Review Article

Travel Prevention Using Telepsychiatric Services: A Review

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Abstract
Background: Telepsychiatry is a type of mental health service delivery using information and communication technology for patients living far from psychiatrists It can reduce the number of travelers looking for mental health services. This study aimed to review articles that reported the percentage of prevented travels or referrals using telepsychiatry.
Methods: The PubMed database was searched in September 2019 for this review study. Data were extracted from admitted studies based on a series of variables consisting of author, country, modality, referral setting, urgency, study design, sample size, and percentage of prevented travel. Descriptive statistics were used to analyze data.
Results: Eight studies were included. Half of these studies were conducted in Australia. Real-time telepsychiatry modality was used in most of the studies (75%). The hospital was the most referral setting in the studies (62.5%). The type of telepsychiatry services delivered in 75% of the studies was elective. The study design of 62.5% of studies was prospective. The number of included participants in the studies ranged from 28 to 1943. The percentage of avoided travels ranged from 12 to 79.
Conclusion: Successful telepsychiatry systems could prevent unnecessary referrals and travels. However, the effective use of telepsychiatry services depends on various factors, including the type and period of the disease, the therapist's efficacy in terms of correct diagnosis and treatment, and patient cooperation.
Keywords: Telemedicine, Telepsychiatry, Travel, Referral, Prevent, Review

Introduction

The global prevalence of mental disorders is about 13%. This means that almost 970 million people worldwide suffer from at least one mental disorder (1). The number of mental health workers is nearly one per 100 000 population around the world (2). The low number of psychiatrists and their centralization in urban centers has caused many patients in rural and deprived areas not to access mental healthcare services. Therefore, patients have to travel and spend a lot of time and cost to access these services.

Today, the use of information and communication technology in medicine for delivering healthcare services at a distance has expanded as telemedicine. As a subgroup of telemedicine, telepsychiatry is the mode of mental health services delivery for patients living in rural areas and far from psychiatrists (3). Studies have shown that telepsychiatry is a reliable method that can reduce face-to-face visits (4,5). It can be an effective solution for reducing travel costs (6) and increasing patients' and providers' satisfaction (7). In addition, studies have shown

that telepsychiatry can be a useful method for delivering mental health services and preventing the transmission of infection to patients and psychiatrists during coronavirus disease 2019 (COVID-19) (8,9).

Apart from the direct costs, mental disorders impose high indirect costs on society. These disorders affect family, community members, and the patient and reduce the development process of the country by negatively affecting the people's efficiency and quality of life. Timely identification and treatment of people affected by mental illness can reduce the progression of the disease and improve the mental and physical health of the people. However, despite the importance of mental health, problems such as shortage and inappropriate distribution of psychiatrists and fear of stigma prevent patients from seeking psychiatric services.

One factor that can help policymakers in the successful implementation of a telepsychiatric system is to know to what extent the use of this system can prevent unnecessary referrals and travels. Few studies have been done in this area. However, these studies were conducted under

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different conditions, and each used different methods to provide remote services that could affect the number of referrals. Therefore, this review study aimed to determine the percentage of travel or referral prevention using telepsychiatric systems.

Methods

The Medline database through PubMed was searched in September 2019 to retrieve relevant studies without date limitation. A study showed that most telemedicine studies could be accessed by searching only the Medline database (10).

The combination of keywords to search was as follows: [telemedicine OR telehealth OR telecare OR telepsychiatry OR teledermatology OR teledentistry OR telesurgery OR teleradiology OR teleneurology OR telepaediatrics OR telepaediatrics OR teletrauma OR teleconsultation OR "tele emergency" OR telepsychology OR "tele wound care" OR "tele ENT" OR teleotology OR telecardi* OR telemonitoring OR teleophthalmology OR televisit* OR telematics OR "telehome care" OR telediagnosis OR telenursing OR teleoncology OR telemetry OR teleconsulting OR teleservice OR telesonography OR teleobstetric OR telegyn* OR teleburn* OR telenursing OR telerehabilitation OR telegeriatrics OR telemedical OR PACS OR "remote consultation" OR "health information system" OR "web-based" OR "computer aided"] AND [referral* OR visit* OR hospitalisation OR transfer* OR transport* OR admission* OR travel* OR cost saving* OR appointment OR cost stud* OR remote consultation* OR economic*] AND [avoid* OR reduc* OR decreas* OR unnecessar* OR sav* OR prevent]

Original studies in English with published abstracts reporting the percentage of prevented travels for patients or healthcare providers, or providing data to indicate the above-said percentage, were included in this review. The following studies were excluded: review studies, letter to editor papers, telehomecare studies, single case studies or studies with less than 15 participants, studies about medical or health education, and studies without methodology, credible data, and analysis, which are not able to indicate the percentage of prevented travels.

All retrieved titles and abstracts were assessed by two of the authors independently. Studies with information relating to the impact of telemedicine on travel, referral, and transfer were retrieved for closer evaluation by full texts. The full texts of the final studies were reviewed by two of the authors to extract data based on the checklist, including items such as author, country, modality, referral setting, urgency, study design, sample size, and percentage of prevented travels (Table 1).

Data were descriptively analyzed using frequencies and percentages.

Results

The PubMed search resulted in 6579 studies, of which 859 were selected for further evaluation. After reviewing these studies, 257 were included. Since it is not possible to report all these studies in one article, we discussed only the psychiatry specialty in this article. Therefore, only eight studies were included in this review (Figure 1).

Country

Half of the studies (n = 4, 50%) were conducted in Australia. The remaining were performed in USA (n = 2, 25%), Canada (n = 1, 12.5%), and Iran (n = 1, 12.5%).

Modality

The telepsychiatry method in most of the studies (n = 6, 75%) was real-time, and in two studies (25%) hybrid.

Referral setting

In five studies (62.5%), patients were referred from the hospital, and in three studies (37.5%), the referral setting was a primary care center.

Urgency

The type of telepsychiatry service delivery in six studies (75%) was elective, and only in two studies (25%) was emergency. Five studies (62.5%) were prospective, and the remaining (n = 3, 37.5%) were retrospective.

Study design
Sample size

The number of included samples in the studies varied from 28 to 1943.

Table 1. Data from included studies

| Author	Country	Modality	Referral setting	Urgency	Study design	Sample size	Percentage of prevented travel
Mazhari et al (4)	Iran	Real-time	Hospital/inpatient	Elective	Prospective	40	70.0
Reliford and Adebanjo (11)	USA	Real-time	Hospital/outpatient	Elective	Prospective	35	75.0
Roberts et al (7)	Canada	Real-time	Primary care/outpatient	Emergency	Prospective	60	61.3
Buckley and Weisser (12)	Australia	Real-time	Hospital/inpatient	Elective	Retrospective	1943	40.4
Saurman et al (13)	Australia	Real-time	Primary care/outpatient	Emergency	Prospective	558	48.0
Worth et al (14)	USA	Hybrid	Primary care/outpatient	Elective	Retrospective	595	12.0
D'Souza et al (15)	Australia	Hybrid	Hospital/inpatient	Elective	Prospective	28	79.0
Trott and Blignault (16)	Australia	Real-time	Hospital/outpatient	Elective	Retrospective	240	40.0
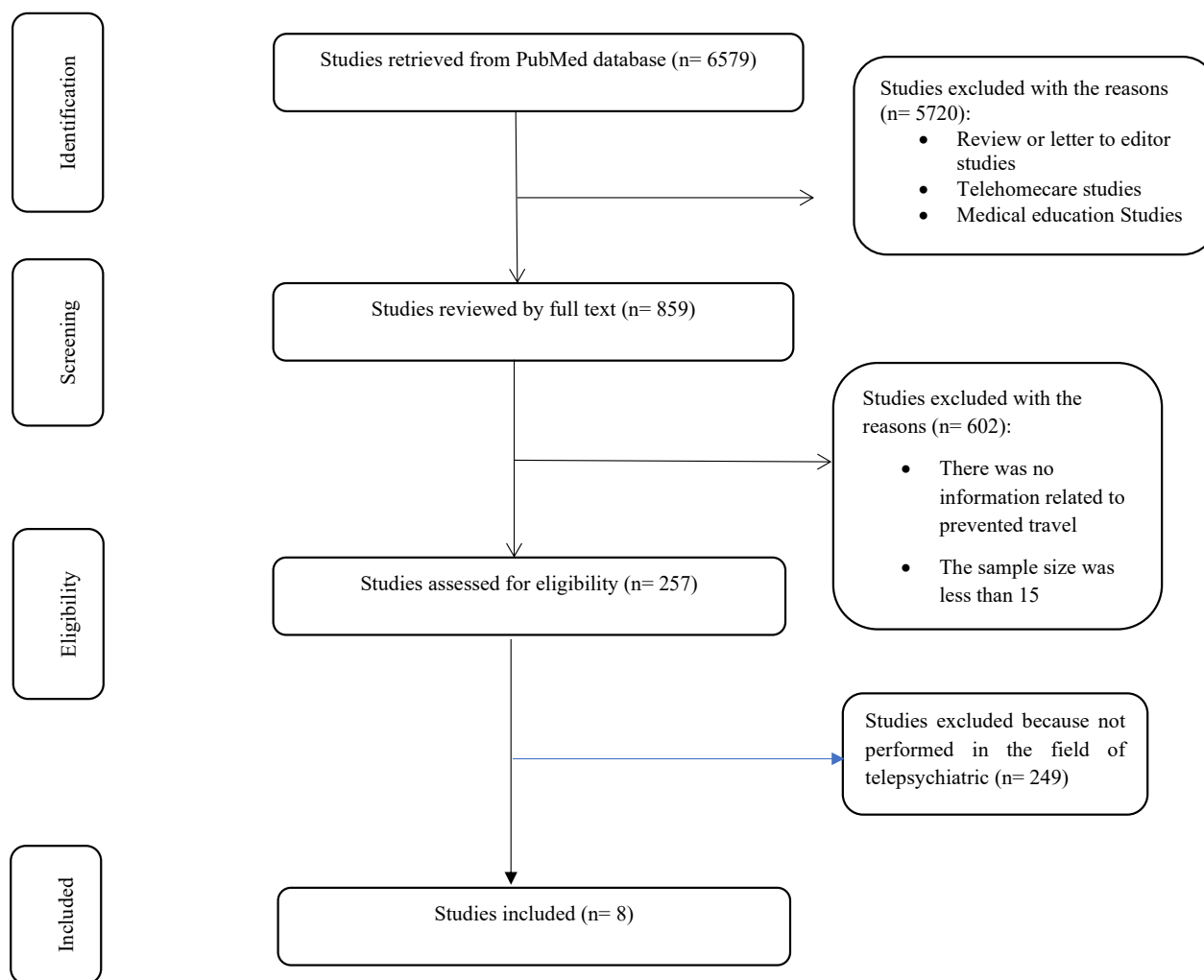
Figure 1. The flow diagram depicts the selection process of included studies

Percentage of prevented travel
The percentage of avoided travels ranged from 12 to 79.

Discussion
According to our results, telepsychiatry could reduce referrals between 12% to 79%. The lowest reduction rate (12%) is related to Worth's study, which may be due to the condition of the participants (14). About half of the patients (51%) in this study certainly needed an in-person appointment with psychiatrists. Therefore, the situation of patients may be one of the critical elements in reducing the number of referrals. The highest rate of referral reduction (79%) was related to D'Souza's study. Although the sample size in this study was small (n = 28), all patients were acute hospitalized cases (15). In similar studies of other specialties, the travel reduction rate using teledermatology and telepediatrics were 18.5% to 94% (17) and 12% to 98% (18), respectively. These differences may be because patients with mental diseases will to contact their physicians directly. Face-to-face visits offer the emotional relationship between patient and therapist. This relationship is more important in psychiatry than in other specialties.

Real-time telemedicine was used in all studies. As mentioned previously, in mental disorders, the therapist needs face-to-face communication with the patient to diagnose, treat, and follow up. Real-time or live two-way communication methods provide almost this situation; therefore, both patient and therapist feel like an in-person visit. However, a study showed that store-and-forward telepsychiatry could decrease costs, increase access, and supplement other care options (19).

Unlike other specialties, psychiatry is not dependent on special medical equipment. Therefore, telepsychiatry can be used with low-cost equipment, such as a two-way communication videoconference. Although in high bandwidth networks, the speed of transfer and the quality of images are better, the results of a telepsychiatry study that uses Skype in the network infrastructure of a developing country showed a high rate of satisfaction and a 70% reduction in referrals (4). In a systematic review study conducted to investigate the effectiveness and feasibility of telepsychiatry in limited resources areas, the reported bandwidth in various studies was between 128

and 768 kbps (20).

Half of the studies were conducted in Australia. Australia is a pioneer in using telemedicine to provide healthcare services. The Australian government has also enacted different laws to develop and support telemedicine (21).

Most studies were performed in an outpatient setting. Because of the large volume of outpatient services, more patients can be treated using telepsychiatric in this setting because the patients' condition with mental disorders will worsen over time if not treated. On the other hand, evidence has shown that virtual visits through video conferencing for patients and their families are more comfortable and cost-effective than transferring patients to large medical centers (17). In an inpatient setting, it is also necessary to take care of some high-risk patients, such as patients with suicidal intentions or severe schizophrenia who harm others. Due to the lack of specialists and inpatient facilities, referring these patients to other centers before their condition stabilizes can be dangerous; therefore, in this situation, telepsychiatry also was able to reduce the period of hospitalization and avoid traveling for these patients.

To the best of our knowledge, this is one of the first review studies considering referral and travel prevention using telepsychiatry. However, there are some limitations to the findings. We have searched only the PubMed database to retrieve articles. Although a study showed that most telemedicine articles were available in PubMed (10), we probably missed some articles. The other limitation is that we could not use analytical statistics, such as the linear regression model and meta-analysis, to estimate the reduction in referrals due to the low number of included studies and the absence of homogeneity in the study design of included articles.

Conclusion

The effectiveness of telepsychiatry depends on various factors, including the type and period of the disease, the therapist's efficacy in terms of correct diagnosis and treatment, and patient cooperation. Successful telepsychiatry systems can prevent unnecessary referrals and travels; thus, it can be considered an effective tool to remove barriers to accessing mental health care during pandemics like COVID-19.

Conflict of interests
The Authors declare that there is no conflict of interest.

Ethical considerations
Not applicable.

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