 'Experts by experience', where young people shared their thoughts, with pupils from St Mary's discussing issues impacting young people today, and the potential role that digital technologies can play in supporting young people's mental health. This session was supported by MD Educational Foundation. Finally, the workshop concluded with a reflective interactive Vevox session on 'How can we better support the mental health of young people?' where young people and then all attendees shared their ideas and thoughts on how we can better support young people's mental health.

The Digital Mental Health and Wellbeing Conference commenced at 14:00 on 19 June after the pre-conference event. The conference programme comprised of 10 sessions, each representing a theme: 1) Employee Wellbeing, 2) Digital Transformation and co-design of mental health services, 3) Usability Evaluation of digital interventions, 4) Sensors and wearable technologies in mental health, 5) Health apps, web apps, and software in mental health, 6) Digital Mental Health Interventions, 7) Gamification, Virtual Reality (VR), and Augmented Reality (AR), 8) Conversational interfaces for mental health, 9) Machine learning & Natural Language Processing in mental health, and 10) Digital interventions and suicide prevention. The conference included four excellent keynotes. This included a keynote by Dr Charlotte Blease (Uppsalla University) who presented “*Open notes meets open AI: Mental health documentation in the era of generative AI*”. Dr Paulina Chmara and Corinne Pearson (Silvercloud) gave a keynote entitled “*30,000+ Referrals: Pioneering Mental Healthcare with SilverCloud & HSE Ireland*”. Professor Sandra Bucci (University of Manchester) gave a keynote presentation focusing on current practices of digital mental health tools entitled “*Using digital interventions with people with severe mental health problems: Current practices and future directions*” and also Dr David Coyle (University

¹ <https://www.atlanticfutures.com/>

Conference Proceedings: 2nd International Digital Mental Health & Wellbeing Conference
Ulster University, Derry-Londonderry

College Dublin) gave a keynote on how to integrate theory and practice into digital youth mental health with a talk entitled “*Mind the theoretical gap: integrating theory and practice in digital youth mental health*”. The conference also included a lunch workshop to provide wellbeing and mental health advice which was facilitated by Inspire Wellbeing.

Two presentations were awarded during the conference. This included an award to Sarah Z. Mbawa (HU University of Applied Sciences Utrecht,) who presented work on establishing user needs for conversational agents in the suicide prevention ecosystem. The award for early career/PhD researcher was jointly awarded to Fangziyun Tong (School of Computing and Information Systems, University of Melbourne, Parkville, AU) for their presentation focusing on the development of a Digital therapeutic alliance scale in the context of fully automated mental health apps and Gillian Cameron (Inspire Wellbeing and Ulster University) for their presentation talk on applying association rule mining to employee wellbeing platform event logs.

The conference showcased the outstanding digital mental health research being conducted across numerous institutions. It also emphasised the advantages of interdisciplinary teams of researchers collaborating to design and test innovative digital interventions, as well as adopting a cross-disciplinary approach to digital mental health to support young people. Additionally, the conference facilitated the dissemination of various novel digital interventions and tools developed by companies and service providers for their clients. It was clear that the conference successfully united the public (during the free public event), academics, healthcare professionals, industry leaders, charities, and other service providers. We believe this inclusive approach is crucial for bridging the gap between research and real-world implementation, thereby making significant progress in digital mental health.

Finally, having completed the second edition of the conference, we will now host the 3rd International Digital Mental Health and Wellbeing Conference in 2025 at the University of Granada, Spain.

Keynotes

Keynote 1

Open notes meets open AI: Mental health documentation in the era of generative AI

Dr Charlotte Blease

Biography

Dr Charlotte Blease is a philosopher and interdisciplinary healthcare researcher at the Department of Women's and Children's Health, Uppsala University, Sweden, and Research Affiliate at Digital Psychiatry, Beth Israel Deaconess Medical Center, Boston, USA. Prior to this she was based at Harvard Medical School for five years and has held academic posts in the UK, Ireland, and Germany.

Blease has a diverse publication portfolio of more than 120 peer-reviewed journal papers and book chapters ranging across digital health, clinical ethics, philosophy of medicine, and psychology. Among her research expertise is assessing patient online record access and surveys on clinicians' views about the impact of artificial intelligence on their jobs.

Next year, her co-edited book on the "Nocebo Effect" will be published (Mayo Clinic Press). She is also writing a book about the psychology of the medical appointment, and the potential for artificial intelligence to help address inherent human limitations with delivering healthcare (Yale University Press).

Keynote 2

Using digital interventions with people with severe mental health problems: Current practices and future directions.

Professor Sandra Bucci

Biography

Sandra Bucci is a Professor of Clinical Psychology at the University of Manchester a National Institute for Health and Care Research (NIHR) Research Professor. She is an honorary consultant clinical psychologist at Greater Manchester Mental Health NHS Foundation Trust (GMMH), co-Director of the Complex Trauma and Resilience Research Unit (GMMH), and Editor-in-Chief of the British Psychological Society journal *Psychology and Psychotherapy: Theory, Research and Practice*. Prof. Bucci leads a large co-produced programme of research focused on developing digital solutions for people with severe mental health problems.

Keynote 3

Mind the theoretical gap: integrating theory and practice in digital youth mental health

Dr David Coyle

Biography

David Coyle is an Associate Professor with the School of Computer Science and a founding member of the HCI@UCD research group. HCI@UCD is an interdisciplinary research group bringing together designers, computer scientists, social and cognitive scientists. It has core research interests in digital health technology, user autonomy, and ethical aspects of design. The group publishes regularly in leading journals and conferences, including ACM CHI, and seeks to develop technologies that have a positive impact on society.

His research focuses on Human Computer Interaction and health technologies, with an emphasis on digital mental health. He has an established international reputation in this field, with achievements including regular high impact publications, large-scale deployments, and two successful spinout companies. Conservatively estimated, technologies developed from his research have supported mental health interventions for over one million people. This has included online interventions for adults, clinical interventions for young people, and specialist interventions for adults with intellectual disabilities.

He is the founder of a not-for-profit company, Handaxe CIC, which was established to increase the societal impact of his research. He has also advised the Irish Health Service Executive (HSE) on national mental health strategies.

Peer Reviewed Abstracts

Session 1 Employee Wellbeing

Applying Association Rule Mining to Employee Wellbeing Platform Event Logs

Gillian Cameron [1][2], Maurice Mulvenna [2], Raymond Bond [2], Edel Ennis [3], Siobhan O'Neill [3], David Cameron [1]

[1] Inspire, Northern Ireland, UK

[2] School of Computing, Faculty of Computing Engineering & the Built Environment, Ulster University, Northern Ireland, UK

[3] School of Psychology, Faculty of Life and Health Sciences, Ulster University, Northern Ireland, UK

Introduction: The availability of mental health data is on the rise, but processing can be challenging due to data being unstructured, or noisy. Data mining, the technique of analysing large databases to uncover new knowledge, is gaining popularity in medicine and mental health fields. Using techniques such as data mining to analyse mental health data can allow researchers to estimate the effects that mental illnesses have had and will have on global populations. One such technique is association rule mining, a data mining technique to discover frequent associations between items in a dataset.

Aim: The aim of this study is to apply this technique to a dataset produced by employees using a wellbeing platform, to understand the relationship between different tools and resources used on the platform.

Methodology: The Inspire Support Hub is an employee wellbeing platform, developed using PHP and MySQL, containing a range of tools including a mood tracker, a chatbot delivering self-assessments, and psychoeducation. Interactions with the Inspire Support Hub are recorded as anonymous events, including clicks, mood tracks, self-assessment results, with a unique user ID and date/timestamp. Upon sign up, the user utilises a company pin and their sector is recorded. 11,583 users utilised the platform from February 2019 to April 2023. 503 distinct events could be clicked on within the support hub. R studio was used to analyse the event logs collected. R packages dplyr and tidyverse were used for data cleaning and wrangling, and ggplot2 for data visualisation. The support hub event logs were converted into transactions, and an association rule mining technique was applied using the package arules. Using the Apriori algorithm, associations between the logged events can be found during a user's session on the Inspire Support Hub. The Apriori algorithm was applied with the minimum support set to 0.05, meaning that events with a proportion of the total available events within the data set of over 5 per cent were included. The confidence level was set at 0.8, meaning the rule is included in the output only if it's correct 80% of the time.

Results: Results demonstrate that sessions containing events on the chatbot or mood tracker components on the Inspire Support Hub were the most common interactions, and a prominent feature of the discovered association rules.

Conclusions: Based on these association rules, we can obtain greater insight into the user's journey, and provide insights and recommendations for building better digital tools for mental health, with a more personalised user experience.

Support for Employee Mental Health: Implementing a Stress Detection Algorithm in the Workplace - David W. Vinson, Mihael Arcan, David-Paul Niland, Fionn Delahunty

David W. Vinson [1], Mihael Arcan [2], David-Paul Niland [2], Fionn Delahunty [2]

[1] IntouchCX, Winnipeg, Canada

[2] Lua Health, Galway, Ireland

In today's workplace, employee well-being is a pressing issue. A report from the American Psychological Association in 2021 found that a significant 71% of employees experience stress or tension at work, leading to high rates of attrition and absenteeism, with 61% of attrition and 16% of sick days attributed to poor mental health. Employers face the challenge that employees often only recognise their mental health issues when they reach a crisis point, resulting in limited use of corporate well-being benefits, even among those who statistically need support. This research aims to introduce a stress detection algorithm that provides real-time support pre-emptively before individuals realise, they need help. Leveraging automated chatbot technology, this solution offers a simple and controllable way to reach employees. The study comprehensively examines the feasibility of integrating these innovations into practical learning applications within real-world contexts, identifying effective strategies and optimal deployment scenarios.

The proposed chatbot-style system is integrated into a broader employee experience platform in Colombia and the Philippines, which includes tools such as schedule management, event calendars, performance evaluation, and internal communication, all focused on enhancing employee well-being. For this, we utilise linguistic biomarkers in employees' daily communication to identify well-being issues and deterioration passively. The proprietary stress detection algorithm analyses chat conversations between employees and team leaders, flagging chats indicating stress for immediate action. Unlike questionnaire-based solutions, this algorithm objectively measures stress levels and provides personalised treatment suggestions in real time.

The system proactively engages with individuals through chat, offering a hyper-personalised well-being assistant experience. Besides focusing on stress, we analysed signs of burnout, depression, and anxiety, which we leveraged to provide early access to resources, significantly improving support effectiveness, with studies showing a 22% increase when assistance is provided early. In an 18-week pilot program analysing over 210,000 messages, approximately 2% were identified as containing stress indicators. Most employees had at least one stressed message, with a median of 363 messages per employee. Demographic factors such as age, gender, location, and tenure were assessed for their influence on stress levels. Location, particularly Colombia, and longer tenure were associated with higher percentages of stressed messages.

Engagement with chatbot-initiated conversations showed a positive correlation between engagement opportunities and actual engagement, particularly among less-tenured employees. The study emphasises the potential impact of alert timing on employee engagement and well-being, highlighting the intersection between sustainability and mental health in the workplace. By enhancing the working environment, mitigating work-related stress, and fostering sustainable work practices, the research

advocates for a holistic approach to employee well-being. The findings underscore the connection between sustainability initiatives and mental health, offering valuable insights for organisations striving to create healthier and more resilient workplaces. Future research aims to explore the impact of timing on employee engagement further.

Analysis of police service client presentations to psychological therapy services - Byron Graham, Maurice Mulvenna, Raymond Bond, Anne Moorhead, Courtney Potts, Norry McBride

Byron Graham [1], Maurice Mulvenna [2], Raymond Bond [2], Anne Moorhead [3], Courtney Potts [4], Norry McBride [5]

[1] Queen's Business School, Queen's University Belfast

[2] School of Computing, Faculty of Computing Engineering & the Built Environment, Ulster University, Northern Ireland, UK

[3] School of Communication and Media, Ulster University, Northern Ireland, UK

[4] School of Psychology, Ulster University

[5] Police Rehabilitation and Retraining Trust

Introduction

The Police Rehabilitation and Retraining Trust (PRRT) was established in 1999, in order to address personal concerns by serving and retired officers relating to their time and experiences on the force. In many cases, officers incurred adverse psychological and physical injuries that could hinder their quality of life. PRRT provides the three core services of: psychological therapies, physiotherapy, and new career coaching and development, with the largest demand for psychological therapy services.

Aim

The aim of this study is to provide an analysis of the psychological therapy services based on the Clinical Outcomes in Routine Evaluation (CORE-OM) outcome scores.

Methods

Data for the study were obtained from PRRT, with Ulster University ethical approval (CMFC-22-003). Individual level data were obtained relating to client characteristics, episode details, and test scores. Observations were included only for clients discharged from the service, with at least two recorded CORE-OM scores (Evans, John Mellor-Clark, Frank Mar 2000).

Results

The mean change in psychological distress measured using the CORE score is an overall reduction of 32, and this takes place over an average of 319 days. A paired sample t-test found that there was a statistically significant ($p < 0.001$) difference between the mean first and mean last recorded core score within the episode of care.

Analysis shows that almost two thirds of clients (71%) are male. Overall mean age is 50. In terms of the clients' mental health conditions, these are recorded as PTSD (43%), depression (16%), and anxiety disorder (14%). Most clients have no risk to themselves disclosed (62%), followed by 'fleeting thoughts' (34%), with a smaller proportion reporting a plan or intent (4.3%). A majority of clients are discharged

with a status of 'Treatment Completed' (79%). The most frequent treatments are CBT (66%) and CBT + EMDR (31%).

Conclusions

The results show improvements in client outcome scores through attending the service, as well as differences in the extent of improvement across different client characteristics.

Session 2 Digital Transformation and Co-Design of Mental Health Services

Developing a National Strategy for Digital Mental Health in Ireland: A Thematic Analysis of Stakeholder Focus Group Discussions - Robyn Fitzgerald, Sarah Kennedy, Ruth Melia

Robyn Fitzgerald [1,2], Sarah Kennedy [1], Ruth Melia [1]

[1] University of Limerick

[2] Health Service Executive

Introduction

Digital Mental Health supports aim to improve health outcomes by facilitating accessible, acceptable, person-centred access to overcome geographic, stigma, privacy and service-availability barriers. Such interventions can offer an alternative or adjunct to face-to-face mental health service provision. In November 2023, the Sharing the Vision Digital Mental Health Specialist Group with the support of the Health Research Board hosted a Digital Mental Health conference entitled , ‘Shared Vision for Research, Policy and Practice’ at the University of Limerick. The aim of this conference was to bring together experts and key stakeholders across research, policy, clinical practice, and lived experience, to inform the upcoming digital mental health strategy. Focused strategy discussion groups were facilitated with stakeholders invited to discuss their vision for digital mental health, underlying principles, barriers and enablers, strategy scope, and proposed outcomes. Delegates were assigned to groups at registration to facilitate representation across research, policy, practice and lived experience within groups. The aim of the current study is to thematically analyse the qualitative data collected during six strategy focus group discussions with key stakeholders in Digital Mental Health.

Methods

47 stakeholders were each assigned to one of six focus groups. Groups were facilitated to discuss key aspects of strategy development with the support of a group facilitator, standard prompt questions, and an allocated scribe. Focus group discussions were 50 minutes in duration and occurred concurrently on November 23rd 2023. Stakeholders included digital mental health researchers, clinicians and service providers, those with lived experience of accessing digital mental health supports, and those tasked with digital mental health strategy development.

Focus group discussions were transcribed, and researchers coded and analysed the qualitative data using a thematic analysis framework. Researchers followed Braun and Clarke's (16) 6-step framework: become familiar with the data, generate initial codes, search for themes, review themes, define themes, write-up. Inductive-deductive cycles of thematic analysis were utilized. As the researchers sought to understand stakeholder's views in relation to specific strategy topics, the first step in the analysis took a largely deductive approach. Based on the discussion topics and a read-through of each transcript, broad codes were identified. In the second analytic step, a largely inductive approach was taken to analysing the coding reports from step one. Data were broken down further to identify specific sub themes. In the third step, the researchers juxtaposed the resulting sub-themes.

Results

Results presented will include themes and sub-themes identified through a thematic analysis of expert focus groups to inform the development of a national digital mental health strategy.

Conclusions

Implications for the national digital mental health strategy, future research, and clinical practice will be discussed.

Forming Public Patient Involvement (PPI) Groups: Lessons from a Systematic Literature Review - Shannon Aisling Forde, Tara Coppinger, Susan Rea

Shannon Aisling Forde [1] Tara Coppinger [1] Susan Rea [2]

[1] Department of Sports, Leisure & Childhood Studies, Munster Technological University, Bishopstown, Cork, Ireland, T12 P928

[2] Nimbus Centre, Munster Technological University, Bishopstown, Cork, Ireland, T12 P928

Introduction:

This study focuses on using the findings from a recent systematic literature review (SLR) investigating the efficacy of digital technology at promoting physical activity (PA) for individuals with severe mental illness (SMI). The SLR drew findings based on the effectiveness, challenges, and gaps in utilising digital tools for promoting PA in this population. Key outcomes revealed the potential benefits of digital technology in overcoming barriers to PA engagement such as lack of motivation, knowledge and support. Moreover, the review identified various types of digital interventions; including smartphone applications and wearable devices, which demonstrated promising results at encouraging, motivating, and increasing SMI individuals' PA awareness and participation in PA. These findings were then used to inform content for discussion in Patient and Public Involvement (PPI) groups to support the design of a digital PA intervention for this population.

Methods:

Informed by the findings of the SLR, 2 separate PPI groups were created, which aimed to integrate perspectives from (i) individuals with lived experiences of SMI and (ii) their clinicians. The panel facilitated a collaborative process, whereby stakeholders could contribute insights, preferences, and concerns regarding the development and implementation of digital technology to promote PA and minimise barriers to participation. Through interactive discussions and feedback sessions, the PPI panel will play a crucial role in shaping the design, content, and functionalities of the future digital intervention tailored to the specific needs and preferences of individuals with SMI, within a residential setting. This paper will present the process used to inform PPI group design, the engagement methodology, outcomes, and how this was used in the co-design of a digital-based intervention to promote PA in those with a SMI in a community based residential setting.

Results:

Our study is currently ongoing and the outcomes from the PPI groups will be presented at the conference.

Conclusions:

This study underscores the significance of integrating evidence-based research findings into participatory design processes, such as PPI groups, to ensure that digital health interventions are not only effective but also responsive to the diverse needs and preferences of individuals with SMI. By

leveraging insights gleaned from SLR's, stakeholders can collaboratively work towards developing innovative solutions that promote PA and enhance overall well-being among this vulnerable population.

Co Designing an Affective Computing solution for Anxiety Disorders: blending Signals and Self-Reported Data in Clinical Pathways - Luigi A. Moretti, Miles Thompson, Michael Loizou, Paul Matthews, David Western

Luigi A. Moretti [1], Miles Thompson [2], Michael Loizou [3], Paul Matthews [4], David Western [1]

[1] UWE Bristol (University of the West of England), School of Engineering, England, UK.

[2] UWE Bristol (University of the West of England), School of Social Sciences, England, UK. [3] University of Plymouth, Faculty of Health, England, UK.

[4] UWE Bristol (University of the West of England), School of Computing and Creative Technologies, England, UK.

In recent years, there has been a concerted effort to harness digital technologies for the support of mental health, primarily focusing on individual well-being. However, the integration of these technologies with clinical pathways, a more intricate yet potentially impactful application, has received relatively little attention. Our study is dedicated to the co-design of an affective computing-based solution for Ecological Momentary Assessment (EMA) tailored for anxiety disorders. This presentation will summarise initial findings from our co-design activities and parallel technical developments, offering insights into identified needs, preferences, and potential solutions.

Our goal is to support the patient journey from prevention-screening, detection-diagnosis and monitoring-treatment. Anxiety disorders persistently face issues of under-/mis-diagnosis, owing to challenges in differential diagnoses among subtypes and the presence of common co-occurring somatic complaints and comorbidities. Standard self-reported approaches for evaluating emotional regulation are criticized for their paradoxical nature, while semi-structured interviews may lack specificity and cross-cultural validity, enabling patients to conceal or simulate mental health conditions. It is desirable for a comprehensive and objective tool to differentiate sub-disorders and their stages as well as to quantify their impact on quality of life, and to furnish data substantiating therapeutic success as well as the efficacy of pharmaceuticals, psychological interventions, and alternative treatments.

The affective dimensional model, which frames emotions into the scales of valence, arousal and dominance, can be used to spot abnormalities, such as anxiety patterns, in longitudinal data. We rely on readily available market devices, such as smartphones and smartwatches, to mitigate the risk of stigma among users and ensure affordability. These devices facilitate the collection of both passive (e.g. PPG, GSR) and active (e.g. one-lead-ECG) bio-signals, correlating with variations in the autonomic nervous system and providing indirect insights into emotional states. Furthermore, these devices enable users to collect self-reported data (e.g. surveys, recordings), which can be analyzed (e.g. by Natural-Language-Processing-Models) for tone and content to detect behavioral changes. The integration of these data modalities allows for a more accurate output and/or facilitates comparisons to evaluate user self-awareness. Such an approach would enhance patient awareness and engagement, fostering acceptance and adherence to therapy. Additionally, it would provide clinicians with supplementary information to complement standard approaches, facilitating improved communication and understanding with patients. This would empower the latter to recognize their issues earlier, seek timely support, and better self-manage, thereby reducing the frequency of visits to clinicians. This aligns

with the evolving patient-centric approach and addresses the mounting pressure on healthcare workforce.

Acknowledging the historical challenge of dropouts in digital solutions and medical devices, our study embraces a co-design/co-production approach. Individuals affected by anxiety disorders and clinicians (e.g. psychologists and psychiatrists), will actively engage in the development process of the solutions user experience through iterative activities structured in six phases, ranging from problems definition to post-design evaluation, and including focus group brainstorming, interviews, and online surveys. This inclusive approach addresses the bemoan of a lack of stakeholder consultation and ensures that any developed solution is intricately tailored to the unique needs of users, fostering engagement, acceptance, and privacy-respect.

Co-production of an app to support the mental health and wellbeing of people with Parkinson's disease: a PERCEPT and person-based approach - Cathryn Pinto, Angeliki Bogosian, Jennie Brown, Ricardo Volpato, Catherine Hurt, Lance McCracken, Sam Norton, Patricia Cubi-Molla, Sulayman Chowdhury, Simone Stumpf

Cathryn Pinto [1], Angeliki Bogosian [1], Jennie Brown [1], Ricardo Volpato [2], Catherine Hurt [1], Lance McCracken [3], Sam Norton [4], Patricia Cubi-Molla [5], Sulayman Chowdhury [5], Simone Stumpf [2]

[1] City, University of London, School of Health and Psychological sciences, London UK

[2] University of Glasgow, School of computing science, Glasgow, UK

[3] Uppsala University, Department of Psychology, Uppsala, Sweden

[4] King's College London, Department of Psychology, London, UK

[5] Office of Health Economics, London, UK

Introduction: There is an urgent need to develop appropriate psychological interventions for people with Parkinson's disease. Current provision of psychological support is limited and can be challenging for people who have difficulties with speech and mobility. We describe the development of a psychological support app and how we integrated the views of target users through using a co-production approach.

Methods: We combined 2 approaches (the PERCEPT method and person-based approach) to co-produce the app. Stage 1 (intervention planning) included conducting 4 workshops with people with Parkinson's and carers. Participants were purposively selected to represent different symptoms and familiarity with using technology. Workshop discussions were used to develop personas and guiding principles which shaped the intervention planning and design. Stage 2 (intervention optimisation) included conducting 6 think-aloud interviews and refining the intervention based on user feedback. The final intervention prototype was presented to participants in a final workshop.

Results: 10 participants took part in the workshops (3 carers and 7 people with Parkinson's). Key themes that informed intervention planning included the levels of acceptance of Parkinson's disease, finding a balance with Parkinson's care and management, and being accessible and sensitive to different Parkinson's symptoms. Each of themes were taken into account when developing the guiding principles which were used to make decisions around intervention content and design. We co-created 2 personas with workshop participants which included characteristics such as disease stage, Parkinson's symptoms (e.g. tremors and speech difficulties), and attitude or outlook towards managing Parkinson's. These personas were drawn on to develop the app wireframes and the subsequent app prototype. Feedback from the think-aloud interviews included improving the homepage layout and structure, improving the functionality of features such as voice recording and session ratings, and providing clearer explanations or guidance for some sessions so users know what to expect.

Conclusions: Adopting a co-production approach ensured that intervention content and design was relevant and accessible to people with Parkinson's. The user feedback obtained through this intervention planning and optimisation process provides useful insights and examples for developing engaging digital interventions with people with Parkinson's disease and similar populations.

Utilising Lived Experience Data to Establish a Patient-Centric Digital Wellbeing Solution for People Living with Dementia - Imtiaz Khan, Emma Wootten, Sion Brown, Imtiaz Hussain Khan, Affan Bin Hasan, Chaminda Hewage, Steve Kinsey

Imtiaz Khan [1], Emma Wootten [2], Sion Brown [3], Imtiaz Hussain Khan [1], Affan Bin Hasan [1], Chaminda Hewage [1], Steve Kinsey [3]

[1] Cardiff Metropolitan University, School of Technologies, Cardiff, UK

[2] Age Connect Torfaen, Gwent, UK

[3] AITutoring, Gwent, UK

INTRODUCTION

How do people living with dementia carry out their daily routines? By understanding their lived experience, can we change the current care approach and improve their wellbeing? Funded by the prestigious Longitude Prize on Dementia and in collaboration with Age Connect Torfaen (ACT), Centre for Industry 4.0 and Blockchain Research (CI4BR) endeavour to answer these questions and developed a patient-centric healthcare 4.0 solution, - DementiaConnects app. Developed through a cocreation approach with 600+ PwD and their carer linked to ACT, the objective of the DementiaConnects app is to utilise the lived experience data to understand the progression of dementia.

RESULTS

The app has introduced mechanisms to passively measure the cognitive, physiological and psychological state of the PwD in near real-time basis. To understand the cognitive abilities, particularly short-term sequential memory, the app provides interactive instructions for daily tasks (e.g. brushing teeth, drinking water etc.) in a sequential manner. As the PwD undertake these tasks, time duration of different parts of the task (e.g. taking out toothpaste from the tube) is recorded and forms the basis for timeseries data analysis. PwD can also play different games (e.g. solitaire) which again passively provides data about the time to take move, rate of successful move etc. To understand the physiological state of the PwD, smartwatch like wearable devices is integrated with the app to measure the different physiological parameters like sleep patterns, heart rate etc. Finally, to understand the psychological state, the app is integrated with ChatGPT to provide natural conversation (voice to text to voice). The app also provides selection of music and photos according to individual choices. Meta analysis of conversation and entertainment selection provides an outlook about psychological state and choices of PwD.

CONCLUSION

Using these cognitive, physiological and psychological lived experience data, we are developing a peer-to-peer support network, where likeminded PwD with similar abilities can support each other virtually. Community support will not only help to mitigate loneliness but also can improve wellbeing.

Public Perception of the Risks and Benefits of Digital Mental Health Technologies; A Regulatory Perspective - Holly Coole, Francesca Edelmann, Gareth Hopkin, Richard Branson, Paul Campbell, Sophie Cooper, Mark Salmon, James Humphreys, Mark Gill

Holly Coole PgDip, Francesca Edelmann BSc, Gareth Hopkin PhD, Richard Branson MA, Paul Campbell FRCA, Sophie Cooper BSc, Mark Salmon MBA, James Humphreys MA, Mark Gill

[1] Medicines and Healthcare products Regulatory Agency, 10 South Colonnade, London, England, E14 4PU

[2] National Institute for Health and Care Excellence, Level 1A, City Tower, Piccadilly, Manchester, England, M1 4BT

[3] Woodnewton Associates Limited, 5 Chancery Lane, London WC1A 2LG

Digital mental health technologies (DMHTs) are becoming well established within mental health services and through direct-to-consumer models. They present a significant opportunity to improve access to and quality of mental health care. Due to their scalable nature, DMHTs may support services to bridge the gap between demand for interventions and the available workforce, particularly where existing pathways have long delays or restricted capacity.

However, the challenges and risks associated with DMHTs also need consideration. In a rapidly developing market, it isn't clear who technologies are aimed at, how they function, and whether claims of safety and effectiveness are supported by good-quality evidence. There are also concerns that many people stop using DMHTs too soon, because they are dissatisfied or the technology is unengaging, and that this risks discouraging future help-seeking behaviour and cause other indirect harms.

The Wellcome Trust have funded a 3-year project, spearheaded by the MHRA and in partnership with NICE, to explore and provide more clarity on how regulatory and health technology assessment requirements apply to DMHTs specifically. The initial phase of the project comprised a series of reviews and activities to establish the current landscape of DMHTs and their applications in practice. One such activity commissioned the expertise of a market research company, Woodnewton, to explore public perceptions towards DMHTs, their risks and benefits, and what effective regulation of these technologies should look like.

The results of the market research validated known concerns, particularly regarding the high level of disengagement amongst DMHT users. The research also highlighted further insights regarding how the public perceive these technologies, along with their concerns and hopes for their use in health and care services both now and in the future.

The results also provided helpful insights for the MHRA and NICE to consider in latter stages of the project, and how information regarding DMHTs should be disseminated to maximise awareness and impact of the project outputs.

Conference Proceedings: 2nd International Digital Mental Health & Wellbeing Conference
Ulster University, Derry-Londonderry

We will present information on the findings of the market research in the context of the Wellcome-funded project and how these will inform subsequent work on qualification and classification of DMHT as Software as a Medical Device (SaMD), clinical evaluation and post-market surveillance.

Session 3 Usability Evaluation of Digital Interventions

Assessing the uses, benefits, and limitations of digital technologies in supporting obesity and mental healthcare communication: a scoping review - Amanda Kearns, Anne Moorhead, Maurice Mulvenna, Raymond Bond

Amanda Kearns [1], Anne Moorhead [2], Maurice Mulvenna [3], Raymond Bond [3]

[1] Ulster University, Institute for Nursing and Health Research, Belfast, Northern Ireland

[2] Ulster University, School of Communication and Media, Institute for Nursing and Health Research, Belfast, Northern Ireland

[3] Ulster University, School of Computing, Belfast, Northern Ireland

Introduction

Obesity and mental health issues are major public health concerns with complex interconnections that impair physical, social, and mental well-being. Digital technologies offer potential for enhancing healthcare communication between health professionals (HPs) and individuals living with obesity and mental health issues, but their effectiveness is not fully understood. This scoping review aims to identify and understand the different types of technologies that are used by health professionals in supporting obesity and mental health communication.

Methods

A comprehensive scoping review, guided by Arksey & O'Malley's (2005) methodology, analysed literature from 2013-2023 across eight databases. Data extraction focused on HPs' use of communication technologies, intervention types, biopsychosocial considerations, and perceptions of technology use. The review question was: 'What are the uses, benefits, and limitations of digital technology in supporting communication between HPs and persons living with obesity and mental health issues?'

Results

In total, eight studies met the inclusion criteria, featuring web-based platforms, social media, synchronous videos, telephone, automated SMS, and email. Technologies such as Virtual Learning Collaborative (VLC) dashboards and video conferencing, supported by automated SMS and social media Facebook and WhatsApp groups were commonly used. Psychologists, dietitians, social workers, and health coaches used digital tools to facilitate virtual appointments, diet and mental health monitoring, and motivational and educational support through group therapy, one-to-one sessions, and hybrid models. Benefits include improved access to care and engagement, with personalised digital CBT offering tailored feedback. Perceived stigma reduction and enhanced privacy for participants compared with in-person evaluations helped promote adherence and motivation. While digital tools have been successful in obesity management in seven of the eight included studies, none of the interventions showed any significant progress in mental health outcomes. Limitations included

engagement difficulties due to conflicting personal family and work commitments, variable communication mode preferences with some preferring in-person sessions, and misunderstandings of SMS prompts. Conflicts arose from cultural and individual differences, weight stigma, and confusion over HP roles in obesity and mental health care.

Conclusions

Digital technologies have diversified the approaches HPs can take in delivering education, counseling, and motivation to individuals with obesity and mental health issues, facilitating private, stigma-reduced environments for personalised care. While effective in obesity management, the review reveals a shortfall in addressing mental health needs. This highlights an urgent need for digital tools to act as mediums for a deeper engagement with individual's complex biopsychosocial needs. The integration of data science and technological advancements offers promising avenues for tailored digital solutions. The findings advocate the importance of continued innovation and adaptation in digital healthcare communication strategies, with clearer HP roles and an interdisciplinary, empathetic approach focused on individual needs.

Mental health and illness privacy concerns: Web based service or Mobile app? - Neenu Garg, Eunice Anteh, Tariq Elahi

Neenu Garg [1], Eunice Anteh [2], Tariq Elahi [1]

[1] University of Edinburgh, School of Informatics, Edinburgh, Scotland, UK

[2] Heriot-Watt University, The Urban Institute, Edinburgh, Scotland, UK.

Digital platforms for mental health and illness have become increasingly popular for individuals seeking support and assistance in managing their mental well-being. People with mental health issues have poor health, increased cardiovascular risk factors, high mortality rates, high levels of anxiety, sleep disorders, post-traumatic stress disorder and psychotic disorders. Web based services and mobile apps for mental health have shown promising potential and advantages for improving mental health outcomes. Many of these services come free of cost and users can use them for their routine well being. Regardless of their benefits, there are growing concerns regarding user privacy and information security associated with Personal Identifiable Information (PII) leakage by these services. Different platforms however, have different security and privacy policies in place.

The objective of proposed study is to conduct manual tests to extract PII which is shared over Internet while using these services. A manual analysis of most popular digital mental health services has been conducted to understand which service offers better privacy and security for users - whether web services or mobile apps. The study critically evaluates the privacy features and vulnerabilities inherent in both platforms. This study will provide significant insights into the comparative strengths and weaknesses of web services and mobile apps essential to guiding the ethical design and delivery of digital mental health services, empower digital literacy among users with an actionable information about how leaked PII can be used by third parties to build profiles about them. It will also help promote healthcare access and equity and drive technological innovation in the digital mental health field. The apps and web services that have been selected for the study are based upon the review and ratings available from the people using same type of service that a user uses. Our findings reveal that a plenty of PII is leaked like location, gender, email addresses, phone numbers, while using these services. However, the choice of selecting a particular service depends on user's priorities and the level of control they wish to have on their PII.

Strong personalisation improves the relevance of self-help content in an anxiety app - a simulation study using interaction log data - Clemence Rhodes-Maquaire, Paul Matthews

Clemence Rhodes-Maquaire [1], Paul Matthews [1]

[1] University of the West of England, School of Computing and Creative Technologies, Bristol, UK

Sustaining user engagement and long-term usage of mental health apps remains a challenge. Personalisation is considered a promising avenue to address this issue and thereby improve a person's overall mental well-being. Nevertheless, there are few digital mental health interventions employing extensive personalised techniques to provide tailored and responsive support based on users' particular profiles and activities.

This paper aims to investigate the extent to which a personalised self-help content feed would improve user relevance compared to standardised or even random presentation. The study uses a retrospective data mining approach whereby user interactions are taken as proxies for preferences, and simulates a scenario that compares three ranking conditions, each with a different way of accessing self-help content: user-ranked content (sorted based on popularity), randomised content, and personalised content.

Data from the SAM mental health app was analysed, encompassing user ratings for various content items and individual mood tracker scores. The dataset comprises 7,834 users and 20,728 ratings with access to 58 different forms of cognitive-behavioural therapy and self-help techniques. Users rated the content they encountered while also tracking their moods on a scale. To simulate the ranking conditions, three methods were employed: random sampling (for randomised content), a context-free policy (for user-ranked content), and a Linear Upper Confidence Bound Hybrid algorithm for personalised content. The Linear Upper Confidence Bound Hybrid algorithm is a form of contextual bandit which aims at personalising individual users' content based on their context, in this case their user identifier and their aggregate mood tracking scores.

Using the same dataset for all the ranking conditions enabled us to identify the differences between the models using a loss/reward mechanism (which assumes that the first result presented to the user should be the most relevant to their context). Results indicated that the random approach was the least effective in recommending content to users. Both the personalised and user-ranked content demonstrated the ability to prioritise suitable content, with the personalised condition ranking content better than the standard approach. However, improvements in the personalised ranking condition were contingent on the assumptions regarding user interaction algorithm parameters. This research suggests that personalisation is a viable approach to improving the relevance and timeliness of digital mental health interventions but emphasises the importance of cautious implementation and continuous evaluation. An ongoing prospective study with consistent application of the three ranking conditions and the same mental health app will contribute to the validation of the simulation.

Ascertaining the acceptability and feasibility of using digital health technologies to assess and understand challenging to manage behaviours in neurorehabilitation - Alistair Teager, Anna Lee, Kerry Watts, Rachel Burgon, Thomas Handy, Abigail Methley, Nick Alderman

Alistair Teager [1], Anna Lee [1], Kerry Watts [1], Rachel Burgon [2], Thomas Handy [1], Abigail Methley [3], & Nick Alderman [4]

[1] Manchester Centre for Clinical Neurosciences, England, UK

[2] University of Sheffield, England, UK

[3] Innovative Clinical Psychology Solutions, England, UK

[4] Elysium Neurological Services, England, UK

Introduction

Challenging to manage behaviours (CtMB) include verbal, non-verbal and physical behaviours that impact care. Approximately 40% of individuals present with Challenging to Manage Behaviours (CtMB) following acquired brain injury, affecting neurorehabilitation and prognosis. Current practice relies on paper-based measures and informal observations, but the data gathered can be inconsistent, and data collection can be time-consuming. Digital health technologies (DHT) are widely used with the potential to increase the accuracy, consistency, and utility of assessment data. The current study therefore ascertained how acceptable and feasible DHTs would be in assessing and understanding CtMB in neurorehabilitation, and potential barriers and facilitators to implementation.

Methods

An electronic questionnaire was distributed via email and social media to multidisciplinary professionals in the United Kingdom to gather quantitative data about DHT use and utility in relation to CtMB.

Results

Sixty-nine professionals completed the survey. The majority of respondents worked in specialist neurorehabilitation settings; 56.4% of respondents were psychologists. Only 7.2% of respondents had used DHTs to assess CtMB, but 71% felt that DHTs would be easy to use to record CtMB, and 73.9% felt that DHTs would be easy to use to understand CtMB. The most frequently reported barriers participants were concerned about were having limited physical resources (82.6%), under-staffing (62.3%), DHT usability (62.3%), and cost (58%). The most frequently reported facilitators were accessing training on using the DHT (88.4%), having 1:1 demonstrations on using the DHT (78.3%), accessing peer support (73.9%), and accessing ongoing technical support (69.6%).

Conclusions

Developing DHTs to assess and understand CtMB in neurorehabilitation appears to be acceptable; whilst a small proportion of clinicians have experience of using DHTs in CtMB, the majority feel that they would be easy to use. In order to make DHT implementation more feasible, it will be important to ensure that training and demonstrations are prioritised when upskilling clinical teams, and that timely technical and peer support is available to maintain usability and problem-solve issues that may arise. Relatedly, DHT developers will need to be aware that many respondents were concerned about lack of physical resources, staffing levels, and associated cost. Despite many respondents reporting that using a DHT would be easy, there was still trepidation about usability, reaffirming the need for ongoing support.

Probing the Acceptance of Automated Timely Interventions to Enhance Cognitive Behavioural Therapy for Obsessive Compulsive Disorder - David Western, Miles Thompson, Fiona Brimblecombe, Luigi A. Moretti, Faith Martin

David Western [1], Miles Thompson [2], Fiona Brimblecombe [3], Luigi A. Moretti [1], Faith Martin [4]

[1] UWE Bristol (University of the West of England), School of Engineering, England, UK

[2] UWE Bristol (University of the West of England), School of Social Sciences, England, UK. [3] University of Manchester, School of Social Sciences, England, UK

[4] Cardiff University, School of Psychology, Wales, UK.

Introduction

Cognitive Behavioural Therapy (CBT) is a cornerstone of treatment for Obsessive-Compulsive Disorder (OCD), the fourth most common mental health condition. However, the effectiveness of CBT is often compromised by non-adherence, including to prescribed between-session practice tasks, such as exposure-response prevention techniques. This Adhering to therapeutic practice may be particularly challenging during periods of elevated emotional distress. This study investigates the potential role of in-home and wearable monitoring technologies to provide supportive feedback loops to interrupt compulsions, to increase between-session practice, to thereby augment therapy outcomes.

Methods

To explore the acceptability of this concept we conducted two online surveys: one with people with lived experience of OCD (pwOCD; N=103) and another with mental health professionals experienced in working with OCD (professionals N=14). Both surveys presented three design concepts (scenarios) representing various trade-offs between technical efficacy, complexity, and intrusion, all focused on a specific use case: triggering automated interventions when compulsive hand-washing is detected, to prompt the person to practice therapeutic techniques. The three scenarios were 1) simple hand-in-sink detector with alarms based on frequency/duration of washing, 2) more precise camera-based solution, and 3) smartwatch-based motion sensing approach. The automated interventions considered include audible alerts, vibrations, and user-specific pre-recorded audio or text. The survey for pwOCD, based on Unified Theory of the Acceptance and Use of Technology 2, captured quantitative (Likert scale agreement) and qualitative responses regarding overall acceptance of each scenario and potential underlying factors (e.g. social influences, performance expectations). The survey for professionals presented the same three scenarios, although for brevity the questions and invited their impressions on the overall concept, quantitatively and qualitatively. Qualitative responses were analysed using sentiment analysis.

Results

The majority of pwOCD indicated a willingness to use at least one of the scenarios. The most popular was the smartwatch: 66% of respondents indicated they 'agree' or 'strongly agree' they would use if

available), compared to 51% for simple sensor and 42% for precision camera. Sentiment analysis reinforced preference for the smartwatch. Qualitative responses indicated that the nature of the individual's compulsions could be an important determinant of their interaction with any system, with substantial individual variation. Professionals' feedback mirrored the positive inclination toward technology integration. 10/ of 14 , 'agreed' or 'strongly agreed' that technology could help people tackle OCD. Qualitative responses highlighted perceived benefits, including the potential for objective data to support new modes of patient/therapist interaction. Concerns raised included the limited scope of solutions focused on a single compulsion and the notion that automated interventions may deskill the pwOCD in proactively identify their compulsions.

Conclusions

Overall, these findings indicate broad support for further development of technology for automated interventions in OCD, with caveats. Such systems must be carefully implemented to avoid unintended consequences of creating reliance on them for detection. Co-design is required to ensure expertise from both pwOCD and clinical professionals are integrated. Furthermore, owing to the individual variation in experience of OCD, it may be necessary to develop multiple separate solutions tailored to specific compulsions and responses of pwOCD. This research lays the groundwork for future development and evaluation of prototype interventions.

A rapid health response to COVID-19 lockdowns in rural Victoria: assessing factors influencing change in mental health outcomes - Darryl Maybery, Denise Azar, Tim Campbell, Elizabeth Craig, Michaela O'Regan, Rochelle Hine, Eleanor Mitchell, Anton Isaacs, Keith Sutton, Shane Bullock, Michael Naughton

*Darryl Maybery [1] Denise Azar [1,2] Tim Campbell [1] Elizabeth Craig [2] Michaela O'Regan[2]
Rochelle Hine[1] Eleanor Mitchell[1] Anton Isaacs[1] Keith Sutton[1] Shane Bullock[1] Michael
Naughton[1]*

[1] School of Rural Health, Monash University, Warragul, VIC 3820, Australia
[2] Gippsland Primary Health Network, Traralgon, VIC 3844, Australia

Introduction

The rapid roll out of the Head to Health initiative across Victorian Primary Health Networks (PHNs) in 2020 was in response to the rise in mental health presentations due to the COVID-19 pandemic and accompanying restrictions on citizen movement. This study examined the changes in service user levels of mental distress from one rural PHN's innovative and targeted hub and spoke model that featured stepped care and telehealth.

Method

Service user data, extracted from the services database, examined the factors impacting participant mental health from entry to exit from the service. Over 18 months, the 2,604 service users were most commonly female, Australian born and English-speaking. This included 49.3 percent who were referred from a GP (33.3 self-referred) and 60 percent presenting with episodes of anxiety and/or depression.

Results

Regression analyses showed location, gender, age and type of referral as significant predictors of Kessler5 (K5) change scores. Older males, self-referrals and combined face to face and telehealth service delivery had greater improvements in mental health outcomes.

Conclusions

While there were limitations to the data that was employed in the study the gender, age and combined face-to-face and telehealth findings are important as they suggest new and innovative treatment options with potential access implications for service users in rural and remote locations and also for older age groups and men.

A Mixed-Methods Investigation into Youth Experiences with a Digital Mental Health Helpline During and After COVID-19 - Shyn Wei Phua, Leslie Gutman

Shyn Wei Phua [1]; Leslie Gutman [1]

[1] University College London, Division of Psychology and Language Sciences, London, UK

Introduction

The adverse mental health implications of COVID-19 have been well-established in the UK, with emphasis on its disproportionate impact on youths. Compounded by persistent challenges in accessing child and adolescent mental health services (CAMHS), the imperative for digitalisation of mental health services has attained, perhaps, unprecedented significance. Existing research into digital mental health helplines have been limited, with a dearth of studies focusing on user experiences, especially within the post-pandemic context. This study aims to fill this gap by exploring the experiences of youths utilising a digital mental health helpline amidst the pandemic and subsequent post-pandemic landscape.

Methods

A mixed-methods design was employed to investigate data collected by the helpline from 2020 to 2023. A total of 807 participants, aged from 16 to 25+, completed an online feedback survey regarding their experiences with the helpline, which consisted of a combination of Likert scale ratings, multiple-choice, and open-ended questions.

Results

Quantitative analysis revealed heightened satisfaction levels and perceived impact during the pandemic - from the onset of Lockdown 1 to the conclusion of Lockdown 3 - compared to post-pandemic. Additionally, a significant negative association emerged between satisfaction levels and months elapsed since Lockdown 1, indicating a progressive decline in user experiences following the pandemic's cessation. Thematic analysis of open-ended responses highlighted that participants generally felt supported by the helpline in multiple ways across pandemic and post-pandemic periods. Nonetheless, areas for improvement across service delivery, protocol, and technical functionalities were identified. Due to the disproportionate number of valid responses collected from the post-pandemic period compared to the pandemic period, definitive comparisons could not be drawn. However, a small subset of sentiments emerged post-pandemic, expressing frustration with constraints on talk-time.

Conclusions

These findings suggested that the helpline effectively navigated new challenges during the pandemic, outperforming its post-pandemic performance. It demonstrated greater capacity to handle increased service demand during the pandemic compared to afterward, potentially contributing to the post-pandemic decline in satisfaction. Moreover, possibly through bridging the gaps created by disrupted

mental health services, the helpline was perceived to be more impactful during the pandemic than after. Across pandemic and post-pandemic periods, the helpline seemed to serve as a valuable support tool. However, multiple aspects of the service needed to be improved to enhance participants' experiences. This study affirms the positive impact of helplines on the mental well-being of youths, underscoring their potential to provide intermediary support and alleviate the strain on mental healthcare services. Valuable insights into this helpline's ability to navigate pandemic-induced challenges and its struggles adapting to the post-pandemic landscape are presented. Ultimately, the study suggests that more resources should be allocated to improving the post-pandemic state of the helpline. Specifically, volunteer training could focus on enhancing patience and empathy, and staffing may need expansion to meet post-pandemic demand. In the future, the service could consider expanding the scope of services offered. Future research should further investigate post-pandemic-specific factors influencing helpline experiences, to provide a more comprehensive understanding and guide improvements.

elTaz Children's Mental Health assessment tool: Evaluating Usability and Acceptance in CAMHS and Paediatric settings - Aisling Mulligan, Anne Coffey, Elena Tan, Kim Hopkins, Pauline Carroll, Alfonso Rodriguez-Herrera

Aisling Mulligan [1,3], Anne Coffey [1], Elena Tan [2], Kim Hopkins [3], Pauline Carroll [4], Alfonso Rodriguez-Herrera [4,5]

[1] Department of Child and Adolescent Psychiatry, University College Dublin

[2] Royal College of surgeons of Ireland, Dublin

[3] Child and Adolescent Mental Health Service, Grangegorman Primary Care centre, Dublin [4] St Luke's General Hospital, Kilkenny

[5] School of Medicine, University College Dublin

Introduction

Across Ireland, hospitals and community child and adolescent mental health services (CAMHS) are facing a surge in cases of self-harm, anxiety, depression, and eating disorders. There is an urgent need for accessible mental health services and for a way to effectively identify those most in need of limited mental health services.

The development of the telTaz platform, a digital mental health screening and assessment tool is proposed as a solution to these challenges. Co-designed by a group of mental health professionals with children and families, telTaz leverages smart surveying technology with child-friendly language (cartoons and emojis) to measure psychological distress. It is being designed to quickly identify children with mental health concerns, particularly, children at risk and triaging them to the most appropriate carepaths so they can receive support and treatment.

Objective

This study performs a feasibility study of telTaz -(Minimum Viable Product) digital mental health platform to determine its usability, acceptability and clinical utility with children, parents and healthcare professionals in CAMHS and selected paediatric services across the Ireland East Hospital Group,

Methods

This study has ethics approval with UCD ethics committee (LS-21-91-Mulligan) and also has ethics approval for HSE Dublin North City and County CAMHS and HSE South East Ethics Committee. This ongoing multi-center, mixed-method usability study is recruiting participants to evaluate telTaz' effectiveness for children, families, and healthcare professionals. Through flyers, information leaflets, and collaboration with clinicians, we have recruited a purposeful sample of 37 children (aged 4-7, 8-13, and 14-17) and their families from CAMHS clinics. Clinicians are also being recruited to participate in the study, further enriching our data collection. Our target sample size is 50-60 participants, from hospitals and CAMHS.

Usability testing involves children, parents and healthcare professionals interacting with telTaz. A researcher observes and takes notes on their experience, recording both verbal and non-verbal responses (e.g., facial expressions, body language). Children are encouraged to think-aloud. Following app completion, children participate in a semi-structured interview, exploring their thoughts and suggestions for improvement. Similar sessions are ongoing with parents and healthcare professionals. These sessions incorporate the MAUQ "Interactive Mobile Health App for Patient". Thematic analysis,

following Braun and Clarke (2006), is used to analyse the transcribed data. All tasks are performed on a Samsung Galaxy Tab S5E.

Results

Initial findings suggest positive usability for children. They find the app: (1) Easy to use -Intuitive interface requires minimal navigation effort. (2.) Efficient - Allows quick survey completion, maintaining engagement. (3) Satisfactory - Meets children's expectations and results in a positive experience. Some older children expressed an additional feature that allows them to add comments. This suggests young people value the ability to provide feedback or expand on their responses via the app.

Future Analysis

Clinician perspectives will be explored through interview and survey data analysis, focusing on (1) how easy it is to integrate telTaz into existing carepaths and workflows (2) Do clinicians find the screening tool and data valuable for initial evaluation and triage within CAMHS and hospital settings?

Conclusion

telTaz shows promise as a user-friendly and efficient tool for child mental health screening. Future analysis will explore its clinical utility and potential for streamlining healthcare workflows.

Acknowledgement

This project has been funded via a research grant by the Academic Health Science System (AHSS) University College Dublin, 2023.

Session 4 Sensors and Wearable Technologies in Mental Health

Affective State Prediction in Depression using Wearable Sensor Data: Impact of Time Windows -
Cristina G. Vazquez, Corinne Eicher, Reto Huber, Golo Kronenberg, Hans-Peter Landolt, Erich
Seifritz, Giulia Da Poian

*Cristina G. Vazquez [1], Corinne Eicher [2,3,4], Reto Huber [4], Golo Kronenberg [2], Hans-Peter
Landolt [3], Erich Seifritz [2], Giulia Da Poian [1]*

[1] Sensory-Motor Systems (SMS) Lab, Department of Health Sciences and Technology, ETH Zurich,
Switzerland

[2] Department of Psychiatry, Psychotherapy and Psychosomatics, Psychiatric University Hospital
Zurich, University of Zurich

[3] Institute of Pharmacology and Toxicology, University of Zurich, [4] Child Development Centre,
University Children's Hospital, Zurich.

Introduction

Major depressive disorder affects over 300 million individuals and its prevalence is expected to rise. Current methods, reliant on self-administered or interview-based assessments, lack accuracy and continuous monitoring capabilities. Smartphone-based ecological momentary assessment offers a viable alternative, providing real-time insights into symptoms and behaviors. However, challenges such as time consumption and invasiveness persist. Recent research explores the fusion of machine learning and wearable sensor technologies to facilitate objective and continuous symptom tracking. In this study, we investigate the use of deep learning algorithms and wearable sensors in predicting affective states, focusing on valence, arousal, and sleepiness, which commonly manifest in individuals with depression.

Methods

Data were obtained from the SMART clinical trial, with ethical approval from the Kantonale Ethikkommission Zurich. Participants, aged 18-55, were recruited based on DSM-5 criteria for depression, with assessments conducted using the Hamilton Depression Rating Scale 17-item version. Participants wore an ECG patch (VivaLINK, VV330) throughout the study, recording respiration rate, accelerometer (25 Hz) and ECG (128 Hz), and a mobile app facilitated digital questionnaires three times daily. Mood was assessed using validated questionnaires, including a 6-item mood questionnaire (range 0-6) and the Karolinska Sleepiness Scale (range 0-10). Responses were categorized into low, neutral, and high levels for valence, arousal, and sleepiness. ECG signals underwent preprocessing to extract HRV metrics, including heart rate, sample entropy, and root mean squared of successive differences. Respiration rate and physical activity were also computed. Temporally aligned data with a 5-minute window resolution were used for analysis. We employed a CNN-based architecture comprising five convolutional blocks followed by a multilayer perceptron for affective state classification. The model accommodated varying time series lengths and inputs from multiple signals. This way we could systematically examine the performance of different data modalities, including HRV metrics, respiration rate, and physical activity, and optimal prediction time windows, in classifying affective states using a 10-fold stratified cross-validation approach.

Results

Data from 26 participants (16 depressed patients, 10 healthy controls) over 35 days were analyzed. Depressed patients exhibited higher HDRS-17 scores (19.1 (\pm 3.6)) compared to healthy controls (2.4 (\pm 4.9)). Compliance rates for completing questionnaires and wearing the wearable patch were higher among healthy controls compared to depressed patients. The merged dataset comprised 1232 distinct questionnaires linked to wearable data, with variations in data availability among participants. The predictive accuracy for valence improved with longer data windows (24 hours before assessment), while optimal performance for arousal and sleepiness classification was achieved with shorter time windows (12 hours before assessment). Combining multiple physiological modalities enhanced the predictive performance for affective state classification. Our models achieved notable classification metrics for the 3-level affective states, with a balanced accuracy of 0.65 for valence, 0.56 for arousal, and 0.53 for sleepiness.

Conclusions

The model could better discern among different level of valence, while performance for arousal and sleepiness were limited. However, all achieved metrics well above baseline levels. We identified optimal time windows for prediction for valence, arousal and sleepiness - and showed that combining longitudinal heart rate and heart rate variability metrics with physical activity enhanced the predictive performance for affective states classification compared to individual modalities demonstrating competitive performance with previous work.

Exploring Major Depressive Disorder through Clustering of Objective Sleep Markers Measured by Fitbit Devices - Carolin Oetzmann, Yuezhou Zhang, Ewan Carr, Lamers Femke, Faith Matcham, Sara Siddi, Katie M White, Sara Simblett, Josep Maria Haro, Vairavan Srinivasan, Qingqin Li, Brenda WJH Pennix, Amos Folarin, Richard Dobson, Vaibhav A Narayan, Matthew Hotopf, Nicholas Cummins

Carolin Oetzmann [1], Yuezhou Zhang [1], Ewan Carr [1], Lamers Femke [2,3], Faith Matcham [4], Sara Siddi [5], Katie M White [1], Sara Simblett [1], Josep Maria Haro [5], Vairavan Srinivasan [6], Qingqin Li [6], Brenda WJH Pennix [2,3], Amos Folarin [1], Richard Dobson [1], Vaibhav A Narayan [7], Matthew Hotopf [1], Nicholas Cummins [1], on behalf of the RADAR-CNS consortium [8].

[1] King's College London, London, UK

[2] Department of Psychiatry, Amsterdam UMC, location Vrije Universiteit, Boelelaan 1117, Amsterdam, The Netherlands

[3] Amsterdam Public Health, Mental Health program, Amsterdam, The Netherlands

[4] School of Psychology, University of Sussex, Falmer, UK

[5] Parc Sanitari Sant Joan de Déu, CIBERSAM, Universitat de Barcelona, Barcelona, Spain

[6] Janssen Research and Development, LLC, Titusville, NJ, USA

[7] Davos Alzheimer's Collaborative, Geneva, Switzerland

[8] <https://www.radar-cns.org>

Introduction

Major depressive disorder (MDD) is defined by an array of bidirectional, heterogeneous symptoms that make it very challenging to understand the condition at a population level. Subtyping offers a way to unpack this phenotypic diversity for improved disorder characterisation. However, behavioural subtyping approaches heavily rely on self-reported symptom measures rather than objective measures, introducing reporting bias. To address this limitation, our study employs objective digital measures collected via Fitbit to explore such subtypes. We focus on sleep, a prevalent concern with over 90% of MDD patients reporting poor quality sleep.

Methods

Using longitudinal data from the RADAR-MDD study (n=609), we explored sleep symptom clusters in participants with recurrent MDD via k-means clustering. Sleep symptoms, tracked over two years with Fitbit wearables, were aggregated weekly and aligned with three-monthly depression assessments (IDS-SR). We used k-means to identify clustering using all repeated measurements. Recognising that k-means clustering does not account for the clustering of repeated measures, we conducted a sensitivity analysis using a single timepoint per participant (their most data-rich week during follow-up). Differences in cluster demographics and depression scores were assessed via chi-squared tests and

ANOVAs, supplemented with post-hoc Tukey Honest Significant Difference tests.

Results

We identified five clusters as optimal based on model fit statistics, clinical interpretability, and parsimony: (1) Average sleep time, low sleep efficiency, and high awakenings; (2) Average sleep time, low variation, low awakenings and highest efficiency; (3) Low sleep time, low efficiency, and late sleep onset; (4) Highest sleep time, high variability and awakenings, later sleep offset; and (5) High variation in sleep time, onset and offset. The two average clusters (1 and 2) reported significantly lower depression severity than the low cluster (3). Additionally, the 'average, low efficiency' cluster (1) reported significantly lower depression scores than the highest sleep time cluster (4). Participants in the 'average, low efficiency' cluster (1) tended to be older than those in the 'average, high efficiency cluster' (2). Furthermore, participants in the 'high variation' cluster (5) were younger and more likely to be female compared to other clusters. Further sensitivity analyses using a more flexible clustering method, Gaussian Mixture Models, confirmed these findings from the k-means analyses.

Conclusions

Our study aimed to advance our understanding of MDD heterogeneity through behavioural subtyping of objective sleep symptoms. We identified five sleep clusters, which differed in demographic factors and depression severity. While our findings are a first step in the objective depression symptom clustering literature, further validation is essential using techniques like Hidden Markov models that can accommodate repeated measures. Furthermore, future studies should investigate how these clusters (and others identified from digital data such as: activity, heart rate, Bluetooth, etc.) can be utilized to enhance the accuracy of depression outcome predictions by reducing noise and enhancing signal clarity.

The UL-aid Depression Project: Exploring Depression, Residual Symptoms, and Stress Using Network Models and Wearable Technology - Aoife Whiston, Eric R. Igou, Donal G. Fortune, Maria Semkovska

[1] Aoife Whiston [1] Eric R. Igou [1] Donal G. Fortune [2] Analog Devices Team [3] Maria Semkovska

[1] Department of Psychology, Faculty of Education and Health Sciences, University of Limerick [2] Analog Devices Inc. Ireland [3] DeFREE Research Unit, Department of Psychology, University of Southern Denmark

Introduction

Residual symptoms and stress are amongst the most reliable predictors of relapse in remitted depression. Standard methodologies often preclude continuous stress sampling or the evaluation of complex symptom interactions. This limits knowledge acquisition relative to the day-to-day interactions between residual symptoms and stress. The study aims to explore the interactions between physiological stress and residual symptoms network structure in remitted depression.

Methods

Twenty-two individuals remitted from depression completed baseline, daily diary (DD), and post-DD assessments. Self-reported stress and residual symptoms were measured at baseline and post-DD. Daily diaries required participants to use a wearable electrodermal activity (EDA) device during waking hours and complete residual symptom measures twice daily for 3-weeks. Two-step multilevel vector auto-regression models were used to estimate contemporaneous and dynamic networks.

Results

Depressed mood and concentration problems were central across networks. Skin conductance responses (SCRs), suicide, appetite, and sleep problems were central in the temporal and energy loss in the contemporaneous network. Increased SCRs predicted decreased energy loss. Residual symptoms and stress showed bi-directional interactions.

Conclusions

Overall, depressed mood and concentration problems were consistently central, thus potentially important intervention targets. Non-obtrusive bio-signal measures should be used to provide the clinical evidence-base for modelling the interactions between depressive residual symptoms and stress. Practical implications are discussed throughout related to focusing on symptom-specific interactions in clinical practice, simultaneously reducing residual symptom and stress occurrences, EDA as pioneering signal for stress detection, and the central role of specific residual symptoms in remitted depression.

Exploring the Interplay of Physiological Signals and Emotions Using Wearables and Machine Learning - Yuexin Liu, Amir Tofighi Zavareh, Ben Zoghi

Yuexin Liu [1], Amir Tofighi Zavareh [1], Ben Zoghi [1]

[1] Texas A&M University, The Department of Engineering Technology and Industrial Distribution, Texas, USA

Mental health disorders constitute a global public health crisis, affecting millions of individuals worldwide. Timely diagnosis, monitoring, and treatment of these conditions are important for improving patient outcomes and reducing the burden on healthcare systems. In recent years, there has been a remarkable boost in the development and utilization of sensors and wearable technologies in the field of mental health. This research focuses on the innovative utilization of wearables and machine learning to enhance emotional well-being and mitigate stress. Specifically, the study centers on the Empatica EmbracePlus wearable device to explore the correlation between physiological vital signs and emotional states. Participants from the Master of Engineering Technical Management (METM) program at Texas A&M University are engaged in this study, driven by three primary motivations: a) to investigate the relation between physiological signals and emotions using wearable sensors, b) to evaluate the potential efficacy of intentional practice in enhancing emotional intelligence and reducing stress that can contribute to overall well-being. The research aims to uncover the relationship between emotions and vital signs. Participants will continuously wear EmbracePlus devices, gathering vital data such as heart rate, blood oxygen saturation (SpO₂), sleep patterns, electrodermal activity (EDA), skin conductance level (SCL), and temperature. This comprehensive data collection occurs both day and night, with participants wearing the devices for a minimum of 8 hours daily to ensure a holistic capture of their physiological responses. Additionally, participants will engage in a weekly self-reporting process to identify their emotional states using predefined primary emotions. This self-reflection allows participants to recognize emotional fluctuations and tag specific events when their emotions deviate from their baseline. By doing so, the study gains insights into emotions within real-life contexts and variations throughout the week. Machine learning models, including Convolutional Neural Networks (CNNs), Long Short-Term Memory (LSTM), Recurrent Neural Networks (RNNs), Random Forests, and Support Vector Machines (SVMs), will be deployed. These models will analyze the physiological data as independent variables and self-reported emotional states as dependent variables, uncovering relationships and patterns that might affect human perception. The chosen algorithms demonstrate their potential in decoding complex, time-dependent associations within physiological signals, aligning with the objective of discovering meaningful correlations between vital signs and emotions. This research represents a critical step in advancing the understanding of the dynamic interplay between physiological vital signs and emotional well-being. The integration of wearables and machine learning techniques offers a foundation for future interventions that enhance emotional intelligence, manage stress, and promote overall well-being.

Session 5 Health apps, web apps, and Software in Mental Health

Performance results from app-based mental health assessment using machine learning on voice biomarker data - Philip Donaghy, Edel Ennis, Maurice Mulvenna, Raymond Bond, Niamh Kennedy, Mike McTear, Henry O'Connell, Nate Blaylock, Raymond Brueckner

Philip Donaghy [1], Edel Ennis [1], Maurice Mulvenna [1], Raymond Bond [1], Niamh Kennedy [1], Mike McTear [1], Henry O'Connell [2], Nate Blaylock [2], Raymond Brueckner [2]

[1] Ulster University, Belfast, Northern Ireland.

[2] Canary Speech LLC, Provo, Utah, USA.

Introduction

This work reports on the results from a 12-week study testing an app-based voice biomarker mental health assessment. The study population were young adults aged 16-24, with weekly assessments conducted at the participants' convenience. Participants were recruited using social media, schools, mental health charities and universities. The young people were able to self-identify as mentally well or struggling with their mental health.

Methods

The study consisted of 12 weekly assessments, with an average assessment lasting 10 minutes. During an assessment the participants were prompted with the question "How has your day been?" to gather spontaneous voice data for 40 seconds.

Participants then completed the Patient Healthcare Questionnaire-9 (PHQ-9) to evaluate major depressive disorder (MDD), the Generalized Anxiety Disorder-7 (GAD-7) for anxiety assessment, and the DSM-5 Cross-Cutting Symptom Measure, which evaluates a wide range of mental health symptoms. These mental health scale results were correlated with results from vocal biomarker focused machine learning detection models for depression and anxiety. Participants also provided demographic and mental health information as part of the consent process. The information derived from this was used to assess the model performance in the various demographic and mental health subgroups.

Results

The demographic factors were found to have little effect on model performance. However, significant differences in the detection model's performance were observed as the severity of depression and anxiety increased. The severity thresholds of the PHQ-9 and GAD-7 scales were used for this analysis. Depression detection model performance decreased when severity increased. The 'None' depressed category performed better than the 'Moderate' depression category. We also found comorbid anxiety impacted the accuracy of the depression detection model. Depression model accuracy was higher when there was 'minimal' anxiety compared to performance in the presence of 'moderate' anxiety.

For the anxiety detection model, performance decreased as anxiety severity increased. There were significant differences in model performance between participants with 'Minimal' anxiety and those with 'Moderate' anxiety. Similarly, the results showed that the anxiety model accuracy was impacted by comorbid depression, with increases in depression severity decreasing anxiety detection model performance. For the 'None' depressed category accuracy was higher when compared to 'moderate' depression.

Conclusion

The models used to detect anxiety and depression were impacted by mental health factors, but less so by demographic factors. These results show model performance for both disorders is negatively impacted by the severity of the target disorder and other comorbid disorders.

Mobile Phone Mood Tracking, Inference and Prediction: A Literature Review - Fiona Hegarty, Dr. Liadh Kelly, Professor Thomas J. Naughton

Fiona Hegarty[1], *Dr. Liadh Kelly* [1], *Professor Thomas J. Naughton* [1]

[1] Department of Computer Science, Maynooth University, Maynooth, Co. Kildare, Ireland.

Introduction

This review paper is a systematic literature review of papers published in the past five years from the PubMed Library.

Methods

Our search criteria and subsequent filtering process were crafted to select observational studies that used data capture from a mobile phone to track or infer mood. Other review papers, papers for randomised controlled trials or intervention studies, or papers that involved psychological disorders other mood related disorders were excluded. Studies that had some aspect of mood inference or prediction were included even if they had other research questions; in such cases we only reported on the relevant questions aligned to our review objectives. Our initial search brought back 397 papers that we narrowed down to a final 24 papers that were most relevant.

Conclusions

A lot of variation was found in the studies selected but a few distinct categories have emerged: participant base, mood capture methodology, data capture methods, and modelling. Studies in the participant base category fell into two broad sub-categories: clinical and non-clinical participants. The former involved studies on participants with a diagnosed mood disorder or medical condition, while the latter was a mix of participants that included employees, students, and the general population.

The second category relates to the mood capture methodology: the use of clinical instruments versus momentary mood capture from an ecological momentary assessment (EMA) using a mobile phone. In most cases the participant category informed the method used to capture mood - for clinical participants mood disorder severity was most often being captured with an established clinical instrument. Where the participant base was non-clinical, general mood from an EMA or the presence or absence of a mood disorder was captured. For general mood capture via an EMA there was a wide variation in the models employed, from one-dimensional scales to scales with two or more dimensions. The third category relates to the data capture methods for use as predictors in a model. A range of

passive and active methods were used, however, we found that the context could be categorised into four general sub-categories: the behavioural, physiological, psychological, and environmental lived context of the participant. These sub-categories also encompass what type of data is included in the models. Many of the selected studies concern a plurality of these four contexts, and we have produced a taxonomy detailing the relationship between each study and these contexts.

The fourth category relates to how the data is modelled. Regression was found to be the most popular method, with a focus on mixed effects models to account for within-participant variation. While standard machine learning techniques are a close second in popularity, there were very few studies that explored deep learning methods.

In our paper, we give an overview of the studies associated with the categories and sub-categories we have defined, and explore some of the key findings in relation to the contribution of different aspects of user behaviour, physiology, environment, and psychology to the prediction or inference of mood or aspects of a mood disorder.

Predicting and Monitoring Symptoms in Diagnosed Depression Using Mobile Phone Data: An Observational Study - Arsi Ikäheimonen, Nguyen Luong, Ilya Baryshnikov, Richard Darst, Roope Heikkilä, Joel Holmen, Annasofia Martikkala, Kirsi Riihimäki, Outi Saleva, Erkki Isometsä, Talayeh Aledavood

Arsi Ikäheimonen [1], Nguyen Luong [1], Ilya Baryshnikov[2,3], Richard Darst [4], Roope Heikkilä [5], Joel Holmen [6], Annasofia Martikkala [2,3], Kirsi Riihimäki [3,7], Outi Saleva [3], Erkki Isometsä [2,3], Talayeh Aledavood [1]

[1] Department of Computer Science, Aalto University, Espoo, Finland.

[2] Department of Psychiatry, University of Helsinki, Helsinki, Finland.

[3] Helsinki and Uusimaa Hospital District, Helsinki, Finland.

[4] School of Science, Aalto University, Espoo, Finland.

[5] City of Helsinki Mental Health Services, Helsinki, Finland.

[6] University of Turku and Turku University Central Hospital, Turku, Finland.

[7] Finnish Institute for Health and Welfare, Helsinki, Finland.

Introduction

Clinical diagnosis and monitoring of depression rely predominantly on interviews conducted by professionals and the use of self-report questionnaires filled out by patients. However, these traditional methods have limitations regarding consistency, accessibility, and real-time monitoring capabilities. The widespread use of smartphones and other personal consumer devices has prompted research into exploring the potential of data collected via these devices to serve as digital behavioral markers. These markers may help in detecting and monitoring depression symptoms. Our research focuses on the potential of using behavioral data collected with mobile phones to identify and monitor symptoms in patients diagnosed with depression.

Methods

In a prospective cohort study, we collected smartphone behavioral data for up to one year. The study consists of observations from 99 subjects, including healthy controls (n=25) and patients diagnosed with various depressive disorders: major depressive disorder (MDD) (n=46), major depressive disorder with comorbid borderline personality disorder (MDD|BPD) (n=16), and bipolar disorder with major depressive episodes (MDE|BD) (n=12). Data were labeled based on depression severity, using the 9-item Patient Health Questionnaire (PHQ-9) scores. We performed statistical analysis and employed supervised machine learning on the data to classify the severity of depression and observe changes in the depression state over time.

Results

We identified 32 behavioral markers associated with the changes in depressive states. Our analysis classified depressed subjects with an accuracy of 82% and depression state transitions with an

accuracy of 75%. Furthermore, our predictive model demonstrates promising performance in forecasting future PHQ-9 scores, explaining 67% of the variance in the observed data.

Conclusions

This study suggests that gathering and using digital behavioral data from a group of clinically diagnosed individuals is possible. Additionally, it identified the key data streams that should be considered in future research on behavioral indicators of depression symptoms. The use of mobile phone digital behavioral markers to supplement clinical evaluations may aid in detecting the presence and relapse of clinical depression and monitoring its outcome, particularly if combined with intermittent use of self-report of symptoms.

Development of a Digital Therapeutic Alliance Scale in the Context of Fully Automated Mental Health Apps - Fangziyun Tong, Reeva Lederman, Simon D'Alfonso, Katherine Berry, Sandra Bucci

Fangziyun Tong [1][2], Reeva Lederman [1], Simon D'Alfonso [1], Katherine Berry [2][3], Sandra Bucci [2][3]

[1] School of Computing and Information Systems, University of Melbourne, Parkville, AU

[2] Division of Psychology and Mental Health, School of Health Sciences, Manchester Academic Health Sciences Centre, University of Manchester, Manchester, UK.

[3] Complex Trauma and Resilience Research Unit, Greater Manchester Mental Health NHS Foundation Trust. UK.

Introduction

Therapeutic alliance (TA) is a term that concerns the establishment of certain qualities in the relationship that develops between a client and a mental health professional, qualities such as affective bond and shared goals/tasks, which have proven to be essential ingredients in successful therapy outcomes. With the growth of unguided mental health apps (apps without human support) in recent times, either as standalone sources of mental health support or supplementations to traditional care, the question arises as to whether there is an analogous notion of a digital therapeutic alliance (DTA), and whether and how it plays a role in usage and efficacy of mental health apps. Our recent work in constructing a DTA conceptual model has determined that the DTA has five dimensions: flexibility, self-initiative, emotional experiences, openness, and goals. Through a four-stage process, we have subsequently built a preliminary scale to quantitatively capture this conceptualization.

Methods

In Stage 1, scale domains and items were generated based on a literature review and qualitative feedback from mental health app users. In Stage 2, two rounds of survey were conducted with 39 digital mental health experts. Content Validity Index (CVI), Content Validity Ratio (CVR), and qualitative feedback from experts were used to assess the content validity of the scale and to revise items. In Stage 3, interviews were conducted with 20 mental health app users to assess the face validity of the scale. Feedback from users was considered to further revise the scale. In Stage 4, the scale was pilot-tested in two studies: a cross-sectional survey of mindfulness app users, and a longitudinal study (for 30 days) of the app MoodMission (<https://moodmission.com/>). Internal consistency (Cronbach's alpha) was calculated in both studies. Convergent validity was assessed by investigating the associations between our new scale and the Digital Therapeutic Alliance Inventory (DWAi).

Results and Conclusion

Following the four stages, the current DTA has 39 items. This is the first purpose-built scale that has been built based on an empirically grounded conceptualization of DTA. Our studies have confirmed that it has reliability, face validity, content validity, and convergent validity.

Connecting young people digitally to improve their mental health - Becca Randell

Becca Randell

- [1] Health Innovation Kent, Surrey and Sussex, Crawley UK
- [2] NIHR Applied Research Collaboration, Kent Surrey and Sussex, UK.
- [3] University of Sussex, Brighton, UK.

As covid hit, Health Innovation Kent Surrey and Sussex (HIKSS) worked in partnership with the voluntary sector, YMCA Downslink group to develop the e-wellbeing website (e-wellbeing.co.uk) for children and young people up to the age of 18. This platform helps young people and their families navigate mental health services, providing those who work with them, the tools, information and advice. We worked in partnership with YMCA Downslink and University of Sussex to evaluate the reach and accessibility of the e-wellbeing platform. Our work showed that over 15,000 young people accessed e-wellbeing in the first year, with over 53,000 page views. The most popular pages were information and advice on low mood and anxiety, and over 96% said that e-wellbeing had helped them deal with their problems.

HIKSS also undertook a review of CYP digital services in partnership with YMCA and young e-ambassadors and identified gaps in services. Young people also co-produced key digital mental health ambitions which were shared with key system leads. The review identified that 85% of children and young people who had accessed mental health support found it useful and 66% said that they accessed online support for the first time during the pandemic. The review has been shared and the digital ambitions are fully embedded within local mental health plans and strategies. The e-wellbeing platform has been expanded to support over 18 year olds and a specific online resource as part of the platform for young carers.

A key impact of the review has been the funding to develop a toolkit and training for the workforce on how to connect digitally with young people on their mental health. This training has been co-produced and co-facilitated with young people, e-wellbeing youth ambassadors which includes podcasts on embedding trauma informed approaches, diversity and inclusion and the use of different types of social media.

Getting Older Adults Online: What Predicts Online Psychotherapy Use Among Over 50s? - Siofra McCrum, Dr. Jemma McGourty, Dr. Orla Moran

Siofra McCrum [1, 2], Dr. Jemma McGourty [1], Dr. Orla Moran [2]

[1] Dept of Nursing, Midwifery & Early Years, Dundalk Institute of Technology, County Louth, Ireland
[2] NetwellCASALA Research Centre, Dundalk Institute of Technology, County Louth, Ireland

Introduction

Online psychotherapy is a growing area of research, particularly as a result of the Covid-19 pandemic. However, there is little known about the attitudes of older adults towards online psychotherapy, in particular, psychotherapy via synchronous video call. Understanding attitudes towards online psychotherapy can improve its implementation and increase access to mental health services. The present research aimed to measure older adults' attitudes towards face-to-face (f2f) and online psychotherapy and identify predictors of these attitudes.

Methods

156 older adults aged 50+ (109 female, 46 male, 1 non-binary, M=62.12 years, SD=8.29) completed a quantitative questionnaire, either online or using pen and paper. The questionnaire consisted of four pre-existing, validated scales: Senior Technology Acceptance Model Questionnaire; Barriers to Mental Health Services Scale-Revised; Face-to-face Counselling Attitudes Scale and Online Counselling Attitudes Scale.

Results

Participants had higher mean scores on value of f2f ($x=24.12$) than online ($x=20.62$) psychotherapy, and higher mean scores on discomfort with online ($x=14.83$) than f2f ($x=11.81$). Positive correlations were found between value of f2f and online psychotherapy ($r=.445$, $p<.001$), and between discomfort with f2f and online psychotherapy ($r=.503$, $p<.001$). Regression analyses found that attitudes towards f2f psychotherapy ($t=5.547$, $p<.001$), prior experience with online psychotherapy ($t=3.11$, $p=.002$), and positive control beliefs around technology ($t=2.22$, $p=.028$) were positive predictors of attitudes towards online psychotherapy. Further regression analysis found that experience with f2f psychotherapy ($t=3.005$, $p=.003$), having negative help-seeking beliefs ($t=-3.337$, $p=.001$) and having a lack of knowledge and fear of psychotherapy ($t=-3.363$, $p<.001$) were significant predictors of attitudes towards f2f therapy.

Conclusions

Participants placed greater value in and were more comfortable with f2f than online psychotherapy. Positive attitudes towards f2f psychotherapy and positive control beliefs around technology predicted positive attitudes towards online psychotherapy. Having negative help-seeking beliefs and having less knowledge of and greater fear of psychotherapy predicted negative attitudes towards f2f psychotherapy. Thus, improving older adults' attitudes towards f2f psychotherapy and increasing

feelings of control over technology could improve older adults' attitudes towards online psychotherapy. Furthermore, increasing knowledge of psychotherapy and decreasing fear of psychotherapy could improve attitudes towards psychotherapy generally among older adults.

A randomized controlled trial to assess the efficacy of a mobile app-based Cognitive Bias Modification (CBM) therapy for Paranoia called STOP (Successful Treatment for Paranoia) - Jenny Yiend, Rayan Taher, Carolina Fialho, Chloe Hampshire, Che-Wei Hsu, Thomas Kabir, Jeroen Keppens, Philip McGuire, Elias Mouchlianitis, Emmanuelle Peters, Tanya Ricci, Sukhwinder Shergill, Daniel Stahl, George Vamvakas, Pamela Jacobsen

*Jenny Yiend [1], Rayan Taher [1] *, Carolina Fialho [1], Chloe Hampshire [2], Che-Wei Hsu [1], Thomas Kabir[3], Jeroen Keppens [4], Philip McGuire [1], Elias Mouchlianitis [1], Emmanuelle Peters [5], Tanya Ricci[1], Sukhwinder Shergill [7], Daniel Stahl [8], George Vamvakas [9], Pamela Jacobsen [2].*

[1] Department of Psychosis Studies, Institute of Psychiatry, Psychology & Neuroscience,

[2] Department of Psychology, University of Bath, Bath, UK.

[3]The McPin Foundation, London, UK

[4] Department of Informatics, King's College London, London, UK

[5] Department of Psychology, Institute of Psychiatry, Psychology & Neuroscience, King's College London, London, UK

[6] Department of Biostatistics & Health Informatics, Institute of Psychiatry, Psychology & Neuroscience, King's College London, London, UK

[7]Kent and Medway Medical School, Canterbury, Kent, United Kingdom

[8]Department of Biostatistics and Health Informatics, Institute of Psychiatry, Psychology & Neuroscience, King's College London, UK

[9]Clinical Trials Unit, King's College London, London

Introduction

Paranoia, or worries about harm from others, is a concern many people may experience and can cause distress and impairment in everyday life. Digital interventions are an important part of increasing access to help and support, including to those who may not be accessing mental health services. STOP (Successful Treatment of Paranoia) is a smartphone app which is designed to target a common cognitive bias towards threatening interpretations of ambiguous or neutral scenarios (cognitive bias modification).

Methods

The STOP study is a three-arm, double-blind, multi-site randomized controlled trial. 273 participants experiencing paranoia will be recruited from both clinical and non-clinical populations. All participants will be randomly allocated to receive one of two versions of STOP (6 or 12 weeks) or a text-reading control. To assess the efficacy of the app, assessments will be completed pre, post and at 24-week follow up. Participant's self-reported paranoid ideation is the primary outcome. Secondary outcomes include measures of other clinical symptoms, recovery and interpretation biases.

Results

We will present the study protocol and a recruitment update. The study has a 22-month recruitment phase, which began in October 2022 and is scheduled to end 2024.

Conclusions

This study will evaluate if STOP is an effective and safe intervention. If proven effective, STOP may be an additional accessible, low-cost psychological treatment for paranoia.

Digital mental health interventions for university students with mental health difficulties: systematic review and meta-analysis - Alba Madrid Cagigal, Gary Donohoe

*Alba Madrid Cagigal [1] *, Gary Donohoe [1]*

[1] University of Galway, School of Psychology, Republic of Ireland

Introduction

Mental health difficulties appear to be more prevalent among third-level students than the general population. Counselling services in universities face several challenges such as increasing workloads, leading to large waiting lists. Digital mental health interventions are capable of being delivered directly into people's hands with no-to-low human resources. It is therefore crucial to identify features that promote engagement and that are effective for university students with mental health difficulties.

Objective

The aim of this study is to conduct a systematic review and meta-analysis of the literature examining effectiveness of digital mental health interventions for university students with ongoing mental health difficulties.

Methods

The following databases were searched: PubMed, EBSCOhost (CINHAHL/PsycINFO/PsycArticles) and Web of Science. Eligible studies were peer-reviewed English language feasibility studies, randomized controlled trials, non-randomized controlled trials, other types of randomized trials, longitudinal studies and mixed methods published in the last 6 years. Data extraction included demographics, eligibility criteria, details of the intervention, presence or absence of guidance, and statistical information. Two-arms randomized-control trials were included in the meta-analysis. A random-effects meta-analysis was conducted and standardized mean differences were calculated. This study is registered with PROSPERO, CRD42024504265.

Results

34 eligible studies were included in this narrative review, of which 21 randomized-controlled trials were included in the meta-analysis. Random-effects meta-analysis indicated a medium and significant effect size for depression ($k=16$; $n=2316$; Cohen's $d = 0.55$, 95% CI 0.37-0.72; $P<.001$), and anxiety ($k=15$; $n= 1848$; Cohen's $d = 0.46$, 95% CI 0.31-0.61; $P<.001$). Moreover, sub-group analyses revealed that effectiveness of interventions was associated with CBT-based interventions in both depression ($k=6$; Cohen's $d = 0.69$, 95% CI 0.33-1.72; $P<.001$) and anxiety ($k=9$; Cohen's $d = 0.53$, 95% CI 0.23-0.77; $P<.001$). Lastly, there was no evidence that interventions based on self-help and therapist support were associated with larger effects than those based on self-help only.

Session 6 Digital Mental Health Interventions

Clinicians and Users Views and Experiences of a Tele-Mental Health Service Implemented Alongside the Public Mental Health System during the COVID-19 Pandemic - Darryl Maybery, Anton Isaacs, Eleanor Mitchell, Keith Sutton, Michael Naughton, Rochelle Hine, Shane Bullock, Denise Azar

Darryl Maybery[1] Anton Isaacs[1] Eleanor Mitchell[1] Keith Sutton[1] Michael Naughton[1] Rochelle Hine[1] Shane Bullock[1] Denise Azar[1,2]

[1] School of Rural Health, Monash University, Warragul, VIC 3820, Australia [2] Gippsland Primary Health Network, Traralgon, VIC 3844, Australia

Abstract

A tele-mental health model called Head to Health was implemented in the state of Victoria, Australia to address the mental health crisis caused by the COVID-19 pandemic. It was a free centralized intake service that adopted a targeted approach with several novel elements, such as stepped care and telehealth. This study examines the views and experiences of clinicians and service users of the tele-mental health service in the Gippsland region of Victoria during the COVID-19 pandemic. |

Method

Data was obtained from 47 clinicians via an online 10-item open-ended survey from 19 service users through semi-structured interviews.

Results

Six categories emerged from the data. They were: 'Conditions where use of tele-mental health is appropriate', 'Conditions where tele-mental health may not be useful', 'Advantages of tele-mental health', 'Challenges in using tele-mental health', 'Client outcomes with tele-mental health', and 'Recommendations for future use'.

Conclusions

This study highlights what did and did not work when tele-mental health was implemented alongside a public mental health service at a time of crisis of the COVID-19 pandemic. This is one of a few studies where clinicians' and service users' views and experiences have been explored together to provide a nuanced understanding of perspectives on the efficacy of tele-mental health including findings (e.g. rapport, face to face and tele contact, communication, privacy implication) have implications for policy and practice.

A Chat-Based therapy for emotional support: exploring the impact on psychological distress and goal attainment - Armin Rez, Cristina Van Nood, Gili Hoter Ishay, Cristina Gil-Lopez

Armin Rez [1], Cristina Van Nood [1], Gili Hoter Ishay [3] Cristina Gil-Lopez [1, 2]

[1] DIGITAL MIND SOLUTIONS, S.L.

[2] Valencia Polytechnic University

[3] Haifa University

Background

The treatment landscape for mental health has undergone significant transformations with the advent of online interventions. These interventions overcome common barriers for mental health help seeking and may offer a public mental health solution. However, their efficacy is still evaluated, especially chat-based therapies.

Aim

This research explores the effect of Emotional Support (ES) chat-based therapy in reducing psychological distress and achieving therapeutic goals over time in treatment.

Method

113 individuals were evaluated over two time points, one group after a week, and another group after 3 weeks. Psychological distress was assessed using the Kessler Psychological Distress Scale (K6) and goal attainment was measured by one item over the two time points.

Results

A significant reduction in psychological distress was found at both time points ($F(1) = 5.10, p = .03^*$) after one week and , $F(1) = 24.25, p = .000^{***}$), after 3 weeks. Additionally, goal attainment report showed a significant change over time in both groups ($F(1) = 5.03, p = .03^*$; $F(1) = 31.61, p = .000^*$), emphasizing their positive progress towards their therapeutic goals.

Conclusion

This research suggests the effectiveness of chat based therapy in reducing psychological distress after a short period of a week or 3 weeks and its possibility in enhancement of personal goals. Overall, this study reinforces the importance of further investigating and integrating online mental health services to optimize clinical outcomes.

Innovating a Telegram Bot for Harmonizing Parent-Child Relationships; an Emotionally Focused Family Therapy (EFFT) approach - Morteza Rezaei-Zadeh, Mohammad-Ali Mazaheri-Tehrani, Hamideh Mohammadi-Nasab

Morteza Rezaei-Zadeh [1], Mohammad-Ali Mazaheri-Tehrani [2], Hamideh Mohammadi-Nasab [2]

[1] University of Leicester, School of Medicine, UK. [2] University of Shahid Beheshti, Faculty of Education and Psychology, Tehran, Iran

Introduction

Technology has increasingly impacted families in general and parent-child relationships in particular both positively and negatively. Recent studies have underscored the negative effects of social media on parenting capabilities and interactions. However, other studies suggest that technology possesses significant potential to address parental challenges, including parent-child conflicts.

Methods:

Interviewing 24 teenagers, 12 parents, and 10 psychologists, this study employs an exploratory qualitative approach to identify parent-child conflicts and proposes solutions for mitigating them. These conflicts and solutions are outlined using Emotionally Focused Family Therapy (EFFT) approach. Subsequently, utilizing agile software design methods, a Telegram bot was developed to address these conflicts by implementing the identified solutions. To evaluate the effectiveness of this software in reducing parent-child conflicts, 120 children and their parents participated in an experimental study, divided into three groups. The first group participated in a series of online workshops aimed at reducing parent-child conflicts. The second group interacted with the Telegram bot developed by this study, while the third group did not participate in either the online workshops or interact with the Telegram bot.

Results

Ten types of parent-child conflicts and six solutions for mitigating them are proposed. After designing, developing and implementing the Telegram bot based on those conflicts and solutions, results indicate that it was significantly more effective than the online workshops in reducing parent-child conflicts, with its impact proving to be more sustainable.

Conclusion

This does not mean that all technological solutions for psychological and well-being purposes are effective. As one of the pre-requirements of this effectiveness, an interdisciplinary team of psychology and pedagogy experts were involved in designing, developing and testing this Telegram bot. This is particularly significant, given recent studies indicating that subject-matter experts are often hesitant to engage in the design of technologies pertinent to their expertise for professional purposes. The primary role of subject-matter experts in designing professional software lies in translating their theories into action through embedding them into processes facilitated by technology. Theoretical and practical implications of these findings are discussed, and suggestions for future studies are provided.

Online synchronous chat counselling for young people: A systematic review - Maria Tibbs, Maeve Dwan-O'Reilly, Aileen O'Reilly, Amanda Fitzgerald

Maria Tibbs [1,2], Maeve Dwan-O'Reilly [1,2], Aileen O'Reilly [3], Amanda Fitzgerald [1]

[1] University College Dublin, Ireland
[2] Jigsaw National Centre for Youth Mental Health
[3] ALONE

Introduction

Youth mental health is a global issue, with 75% of many serious mental health difficulties emerging before the age of twenty-five. There has been an increase in the provision of online counselling for young people's mental health, due to their accessibility, cost effectiveness and reduced stigmatising effects. Online synchronous chat counselling consists of real-time, text-based, one-to-one chats with a mental health professional and/or trained volunteer. Literature examining the components within, and acceptance and effectiveness of these interventions has not yet been synthesised. In response to the increase in the use of online synchronous chat supports in recent years, this review aims to provide a rigorous synthesis of the available literature on online synchronous chat counselling for young people aged 12-25.

Methods

A literature search was conducted via PsycINFO, MEDLINE, CINAHL, and Web of Science for peer-reviewed literature. Relevant service websites were searched for grey literature, including internal evaluation reports. Backward and forward reference checking of final included studies was conducted. 6,353 titles and abstracts and 343 full texts were screened, resulting in 24 qualitative and quantitative papers and internal service reports being included for synthesis. Quality of included articles was examined using the Mixed Methods Analytical Tool (MMAT). Data were extracted using a combination of the TIDieR checklist, the Theoretical Framework for Acceptability, and the Behaviour Change Taxonomy. Data analysis was conducted using narrative synthesis.

Results

The search identified $n = 23$ peer-reviewed studies and $n = 1$ service reports of chat-based counselling interventions supporting youth mental health difficulties. Across the final included papers, there was considerable heterogeneity in how the chat interventions were designed, implemented and evaluated. Five (out of 93) Behaviour Change Techniques (BCTs) were identified as commonly used within these interventions. Most studies reported that young people found the interventions acceptable, highlighted

the benefits of their design, and felt positive about the counsellor delivering the intervention. A majority of studies reported decreased mental health difficulties and increased well-being following the intervention.

Conclusions

Findings from most included studies underscore the acceptability of online synchronous chat counselling interventions among young users seeking mental health support. Nevertheless, challenges such as internet connectivity issues, communication pace, and misunderstandings persist among certain users. While existing evidence on effectiveness is generally positive, it remains constrained by the limited number of randomised controlled trials (RCTs) in this area. These insights hold valuable implications for mental health practitioners, researchers, and policymakers involved in the design, implementation, and evaluation of synchronous online chat counselling services for young individuals.

Using Conversational Media to Support Delivery of the Verbal Wellbeing Digital Mental Health Intervention - Dr Natalie Divin, Dr Iman Naja, Dr Siobhan Campbell, Dr Francesca Benatti, Dr Alessio Antonini; Sarah Coward

Dr Natalie Divin [1]; Dr Iman Naja; Dr Siobhan Campbell; Dr Francesca Benatti; Dr Alessio Antonini [2]; Sarah Coward [3]

[1] Verbal Arts Centre, Stable Lane & Mall Wall, Bishop Street Within, Derry~Londonderry, Northern Ireland, UK.

[2] The Open University, Walton Hall, Milton Keynes, England, UK.

[3] In the Room, Castleford, England, UK.

In 2023, the Verbal Arts Centre launched Verbal Wellbeing, a digital mental health app designed to improve mental wellbeing in primary school children. Verbal Wellbeing was created to provide widespread and convenient access to Verbal's bibliotherapy-based interventions which have significantly improved mental wellbeing, resilience, emotional management and more. The app uses Verbal's Shared Reading Model by combining storytelling with psychologically-informed questions to promote discussion and reflection. These interventions are guided by the app's user interface and do not require training to deliver, allowing interventions such as Building Resilience and Managing Emotions to be delivered by school staff in multiple settings.

As poor childhood wellbeing continues to increase, school staff are placed under greater pressure to improve children's resilience and to provide wellbeing support in the classroom. As teaching staff have limited time to provide educational and socioemotional support, it is essential for them to feel confident that the wellbeing interventions delivered in their school are beneficial, effective, evidence-based and have demonstrable impact. However, equipping teachers with this information can be challenging due to factors such as time constraints, unfamiliarity with subject material and more.

Verbal has partnered with the Open University and In The Room to create interactive conversational media pieces to address educators' questions on Verbal Wellbeing. In The Room's conversational media platform uses videos combined with chatbot technologies to simulate conversational experiences. Using speech recognition and Artificial Intelligence (AI), user's spoken or text-based questions are answered from a pool of pre-recorded material by a subject matter expert in a relaxed and conversational manner. Users can continue to ask questions or can be directed towards relevant follow-up questions. The conversational media pieces from this collaboration target three key topics: helping teaching staff to learn more about the Verbal Wellbeing platform; making psychological theories and information underpinning Verbal Wellbeing more accessible; and making information on the impact of Verbal Wellbeing more accessible.

This presentation will detail the collaborative development and evaluation of these experiences, including the use of co-production with teachers to develop the question library and the evaluation of

the experiences with prospective Verbal Wellbeing users. These findings will showcase the potential for conversational media to support and build confidence with users, to bridge the gap between app users and app creators, and to help users connect with subject matter experts in a manner that is convenient, enjoyable, accessible and scalable.

Psychological Implications of Employment Status and Social Media Use among Higher Educated Youth: A Study in Kolkata City - Mohai Menul Biswas

Mohai Menul Biswas[1]

[1] International Institute for Population Sciences, Mumbai, India

Background

Higher educated youth are more susceptible to common mental disorders, such as depression, anxiety, or stress. Mental health issues are associated with socio-economic background, employment status, social media use etc.

Purpose/Objective

This study aims to assess the prevalence and associated risk factors of depression, anxiety, and stress among higher educated youth in Kolkata.

Data and Methods

Four hundred graduate youth (21-35years) who were residing in the city of Kolkata were surveyed for the study. Measures included socio-demographics, social media use, impact of covid-19 and the Depression Anxiety Stress Scale (DASS-21). Descriptive statistics, SEM and binary logistic regression were carried out to identify the factors associated with depression, anxiety and stress.

Results

The overall prevalence of depression, anxiety and stress among the participants was 54.4%, 61.7% and 47.8% respectively. Younger men and women were more prone to social media addiction and susceptible to mental health problems. SEM analysis findings suggest that being infected by COVID was also positively associated with poor mental health ($b = 1.15$, 95% CI = 0.17 – 2.14). Unemployed individuals had 4.37 units higher mental health score compared to employed individuals ($b = 4.37$, 95% CI = 3.04 – 5.69).

Conclusion

The findings emphasized the important detrimental role of unemployment, social media use and covid 19 on the mental health of higher educated youth. The relatively high rates of depression, anxiety, and stress among graduate job seekers should prompt the implementation of market force initiatives that incorporate interventions related to the major risk factors uncovered herein.

A randomized controlled trial of an online CBT based guided intervention for students with depression and/or anxiety: Findings from the cross-border Student Psychological Intervention Trial (SPIT) - Margaret McLafferty, Natasha Brown, John Brady, Rachel McHugh, Caoimhe Ward, Louise McBride, Anthony J. Bjourson, Siobhan M. O'Neill, Colum P. Walsh, Elaine K. Murray

Margaret McLafferty [1], Natasha Brown [2], John Brady [3], Rachel McHugh [4], Caoimhe Ward [1], Louise McBride [2], Anthony J. Bjourson [1], Siobhan M. O'Neill [4], Colum P. Walsh [5] Elaine K. Murray [1]

[1] Personalised Medicine Centre, School of Medicine, C-TRIC, Altnagelvin Hospital, Ulster University, Derry,/Londonderry, BT47 6SB

[2] Department of Nursing and Health Care, Atlantic Technological University (ATU), Letterkenny, F92 FC93

[3] Western Health and Social Care Trust, Tyrone and Fermanagh Hospital, Omagh, BT79 0NS, UK [4] School of Psychology, Ulster University, Coleraine BT52 1SA

[5] Department of Biomedical and Clinical Sciences, Linköping University, Linköping SE-581 83, Sweden

Introduction

Elevated levels of psychological problems have been revealed among college students globally. Indeed, the rates appear to be increasing, impacting not only on mental health and wellbeing but also on retention rates and academic achievement. Despite these high rates many students report that they are reluctant to seek help from traditional sources for their mental health problems. It is important therefore to identify and evaluate novel initiatives, such as digital interventions, to assist those at risk and improve their wellbeing.

Methods

The Student Psychological Intervention Trial (SPIT), a cross-border, EU funded project, commenced in September 2019 at Ulster University and ATU Donegal. The first phase of the study involved a longitudinal survey conducted as part of the World Mental Health International College Student Initiative (WMH-ICS). The second phase of the study involved the development and evaluation of an online CBT-based, intervention for college students with mild to moderate symptoms of anxiety and/or depression. A randomised controlled trial was conducted with 71 college students (35 intervention group, 36 control group). The wellbeing programme consisted of seven online sessions which lasted approx. an hour. Written support was provided by trained guides and the intervention was available 24/7.

Results

Significant decreases in depression and anxiety scores were revealed among those who received the intervention from time one (pre-intervention) to time two (post intervention) but not among the treatment as usual (control) group. The decrease in depression scores remained significant for the intervention group six months post-intervention. Interviews with participants and guides revealed support for such an initiative to be rolled out in colleges.

Conclusion

The study highlights the importance of identifying students who may be struggling with mental health problems early in their time at college, and that digital interventions may be a useful alternative support option for students.

Session 7 Gamification, Virtual Reality (VR), and Augmented Reality

Acceptability, Feasibility, and Preliminary Evaluation of an Animated Virtual Reality Game for Reducing Mental Health Stigma in Healthcare Students and Trainees - Raul Szekely, Oliver Mason, David Frohlich, Elizabeth Barley

Raul Szekely [1], Dr Oliver Mason [1], Prof David Frohlich [2], Prof Elizabeth Barley [3]

[1] University of Surrey, School of Psychology, Guildford, UK.

[2] University of Surrey, Digital World Research Centre, Guildford, UK.

[3] University of Surrey, School of Health Sciences, Guildford, UK.

Introduction

Virtual reality (VR) is an appealing technology with numerous applications in the mental health education and training of healthcare professionals. Drawing on narrative theory and immersive storytelling, VR games provide interactive and engaging experiences that can foster empathy and understanding, potentially enhancing their effectiveness in mental health stigma reduction efforts. This study aims to pilot-test the acceptability, feasibility, preliminary efficacy, and user experience of an animated VR game (“Goliath: Playing with Reality”) aimed at reducing stigma related to psychosis/schizophrenia among healthcare students and trainees.

Methods

This pilot study employed a mixed-methods design. Sixteen trainee clinical psychologists with experience working with service users with psychosis/schizophrenia engaged with the VR game using an immersive headset and controllers, and completed measures before and after. Quantitative measures assessing intervention acceptability, appropriateness, and feasibility were collected and analysed descriptively. These were complemented by qualitative feedback on user experience, analysed through deductive content analysis. Pre- and post-intervention mental health stigma-related measures were also collected and analysed using paired samples t-tests.

Results

Most participants found the VR game acceptable, appropriate, and feasible for mental health stigma reduction. While quantitative analysis showed non-significant changes in stigma-related measures, the qualitative feedback highlighted the immersive storytelling and symbolic portrayal of psychosis, with participants being impressed by the audio-visual elements and recognising the educational value of the VR game in presenting the experience of living with schizophrenia and challenging stigma among healthcare students and trainees. Additionally, the VR game evoked strong emotional responses, fostering empathy and prompting reflection within participants. However, participants noted usability concerns and suggested the need for more psychoeducation to improve the VR game further.

Conclusions

The VR game is perceived to show promise as a tool for mental health education among healthcare students and trainees. Engagement into the narrative of the VR game and emotional connection with the character could potentially increase the impact of stigma reduction efforts in relation to psychosis/schizophrenia. Further work should address usability concerns and explore the scalability

and effectiveness, as well as the underlying psychological mechanisms, of VR-based interventions relative to other modalities in the mental health education of healthcare students and trainees.

Evaluating a Virtual Reality Solution in Addiction Recovery for Marginalized Communities - Daithi Conlon, Dominic Holmes

Daithi Conlon [1], Dominic Holmes [2]

[1] Life Process Program Ltd

[2] eXRt Intelligent Healthcare Limited

Background:

The Life Process Program is a well-established evidence-based addiction recovery program, originally introduced in a residential recovery facility where it achieved 65% success rates. In 2012 the program was adapted for online use, where users engage through video lectures, reading materials and interactive exercises that necessitate typed responses. While proven effective for over a decade within primarily 'middle-class' demographics, extending its reach to marginalized populations, such as homeless communities, has surfaced unique challenges. Notably, literacy barriers and reduced dexterity due to physical conditions prevalent among these populations hinder the program's usability and engagement.

Technology offers a solution: suitably designed Virtual Reality (VR) applications have the potential to provide a more accessible and intuitive experience. By enabling interaction through hand gestures, this technology circumvents the need for traditional keyboard or touchscreen inputs, thus offering a potentially transformative solution for individuals facing literacy and physical challenges.

Objective

The aim of the trial is to test the feasibility of incorporating the Life Process Program into a VR application to enable a more intuitive experience within a community that typically exhibits challenges with dexterity of digits as well as both IT and language literacy skills.

Methodology

With UKRI funding secured to support the technical implementation, the proposed study will test the feasibility and acceptability of the VR adaptation among a cohort of homeless individuals. Participants will be recruited in collaboration with homeless shelters, and the intervention will be assessed over an eight-week period. Key outcome measures will include engagement rates, user satisfaction, and qualitative feedback on the VR experience.

Outcomes:

- We will measure participant engagement and progress through the program with their level of interaction within the VR application (completion of modules, exercises etc).
- To assess user satisfaction we will use questionnaires and interviews with participants on completion of the trial.
- To assess usability we will also use a standard SUS (System Usability Scale) measure.

Significance

By leveraging VR technology, this study endeavors to democratize access to effective addiction recovery resources. The findings could illuminate pathways to overcoming technological and literacy barriers in health interventions, potentially setting a precedent for broader applications of VR in reaching underserved populations.

Virtual Resilience: Exploring the Efficacy of Digital Tools and Strategies in Countering Stigmatisation of Mental Health among African Refugee Women - Eunice Anteh

Eunice Anteh, Gina Netto and Sacha Hasan

Heriot-Watt University

As global migration continues to rise, individuals and families are confronted with significant mental health challenges often exacerbated by cultural, social, historical, and linguistic barriers. African refugee women are faced with additional stressors from gender roles and racial discrimination. Mental health stigma compounds these challenges, hindering access to support and perpetuating the silence surrounding mental health issues. The mental health of African refugee women and how digital technologies maybe effective in overcoming stigma remains critical yet underexplored facet of their care experience. This proposed chapter aims to explore the potential of digital interventions to foster resilience and combat mental health stigma experienced by African refugee women. Through qualitative research design, in-depth interviews will be conducted with refugee women of African descent, mental health professionals and/or community support workers in Scotland. A feminist translocational intersectionality framework guided by critical realist perspective are employed to ensure better understanding of mental health needs, help-seeking behaviours, beliefs, and stigmatizing factors within African refugee women to influence the design of more effective digital mental health interventions. This chapter seeks to capture the intersecting perspectives on the design, adaptability and impact of digital mental health interventions, cultural sensitivity, mental health literacy, and role of social networks in reducing mental health stigma and improving mental health outcomes. This research contributes valuable insights to the field of mental health, gender, technology, and migration studies. Findings from the study could inform policy recommendations aimed at integrating digital tools and strategies that underscores the importance of resilience, inclusivity, representation, and linguistic considerations to reduce mental health stigma within African refugee women.

Addressing Mental Health Stigma with Serious Games in Virtual Reality - Oliver Mason

Oliver Mason

University of Surrey, England, UK

I describe several studies concerning with whether playing a serious virtual reality game might address stigmatised attitudes about severe mental illness, and schizophrenia in particular. The game chosen, Hellblade: Senua's Sacrifice, contains a first-person experience of voice-hearing and other psychotic symptoms. We hypothesised that gameplay would increase Empathy, reduce Desire for social distance and improve attitudes to schizophrenia using measures adapted from prior work. We also measured participants' beliefs about the voices heard by the protagonist, Senua, using the Beliefs about Voices Questionnaire. Results partially support the role that serious games can play in addressing mental health stigma in that attitudes improved, but empathy and desire for social distance did not. Overall, Senua's voices were experienced very similarly to those of clinical voice hearers supporting the clinical veracity of the game depiction of psychosis.

Session 8 Conversational Interfaces for Mental Health

Exploring Large Language Models in Digital Mental Health: Unlocking the Potential and Navigating the Pitfalls - Michael McTear

Michael McTear

School of Computing, Ulster University, Belfast

Traditionally conversational systems were hand-crafted using best practice guidelines. Designers provided training examples to recognize the intents behind the user's utterances, and created system responses and conversational flows that followed a pre-designed path. This approach guaranteed that the conversations generated would be under the control of the designer but at the expense of inflexibility and a tendency towards repetitiveness. With the launch of OpenAI's ChatGPT in November 2022, conversational AI was transformed with the use of Large Language Models that enabled more extensive interpretation of user inputs as well as dynamically generated system responses and conversation flows. This talk provides examples of how Large Language Models and related technologies such as Retrieval Augmented Generation can be used to improve conversational interactions in mental healthcare contexts as well as mitigating the risks associated with the generation by Large Language Models of harmful and misleading information.

Development of an artificial intelligence chatbot to analyse challenging to manage behaviours - Prem Deep Mareedu, Thomas Handy, James Chapman, James Burch, Alistair Teager

Prem Deep Mareedu [1], Thomas Handy [2], James Chapman [1], James Burch [1], Alistair Teager [2]

[1] Decently, Manchester Tech Centre, Manchester, UK

[2] Manchester Centre for Clinical Neurosciences, Salford, UK

Background

Challenging to manage behaviours (CtMB), which can include verbal and physical aggression, are prevalent following acquired brain injury (ABI), with 54% of individuals experiencing at least one CtMB, and these can affect prognosis, neurorehabilitation, and community reintegration. To assess CtMBs and inform clinical interventions, paper-based Antecedent Behaviour Consequence (ABC) charts are frequently utilised, but they have historically been analysed by hand by clinicians. The process is often limited by data collection issues, and the time taken to gather and analyse information, and feedback results. With Digital Health Technologies (DHTs) transforming healthcare provision, and artificial intelligence (AI) increasingly utilised to analyse datasets, the present study therefore looked to build an AI Chatbot to analyse and summarise ABC chart data in order to improve clinical practice in analysing CtMB.

Methods

To develop the AI Chatbot, a rule-based Retrieval Augmented Generation (RAG) model using OpenAI's ChatGPT-4 was utilised. To facilitate and test the development of the Chatbot, 435 anonymised ABC charts were extracted from the electronic patient records for 107 historical patients in a neurosciences centre. This data was converted to a JavaScript Object Notation file (JSON) and read within the Python code. RAG models use tailored prompts and context-retrieval combined with user queries to harness GPT-4's ability to respond to specific questions. This study utilised OpenAI's prompt engineering strategies and tactics to develop Chatbot prompts appropriate for ABC chart analysis. In order to measure speed of analysing and summarising ABC charts, the Chatbot was provided with a user query (e.g. Summarise patient X). The summary was tested for a sample of 10 patients, each differing number of ABC Charts. Additional prompt questions were also trialled (e.g. What triggers patient X's behaviour?).

Results

An AI Chatbot has been built to facilitate the analysis and understanding of CtMB. The mean time to analyse ABC chart data and produce a brief, structured summary within 800 characters was 7.81 seconds (range: 4.95-12.95). These summaries included basic patient information alongside the analysis of common triggers, behaviours, and consequences of specific CtMBs, as well as exploring specific queries for each patient's ABC charts.

Conclusions

Initial results have shown that it is feasible to develop an AI Chatbot and this has been able to analyse and summarise ABC charts rapidly, which could catalyse the analysis of CtMB in neurorehabilitation. Future research would benefit from determining the inter-rater reliability between the Chatbot and clinician outputs, measuring trust in Chatbots used in CtMB, and ascertaining the preferences of clinicians in the summaries produced.

Establishing User Needs for Conversational Agents in the Suicide Prevention Ecosystem - Sarah Z. Mbawa, Shakila Shayan, Aletta Smits, Dennis Nguyen, Tishana Brooks, Nynke Brandsma, Koen Van Turnhout

Sarah Z. Mbawa [1] Shakila Shayan [1], Aletta Smits [1], Dennis Nguyen [2], Tishana Brooks [1], Nynke Brandsma [1], Koen Van Turnhout [1]

[1] HU University of Applied Sciences Utrecht, Utrecht, The Netherlands.
[2] Utrecht University, Utrecht, The Netherlands.

Introduction

This paper presents a thorough examination of the user requirements for conversational agents (CAs) within the domain of mental healthcare specifically suicide prevention. Suicide is the second leading cause of death among young people. According to the World Health Organization, more than 800,000 people die yearly due to suicide, and for every adult who commits suicide, there could be as many as twenty who attempt to end their lives. Contributing factors to suicidal behaviours are diverse, but the two leading ones are 1) limited access to mental health; and stigmatization.

Various mental health care specialties have explored the use of technology such as CAs to address these issues. The findings show that this advanced technology can save time in predicting the behaviours and outcomes for those who are at risk of suicide. Another benefit of this technology is its potential of reducing the fear of stigmatisation and alleviating accessibility issues by providing a readily available recourse.

While CAs are undergoing experimentation in various healthcare scenarios, their application in suicide prevention care remains limited due to clinical and ethical considerations. Research activities have predominantly concentrated on refining algorithms and dialogue designs to generate well-structured and empathetic conversations while maintaining appropriate connectedness. While significant, this emphasis overlooks design requirements extending beyond dialogue. Furthermore, there is a notable absence of emphasis on incorporating user perspectives into design and research efforts within this domain.

Methods

To address this gap, we included key stakeholder groups in our research: 11 potential users who suffer from mental disorders and entertain suicidal ideations, and 10 mental health care experts, including volunteers manning the suicide prevention line. Through semi-structured face-to-face interviews and a focus group with the volunteers, we gathered data on their ideas on the design of the conversational agent. Employing grounded theory research methodology, we iteratively analysed the transcribed interview data to develop a framework of the user needs.

Results

The user needs identified in our study can be categorized into three main groups: 1) general needs, 2) design needs, and 3) interaction needs. General needs pertain to the qualities of dialogue and the CA's ability to comprehend these dialogue. This includes being empathic and capable of distinguishing distress from suicidal thoughts. Design needs include the relevant features of the app, such as modality options. Interaction needs focus on the quality of interaction between the user and the algorithm, such as the ability to recall previous conversations or making contextual recommendations. In both expert interviews and the focus group, engagement techniques were emphasised, including direct interaction with individuals struggling with suicidal ideation. These techniques also align with interaction needs.

Conclusion

In conclusion, this study offers valuable insights into designing and implementing conversational agents for suicide prevention. It emphasises the importance of user-centered approaches that prioritize accessibility, personalization, and trust. By integrating these insights into CA design and development, innovative solutions can be created to effectively support individuals in distress, while complementing traditional mental healthcare practices.

Session 9 Machine Learning and Natural Language Processing in Mental Health

Language Models to identify mental health topics in conversations - Cristina Luna-Jimnez, Zoraida Callejas, David Griol

Cristina Luna-Jimnez [1], Zoraida Callejas [1,2], David Griol [1]

[1] Universidad de Granada, Departamento de Lenguajes y Sistemas Informáticos, E.T.S. de Ingenierías Informática y de Telecomunicación.C/ Periodista Daniel Saucedo Aranda S/N, 18071, Granada, Spain

[2] Centro de Investigación en Tecnologías del Información y las Comunicaciones (CITIC-UGR), Granada, Spain

Introduction

Mental health is a major issue in society. The World Health Organization estimated that one in eight people globally were affected by mental health conditions. In this scenario, creating technological solutions to diagnose and accompany users could provide additional support in saturated mental health services systems. Due to the recent growth of Large Language Models and their success in solving tasks of different natures (e.g. reasoning or question-answering), one may think that they could apply to this discipline; however, these systems still require extensive evaluations to be used in sensitive domains as it is mental health. To fill in this gap, we performed extensive evaluations of two open-source families of Language Models, RoBERTa (R in what follows) and the 7Billion version of Llama-2 (LL in what follows), pre-trained on open-domain versus their adapted versions to mental-health domain (MentalRoBERTa and MentalLlama). We reported results in two distinct datasets in fine-grain mental health topic classification.

Methods

The two selected datasets contain questions and answers annotated in terms of 28 and 39 topics, including diseases (e.g. depression, anxiety, PTSD) and symptoms or causes (relationships, anger management, sleep problems, etc.). Both datasets were split following an 80/10/10 schema, resulting in 487 samples in the test set of Counsel-Chat (CC) and 17,688 for the test set of 7Cups (7C), the 90% remaining samples belonged to the training and validation sets.

Regarding the methods employed, we compared Zero-Shot with Embedding Extraction (EE) strategies for all the models. For the EE strategies, an adaptation stage was performed after extracting the embeddings by training several types of classifiers from the sklearn library (SVM, Random Forest, Nearest Centroid, k-NN, Multilayer Perceptron, and Decision Trees), although we only reported the performance of those that obtained the best scores in the development set.

Results

As the datasets are unbalanced in their number of classes, we reported improvements in the weighted-F1 (W-F1) metric on the test sets relative to the Zero-Shot, considered the baseline since this method does not require any specific training. First, Zero-Shot obtained a W-F1 of 5.90%, 3.01%, 28.43%, and 18.20% for RoBERTa (R), Mental-RoBERTa (MR), Llama-2 (LL) and MentalLlama (MLL), respectively,

in the Counsel-Chat dataset; for 7 Cups W-F1 values were 18.29%, 9.44%, 40.38% and 28.46% for R, MR, LL, and MLL, respectively. The top classifiers for the embedding extraction methodology achieved percentage point improvements of 18.66 (R), 23.31 (MR), 3.93 (LL), and 15.23 (MLL) compared to the Zero-Shot approaches.

Conclusions

We performed an analysis of two families of Language Models (RoBERTa and Llama-2) in two domains (general and mental) evaluating two approaches (Zero-Shot and Embedding Extraction). Results indicate that Llama models are superior to the RoBERTa family, as well as Embedding Extraction to Zero-Shot. Regarding the open vs. mental-health adapted models, a change of tendency was observed in Zero-Shot vs. Embedding Extraction strategies, being better mental models when adjusted, but not when they act as Zero-Shot predictors, highlighting possible erroneous conclusions about models' performances if only Zero-Shot strategies are compared.

Towards robust protocols for longitudinal mHealth speech analysis in mental health: an investigation of practice effects - Judith Dineley, Roberts Tamaris, Tian Pan, Lauren L. White, Zahia Rahman, Catriona Lucas, Ewan Carr, Faith Matcham, Johnny Downs, Richard Dobson, Nicholas Cummins

Judith Dineley [1], Roberts Tamaris [1], Tian Pan [1], Lauren L. White [1], Zahia Rahman [1], Catriona Lucas [1], Ewan Carr [1], Faith Matcham [2], Johnny Downs [1], Richard Dobson [1,3], Nicholas Cummins [1,4]

[1] Institute of Psychiatry, Psychology and Neuroscience, King's College London, London, UK.

[2] School of Psychology, University of Sussex, Falmer, UK.

[3] Institute of Health Informatics, University College London, London, UK.

[4] Thymia, London, UK.

Speech is a rich source of information on cognitive and neuromuscular functioning, and a growing literature has demonstrated these signals are detectable for conditions including major depression, psychosis and amyotrophic lateral sclerosis. By exploiting this signal, speech has potential as a form of non-invasive objective health state monitoring. Furthermore, the increasing prevalence of mobile and smart devices provides an accessible and convenient means for regular recording.

However, health-related changes in speech can be subtle, and speech recordings have multiple sources of variability. These range from speaker and recording factors to speech feature extraction and the analytical models used to estimate symptom severity that can mask or even mimic pathological effects. For example, recording in the morning or a reverberant environment, such as a hallway or bathroom at work, can result in a lower measured pitch, which is also associated with major depression.

Consideration of sources of variability is particularly important when developing protocols for robust longitudinal monitoring, and analytical models, such as machine learning, for mental state prediction. To date, most research in speech-based assessments has been cross-sectional and challenging to replicate.

Practice effects are a potential confounder in longitudinal speech-based health assessment and a neglected area in the literature. In the case of scripted elicitation - where participants read aloud a set text- participants become increasingly familiar with the reading, resulting in changes in their speech that may mask or mimic health-related changes.

This study used repeated recordings to identify systematic within-participant changes in timing and pausing characteristics, as a participant's number of recording sessions increases, that are indicative of practice effects. We investigated practice effects in the speech of healthy individuals to enable future comparisons in clinical cohorts.

We analysed speech samples from 42 individuals recorded reading a set text - first in a supervised environment and then remotely using their smartphone in semi-controlled conditions. Using linear mixed effects models and intraclass correlation coefficients, we compared the observed practice effects against baseline data; this comprised a separate cohort of 54 individuals, recorded in a lab environment that minimised variability due to set-up and acoustic conditions, using the same repeated reading in three sessions in one day ($n = 28$) and one week ($n = 26$), plus a new, unpractised reading in each session. Reading duration decreased systematically with practice (e.g., $n=28$, studio microphone: practised, effect = -0.14 , 95% CI = $[-0.23, -0.06]$, $p < 0.001$ versus non-practised, effect = -0.10 , 95% CI = $[-0.21, -0.01]$, $p > 0.05$). Further investigation is needed to understand non-systematic variations observed in other features such as articulation rate and pause duration.

This is essential foundational work for future developments utilising speech in longitudinal remote monitoring settings. Our findings will inform future protocols by characterising practice effects in remotely collected speech samples, for example, the need for a series of readings for systematic speech elicitation. Importantly, our findings can also inform the development of analytical models, such as machine learning, for mental state prediction not confounded by practice effects.

Understanding Depression's Multifaceted Effects in Outpatient Settings - Mihael Arcan, David-Paul Niland, Sean Gordon, Anne Doherty, Fionn Delahunty

Mihael Arcan [1], David-Paul Niland [1], Sean Gordon [2], Anne Doherty [2][3], Fionn Delahunty [1]

[1] Lua Health, Galway, Ireland.

[2] School of Medicine, University College Dublin, Belfield, Dublin 4, Ireland.

[3] Mater Misericordiae University Hospital, Eccles Street, Dublin 7, Ireland.

Introduction

Affective disorders, including depression, pose a significant cardiovascular risk, with up to a 150% increased likelihood of experiencing a cardiovascular event compared to the general population, similar to the risk associated with smoking or diabetes. People with depression are 60% more likely to develop diabetes than those without depression and face greater risks of arthritis, hypertension, and peptic ulcer disease. Furthermore, mood disorders like depression may hinder early diagnosis of medical conditions, potentially leading to advanced cancer diagnoses and higher mortality rates, despite cancer incidence rates being similar to the general population.

Methods

As depressive episodes are commonly observed among medical inpatients, we conducted our study in the outpatient settings of Mater Misericordiae University Hospital, recruiting participants from two specialist clinics: the diabetes day centre and the cancer monitoring clinic. Eligible participants aged 18 and above, who did not show acute mental illness or cognitive impairment, were invited to participate in our study. Measures taken included sociodemographic factors such as marital status or educational level, clinical history, and validated assessments of depressive and anxiety symptoms using the Patient Health Questionnaire (PHQ-9) and Generalised Anxiety Disorder (GAD-7) questionnaire. Each participant (n=50) was interviewed for several minutes.

Results

We categorised interview transcriptions based on classifications derived from the Patient Health Questionnaire (PHQ) and Generalised Anxiety Disorder (GAD) questionnaire. Our objective was to utilise deep learning models to distinguish individuals with specific mental disorders from those without. Non-symptomatic and mild symptomatic instances were combined into Class 0, while moderate to severe instances were grouped into Class 1. Additionally, for the four-class classification, we organised the scores based on cut points where total scores of 5, 10, 15, and 20 represented mild, moderate, moderately severe, and severe depression, respectively. For training, we leverage transformer models with different pretrained embedding models, such as BERT or RoBERTa. Our best binary classifier for GAD achieved an F1 score of 0.66, which decreased to 0.50 for the four-class classification. Regarding PHQ scores, our best two-class classifier obtained an F1 score of 0.75, whereas the four-class classifier yielded a score of 0.40.

Conclusions

In conclusion, depression emerges as a substantial contributor to cardiovascular risk, on par with the risks posed by smoking or diabetes. Individuals affected by depression are predisposed to a range of comorbidities, including diabetes, arthritis, hypertension, and peptic ulcer disease. Furthermore, the study underscores the potential ramifications of depression on timely medical condition diagnosis, potentially leading to adverse outcomes such as advanced cancer diagnoses and increased mortality rates. Conducted in outpatient settings at Mater Misericordiae University Hospital, the study recruited participants from specialized clinics and comprehensively assessed sociodemographic factors, clinical history, and depressive and anxiety symptoms. Notably, the study's findings reveal varying performance metrics in both binary and four-class classifications for GAD and PHQ scores.

The Feasibility and Acceptability of a Mobile-based Safety Planning App to Address Suicidality with Young People Accessing Secondary Level Mental Healthcare - Robyn Fitzgerald, Ruth Melia, Kady Francis, Jim Duggan, John Bogue, Mary O'Sullivan, Karen Young, Derek Chambers, Shane J McInerney, Edmond O'Dea, Rebecca Bernert

Robyn Fitzgerald [1], Ruth Melia [1,2,3], Kady Francis [3,4], Jim Duggan [5], John Bogue [3], Mary O'Sullivan [4], Karen Young [6], Derek Chambers [7], Shane J McInerney [4,8], Edmond O'Dea [2], Rebecca Bernert [9]

[1] Health Service Executive Community Healthcare Mid-West, Limerick, Ireland.

[2] Department of Psychology, University of Limerick, Limerick, Ireland.

[3] School of Psychology, University of Galway, Ireland.

[4] Health Service Executive Community Healthcare West, Galway, Ireland.

[5] Insight Centre for Data Analytics, University of Galway, Galway, Ireland.

[6] College of Engineering and Informatics, University of Galway, Galway, Ireland,

[7] Health Service Executive, Dublin, Ireland.

[8] Department of Psychiatry, University of Galway, Galway, Ireland. [9] Department of Psychiatry and Behavioural Science, Stanford University, Palo Alto, CA, United States.

Introduction

Over 700,000 people die by suicide annually, making it the fourth leading cause of death among those aged 15-29 years globally. Safety planning is recommended good practice when individuals at risk of suicide present to health services. A safety plan, developed in collaboration with a health care practitioner, details the steps to be taken in an emotional crisis. Safety plans, typically paper based, need to be available to the person in-situ and immediately accessible. Mobile-based safety plans offer an accessible means of facilitating access. SafePlan, a safety planning mobile app, was designed to support Young People experiencing suicidal thoughts and behaviours to record a plan that is personalised, adaptable, and immediately accessible in times of crisis.

The aim of the study is to assess the acceptability and feasibility of the SafePlan mobile app for young people experiencing suicidal thoughts and behaviours in secondary-level mental health services in Ireland (Child and Adult Mental Health Services & Adult Mental Health Services). Clinician's experiences will also be explored to assess the acceptability of a mobile-based safety plan in this setting.

Methods

SafePlan is an ongoing study assessing the feasibility and acceptability of a mobile-based safety plan. Participants include Young People aged 16-35 years who are currently accessing secondary level mental health support, have experienced suicidal ideation or behaviours in the past six months or have made a previous suicide attempt. The acceptability and feasibility of the SafePlan app will be evaluated using both qualitative and quantitative methodologies. The primary outcomes are feasibility outcomes and include the acceptability of the app to participants and clinicians, the feasibility of delivery in this

setting, recruitment, retention, and app use. Psychometric measures include: Beck Scale for Suicide Ideation, Columbia Suicide Severity Rating Scale, Coping Self-Efficacy Scale, Interpersonal Needs Questionnaire, and Client Service Receipt Inventory. Changes in primary outcome measures will be compared using a repeated measures design, with data collected at baseline and at post-intervention. Thematic analyses will be used to analyse the qualitative data gathered through semi structured interviews with Young People and clinicians. Here we report on quantitative and qualitative data from a case series study of three participants recruited through the SafePlan project.

Results

Results presented will include quantitative data on clinical and demographic characteristics, mobile app usability, and psychometric outcome measures. Key themes identified during a thematic analysis of qualitative data will be presented.

Conclusions

Implications for future research, policy and practice will be discussed.

Developing interfaces for a reliable Spanish chatbot focused on providing information about suicide - Pablo Ascorbe, María S. Campos, César Dominguez, Jonathan Heras, Magdalena Pacrez, Ana Rosa Terroba-Reinares

Pablo Ascorbe [1], María S. Campos [2], César Dominguez [1], Jonathan Heras [1], Magdalena Pacrez [3], Ana Rosa Terroba-Reinares [4]

[1] Departamento de Matemáticas y Computación., Universidad de La Rioja, Spain.

[2] Unidad de Salud Mental Espartero, Logroño, La Rioja, Spain.

[3] Teléfono de la Esperanza., Spain.

[4] Fundación Rioja Salud, La Rioja, Spain.

Introduction

The World Health Organization identifies suicidal behavior as one of the most serious public health problems that causes thousands of deaths worldwide. To intervene in this problem, it is important to attend to both people with suicidal behavior and their relatives. An approach to reach such a goal is the construction of informative chatbots that provide reliable information on suicide prevention. A chatbot can give access to virtual services to certain people who would avoid using a face-to-face service, either because the latter is overburdened, because they cannot afford it, or to avoid the stigma attached to certain people with mental health problems. Moreover, the anonymity offered by chatbots allows some people, especially the younger ones, to seek information about their doubts or freely express their feelings and problems. Nevertheless, most of the proposals included in the literature have been conducted in English-speaking populations. Research into the personalisation of chatbots in order to provide answers to different types of users is also highlighted as an interesting and little-studied aspect. Finally, the uses of machine learning methods that stand out in chatbots include the classification and detection of people potentially at risk of suicidal behaviour, but there is no evidence of studies that involve providing information, for example to family members, about suicidal behaviour.

Methods

In this work, we try to overcome these limitations by developing a chatbot called prevenIA that provides reliable information on suicide prevention in Spanish. The chatbot can also detect risky situations and refer them to 112 or to a support team with specialized professionals. The platform used to deploy the chatbot is very important as it could lead to more or less success in using it since some platforms are more adopted among, for instance, young people. At this moment, prevenIA can be offered on WhatsApp, Telegram, Discord, and as a web interface. In this work, we discuss the advantages and disadvantages of these platforms, including the level of market pervasiveness among the population, the degree of anonymity, the data security, the deployment tools offered, their free nature and the type of code (open-closed). All these aspects are essential to reach as many people in need as possible, but in a way that anonymity and security are not compromised.

Results

WhatsApp has the highest social penetration in Spain. However it has some disadvantages: the API is proprietary, and data treatment is not transparent, which could compromise anonymity and security. Telegram and Discord offer the option of deploying bots for free and access to friendly open-source interfaces, but do not have as much pervasiveness; and low transparency on data processing remains. Finally, the web interface, hosted on a server, does not require any installed application or previous account, unlike the previous alternatives, and guarantees data protection requirements; at the cost of losing social impact and the maintenance of the server.

Conclusions

We believe that the web interface is the best candidate, as it guarantees full data processing and the flexibility of a self-built solution.

Session 10 Digital Interventions and Suicide Prevention

The Application of Artificial Intelligence to Ecological Momentary Assessment Data in Suicide Research: A Systematic Review - Ruth Melia, Katherine Musacchio Schafer, Megan L. Rogers, Emma Wilson-Lemoine, Thomas Joiner

Ruth Melia [1], Katherine Musacchio Schafer [2], Megan L. Rogers [3], Emma Wilson-Lemoine [4], Thomas Joiner [5]

[1] University of Limerick
[2] Vanderbilt University
[3] Texas State University
[4] Kings College London
[5] Florida State University

Background: Ecological Momentary Assessment (EMA) can capture highly dynamic processes and intense variability patterns suitable to the study of suicidal ideation and behaviours. Artificial Intelligence (AI), and in particular Machine Learning (ML) strategies, have increasingly been applied to EMA data in suicide research.

Aims

The objective of this review is to (1) synthesize the available empirical research applying AI strategies to EMA data in the study of suicidal ideation and behaviours, (2) identify the methodologies used, EMA data collection procedures employed, suicide outcomes studied, study quality, types of AI applied and results reported, and (3) develop a standardized reporting framework for research applying AI to EMA in mental health in future.

Methodology

PsycINFO, PubMed, SCOPUS and EMBASE were searched for articles published from inception to September 2023. Studies that applied AI to EMA data in the investigation of specific suicide outcomes (suicidal ideation, suicide attempt, suicide death), collected across devices (Smartphone, Personal Digital Assistant, PC, tablet) and settings (clinical, community) were included. The Preferred Reporting Items for Systematic reviews and Meta Analyses (PRISMA) guidelines were used to identify relevant studies while minimizing bias. Specific EMA data reported included EMA sampling method, monitoring period, prompt latency, compliance, attrition, and treatment of missing data. Quality appraisal was performed using CREMAS, an adapted STROBE checklist for reporting EMA studies.

Results

After full text review, a total of 12 articles, comprising 4398 participants met eligibility criteria and were included in the review. 9 of the included studies were published in the previous 2 years. Studies had been carried out in psychiatric hospitals (n = 5), emergency departments (n = 2), outpatient clinics (n = 2), medical residency programmes (n = 1), and university mental health clinics (n = 1) with some conducted across settings. Design features reported (sampling strategy, average prompting frequency, response latency, device used, compliance, and treatment of missing data) varied across studies. In

the application of AI to EMA data to predict suicidal ideation in the short-term, studies reported mean AUCs (0.74 to 0.86), sensitivity (0.64 to 0.81), specificity (0.73 to 0.86), and positive predictive values (0.72 to 0.77).

Conclusions

The application of AI to EMA data within suicide research is a small but burgeoning area with high heterogeneity apparent in data collection and reporting procedures. Findings indicate some promise in the application of ML to self-report EMA data in the prediction of near-term suicidal ideation. The development by the research team of an adapted CREMAS reporting framework aims to standardize reporting on the application of AI to EMA data in mental health research going forward.

Keywords: ecological momentary assessment; artificial intelligence, machine learning; suicidal ideation; suicidal thoughts and behaviours; mHealth

Trial Registration

PROSPERO: CRD42023440218

Open Science Framework: <https://doi.org/10.17605/OSF.IO/NZWUJ>

Digital Wellbeing Care and Access to Mental Health Services - Melia Formento

Melia Formento

Heritage Provider Network, Samuel Merritt University

BACKGROUND: The COVID -19 Pandemic was a global disrupter to medical care in the United States and throughout the world. In March 2020, within weeks of Shelter in Place orders in California clinical services transitioned from in-person to virtual care. The goals were to continue quality access of adult wellness care at Heritage Provider Network in Southern California. The structure of the virtual wellness visit was adapted to best address the quintuple aim of health services to include patient and provider satisfaction, clinical outcomes, health equity, and cost containment.

PROCESS: A group of 10 nurse practitioners and physician assistants developed virtual wellness visits based on person-centered care that originated in clinic-based visits. The group of healthcare providers was able to continue to provide wellness care including assessing for behavioral health needs and making appropriate referrals to mental health services. Behavioral health screening was provided through the Patient Health Questionnaire (PHQ-9) and patients were appropriately referred to mental health professionals who were also providing care virtually.

RESULTS: Virtual Wellness care was provided for over 10,000 patients from March 2020 through March 2021 within the Heritage Provider Network in Southern California. During a time when mental health support was needed most access to screening and referrals was not disrupted. Once the COVID -19 virus was better contained many providers returned to providing care in the traditional in-person manner. However, due to patient and provider preference for virtual care this service remains available to address the quintuple aim of health care.

RECOMMENDATIONS: Developing virtual care services and access to mental health services requires adaptive leadership, strong teamwork, and a structured process. This process may be useful for other health systems to restructure their services to meet the quintuple aim of health care. Evaluating how wellness and mental health services are delivered to vulnerable populations will be an ongoing process.