Telehealth and Its Prospective for Improving Serious Mental Illness Conditions: A Scoping Review

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Abstract

BACKGROUND: Health care services ought to be continued for people with serious mental illness (SMI), despite the pandemic events. These efforts help prevent recurrences of any of these medical conditions through the use of telehealth techniques.

AIM: The aim of this article is to evaluate the application of telehealth among SMI patients.

METHODS: This study used a scoping review framework methodology based on the report by Arksey and O'Malley. A comprehensive literature search was carried out to identify precise studies, and vigorous criteria were employed to select the revelant papers. The search was conducted in several databases, including PubMed, CINAHL (EBSCO), and Science Direct. Subsequently, the data collected were extracted by two independent reviewers, synthesized and presented in the table and narrative format.

RESULTS: A total of 13 studies were identified in the search selection process based on the review objectives, and 5 of these studies were randomized control trials (RCT), while 8 used varied research designs.

CONCLUSION: Based on the results of the scoping review, telehealth services were concluded to be suitable for helping people with SMI obtain the required mental health services.

Introduction

The use of technology in the health care sector is very significant in diverse aspects, including the development of information systems and telehealth applications. Telehealth is widely defined as an electronic information and telecommunication technology to support and promote medical services remotely, in the form of video conference, internet, or by phone [1].

Based on the 2009 WHO survey on the implementation of mHealth, the global use of technology in medical sciences has grown extensively over the years. A total of 14 categories of mHealth services have been implemented through health call centres, emergency toll-free telephone facilities, emergency and disaster management, mobile telemedicine, appointment reminders, community mobilization and health promotion, treatment compliance, mobile patient records, information access, patient monitoring, health surveys and data collection, surveillance, health awareness campaigns as well as decision support systems. The results also showed that health call centers had the most predominant utilization. Furthermore, mHealth appears more widely adopted in Europe and America, compared to other geographical locations [2].

In January 2021, mobile phone users were approximately 5.22 billion in gobal population, with internet access available to about 4.6 billion persons worldwide. This fact shows a massive increase in the universal application of communication technology [3], due to the current coronavirus pandemic. As a consequence, the development of mHealth solutions became very significant across the globe and is widely used for all types of medical challenges, including mental health disorders.

Serious mental illness (SMI) is one of the mental health conditions with the need for critical medical attention. The National Institute of Mental Health defined SMI as "a mental, behavioral, or emotional disorder resulting in serious functional impairment, which substantially interferes with or limits one or more major life activities" [4]. Also, the term commonly described as a grup of chronic mental

conditions, such as schizophrenia, schizoaffective, delusional, major depressive, and bipolar disorders [5], [6].

People with SMI require the assistance of mental health professionals to maintain sufficient quality of life, prevent recurrence and monitor their conditions [7]. These services are currently not only offered offline but also online, mainly using telehealth approach. Several benefits are attached to this technique, including the ability to help consumers better comprehend and utilize complex treatment systems, obtain information relevant to present conditions and viable interventions, increase treatment engagements, learn and maintain effective coping strategies, overcome certain barriers associated with stigma, reduce medical costs as well as improve access and treatment outcomes [8].

The research on telehealth as a means of providing medical services to SMI patients has been widely conducted across various countries for over 10 years, particularly in developed economies. A significant increase in communication tools over the past three years has also been recorded, especially since the pandemic. The virus outbreak prompted researchers and mental health practitioners to apply telehealth very extensively, as multiple studies were readily available. As a consequence, the authors tend to map out the application of telehealth to SMI cases. This article also offers solution to a review question on "how to apply telehealth to SMI patients for improved conditions".

Methods

This article comprehends the scoping review frameworks based on Arksey and O'Malley [9] with the following steps : 1) Identify the research question; 2) Discover relevant studies; 3) Study selection; 4) Develop charts for the obtained data; 5) Collate, summarize and report the results.

Search strategy for relevant literature

Several databases, including PubMed, CINAHL (EBSCO), and Science Direct, were used to find similar articles. The search keywords were defined on the basis of population, concept and context (PCC), where population refers to people with serious mental illness (SMI). This condition forms a small subset of the 300 mental illnesses listed in "The Diagnostic and Statistical Manual of Mental Disorders (DSM)", including bipolar, major depressive, schizophrenia and schizoaffective cases. Meanwhile, concept focuses on the telehealth implementations, but no formulation was provided for context. Therefore, the main search keywords were

"serious mental illness" and "telehealth", although certain options were also exploited.

Study selection

The studies chosen after the search process were based on the inclusion criteria, such as title and abstract related to telehealth application in SMI patients, written in english, full-text, research article, and also published between 2019-2021. This was followed by identifying the available full-text for the selected articles by EW, AN, and K. Under conflicting views in determining the selected materials for analysis, certain discussions become necessary to arrive at a final decision. Figure 1 represents the review selection process in form of PRISMA flowcharts. This illustration includes search results comprising research databases and additional sources, removal of duplicate articles, study screening phase (title/abstract and full text), papers exclusion for particular reasons after reading the full text, and the final number of articles. Studies were removed if the specified conditions are not fulfilled.
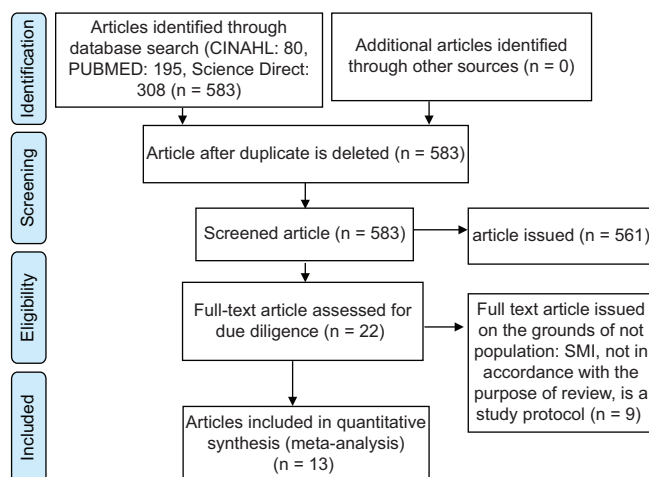
Figure 1: Preferred Reporting Items for Systematic Reviews and Meta-Analyses chart flow

Data extraction and analysis

Data extraction tools were developed by the reviewers to obtain relevant information from selected studies and represented in tables by EW and K. These data comprise specific research details on population and critical concepts, methods, and findings essential to the review purpose. Furthermore, certain modifications and revisions were implemented as necessary during the analysis.

Results

Literature search/study selection

The initial keyword search generated 583 articles, while 11 duplications were discovered using

Mendeley reference manager. However, a total of 550 papers were excluded after examining title, abstract, and full-text availability. The 22 complete articles were identified by two independent reviewers, termed AN and K, although 9 were disqualified for not fulfilling the criteria in Figure 1. Finally, 13 articles were deemed eligible for further analysis (Table 1).

Study characteristics

This scoping review encompassed a total of 13 articles, out of which 5 employed RCT [10], [11], [10], [11], [12], [13], [14]. Meanwhile, 8 studies used different methods involving observational [15], [16], case-control [17], cohort [18], correlational [19], case study [20], comparative study [21] and survey [22]. Furthermore, the present research was conducted in 8 countries between 2019-2021, mostly in developed states. The participants were predominantly SMI patients, comprising schizophrenia, bipolar, and similar severe conditions with functional impairment.

Telehealth characteristics

Telehealth employs various platforms, including web-based, telephone, text message, video conferencing and smartphone applications (Table 2). The applications also varied and are developed as LEAN (Lay health supporters, E-platform, Award, and iNtegration), mobile monitoring, anomaly detection, WEB MOVE, multimodal lifestyle intervention with web-based tools, LTQ (learn to quit) an application to stop smoking, multi-component mobile-enhanced treatment for smoking cessation (iCOMMIT), telemedical care, tele mental health, telephonic aftercare services, teleconsulting (smartphone application, telemedicine and teletherapy.

Purpose of telehealth in SMI patients

The use of telehealth services for SMI cases help improve treatment compliance, ascertain recurrence risk, promote mental health consultations, monitor after care, support activities as well as in decision-making. Additional importance includes training victims to stop smoking, monitoring motor activity, energy, mood, and sleep, weight management intervention and also improve patients' cardiometabolic conditions.

Results of telehealt application in SMI patients

Telehealth applications greatly helps in medical intervention for SMI cases, with a high sensitivity in detecting recurrence. Monitoring of treatment compliance is also an additional responsibility. This technology has the capacity of connecting clients and practitioners to provide solutions through various digital methods and also facilitate joint decision-making related to mental health. However, a previous report showed that telehealth is unable to significantly improve the life quality of victims. Telehealth only facilitates the support needs of SMI individuals, particularly from mental health professionals. Further related studies have also mentioned that telehealth is incapable of improving cardiometabolic conditions as well as increase the readiness to alter certain dietary behaviors.

Discussion

This scoping review investigates the use of telehealth in SMI patients. The technology has been applied in various countries and has grown significantly in various aspects over the last three years, possibly due to extensive development efforts. This widespread application was also attributed to the drastic decline in face-to-face meetings, although mental health cases continue to increase because of the COVID-19 pandemic. Policies on social restrictions directly aggravated the recovery achievement of SMI persons. This situation, therefore, leads to an increased health anxiety, reduced activity and social interactions, as well as significantly disrupts daily routines [23], [24].

A total of 13 articles on the use of telehealth in SMI cases have been reviewed over the past three years. The results showed that various terms were explored in the application. These expressions indicate that the concepts behind the mobile technology varied substantially, both in structure and usability. Also, the adoption of telehealth in SMI conditions appeared very rare before the pandemic [25], due to the several obstacles in its application and services. These barriers include difficulties in navigating technology [26], internet access and devices [27], poor financial conditions of most SMI victims, various pain levels, as well as complex treatment management [28]. Despite telehealth limitations among SMI individuals, the system serves as a means for self-management interventions with several advantages, including helping victims adhere to treatment regimens, reducing the severity and problems in connecting with others, preventing hospitalization, increasing self-esteem and improving perception [29]. Furthermore, mobile health approach also demonstrate superior patient engagement and satisfaction with speedy clinical outcomes and recovery, compared to the regular hospital-based methods [30].

The purpose of telehealth or mobile health applications in SMI patients varies significantly, but tend to improve treatment adherence [10]. People with these conditions are particularly prone to relapse, due to non-compliance with therapy [15]. In

Table 1: Data extraction

Author, year	Country	Title	Purpose	Population and sample	Telehealth term	Design	Result
Xu *et al*. (2019)	China	Lay health supporters aided by mobile text messaging to improve adherence, symptoms, and functioning among people with schizophrenia in a resource-poor community in rural China (LEAN): A randomized controlled trial	To find out if LEAN programs can improve treatment adherence in people with schizophrenia	Population: People with schizophrenia who are divided into control and intervention groups Sample: n = 278 Intervention group = 139 and control group = 139	LEAN (Lay health supporters, E-platform, Award, and iNtegration)	RCT	There was a significant increase in treatment adherence and reduced risk of recurrence in the intervention group
Merikangas *et al*. (2019)	Washington DC (United States)	Real-time Mobile Monitoring of the Dynamic Associations Among Motor Activity, Energy, Mood, and Sleep in Adults With Bipolar Disorder	To examine the directional associations among motor activity, energy, mood, and sleep using mobile monitoring	Adults with bipolar disorder Sample: n = 242	Mobile monitoring	Case–control design	The interventions using mobile monitoring may have greater efficacy than current approaches
Henson *et al*. (2021)	Boston	Anomaly detection to predict relapse risk in schizophrenia	To determine the risk of recurrence in people with schizophrenia using anomaly detection	Eighty-three participants had a diagnosis of SZ and 43 were HC	Anomaly detection	Observational study	This anomaly test can predict recurrence in people with schizophrenia with 89% sensitivity and 75% specificity
Ochoa *et al*. (2020)	Los Angeles, CA, USA	Barriers to Participation in Web-Based and In-Person Weight Management Interventions for Serious Mental Illness	To examine barriers to participation and retention in two modalities (web based and in-person) of a weight management intervention tailored for individuals with serious mental illness (SMI)	Individuals with serious mental illness (SMI), Sample: n = 277 klmpk WEBMOVE (n = 93) MOVE SMI (n = 95) and regular maintenance (n = 89)	WEB MOVE	RCT	Barriers to modality treatment include financial/economic, social, transportation, accompanying physical and mental problems, support from others and emotional support
Looijimans *et al*. (2019)	North Netherlands	Multimodal lifestyle intervention using a web-based tool to improve cardiometabolic health in patients with serious mental illness: Results of a cluster randomized controlled trial (LION)	Determined the effectiveness of a 12-month multimodal lifestyle approach, including a web-based tool to improve patients' cardiometabolic health, versus care-as-usual	SMI patients, Sample: n = 244 Intervention (n = 140) and control (n = 104)	Multimodal lifestyle intervention using a web-based tools	RCT	These interventions cannot improve cardiometabolic health in patients with serious mental illness, but they improve patients' readiness to change dietary behavior, in addition to differences in waist circumference in the intervention group
Vilardaga *et al*. (2019)	United States	Formative, multi-method case studies of learn to quit, an acceptance and commitment therapy smoking cessation app designed for people with serious mental illness	To evaluate LTQ application usage compared to QG	People with SMI 7 participants involved in this study	LTQ (Learn to Quit) an app for quitting smoking QG (Quit Guide) a practice guide to quitting smoking	Case study	LTQ usability levels are above standard limits and higher on average from QG
Wilson *et al*., 2019	Southeast USA	Patient-Informed Treatment Development of Behavioral Smoking Cessation for People with Schizophrenia	To tailor and refine an existing smoking cessation intervention for the population of people who use cigarettes and are diagnosed with schizophrenia, schizoaffective, or psychotic disorder	People who use cigarettes and are diagnosed with schizophrenia, schizoaffective, or psychotic disorder. n = 13 people (5 in cohort 1 and 8 in cohort 2)	Multi-Component Mobile-enhanced Treatment for Smoking Cessation (iCOMMIT)	Cohort	The intervention was helpful. More than a third of participants self-reported smoking abstinence after treatment
Stentzel *et al*., 2021	Stralsund and Greifswald, Germany	Telemedical Care and Quality of Life in Patients With Schizophrenia and Bipolar Disorder: Results of a Randomized Controlled Trial	To assess whether telemedical care programs can improve quality of life	Schizophrenic outpatient, schizoaffective disorder, bipolar disorder with age ≥18 years	Telemedical care	RCT	The concept of telemedical care is not significant to the quality of life in patients with severe mental disorders. More important for quality of life is the general social support and global level of functioning of patients
Costa *et al*., 2021	United States	Tele-Mental Health Utilization Among People with Mental Illness to Access Care During the COVID-19 Pandemic	To reflect the importance of building innovative strategies to create working alliances with people in need of care through tele-mental health	People with mental illness who joined or became followers of the ForLikeMinds community n = 381	Tele-mental health	Survey with correlational analysis	Tele-mental health is becoming a very useful way to help people learn self-care strategies and to connect with others to help build relationships and overcome loneliness
Naik *et al*., 2021	India	Telephonic follow-up during COVID-19 to maintain continuity of care for persons with psychiatric disorders	To explain the usefulness of aftercare telephone services (including liaisons with primary health-care providers) provided to people with psychiatric disorders during the COVID-19 lockdown period in India	Outpatients under unit V of the Nimhas psychiatric department (National Institute of Mental Health and Neuro Sciences), Bengaluru, India n = 1049	Telephonic aftercare services, teleconsultating	Chart review survey	Telephone consultation is not only feasible but also provides a useful means of reaching patients, who specifically require regular follow-up consultations

(Contd...)

Table 1: *(Continued)*

Author, year	Country	Title	Purpose	Population and sample	Telehealth term	Design	Result
Vitger *et al.*, 2019	Danish	The Momentum Trial: The Efficacy of Using a Smartphone Application to Promote Patient Activation and Support Shared Decision-Making in People With a Diagnosis of Schizophrenia in Outpatient Treatment Settings: A Randomized Controlled Single-Blind Trial	To investigate the effects of using smartphone apps to promote patient activation and support joint decision-making for people with schizophrenia spectrum disorder in outpatient care settings	Outpatients with a diagnosis of schizophrenia or psychotic disorders in the Danish capital region n = 260 people (130 in the intervention group, 130 in the control group)	A Smartphone Application		Randomized controlled single-blind trial This study can connect clients and practitioners so that practitioners can provide solutions through digital approaches and can facilitate joint decision-making related to mental health
Roncero *et al.*, 2020	Spanish	The Response of the Mental Health Network of the Salamanca Area to the COVID-19 Pandemic: The Role of the Telemedicine	To illustrate the mental health network's response in the Salamanca area of Spain to the COVID-19 pandemic crisis and the reorganization of its resources in the first 8 weeks after the alert status is announced	9038 people with mental illness, 163 health professionals	Telemedicine	Observational study	The usage of telemedicine is promising in patients with any kind of disorder. Its implementation in daily practice will be considered in the future
Miu *et al.*, 2020	USA	Teletherapy with serious mental illness populations during COVID-19: Telehealth conversion and engagement	To compared teletherapy conversion and utilization rates between SMI and general populations in an outpatient psychiatric clinic	n = 816 people with SMI = 124, and n = 692 non-SMI	Teletherapy	Comparative study	The feasibility of telehealth for serious mental illness populations during the pandemic

RCT: Randomized control trial.

this context, non-compliance is attributed to certain challenges related to neglecting drugs, unpleasant side medicine, and poor disease comprehension [31]. Under these circumstances, the role of telehealth becomes very necessary towards enhancing treatment compliance. The application serves as a reminder to schedule drug intake, provides psycho-education related to treatment and addresses non-compliance issues.

In addition to preventing recurrence and improving compliance, telehealth also monitors after care services [22], physical activity, energy, mood, and sleep [17], conducts mental health consultations and provides social support through telemedicine [13], [15], [16], implements teletherapy [21], assists victims in learning self-care strategies and the ability to connect with others to avoid loneliness [19] as well as, promotes positive activities and provides support in decision-making, particularly in terms of treatment management [14]. Furthermore, the monitoring daily life activities including proper decision-making related to self-care, mood conditions, energy and the ability to socialize, appears very necessary. This daily experience indicates the capacity to maintain self-care and also prevent any recurrence [32].

Telehealth is also intended for particular purposes related to conditions often experienced by SMI patients, including ways to stop smoking [18], [19], weight management and application barriers [11], and cardiometabolic improvement [12]. High smoking rate is another major problem common to mental health victims. These smoking habits pose a greater risk factor to cardiovascular diseases, diabetes and high mortality [32], [33]. Typically, intense smoking appears feasible when experiencing discomfort, stress and even eating anxiety. Therefore, controlling smoking behaviors among SMI patients requires the appropriate strategy and the use of telehealth serves as a potential alternative. Primarily, it is important for smoking victims to understand treatment-emergent nicotine withdrawal symptoms, side effects and the impact of cessation on antipsychotic medications [34], [35]. Weight management also appears necessary, specifically for recovering patients. Furthermore, the measures for cardiometabolic improvement in SMI cases are related to their physical activities [36].

Study limitations

This study did not consider cross-references and as a result, certain eligible articles for analysis are possibly not identified.

Conclusion

Based on the review results of 13 articles, the use of telehealth offers certain level of improvement for SMI patients. This method serves as a means for mental health consultation, therapy implementation, and monitoring of victims' activities. Telehealth was not significantly related to the quality of life among SMI individuals, but help connect with environmental and mental health professionals, as well as fulfill various environmental aspects of human survival.

Authors' Contributions

EW: Conceptualization, method, original draft, review, and editing. SY: Review. DKS: Review. AN: Selection study, data extraction, review, and writing. K: Selection study, data extraction, review, and editing.

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