**Name of journal: *World Journal of Psychiatry***

**ESPS Manuscript NO: 15320**

**Columns: Review**

**Usefulness of telepsychiatry: A critical evaluation of videoconferencing-based approaches**

Chakrabarti S. Usefulness of videoconferencing telepsychiatry

Subho Chakrabarti

**Subho Chakrabarti,** Department of Psychiatry, Postgraduate Institute of Medical Education and Research, Chandigarh 160012, India

**Author contributions:** Chakrabarti S solely contributed to this paper.

**Conflict-of-interest:** No conflict of interest.

**Open-Access:** This article is an open-access article which was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: http://creativecommons.org/licenses/by-nc/4.0/

**Correspondence to: Subho Chakrabarti, MD, MAMS, FRCPsych, Professor,** Department of Psychiatry, Postgraduate Institute of Medical Education and Research, Sector 12, Chandigarh 160012, India. subhochd@yahoo.com

**Telephone:** +91-172-2756808

**Fax:** +91-172-2744401

**Received:** November 21, 2014

**Peer-review started:** December 1, 2014

**First decision:** January 8, 2015

**Revised:** May 7, 2015

**Accepted:** June 9, 2015

**Article in press:**

**Published online:**

**Abstract**

Telepsychiatry, *i.e.*, the use of information and communication technologies to provide psychiatric services from a distance, has been around for more than half a century now. Research over this period has shown that videoconferencing-based telepsychiatry is an enabling and empowering form of service delivery, which promotes equality of access, and high levels of satisfaction among patients. The range of services offered by videoconferencing-based telepsychiatry, potential users and points of delivery of such services are theoretically limitless. Telepsychiatry has both clinical utility and non-clinical uses such as administrative, learning and research applications. A large body of accumulated evidence indicates that videoconferencing-based telepsychiatric assessments are reliable, and clinical outcomes of telepsychiatric interventions are comparable to conventional treatment among diverse patient populations, ages and diagnostic groups, and on a wide range of measures. However, on many aspects of effectiveness, the evidence base is still relatively limited and often compromised by methodological problems. The lack of cost-effectiveness data in particular, is a major hindrance, raising doubts about the continued viability of telepsychiatric services. Added to this are the vagaries of technology, negative views among clinicians, poor uptake by providers, and several legal, ethical and administrative barriers. These hamper the widespread implementation of telepsychiatry and its integration with routine care. Though further advances in technology and research are expected to solve many of these problems, the way forward would be to promote telepsychiatry as an adjunct to conventional care, and to develop hybrid models, which incorporate both traditional and telepsychiatric forms of mental health-care.

**Key words:** Videoconferencing; Telepsychiatry; Tele-mental-health; Assessment; Management; Reliability; Efficacy; Effectiveness; Outcome

© **The Author(s) 2015**. Published by Baishideng Publishing Group Inc. All rights reserved.

**Core tip:** Telepsychiatry refers to the use of information and communication technologies to provide psychiatric services from a distance. Evidence accumulated over six decades shows that videoconferencing-based telepsychiatry is an acceptable and feasible form of providing mental health-care. Additionally, videoconferencing-based assessments are reliable, and clinical outcomes of telepsychiatric interventions are comparable to conventional treatment among diverse patient populations on several measures of outcome. However, problematic study-designs, uncertainty about cost-effectiveness, and poor uptake have hindered the progress of telepsychiatric services. Conducting further research to address these problems, and developing hybrid models incorporating traditional and telepsychiatric forms of care, would be the way forward.

Chakrabarti S. Usefulness of telepsychiatry: A critical evaluation of videoconferencing-based approaches. *World J Psychiatr* 2015; In press

**INTRODUCTION**

Mental health surveys indicate that about a-fifth of the world population suffers from mental disorders, which require treatment[1]. Mental illnesses are not only a source of disability and great distress for those afflicted, but also impose a heavy burden on families of the mentally ill and the society. Despite their high prevalence and potentially disabling consequences, inadequate treatment of mental disorders is rife. Unavailability of accessible and affordable mental health-care is a major hindrance to obtaining treatment[1]. Moreover, treatment resources are not distributed uniformly; consequently, rural and geographically isolated areas remain largely underserved. Traditional systems of mental health-care delivery are not always able to meet the demands of people in these remote areas. Therefore, alternatives to the traditional modes of service delivery for mental health-care have been explored from time to time. One such alternative has been the use of information and communication technologies (ICTs) for delivering mental health care. Advancements in ICTs have been successfully utilized in the field of health-care over the last few decades. The most promising of these is the use of ICTs to deliver mental health-care from a distance, referred to as telepsychiatry. Telepsychiatry was originally conceived to enhance access of remote and rural populations to specialized mental health services. Over the last six decades or so, a growing body of evidence and increasing implementation has demonstrated telepsychiatry’s ability to provide mental health services, which are accessible, wide-ranging and of high quality. However, concerns about the applicability and usefulness of this mode of service-delivery still remain. Despite being somewhat of a success story in developed countries, telepsychiatry is yet to make its mark in low- and middle- income countries of the developing world[2]. This is unfortunate because the need for such services is probably greater in these countries. This review seeks to evaluate the usefulness of telepsychiatry as a mode of service-delivery based on the current evidence. In addition to the evidence for telepsychiatry’s efficacy or effectiveness, the evolution of telepsychiatry, the terms used to describe this technology, the limitations of this form of service-delivery and its potential role in low- and middle-income countries have also been elaborated upon. The focus of this review is restricted to the utility of videoconferencing-based approaches in delivering mental health-care. Although other modes such as telephones or internet-based care, which form a part of the broader array of telemental health or e-health services, have been mentioned, these modalities have not been reviewed in detail. Finally, while considering the evidence, greater emphasis has been placed on randomized-controlled trials (RCTs), these being highest level of research-evidence on the usefulness of any treatment-modality.

**SEARCH STRATEGY**

To review the evidence on telepsychiatry and videoconferencing, a comprehensive search of the following databases was undertaken: MEDLINE, PubMed, PsycINFO, EMBASE, Cochrane Database of Systematic Reviews, Cochrane Controlled Trial Registry, Database of Abstracts of Reviews of Effectiveness, and Google. Search terms included telepsychiatry, telemental health, telecare, telemedicine, e-health, videoconferencing, effectiveness, efficacy, access, outcomes, satisfaction, quality of care, and controlled trials. Articles extracted were of three main types: reviews, guidelines and original research articles. All articles about videoconferencing were manually searched to locate cross-references relevant to the topic. Articles about other modes of telemental health were examined when they provided information relevant to the subject under review.

**THE EVOLUTION OF TELEPSYCHIATRY**

Telepsychiatry is one of the oldest applications of telemedicine. The earliest documentation of telemedicine in psychiatry was from the University of Nebraska, where in 1956 a two-way closed-circuit television system was used for educational and medical purposes[3].In 1961, videoconferencing was used to conduct adult group psychotherapy[4].In 1973, the term telepsychiatry was first used by Dwyer[5] to describe consultation services provided from the Massachusetts General Hospital to a medical site in Boston.Shortly thereafter, telepsychiatry was used among children and adolescents, when a child guidance clinic in New York City was connected to the Mount Sinai School of Medicine[6].Despite this initial success and subsequent reports of its usefulness and acceptance, telepsychiatry was used only sporadically in the 1960s and 1970s. Advances in technology in the late 1980s and early 1990s, which reduced equipment costs, coupled with increased funding from government agencies led to a burgeoning of programmes in north-America, Europe and Australia[7-14].Currently telepsychiatry is one of the most rapidly developing fields of telemedicine, and, after teleradiology, the most practiced form of telemedicine in the world[15].Additionally, from the late 1990s there has been a proliferation of research interest in telepsychiatry, which is reflected in the growing number of reports and reviews of the subject in the past decade and a half. Initial research was focused on descriptions of programmes, and feasibility and acceptability of telepsychiatry[7-14].This has been supplemented over the last decade by controlled trials on outcome, research on other issues such as cost-effectiveness, ethical and legal implications, and by several guidelines on telepsychiatry[7-14]. The emphasis of research on telepsychiatry has also undergone a subtle change of focus; earlier attempts to prove its usefulness are now being replaced by attempts to identify specific situations in which telepsychiatry might be useful, and by evaluation of the strengths and weaknesses of this method of service-provision[13,14].

**TERMS AND CONCEPTS USED**

Although there are no universally agreed definitions of terms used to describe telepsychiatry, several partially overlapping labels and concepts have been used to refer to the entire spectrum of services, which are delivered remotely, that is from a distance and a separate location[7,8].This lack of consistency in definitions may create difficulties in evaluation of the utility of telepsychiatry[16,17]. Hence, an attempt has been made here to provide clearer definitions of four commonly used terms including telepsychiatry, telemental health care, telemental health, and e-mental health. Three of these terms use the prefix “tele”, which means at or over a distance,as in telegram, telephone, or television.

The oldest term used to describe this form of service-delivery is telepsychiatry[7,18].It is derived from the definition of telemedicine, and is a specific term designating psychiatric applications of telemedicine[7,8,19].The National Library of Medicine defines telemedicine as “the use of electronic communication and information technologies to provide or support clinical care at a distance”[19]. Accordingly, telepsychiatry has defined as the “use of electronic communication and information technologies to provide or support clinical psychiatric care at a distance”[20,21]. Though this term is intended to include all modalities of communication such as telephone, fax, e-mail, the internet, still imaging, and live two-way audio-visual communication, in effect the term is often equated with the provision of psychiatric services *via* tele-communication systems, which enable two-way interactive “real-time” communication between patients and providers[20]. Consequently, telepsychiatry is almost synonymously used with videoconferencing, which is a common form of this service-modality[7,22]. Nevertheless, broader definitions of telepsychiatry have also been proposed, in which it is defined as the “electronic transmission of psychiatric consultations, advice or services in digital form, from one location to another using a data communication link provided by a third party carrier, or carriers, (and is) used to provide psychiatric services from a distance”[21].

The terms tele care or telehealth care and its derivative telemental health careare of more recent origin.They are used to refer to “the provision of personalized health-care over a distance”[7,8,23]. Thus, tele-care is the remote or enhanced delivery of care to people in their own homes or community settings, by means of telecommunications and computerized services. It includes the use of sensors and alerts, which provide continuous, automatic and remote monitoring of care-needs, emergencies and lifestyle changes, and the use of ICTs to trigger human responses, or to prevent hazards. Telecare has historically been associated with social care, as distinct from telemedicine or telepsychiatry, which is more about medical care. Tele-care is, therefore, social care services delivered at home through remotely connected computerized medical devices[8,23].

The term telemental health is a broader term, which includes all mental health applications including telepsychiatry and telemental health-care[7,8,21,22].Though, telemental health also refers to the use of ICTs to provide mental health services from a distance, it incorporates the provision of a variety of mental health services from a wider range of professionals, and not just psychiatrists. Moreover, it refers to all forms of technology utilized in the practice of mental health-care from a distance. Such technology may be synchronous (real-time), as in video-conferencing or telephone-based systems, or asynchronous, as with e-mail, and other store-and-forward methods. Store-and-forward modes of communication involve acquiring medical data, and then transmitting this clinical information *via* e-mail or web-applications for later review by a specialist. Unlike synchronous forms of communication, asynchronous communication does not require the presence of both parties at the same time. The information can be transferred in the form of data, audio/video clips, or recordings. E-mail is the most commonly used form of asynchronous communication in telemedicine, and has the advantages of being relatively inexpensive, and not requiring any extra or special hardware support[24].Finally,tele-mental-health also encompasses all forms of service, including both preventive and curative care, and educational and administrative services[7,8,10,21-23,25-27] .

The newest designation of telemental health is e-health or e-mental health. It also refers to the provision of health services to patients or to the lay public through any electronic medium, including the internet, telephone, or fax[7]. However, it is a more user-centred term, and refers not only to the use of a broad range of ICTs, but alsoa new way of service-provision, which involves a commitment to networked ways of improving health-care. A standard definition of e-health would, thus, include “the application of ICTs across the whole range of functions, which affect health-care, from diagnosis to follow-up”. Additionally, it is a method of delivering “responsive care, which is personalized and tailored to the needs of the user”[28,29].

In this article, the term telepsychiatry has been used to refer to videoconferencing, while telemental health and e-health have been used interchangeably, in keeping with the broadest concept of this form of service-delivery.

**THE PURPOSE AND POTENTIAL APPLICATIONS OF TELEPSYCHIATRY**

Telepsychiatry was originally devised to meet the mental health needs of users in remote, rural and inaccessible locations[2,10-19,21,22,25-27,29]. The use of telepsychiatry for remote communitieshelped overcome many of the disadvantages of traditionalmodes of service-delivery. Moreover, telepsychiatry could deliver a wide range of high-quality services, which were usually available only at specialist centres. Consequently, it created an equality of access, and a sense of empowerment among users from remote areas. Additionally, it diminished the cost of provision of services in isolated areas by saving on time and travel, not only for clinicians involved in the provision of care, but also for health-care professionals, and health-care users. Finally, it provided the means of supporting mental health professionals working in such remote environments.

With expansion of telepsychiatric services, they are also being increasingly used in urban areas, for the same reasons, *i.e.*, decreasing costs of care and enhancing access to high-quality care[10,13,14].In recent years the number of patients who could benefit from telemental health services at home has also been growing. Moreover, with the development of a broader array of ICTs, telemental health services are being used to help those who are only mildly to moderately ill, and who may not require specialist care[8,23].

Therefore, telepsychiatry can be as flexible as the practitioner, or the patient may need it to be. The range of services offered, the users of such services, and the points of delivery of such services is theoretically limitless. Tele-mental-health has both clinical or patient-care uses, and non-clinical applications such as administrative, learning and research activities[8,12,17,25-27,29]. The whole range of patient-care services, from assessment and diagnosis, to pharmacological and psychosocial interventions, and to follow-up and home-based care, is included in this mode of service-delivery. Telepsychiatry can also offer other services, such as development of clinical care plans, case management, crisis intervention, neuropsychological testing, legal aid, forensic evaluations, liaison services for other medical specialties, and nursing care. The settings, in which these services can be delivered, are equally diverse. They include inpatients, outpatients, emergency services, forensic settings, community settings, nursing homes, assisted living facilities, prisons, schools, and the homes of users. The patient population can vary from children, to adults, to the elderly, and to special populations such as prison inmates or military personnel. Professional users can include all manner of mental health professionals such as local psychiatrists, trainee psychiatrists at distant sites, nurses, health workers and educators[2,8,10-14,17,19,22,25-27,29]. Telemental health is used routinely to give people access to educational events from remote locations. It can serve as a platform for net-based distant learning sources such as web-casting. Supervision of clinical management and psychotherapy is a major component of the educational uses of telemental health. Finally, a variety of administrative and managerial functions can be supported by telepsychiatry, helping in reducing the costs, time and travel involved in carrying out these tasks[8,26].

**THE EVIDENCE FOR CLINICAL USEFULNESS OF VIDEOCONFERENCING-BASED TELEPSYCHIATRY**

***The size and quality of the evidence***

From somewhere around the year 2000, the evidence-base for telepsychiatry has begun to grow rapidly. It is instructive to follow the progress of some research groups around the world to get an idea of this growth. For example, researchers associated with the Medical University of South Carolina, Charleston, South Carolina, United States have published three reviews on the subject[17,30,31]. The first one, published in 2000[30], covered the period from 1970 to 2000, and could locate only 63 publications, mainly pertaining to programme descriptions, reliability of videoconferencing assessments, and satisfaction and acceptance among users. The second review[31], covering the period from 2000 to 2003 included 68 new publications in this three-year period. In addition to studies on novel programmes, research on reliability and satisfaction, clinical outcomes, cost-effectiveness, and legal, regulatory, and ethical issues had already begun to appear. The third review[17] covering the period from 2003 to 2008 came up with 148 new publications. This review noted that RCTs had demonstrated that videoconferencing was as efficacious as face-to-face patient-care in a variety of clinical settings, and with specific patient populations, although the number of such trials was still small. All three reviews and several others concluded that methodologically flawed studies were the norm, which was hampering the progress of research on telepsychiatry[16-18,30,31-34]. The experience of reviewers, post-2008 to date appears to be somewhat similar[2,8-10,12-14,35,36].Although the number of research reports has continued to increase, RCTs are still very few. Videoconferencing-based approaches used to be the most common form of telemental health service till about ten years ago. With the development and proliferation of other ICTs, there is now a growing body of research on telephone, internet, or computer based interventions. Indeed the research-data on these modes of telemental health has outstripped that available for videoconferencing[2,8-10,12,14,23,28,37-39].

***The nature of the evidence on videoconferencing-based telepsychiatry***

Methodological difficulties notwithstanding, telepsychiatry has undergone the most comprehensive examination of its utility[11].Various aspects of efficacy and effectiveness of videoconferencing-based telepsychiatry are briefly reviewed in this section.

**Diagnostic accuracy and reliability of videoconferencing-based assessments:** A large number of studies have compared the accuracy and reliability of videoconferencing-based telepsychiatric assessments with face-to-face evaluations. A list of these studies is included in Table 1[40-79]. The table shows that these studies have been conducted in different disorders, using several different scales or structured interviews, among diverse populations such as children, adults, elderly and ethnic groups, and in different settings such as outpatients, inpatients, emergency services, residential and correctional facilities. They provide substantial evidence that on the whole there seems to be no difference between the reliability and diagnostic accuracy of telepsychiatric assessments, compared to face-to-face assessments. However, as is evident from Table 1, RCTs on this aspect, *i.e.*, studies in which subjects have been randomly assigned to either method of assessment are limited. Moreover, the role of factors such as bandwidth, objective versus subjective aspects of assessments, and reliability in certain populations, *e.g.*, the elderly with sensory deficits, is uncertain.

The reliability of telepsychiatric assessments has been the focus of interest of several reviews on the subject as well[2,7-10,12-14,25,29-34,80-85]. These have generally concluded that despite methodological limitations, videoconferencing-based assessments appear to be comparable to face-to-face evaluations. A meta-analysis on the reliability of telepsychiatric assessments found only 14 studies (with 380 adult patients), which had compared videoconferencing-based assessments with face-to-face evaluations directly using standardized instruments[84]. Despite the limited number of studies, there was no difference in accuracy or satisfaction between the two assessment modalities. Surprisingly, bandwidth did not appear to be a confounder, although there some suggestion that high bandwidth was better for more detailed observation of subjects. A later meta-analysis included studies, which had compared videoconferencing-based diagnosis with a non-telemedicine alternative by reporting a measure of agreement[85].Most of these were in the field of dermatology, but 10 studies were from psychiatry, geriatrics, minor injuries, neurology and rheumatology. Reliability of diagnosis *via* videoconferencing was confirmed in all studies, but problems in study-designs were common. Finally, a more recent review, based on eight previous systematic reviews also concluded that diagnostic assessments conducted *via* videoconferencing were equivalent to face-to-face assessments, but bandwidth and resolution were major factors, affecting the reliability of telepsychiatric assessments[2]. The reliability of tele-mental health assessments using other modalities such as telephones, or web-based tools has also been compared with face-to-face assessments[33,34,83,86]. Most of the evidence suggests that these methods are also as reliable as face-to-face evaluations, but the number of well-designed studies is still meagre (Table 1).

**Clinical outcomes:** Research-data from the initial studies comparing clinical outcomes between videoconferencing-based interventions and conventional treatment found both conditions to be equivalent across diverse populations, across all age groups, and on a wide range of outcome measures[17-19,30-32]. However, these studies lacked randomized-controlled designs; their samples were small and follow-up periods did not extend beyond six months. Moreover, outcomes were inferior for telepsychiatric interventions in certain populations, *e.g.*, those with substance abuse problems. Though later reviews on the subject also indicated positive and equivalent outcomes among patients undergoing telepsychiatric (principally videoconferencing) interventions, the small number of RCTs continued to remain a cause for concern[8-10,16,17,29,33-36]. Fortunately, since then the evidence has been shored up by several, large and well-designed trials, which have demonstrated either equivalent, or even superior outcomes in the groups receiving videoconferencing-based interventions. A list of RCTs of clinical outcomes with these interventions is included in Table 2[87-104]. It is evident from this table that though the number of RCTs is growing, the evidence-base for videoconferencing-based interventions is still a modest one. Moreover, the period of follow-up in these studies has seldom extended beyond one year; statistical methods to test outcome have not always been adequate; and, data on other measures such as service utilization, quality of life, and adherence are limited[2,10-14,22,35,36,39,83].However, despite these methodological inadequacies, it would not be premature to conclude that the bulk of the evidence consisting of uncontrolled and controlled comparisons, as well as RCTs indicates that videoconferencing-based telepsychiatry is no less effective than traditional face-to-face treatment. More recently, the evidence from clinical trials has been supplemented by large-scale naturalistic studies. In one such study, Godleski *et al*[105] assessed clinical outcomes of 98609 patients with mental health disorders during six-month periods prior to, and after their enrolment in telemental health services of the United States Department of Veterans Affairs. The results showed a considerable decline in the rates of admissions and hospital stays among patients of both genders and all age groups following enrolment in telepsychiatric services (Table 2).

**Outcomes in specific disorders:** The literature on the outcome of telepsychiatric interventions in specific psychiatric disorders till around the mid-2000s consisted only of small non-randomised studies; consequently, conclusions about effectiveness of telepsychiatry in these conditions were uncertain[17,18,30,31].Since then RCTs or controlled trials have been conducted with almost all common disorders including depression,anxiety disorders (panic disorders, phobias, obsessive compulsive disorder,and post-traumatic stress disorder),eating disorders, substance abuse,psychosis,dementia,and suicide prevention.

(1) Depressive disorders. RCTs comparing outcomes among patients with depressive disorders included in Table 2 show that treatment delivered by videoconferencing is equivalent to face-to-face treatment on symptom reduction and a range of other outcomes[72,88,89,95,103,104].Indeed, in several instances videoconferencing treatment has actually turned out to be superior to face-to-face treatment on depression outcomes[93,98,99,101]. Two literature reviews have provided further support for the utility of videoconferencing-based telepsychiatry in the treatment of depression[106,107].One of these reviews was based on ten RCTs of different videoconferencing, telephone, internet and computer based treatments of depression[107].Although the authors noted that there was limited data about the effectiveness of telemental health interventions in depression, they concluded that videoconferencing-based treatments yielded the same results as face-to-face treatment. Despite the more recent large-scale RCTs on videoconferencing-based treatments in depression, the evidence-base is still comparatively smaller than other telemental health interventions for depression, such as telephone, internet, or computer based treatments[33,34,108-112].

(2) Anxiety disorders. A few RCTs have demonstrated the efficacy of videoconferencing-based treatments in anxiety disorders[100,102] including panic disorder and agoraphobia[90], but the numbers involved have usually been small. A meta-analysis of 13 studies, one of which used videoconferencing-based treatment for anxiety and depressive disorders, indicated that such interventions could be more effective in anxiety than depressive disorders[112].A recent literature review concluded that videoconferencing and telephone-based treatments can be equally effective as face-to-face treatments of obsessive compulsive disorder[113].As with the literature on depression, the number of RCTs for telephone, internet or computer based therapies for anxiety disorders are much larger than those with videoconferencing-based treatments[33,34,108-112].

(3) Post-traumatic stress disorder. Some RCTs have compared the efficacy of videoconferencing-based interventions with face-to-face treatments in post-traumatic stress disorder (PTSD)[94,97], and have found these to be equally efficacious. RCTs favouring videoconferencing-based treatments of PTSD have been supplemented by non-randomized controlled trials with extended periods of follow-up with similar results[114,115]. Other aspects of treatment such therapeutic alliance, levels of attrition and compliance, patients’ satisfaction, clinicians’ satisfaction and patients' retention of information have been compared both in RCTs[116]and controlled trials[117],and have been found to be similar in both treatment conditions. The efficacy of videoconferencing-based interventions in PTSD has also been endorsed by literature reviews of the subject[118], and a meta-analysis of telehealth interventions[119].

(4) Eating disorders. A RCT comparing cognitive behaviour therapy (CBT) for bulimia and other eating disorders delivered *via* videoconferencing with face-to-face treatment found both treatments to be similar on reduction of eating disorder and depression symptoms, self-esteem, quality of life, functioning and therapeutic alliance[96]. Other aspects of treatment such as cost-effectiveness and therapeutic factors affecting treatment were also found to be equivalent between the two treatment-conditions[120,121].

(5) Substance abuse. Although several reviews have concluded that videoconferencing-based treatments have considerable potential to be of use in treatment of alcohol and other substance-use problems, there is no RCT on videoconferencing-based treatment of these disorders. Instead, a number of RCTs of telephone, internet, or computer based treatments have been conducted, which have shown that such interventions compare well with face-to-face treatment[33,34,108,122]*.*

(6) Schizophrenia. Video-conferencing-based telepsychiatric studies of schizophrenia consist of programme descriptions, case reports, and controlled trials[33,34,108,123-125].These have shown that schizophrenia can be reliably diagnosed and assessed using videoconferencing, and treatment using this modality results in improved clinical outcome and high rates of satisfaction among patients. However, there are no RCTs comparing videoconferencing with face-to-face treatment. On the other hand, a number of telehealth and e-health studies using randomized designs have yielded positive outcomes in terms of clinical improvement, improved adherence, increased awareness, and self-management interventions[124,125].

(7) Suicide prevention. Studies of suicide risk assessment and monitoring have shown that videoconferencing is as effective as face-to-face assessments[78,126,127]. A review of telehealth interventions found these to be effective not only in assessment, but also in interventions to prevent suicide[127]. However, most trials were of telephone or web based interventions, and the number of RCTs was limited. Concerns about safety of remote assessments have also been raised.

**Outcomes in specific populations:** (1) Children and adolescents. The field of telepsychiatry services for children and adolescents is still a developing one. However, several reviews have noted that the results of studies till date are encouraging[81,108,128-136].Videoconferencing-based approaches among children and adolescents have shown that these are equivalent to face-face methods in diagnosing childhood psychiatric disorders. High satisfaction has been noted among children and their parents, and comparable clinical outcomes have also been demonstrated. Videoconferencing-based studies report positive findings for health care practitioners, time and cost savings, and improvement in quality of care. Nevertheless, the bulk of the evidence consists mostly of programme descriptions, case studies and non-randomized trials. Only three RCTs of videoconferencing have been conducted, one of diagnostic reliability, another of treatment of childhood depression with CBT, and the third on the effectiveness of videoconferencing in teaching training skills to parents of children with attention deficit hyperkinetic disorder[52,88,137].Another ongoing RCT of videoconferencing-based treatment for attention deficit hyperkinetic disorder has yielded promising results[136]. Therefore, although videoconferencing appears to hold great promise as a mode of mental health-care service for children and adolescents, there is a need for well-designed and properly controlled trials to evaluate its usefulness.

(2) The elderly. Telepsychiatry has a special role in the mental health care of the elderly because they account for a large proportion of patients from rural and remote locations, and often have multiple, chronic conditions, which limits their access to high-quality, specialized care[138].There is a wealth of literature on videoconferencing-based assessments of mental state and cognitive function, which clearly shows that these assessments are as reliable as face-to-face interviews in elderly patients, even in those with cognitive impairment[82,108,138-140]. However, most studies are not adequately designed, andthere are very RCTs comparing videoconferencing-based with face-to-face assessments[60,69,82,139,140]. Similarly, though several descriptive and uncontrolled studies have demonstrated improved outcome with videoconferencing-based interventions[138-140],there is only one RCT with 22 patients with dementia, which has shown the benefits of a videoconferencing-based cognitive intervention for these patients[60].

(3) Forensic and correctional settings. Telepsychiatry has obvious advantages while delivering mental health-care for inmates of prisons and other correctional settings, a large proportion of who suffer from mental health disorders[10,12,16,17,141-144]. Videoconferencing-based assessments have proved to be as reliable as face-to-face assessments in forensic settings, but much of the evidence for this derives from uncontrolled studies. Similarly, though telepsychiatry appears to increase access for prison inmates, leads to high satisfaction among them, and cost savings for providers, the evidence for these outcomes and for the clinical effectiveness of videoconferencing-based interventions in forensic settings is almost always derived from case reports, descriptive studies and uncontrolled trials[141-144].

(4) Emergency settings. The application of telepsychiatry for assessment and treatment of patients attending the emergency department with mental health problems is another emerging area. Till date there are a few descriptions of programmes being run in emergency settings and case reports of patients treated in such settings[108,145,146]. These have indicated that videoconferencing is a safe and effective way of delivering services in this area, and patients and staff express high satisfaction with such services. These findings were endorsed by a recent RCT, which found that videoconferencing-based diagnoses were as reliable as face-to-face ones, and the two modes were similar on recommendations about disposition and ratings of dangerousness or suicidality[78].

(5) Ethnic populations. Telepsychiatry is being increasingly used worldwide to provide services to ethnic minorities including American-Indians and the Hispanic community in the United States, aboriginal communities, and Asian and African people[2,108,147-149]. Providing culturally appropriate care is a particular challenge for these up-and-coming telepsychiatric programmes, because the cultural background of patients from ethnic minorities influences their perceptions about technology and the patient-provider relationship[108,147,148]. Nevertheless, a number of RCTs have documented the reliability of videoconferencing-based assessments, as well as feasibility, acceptability and effectiveness of telepsychiatric services among American-Indian veterans and Hispanic communities[66,98,99]. Then again, a recent systematic review of provision of counselling for depression in ethnic minorities through telephone, internet or videoconferencing-based services concluded that more methodologically rigorous studies of use among ethnic minorities were required[150].

**Psychotherapy outcomes:** The usefulness of videoconferencing in conducting effective psychological treatment has gained widespread acceptance. A number of psychosocial interventions can be delivered *via* videoconferencing including CBT, psychotherapy, behaviour therapy, psychoeducation, family therapy and rehabilitation. CBT is the best researched modality, and has been used in different psychiatric disorders, as well as different patient populations. CBT may be particularly well suited to videoconferencing, because it is usually brief, more structured, and less dependent on the therapeutic relationship as other insight-oriented therapies. Thus, it is less likely to be affected by the potential technological limitations of videoconferencing[83]. Videoconferencing-based CBT has been compared in a number of RCTs with face-to-face CBT in different disorders, and has proved to be equally effective[87,88,90,91,96,97,100,102-104]. However, the number of such RCTs is still small, and most trials have been conducted with relatively small sample sizes. A meta-analysis identified 13 RCTs, one of which was a trial on videoconferencing-based CBT, and found positive outcomes favouring telephone, internet and videoconferencing-based therapies for anxiety and depressive disorders. Not surprisingly, the lack of RCTs and direct comparisons with face-to-face treatments meant that the evidence was considered to be only preliminary[112]. Psychotherapy other than CBT *via* videoconferencinghas also been the focus of several trials[151].A recent systematic review of videoconferencing-based psychotherapy identified 65 studies in this area[152].It concluded that such psychotherapy was a feasible option for treatment, lent itself to a variety of therapeutic modalities, was useful in different disorders and patient populations, and was associated with high satisfaction among users. Moreover, it appeared to be as effective as face-to-face psychotherapy, though more large-scale clinical trials were needed to further assess the efficacy and effectiveness of videoconferencing-based psychotherapy. Videoconferencing has also been used to conduct behavioural treatments such as exposure and response prevention[153], family therapy[154], and rehabilitation of patients with chronic conditions[155], but the number of such trials is fewer. In contrast to the somewhat limited literature on videoconferencing-based psychosocial treatments, a large number of telephone- and internet-based (web-based interventions or online counselling) studies, principally of CBT, have been conducted till date. Several meta-analyses and systematic reviews of this extensive literature have shown that such treatments are equally effective as conventional CBT[110, 156-160].However, direct comparisons with face-to-face CBT are still rare, and not all of these trials are methodologically sound either[160].

**The doctor-patient relationship and therapeutic alliance:** An important variable in telepsychiatric interventions is the impact of telepsychiatry on the doctor-patient relationship, and the ability to establish rapport with patients through videoconferencing links[161].It has been proposed that the way doctors and patients communicate with one another through telepsychiatric links affects the outcome of the videoconferencing-based treatment[162].Additionally, in therapeutic settings, one of the primary concerns is about the perceived difficulty of developing an effective therapeutic relationship in the absence of non-verbal cues, particularly since the therapeutic alliance plays a crucial role in the outcome of psychotherapy[161].Telepsychiatry appears to have both positive and negative effects on communication, with technological standards being a key confounding variable[18]. The two major issues, which have the potential to impact the rapport between the doctor and the patient and the therapeutic alliance, are the difficulty in detecting non-verbal cues, and the lack of physical proximity and physical presence[83].

A preliminary review on the subject of the doctor-patient relationship concluded that though relationship building appeared possible *via* telepsychiatry, it had disadvantages compared to face-to-face care, which were not fully understood[163]. However, another series of reviews concluded otherwise[162,164,165]. The first review of 38 studies compared the nature and content of doctor-patient communication in videoconferencing-based telemedicine in different specialties, with the bulk of studies being from psychiatry, otolaryngology, and dermatology. The findings from each study were coded according to 23 categories, and a positive and negative rating assigned to each of the communication results. Approximately 80% of the findings favoured the doctor-patient interaction *via* telemedicine, with all but two (non-verbal behaviour and lack of touch) of the 23 categories analyzed reporting more positive than negative results[164]. These findings were replicated by subsequent reviews, which included 57 and 61 studies respectively, exclusively in the domain of videoconferencing-based telepsychiatry[162,165].

Several reviews have also addressed the subject of therapeutic alliance in telepsychiatry, and concluded that despite methodological limitations, the available literature supports the capability of therapists to develop a therapeutic alliance through videoconferencing[18,83,161]. Additionally, several RCTs comparing videoconferencing-based psychosocial interventions (principally CBT) with face-to-face treatment, have found no differences in the quality of the therapeutic alliance between the two conditions[87,96,97,102]. Finally, a recent systematic review of 11 studies examined the therapeutic alliance in e-therapy for mental health, including videoconferencing-based treatment. It concluded that e-therapy seemed equivalent to face-to-face therapy in terms of therapeutic alliance, and that there was a positive association between the therapeutic alliance and e-therapy outcome. However, the authors also noted that because of the limited amount of evidence, definitive conclusions could not be made[166].

**Patient and provider satisfaction:** Patient and provider satisfaction with telepsychiatry are two outcomes of interest, which have attracted the maximum research attention[2,8,10,13,17,18,31,83,108,163,167]. The most consistently reported findings are the high levels of satisfaction and acceptance among patients. These have been found in virtually every study assessing patient satisfaction with telepsychiatric services, with up to 75% to 100% of the users reporting considerable satisfaction with telepsychiatric care. High satisfaction has been noted for all patient populations (children, adults, elderly, ethnic minorities, prison populations) and all kinds of psychiatric diagnoses. Levels of satisfaction with telepsychiatry are comparable to other branches of telemedicine. Systematic reviews of telemedicine studies, which have included telepsychiatric interventions, have endorsed this finding of high levels of satisfaction among patients[168-170]. A number of RCTs of videoconferencing-based assessments or interventions have also reported similar levels of patient satisfaction in telepsychiatric versus face-to-face care[35,49,56,67,87-89, 92-94,96,97,98,104,107].

Despite these overwhelmingly positive responses from patients, a cautious interpretation of the evidence has been recommended, because of several methodological and conceptual problems afflicting research in this area[17,18,31,83,108,167,168- 170].Firstly, satisfaction is not a very robust indicator of outcome, since in certain instances patients may be satisfied with the care provided despite not benefitting from it. Secondly, the lack of good quality evidence in this area has also been a problem, along with conceptual problems in defining satisfaction. Finally, patient satisfaction might not always imply patient preference; other things being equal, most patients may still prefer face-to-face contact and care. Patients opt for telepsychiatry when it reduces travel, waiting times, absence from work, and costs, and when it enhances their sense of autonomy. Moreover, other factors may determine patient satisfaction, including clinical and demographic variables, severity and type of the disorder, and the availability and quality of telepsychiatric services[17,18,31,83].

Provider and consultee satisfaction has been less well evaluated.The results of such studies are usually mixed, but on the whole provider satisfaction appears to be lower than patient satisfaction with telepsychiatry[2,8,10,13,17,18,31,83,108,163,167,170].This is perhaps reflected in the poor uptake and somewhat negative attitudes concerning telepsychiatry among clinicians. Telepsychiatry might not appeal to some clinicians because of the perceived difficulties in many areas such as communication or rapport building, and uncertainty about legal, regulatory and ethical issues[12,38].

**Cost-effectiveness:** The issue of costs and cost-effectiveness is at the heart of the debate about the viability of telepsychiatric services[31]. However, the assessment of cost-effectiveness of telepsychiatric services has proved to be challenging for several reasons[17,83].Comprehensive evaluations of cost-effectiveness ideally covering both direct and indirect costs under several heads such as operating costs, costs to patients and providers, as well as societal costs, are difficult to conduct. Consequently, there are considerable differences across studies, both with respect to their designs, and in the methods used for analysis of costs[10,12,14,17,18,83,108]. Moreover, costs are dependent on technology, which evolves much faster than the methods used to estimate cost-effectiveness[17,18,83]. Due to these difficulties the quality of the existing evidence on cost-effectiveness of telepsychiatry is extremely variable. Early reviews of cost-effectiveness of telemedicine services concluded that these methodological flaws and the lack of appropriate outcome measures in existing studies made it difficult to determine cost-effectiveness[171].In subsequent reviews of videoconferencing-based telepsychiatry, the evidence seemed to favour telepsychiatric services, but the limited number of good quality studies meant that cost-effectiveness of telepsychiatry could not be unequivocally demonstrated[18,31,172,173]. Since then, RCTs of videoconferencing-based interventions have mostly found that telepsychiatric care is either similar, or even better than traditional modes of care in terms of cost-effectiveness[66,89,92,120]. However, certain other RCTs have found videoconferencing to be the more expensive option[93,101,174]. Accordingly, recent reviews on the subject though finding evidence in favour of telepsychiatry services indicate that the results could depend on a number of moderators such as the study-design, the type of service being offered, the population in question, the technology being used, and the kinds of costs being examined[2,10,12,14,17,83,108,167,171,175]. Travel costs and the volume of telepsychiatric consultations have been examined in a number of studies. “Break-even point” analyses have suggested that a weekly volume of 7 to 14 consultations and travel-distances greater than 30 kilometres or so, determine whether a particular telepsychiatric service will prove to be cost-effective or not. One way of reducing set-up and operating costs could be to utilize the telepsychiatric equipment for other clinical, administrative and educational purposes[8,10,12,14,17,18,29,31,83,108,167,171,172].

**Access to care and empowerment:** Much like the evidence on high patient satisfaction, there is unequivocal evidence that telepsychiatry increases access to high-quality mental health-care for several populations, who may have lacked such care in the past[2,8,10,12,14,17,18,83,108]. It effectively removes several barriers to care such as distance, transportation difficulties, time limitations, costs, safety, and stigma. Consequently, it reduces inequities in care faced by many patients, and leads to a sense of empowerment among them. Therefore, videoconferencing for clinical purposes though originally intended to serve patients in remote and inaccessible locations, is being increasingly used nowadays to enhance access for urban patient populations as well.

**Other outcomes:** Other aspects of utility and feasibility of videoconferencing-based telepsychiatry have received much less research attention, though improvements in treatment-adherence, social functioning and quality of life have generally been found to be similar to face-to-face interventions in some RCTs[89,92-94,95,96,97,98,99,101-104].

**LIMITATIONS AND CONSTRAINTS OF TELEPSYCHIATRY**

Videoconferencing-based telepsychiatry has been around for more than six decades now. During this time an extensive body of evidence has accumulated favouring the usefulness of this mode of service-delivery However, there appears to be a large gap between the research-evidence and the use of telepsychiatry in routine health-care. A number of studies and reviews have focused their attention on the problem of limited clinical uptake of videoconferencing[9-14,17,18,29,34,83,108,176,177].Barriers to the routine clinical use of telepsychiatry include methodological problems, technological hindrances, clinician or provider barriers, issues regarding safety, security and confidentiality, regulatory issues, ethical and legal concerns, and the lack of evidence on sustainability and benefits of integrating telepsychiatric services into existing mental health-care systems. Methodological concerns of the research on effectiveness of telepsychiatry, such as the lack of high-quality RCTs have already been alluded to. The lack of cost-effectiveness data is another major hindrance to obtaining funding for establishing new programmes. Although technology has developed rapidly, the equipment needed for starting a service is still expensive, and difficult to maintain. Problems like connectivity, and compatibility of different systems used (referred to as interoperability) are also quite common[12]. Provider skepticism is another major factor limiting acceptance. Studies have found that after controlling for other barriers, *e.g.*, reimbursement and regulatory issues, negative attitudes of clinicians and institutions are the most significant barriers affecting use of telepsychiatric services[34]. Poor satisfaction with telepsychiatry among clinicians may arise from concerns about establishing rapport and a successful therapeutic alliance with patients, discomfort with technology, inadequate training, and the perception that telepsychiatry might add to, rather than alleviate their clinical burden[176-178]. Concerns about safety also predominate, although several reviews have indicated that the telepsychiatry is safe, even in relatively unsupervised settings, and does not have any negative outcomes[108,179,180]. Concerns about security of the systems overlaps with issues of confidentiality, privacy and consent of patients. Other issues such as requirements for licensing and reimbursement are yet to be resolved fully[108,181,182]. Finally, there is hardly any evidence on sustainability and benefits of such integrating telepsychiatric services into the conventional systems of mental health care[17,83,176]. This usually means that new programmes survive only till they are promoted by enthusiastic local champions who are able to overcome scepticism among providers and attract funding from health-care authorities[176].

**TELEPSYCHIATRY IN LOW- AND MIDDLE-INCOME COUNTRIES**

Despite being largely successful elsewhere, telepsychiatry is yet to make its mark in low- and middle-income countries of the developing world. This is surprising given that telepsychiatric services are ideally suited for delivery of mental health-care in such settings, where traditional means of mental health-care are often unable to cope with the large gap between demand and resources for care, and the inequitable distribution of health-care resources between urban and rural areas[2,15,22,183]. Nevertheless, research in telepsychiatry from these countries has generally consisted of scattered reports of newly established programmes till now[51,184-187].However, there are a few notable exceptions. There are two reports from Hong Kong describing the provision of telepsychiatric services to elderly psychiatric patients[60,188],one of which is a RCT of a cognitive intervention in community-dwelling elderly with dementia[60].There are several reports from an ongoing telepsychiatric programme in the University of KwaZulu-Natal in South Africa[2,15,185]. This group has undertaken systematic reviews of the effectiveness of videoconferencing, developed a model for such a service, and adapted guidelines for its use. Another review of studies from the Middle-East located 11 studies, two of which were RCTs[189]. From India there are reports from two ongoing videoconferencing-based projects. The Schizophrenia Research Foundation at Chennai in the south began experimenting with telepsychiatry in 2005, as part of its psychosocial intervention programmes for Tsunami victims[190,191]. From 2010 they have been running a mobile telepsychiatry service covering 156 villages. Over 1200 patients with severe mental illness have been treated by this facility. The telepsychiatry programme at the Department of Psychiatry, Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh, India, developed in joint collaboration with the Department of Science and Technology, Government of India and the Tata Consultancy Services has also been running for over four years now[22,192]. The nodal centre of this service is at PGIMER, while the three remote sites are in the adjoining hill states of north-India. This programme has several innovative features. Established telepsychiatric programmes usually follow one of the several different models of care, such as direct patient management though video-conferencing, consultation models, or collaborative-care models[14,108]. However, such models may be difficult to implement in countries like India with severe manpower and resource limitations[22,192]. Therefore, right from the onset, the programme at PGIMER has followed a somewhat different model of training and enabling non-specialist personnel at remote sites to diagnose and treat mental illnesses on their own, with minimal consultation, supervision, or direct care from the nodal centre[193]. To this end, a logically-linked computerized decision support system (CDSS) for diagnosis and management of common psychiatric disorders in adults, and in children and adolescents, has been developed as a part of this project. Computerized decision support systems provide clinicians and/or patients with intelligently filtered information at appropriate times to enhance patient care[194].They are generally used to reduce errors in drug prescribing and providing information on best practices for managing patients. A systematic review found that though data on patient outcomes is limited, such systems may enhance preventive care and guideline adherence, particularly when they are effectively integrated into clinical workflows[194]. In the novel telepsychiatry application developed by the PGIMER, the CDSS has been used not only to provide standardized ways of diagnosing and managing psychiatric disorders, but also to effectively link the modules of diagnosis, treatment and follow-up care. The diagnostic module has screening and criteria-based diagnostic sub-modules, which enables the user to generate a diagnosis independently. Based on the diagnosis generated, standardized pharmacological and non-pharmacological treatment can be offered and follow-up undertaken. Training in the use of the application is conducted entirely online, following which a non-specialist health professional can diagnose and treat common psychiatric disorders with minimal supervision from psychiatrists at the nodal centre. Preliminary results regarding accuracy and reliability of the diagnoses generated compared to standardized interviews, and the usefulness of treatment modules has been encouraging[193,195,196].

**CONCLUSION**

Is telepsychiatry an idea whose time has come? There is no doubt videoconferencing-based telepsychiatry facilitates effective service-provision in a large number of areas, where access to high-quality services is difficult. Consequently, it promotes an equality of access, a sense of empowerment among patients, and high levels of satisfaction among them. The evidence to date is highly suggestive that it is comparable to face-to-face care on several aspects of what is traditionally considered effectiveness. However, by the present stringent standards, the quality of the evidence is, perhaps, not adequate. Additionally, there are several barriers to telepsychiatry’s wider implementation such as cost-effectiveness, uncertain ethical and legal implications, and concerns about sustainability of programmes. These continue to thwart its integration into the routine network of mental health services. Accordingly, at present telepsychiatric services can only serve as an adjunct to the more traditional modes of service-delivery, but can never replace them. Therefore, the way forward would be to develop hybrid models, which incorporate both forms of service-delivery[84,172].If telepsychiatry settles into this niche, it has the potential to enhance the overall efficiency of mental health services by removing the many obstacles, which afflict conventional systems of service-delivery. This model may also work for low- and middle-income countries, provided that effective, needs-based forms of telepsychiatric services are developed in these countries as well.

**REFERENCES**

1 **Demyttenaere K**, Bruffaerts R, Posada-Villa J, Gasquet I, Kovess V, Lepine JP, Angermeyer MC, Bernert S, de Girolamo G, Morosini P, Polidori G, Kikkawa T, Kawakami N, Ono Y, Takeshima T, Uda H, Karam EG, Fayyad JA, Karam AN, Mneimneh ZN, Medina-Mora ME, Borges G, Lara C, de Graaf R, Ormel J, Gureje O, Shen Y, Huang Y, Zhang M, Alonso J, Haro JM, Vilagut G, Bromet EJ, Gluzman S, Webb C, Kessler RC, Merikangas KR, Anthony JC, Von Korff MR, Wang PS, Brugha TS, Aguilar-Gaxiola S, Lee S, Heeringa S, Pennell BE, Zaslavsky AM, Ustun TB, Chatterji S. Prevalence, severity, and unmet need for treatment of mental disorders in the World Health Organization World Mental Health Surveys. *JAMA* 2004; **291**: 2581-2590 [PMID: 15173149 DOI: 10.1001/jama.291.21.2581]

2 **Chipps J**, Brysiewicz P, Mars M. Effectiveness and feasibility of telepsychiatry in resource constrained environments? A systematic review of the evidence. *Afr J Psychiatry* (Johannesbg) 2012; **15**: 235-243 [PMID: 22829225 DOI: 10.4314/ajpsy.v15i4.30]

3 **Wittson CL**, Benschoter R. Two-way television: helping the Medical Center reach out. *Am J Psychiatry* 1972; **129**: 624-627 [PMID: 4673018 DOI: 10.1176/ajp.129.5.624]

4 **Wittson CL**, Affleck DC, Johnson V. Two-way television in group therapy. *Ment Hosp* 1961; **12**: 22-23 [PMID: 14007789 DOI: 10.1176/ps.12.11.22]

5 **Dwyer TF**. Telepsychiatry: psychiatric consultation by interactive television. *Am J Psychiatry* 1973; **130**: 865-869 [PMID: 4716685 DOI: 10.1176/ajp.130.8.865]

6 **Straker N**, Mostyn P, Marshall C. The use 0f two-way TV in bringing mental health services to the inner city. *Am J Psychiatry* 1976; **133**: 1202-1205 [PMID: 970494 DOI: 10.1176/ajp.133.10.1202]

7 **Myers K**, Cain S; [Work Group on Quality Issues](http://www.ncbi.nlm.nih.gov/pubmed/?term=Work%20Group%20on%20Quality%20Issues%5BCorporate%20Author%5D); [American Academy of Child and Adolescent Psychiatry Staff](http://www.ncbi.nlm.nih.gov/pubmed/?term=American%20Academy%20of%20Child%20and%20Adolescent%20Psychiatry%20Staff%5BCorporate%20Author%5D). Practice parameter for telepsychiatry with children and adolescents. *J Am Acad Child Adolesc Psychiatry* 2008; **47**: 1468-1483 [PMID: 19034191 DOI: 10.1097/CHI.0b013e31818b4e13]

8 **Millar HR.** Telemental Health in Scotland. Aberdeen: Scottish Centre for Telehealth, 2009. Available from: URL: http://www.sctt.scot.nhs.uk/pdf/mentalhealth.pdf

9 **Rudolf JN.** Effectiveness of telepsychiatry: an integrative literature review. Thesis, Master of Nursing, Montana State University Bozeman, Montana, 2011. Available from: URL: http://scholarworks.montana.edu/xmlui/bitstream/handle/1/2164/RudolfJ0511.pdf?sequence=1

10 **Vaitheswaran S,** Crockett P, Wilson S, Millar H. Telemental health: videoconferencing in mental health services. *Advances in Psychiatric Treatment* 2012; **18**: 392-398 [DOI: 10.1192/apt.bp.111.008904]

11 **Grady B**. Promises and limitations of telepsychiatry in rural adult mental health care. *World Psychiatry* 2012; **11**: 199-201 [PMID: 23024682]

12 **Deslich S**, Stec B, Tomblin S, Coustasse A. Telepsychiatry in the 21(st) century: transforming healthcare with technology. *Perspect Health Inf Manag* 2013; **10**: 1f [PMID: 23861676]

13 **Shore JH**. Telepsychiatry: videoconferencing in the delivery of psychiatric care. *Am J Psychiatry* 2013; **170**: 256-262 [PMID: 23450286 DOI: 10.1176/appi.ajp.2012.12081064]

14 **Hilty DM**, Ferrer DC, Parish MB, Johnston B, Callahan EJ, Yellowlees PM. The effectiveness of telemental health: a 2013 review. *Telemed J E Health* 2013; **19**: 444-454 [PMID: 23697504 DOI: 10.1089/tmj.2013.0075]

15 **Chipps J**, Ramlall S, Mars M. Practice guidelines for videoconference-based telepsychiatry in South Africa. *Afr J Psychiatry* (Johannesbg) 2012; **15**: 271-282 [PMID: 22829230 DOI: 10.4314/ajpsy.v15i4.35]

16 **Antonacci DJ**, Bloch RM, Saeed SA, Yildirim Y, Talley J. Empirical evidence on the use and effectiveness of telepsychiatry via videoconferencing: implications for forensic and correctional psychiatry. *Behav Sci Law* 2008; **26**: 253-269 [PMID: 18548519 DOI: 10.1002/bsl.812]

17 [**Richardson LK**](http://www.ncbi.nlm.nih.gov/pubmed/?term=Richardson%20LK%5BAuthor%5D&cauthor=true&cauthor_uid=20161010)**,** [Frueh BC](http://www.ncbi.nlm.nih.gov/pubmed/?term=Frueh%20BC%5BAuthor%5D&cauthor=true&cauthor_uid=20161010), [Grubaugh AL](http://www.ncbi.nlm.nih.gov/pubmed/?term=Grubaugh%20AL%5BAuthor%5D&cauthor=true&cauthor_uid=20161010), [Egede L](http://www.ncbi.nlm.nih.gov/pubmed/?term=Egede%20L%5BAuthor%5D&cauthor=true&cauthor_uid=20161010), [Elhai JD](http://www.ncbi.nlm.nih.gov/pubmed/?term=Elhai%20JD%5BAuthor%5D&cauthor=true&cauthor_uid=20161010). Current Directions in Videoconferencing Tele-Mental Health Research. *Clin Psychol* (New York) 2009; **16**: 323-338 [PMID: 20161010 DOI: 10.1111/j.1468-2850.2009.01170.x]

18 **Hilty DM**, Marks SL, Urness D, Yellowlees PM, Nesbitt TS. Clinical and educational telepsychiatry applications: a review. *Can J Psychiatry* 2004; **49**: 12-23 [PMID: 14763673]

19 **American Psychiatric Association.** Telepsychiatry via Videoconferencing. Available from: URL: http: //www.psychiatry.org/File Library/Learn/Archives/199821.pdf

20 **The** **Royal Australian and New Zealand College of Psychiatrists.** The Royal Australian and New Zealand College of Psychiatrists Position Statement # 44: Telepsychiatry. Available from: URL: https://www.ranzcp.org/Files/Resources/College\_Statements/Position\_Statements/ps44-pdf.aspx

21 **Tracy J**. Telemedicine technical assistance documents. A guide to getting started in telemecine. Columbia, MO: University of Missouri-School of Medicine, 2004

22 **Malhotra S**, Chakrabarti S, Shah R. Telepsychiatry: Promise, potential, and challenges. *Indian J Psychiatry* 2013; **55**: 3-11 [PMID: 23441027 DOI: 10.4103/0019-5545.105499]

23 **McLean S**, Sheikh A, Cresswell K, Nurmatov U, Mukherjee M, Hemmi A, Pagliari C. The impact of telehealthcare on the quality and safety of care: a systematic overview. *PLoS One* 2013; **8**: e71238 [PMID: 23977001 DOI: 10.1371/journal.pone.0071238]

24 **Gadit AA**. E-psychiatry: uses and limitations. *J Pak Med Assoc* 2006; **56**: 327-332 [PMID: 16900715]

25 **American Telemedicine Association.** Evidence-based practice for telemental health. Available from: URL: http: //www.americantelemed.org/files/public/standards/EvidenceBasedTelementalHealth\_WithCover.pdf

26 **American Telemedicine Association.** Practice guidelines for videoconferencing-based telemental health. Available from: URL: http: //www.americantelemed.org/files/public/standards/PracticeGuidelinesforVideoconferencing-Based TelementalHealth.pdf

27 **American Telemedicine Association.** Practice guidelines for video-based online mental health services. Available from: URL: http: //www.americantelemed.org/practice/standards/ata-standards-guidelines/practice-guidelines-for-video-based-online-mental-health-services

28 **Catwell L**, Sheikh A. Evaluating eHealth interventions: the need for continuous systemic evaluation. *PLoS Med* 2009; **6**: e1000126 [PMID: 19688038 DOI: 10.1371/journal.pmed.1000126]

29 **Pineau G,** Moqadem K, St-Hilaire C, Levac E, Hamel B, Bergeron H,Obadia A, Caron L. Telehealth: clinical guidelines and technological standards for telepsychiatry. Available from: URL: http://www.isfteh.org/files/media/68a2b452fb83e00f41219a6cbd075f27.pdf

30 **Frueh BC**, Deitsch SE, Santos AB, Gold PB, Johnson MR, Meisler N, Magruder KM, Ballenger JC. Procedural and methodological issues in telepsychiatry research and program development. *Psychiatr Serv* 2000; **51**: 1522-1527 [PMID: 11097648]

31 **Monnier J**, Knapp RG, Frueh BC. Recent advances in telepsychiatry: an updated review. *Psychiatr Serv* 2003; **54**: 1604-1609 [PMID: 14645799]

32 **Frueh BC**, Monnier J, Elhai JD, Grubaugh AL, Knapp RG. Telepsychiatry treatment outcome research methodology: efficacy versus effectiveness. *Telemed J E Health* 2004; **10**: 455-458 [PMID: 15689650 DOI: 10.1089/tmj.2004.10.455]

33 **Hailey D,** Roine R, Ohinmaa A. Evidence of benefit from telemental health applications: A systematic review. Alberta, Canada: Institute of Health Economics: 2007: 1-124

34 **Hailey D**, Roine R, Ohinmaa A. The effectiveness of telemental health applications: a review. *Can J Psychiatry* 2008; **53**: 769-778 [PMID: 19087471]

35 **García-Lizana F**, Muñoz-Mayorga I. What about telepsychiatry? A systematic review. *Prim Care Companion J Clin Psychiatry* 2010; **12**: [PMID: 20694116 DOI: 10.4088/PCC.09m00831whi]

36 **Grady B**, Myers KM, Nelson EL, Belz N, Bennett L, Carnahan L, Decker VB, Holden D, Perry G, Rosenthal L, Rowe N, Spaulding R, Turvey CL, White R, Voyles D. Evidence-based practice for telemental health. *Telemed J E Health* 2011; **17**: 131-148 [PMID: 21385026 DOI: 10.1089/tmj.2010.0158]

37 **Black AD**, Car J, Pagliari C, Anandan C, Cresswell K, Bokun T, McKinstry B, Procter R, Majeed A, Sheikh A. The impact of eHealth on the quality and safety of health care: a systematic overview. *PLoS Med* 2011; **8**: e1000387 [PMID: 21267058 DOI: 10.1371/journal.pmed.1000387]

38 **Saeed SA**, Bloch RM, Diamond JL. Telepsychiatry: overcoming barriers to implementation. *Current Psychiatry* 2012; **11**: 28-31

39 **Dattakumar A,** Gray K, Jury S, Biggs BA, Maeder A, Noble D, Borda A, Schulz T, Gasko H. A unified approach for the evaluation of telehealth implementations in Australia. Victoria, Australia: Institute for a Broadband-Enabled Society, The University of Melbourne, 2013. Available from: URL: http://www.broadband.unimelb.edu.au/publications/2013/Evaluation-of-Telehealth-Implementations-in-Australia.pdf

40 **Baer L**, Cukor P, Jenike MA, Leahy L, O'Laughlen J, Coyle JT. Pilot studies of telemedicine for patients with obsessive-compulsive disorder. *Am J Psychiatry* 1995; **152**: 1383-1385 [PMID: 7653700 DOI: 10.1176/ajp.152.9.1383]

41 **Montani C**, Billaud N, Couturier P, Fluchaire I, Lemaire R, Malterre C, Lauvernay N, Piquard JF, Frossard M, Franco A. "Telepsychometry": a remote psychometry consultation in clinical gerontology: preliminary study. *Telemed J* 1996; **2**: 145-150 [PMID: 10165357 DOI: 10.1089/tmj.1.1996.2.145]

42 **Montani C**, Billaud N, Tyrrell J, Fluchaire I, Malterre C, Lauvernay N, Couturier P, Franco A. Psychological impact of a remote psychometric consultation with hospitalized elderly people. *J Telemed Telecare* 1997; **3**: 140-145 [PMID: 9489108 DOI: 10.1258/1357633971931048]

43 **Baigent MF**, Lloyd CJ, Kavanagh SJ, Ben-Tovim DI, Yellowlees PM, Kalucy RS, Bond MJ. Telepsychiatry: 'tele' yes, but what about the 'psychiatry'? *J Telemed Telecare* 1997; **3** Suppl 1: 3-5 [PMID: 9218364 DOI: 10.1258/1357633971930346]

44 **Zarate CA**, Weinstock L, Cukor P, Morabito C, Leahy L, Burns C, Baer L. Applicability of telemedicine for assessing patients with schizophrenia: acceptance and reliability. *J Clin Psychiatry* 1997; **58**: 22-25 [PMID: 9055833 DOI: 10.4088/JCP.v58n0104]

45 **Montani C,** Klientovsky K, Tyrrell J, Ploton L, Couturier P, Franco A. Feasibility of psychological consultation with elderly demented patients. *J Telemed Telecare* 1998; **4** (Suppl 1): 111 [DOI: 10.1258/1357633981931858]

46 **Ruskin PE**, Reed S, Kumar R, Kling MA, Siegel E, Rosen M, Hauser P. Reliability and acceptability of psychiatric diagnosis via telecommunication and audiovisual technology. *Psychiatr Serv* 1998; **49**: 1086-1088 [PMID: 9712219]

47 **Ball C**, Puffett A. The assessment of cognitive function in the elderly using videoconferencing. *J Telemed Telecare* 1998; **4** Suppl 1: 36-38 [PMID: 9640728 DOI: 10.1258/1357633981931362]

48 **Ball C**, Tyrrell J, Long C. Scoring written material from the Mini-Mental State Examination: a comparison of face-to-face, fax and video-linked scoring. *J Telemed Telecare* 1999; **5**: 253-256 [PMID: 10829378 DOI: 10.1258/1357633991933819]

49 **Stevens A**, Doidge N, Goldbloom D, Voore P, Farewell J. Pilot study of televideo psychiatric assessments in an underserviced community. *Am J Psychiatry* 1999; **156**: 783-785 [PMID: 10327917]

50 **Kirkwood KT**, Peck DF, Bennie L. The consistency of neuropsychological assessments performed via telecommunication and face to face. *J Telemed Telecare* 2000; **6**: 147-151 [PMID: 10912332 DOI: 10.1258/1357633001935239]

51 **Chae YM**, Park HJ, Cho JG, Hong GD, Cheon KA. The reliability and acceptability of telemedicine for patients with schizophrenia in Korea. *J Telemed Telecare* 2000; **6**: 83-90 [PMID: 10824375 DOI: 10.1258/1357633001935095]

52 **Elford R**, White H, Bowering R, Ghandi A, Maddiggan B, St John K, House M, Harnett J, West R, Battcock A. A randomized, controlled trial of child psychiatric assessments conducted using videoconferencing. *J Telemed Telecare* 2000; **6**: 73-82 [PMID: 10824374 DOI: 10.1258/1357633001935086]

53 **Jones BN**, Johnston D, Reboussin B, McCall WV. Reliability of telepsychiatry assessments: subjective versus observational ratings. *J Geriatr Psychiatry Neurol* 2001; **14**: 66-71 [PMID: 11419569 DOI: 10.1177/089198870101400204]

54 **Yoshino A**, Shigemura J, Kobayashi Y, Nomura S, Shishikura K, Den R, Wakisaka H, Kamata S, Ashida H. Telepsychiatry: assessment of televideo psychiatric interview reliability with present- and next-generation internet infrastructures. *Acta Psychiatr Scand* 2001; **104**: 223-226 [PMID: 11531660 DOI: 10.1034/j.1600-0447.2001.00236.x]

55 **Grob P**, Weintraub D, Sayles D, Raskin A, Ruskin P. Psychiatric assessment of a nursing home population using audiovisual telecommunication. *J Geriatr Psychiatry Neurol* 2001; **14**: 63-65 [PMID: 11419568 DOI: 10.1177/089198870101400203]

56 **Bishop JE**, O'Reilly RL, Maddox K, Hutchinson LJ. Client satisfaction in a feasibility study comparing face-to-face interviews with telepsychiatry. *J Telemed Telecare* 2002; **8**: 217-221 [PMID: 12217104 DOI: 10.1258/135763302320272185]

57 **Guilfoyle C**, Wootton R, Hassall S, Offer J, Warren M, Smith D. Preliminary experience of allied health assessments delivered face to face and by videoconference to a residential facility for elderly people. *J Telemed Telecare* 2003; **9**: 230-233 [PMID: 12952695 DOI: 10.1258/135763303322225571]

58 **Loh PK**, Ramesh P, Maher S, Saligari J, Flicker L, Goldswain P. Can patients with dementia be assessed at a distance? The use of Telehealth and standardised assessments. *Intern Med J* 2004; **34**: 239-242 [PMID: 15151669 DOI: 10.1111/j.1444-0903.2004.00531.x]

59 **Kobak KA**. A comparison of face-to-face and videoconference administration of the Hamilton Depression Rating Scale. *J Telemed Telecare* 2004; **10**: 231-235 [PMID: 15273034 DOI: 10.1258/1357633041424368]

60 **Poon P**, Hui E, Dai D, Kwok T, Woo J. Cognitive intervention for community-dwelling older persons with memory problems: telemedicine versus face-to-face treatment. *Int J Geriatr Psychiatry* 2005; **20**: 285-286 [PMID: 15717335 DOI: 10.1002/gps.1282]

61 **Cullum CM**, Weiner MF, Gehrmann HR, Hynan LS. Feasibility of telecognitive assessment in dementia. *Assessment* 2006; **13**: 385-390 [PMID: 17050908 DOI: 10.1177/1073191106289065]

62 **Lexcen FJ**, Hawk GL, Herrick S, Blank MB. Use of video conferencing for psychiatric and forensic evaluations. *Psychiatr Serv* 2006; **57**: 713-715 [PMID: 16675769 DOI: 10.1176/ps.2006.57.5.713]

63 **Loh PK**, Donaldson M, Flicker L, Maher S, Goldswain P. Development of a telemedicine protocol for the diagnosis of Alzheimer's disease. *J Telemed Telecare* 2007; **13**: 90-94 [PMID: 17359573 DOI: 10.1258/135763307780096159]

64 **Martin-Khan M,** Varghese P, Wootton R, Gray LC. Successes and failures in assessing cognitive function in older adults using video consultation. *J Telemed Telecare* 2007; **13** (Suppl 3): 60-62 [DOI: 10.1258/135763307783247211]

65 **Singh SP**, Arya D, Peters T. Accuracy of telepsychiatric assessment of new routine outpatient referrals. *BMC Psychiatry* 2007; **7**: 55 [PMID: 17919329 DOI: 10.1186/1471-244X-7-55]

66 **Shore JH**, Savin D, Orton H, Beals J, Manson SM. Diagnostic reliability of telepsychiatry in American Indian veterans. *Am J Psychiatry* 2007; **164**: 115-118 [PMID: 17202552 DOI: 10.1176/ajp.2007.164.1.115]

67 **Manguno-Mire GM**, Thompson JW, Shore JH, Croy CD, Artecona JF, Pickering JW. The use of telemedicine to evaluate competency to stand trial: a preliminary randomized controlled study. *J Am Acad Psychiatry Law* 2007; **35**: 481-489 [PMID: 18086740]

68 **Kobak KA**, Williams JB, Jeglic E, Salvucci D, Sharp IR. Face-to-face versus remote administration of the Montgomery-Asberg Depression Rating Scale using videoconference and telephone. *Depress Anxiety* 2008; **25**: 913-919 [PMID: 17941100 DOI: 10.1002/da.20392]

69 **McEachern W**, Kirk A, Morgan DG, Crossley M, Henry C. Reliability of the MMSE administered in-person and by telehealth. *Can J Neurol Sci* 2008; **35**: 643-646 [PMID: 19235450 DOI: 10.1017/S0317167100009458]

70 **Ciemins EL**, Holloway B, Coon PJ, McClosky-Armstrong T, Min SJ. Telemedicine and the mini-mental state examination: assessment from a distance. *Telemed J E Health* 2009; **15**: 476-478 [PMID: 19548827 DOI: 10.1089/tmj.2008.0144]

71 **Porcari CE**, Amdur RL, Koch EI, Richard DC, Favorite T, Martis B, Liberzon I. Assessment of post-traumatic stress disorder in veterans by videoconferencing and by face-to-face methods. *J Telemed Telecare* 2009; **15**: 89-94 [PMID: 19246609 DOI: 10.1258/jtt.2008.080612]

72 **Thompson DA**, Leimig R, Gower G, Winsett RP. Assessment of depressive symptoms during post-transplant follow-up care performed via telehealth. *Telemed J E Health* 2009; **15**: 700-706 [PMID: 19694599 DOI: 10.1089/tmj.2009.0021]

73 [**Morgan DG**](http://www.ncbi.nlm.nih.gov/pubmed/?term=Morgan%20DG%5BAuthor%5D&cauthor=true&cauthor_uid=24966449)**,** [Crossley M](http://www.ncbi.nlm.nih.gov/pubmed/?term=Crossley%20M%5BAuthor%5D&cauthor=true&cauthor_uid=24966449), [Kirk A](http://www.ncbi.nlm.nih.gov/pubmed/?term=Kirk%20A%5BAuthor%5D&cauthor=true&cauthor_uid=24966449), [McBain L](http://www.ncbi.nlm.nih.gov/pubmed/?term=McBain%20L%5BAuthor%5D&cauthor=true&cauthor_uid=24966449), [Stewart NJ](http://www.ncbi.nlm.nih.gov/pubmed/?term=Stewart%20NJ%5BAuthor%5D&cauthor=true&cauthor_uid=24966449), [D'Arcy C](http://www.ncbi.nlm.nih.gov/pubmed/?term=D'Arcy%20C%5BAuthor%5D&cauthor=true&cauthor_uid=24966449), [Forbes D](http://www.ncbi.nlm.nih.gov/pubmed/?term=Forbes%20D%5BAuthor%5D&cauthor=true&cauthor_uid=24966449), [Harder S](http://www.ncbi.nlm.nih.gov/pubmed/?term=Harder%20S%5BAuthor%5D&cauthor=true&cauthor_uid=24966449), [Dal Bello-Haas V](http://www.ncbi.nlm.nih.gov/pubmed/?term=Dal%20Bello-Haas%20V%5BAuthor%5D&cauthor=true&cauthor_uid=24966449), [Basran J](http://www.ncbi.nlm.nih.gov/pubmed/?term=Basran%20J%5BAuthor%5D&cauthor=true&cauthor_uid=24966449). Evaluation of Telehealth for Preclinic Assessment and Follow-Up in an Interprofessional Rural and Remote Memory Clinic. *J Appl Gerontol* 2011; **30**: 304-331 [PMID: 24966449 DOI: 10.1177/0733464810366564]

74 **Stain HJ**, Payne K, Thienel R, Michie P, Carr V, Kelly B. The feasibility of videoconferencing for neuropsychological assessments of rural youth experiencing early psychosis. *J Telemed Telecare* 2011; **17**: 328-331 [PMID: 21844174 DOI: 10.1258/jtt.2011.101015]

75 **Bui TTN.** A comparison of videoconferencing and in-person administration of the Yale-Brown Obsessive Compulsive Scale. PhD thesis. University of Kansas, 2012

76 **Martin-Khan M**, Flicker L, Wootton R, Loh PK, Edwards H, Varghese P, Byrne GJ, Klein K, Gray LC. The diagnostic accuracy of telegeriatrics for the diagnosis of dementia via video conferencing. *J Am Med Dir Assoc* 2012; **13**: 487.e19-487.e24 [PMID: 22572552 DOI: 10.1016/j.jamda.2012.03.004]

77 **Wong L**, Martin-Khan M, Rowland J, Varghese P, Gray LC. The Rowland Universal Dementia Assessment Scale (RUDAS) as a reliable screening tool for dementia when administered via videoconferencing in elderly post-acute hospital patients. *J Telemed Telecare* 2012; **18**: 176-179 [PMID: 22362836 DOI: 10.1258/jtt.2012.SFT113]

78 **Seidel RW**, Kilgus MD. Agreement between telepsychiatry assessment and face-to-face assessment for Emergency Department psychiatry patients. *J Telemed Telecare* 2014; **20**: 59-62 [PMID: 24414395 DOI: 10.1177/1357633X13519902]

79 **Litwack SD**, Jackson CE, Chen M, Sloan DM, Hatgis C, Litz BT, Marx BP. Validation of the use of video teleconferencing technology in the assessment of PTSD. *Psychol Serv* 2014; **11**: 290-294 [PMID: 24841510 DOI: 10.1037/a0036865]

80 **Hawker F**, Kavanagh S. The evolution of telepsychiatry in South Australia. Adelaide: Rural and Remote Mental Health Service of South Australia, 1988

81 **Alesi N.** Child and adolescent telepsychiatry: reliability studies needed. *Cyberpsychol Behav* 2000; **3**: 1009-1015 [DOI: 10.1089/109493100452273]

82 **Tyrrell J**, Couturier P, Montani C, Franco A. Teleconsultation in psychology: the use of videolinks for interviewing and assessing elderly patients. *Age Ageing* 2001; **30**: 191-195 [PMID: 11443019]

83 **Richardson LK.** “Can you see what I am saying?” An action-research, mixed methods evaluation of telepsychology in rural Western Australia. Murdoch University, 2012. Available from: URL: http://researchrepository.murdoch.edu.au/7023/2/02Whole.pdf

84 **Hyler SE**, Gangure DP, Batchelder ST. Can telepsychiatry replace in-person psychiatric assessments? A review and meta-analysis of comparison studies. *CNS Spectr* 2005; **10**: 403-413 [PMID: 15858458]

85 **Martin-Khan M**, Wootton R, Whited J, Gray LC. A systematic review of studies concerning observer agreement during medical specialist diagnosis using videoconferencing. *J Telemed Telecare* 2011; **17**: 350-357 [PMID: 21983223 DOI: 10.1258/jtt.2011.101113]

86 **Leach LS**, Christensen H. A systematic review of telephone-based interventions for mental disorders. *J Telemed Telecare* 2006; **12**: 122-129 [PMID: 16638233 DOI: 10.1258/135763306776738558]

87 **Day SX,** Schneider PL. Psychotherapy using distance technology: a comparison of face-to-face, video, and audio treatment. *J Couns Psychol* 2002: **49**: 499-503 [DOI: 10.1037//0022-0167.49.4.499]

88 **Nelson EL**, Barnard M, Cain S. Treating childhood depression over videoconferencing. *Telemed J E Health* 2003; **9**: 49-55 [PMID: 12699607 DOI: 10.1089/153056203763317648]

89 **Ruskin PE**, Silver-Aylaian M, Kling MA, Reed SA, Bradham DD, Hebel JR, Barrett D, Knowles F, Hauser P. Treatment outcomes in depression: comparison of remote treatment through telepsychiatry to in-person treatment. *Am J Psychiatry* 2004; **161**: 1471-1476 [PMID: 15285975 DOI: 10.1176/appi.ajp.161.8.1471]

90 **Bouchard S**, Paquin B, Payeur R, Allard M, Rivard V, Fournier T, Renaud P, Lapierre J. Delivering cognitive-behavior therapy for panic disorder with agoraphobia in videoconference. *Telemed J E Health* 2004; **10**: 13-25 [PMID: 15104911 DOI: 10.1089/153056204773644535]

91 **De Las Cuevas C**, Arredondo MT, Cabrera MF, Sulzenbacher H, Meise U. Randomized clinical trial of telepsychiatry through videoconference versus face-to-face conventional psychiatric treatment. *Telemed J E Health* 2006; **12**: 341-350 [PMID: 16796502 DOI: 10.1089/tmj.2006.12.341]

92 **O'Reilly R**, Bishop J, Maddox K, Hutchinson L, Fisman M, Takhar J. Is telepsychiatry equivalent to face-to-face psychiatry? Results from a randomized controlled equivalence trial. *Psychiatr Serv* 2007; **58**: 836-843 [PMID: 17535945 DOI: 10.1176/ps.2007.58.6.836]

93 **Fortney JC**, Pyne JM, Edlund MJ, Williams DK, Robinson DE, Mittal D, Henderson KL. A randomized trial of telemedicine-based collaborative care for depression. *J Gen Intern Med* 2007; **22**: 1086-1093 [PMID: 17492326 DOI: 10.1007/s11606-007-0201-9]

94 **Frueh BC**, Monnier J, Yim E, Grubaugh AL, Hamner MB, Knapp RG. A randomized trial of telepsychiatry for post-traumatic stress disorder. *J Telemed Telecare* 2007; **13**: 142-147 [PMID: 17519056 DOI: 10.1258/1357633077]

95 **Hilty DM**, Marks S, Wegelin J, Callahan EJ, Nesbitt TS. A randomized, controlled trial of disease management modules, including telepsychiatric care, for depression in rural primary care. *Psychiatry* (Edgmont) 2007; **4**: 58-65 [PMID: 20805900]

96 **Mitchell JE**, Crosby RD, Wonderlich SA, Crow S, Lancaster K, Simonich H, Swan-Kremeier L, Lysne C, Myers TC. A randomized trial comparing the efficacy of cognitive-behavioral therapy for bulimia nervosa delivered via telemedicine versus face-to-face. *Behav Res Ther* 2008; **46**: 581-592 [PMID: 18374304 DOI: 10.1016/j.brat.2008.02.004]

97 **Morland LA**, Greene CJ, Rosen CS, Foy D, Reilly P, Shore J, He Q, Frueh BC. Telemedicine for anger management therapy in a rural population of combat veterans with posttraumatic stress disorder: a randomized noninferiority trial. *J Clin Psychiatry* 2010; **71**: 855-863 [PMID: 20122374 DOI: 10.4088/JCP.09m05604blu]

98 **Chong J**, Moreno F. Feasibility and acceptability of clinic-based telepsychiatry for low-income Hispanic primary care patients. *Telemed J E Health* 2012; **18**: 297-304 [PMID: 22424078 DOI: 10.1089/tmj.2011.0126]

99 **Moreno FA**, Chong J, Dumbauld J, Humke M, Byreddy S. Use of standard Webcam and Internet equipment for telepsychiatry treatment of depression among underserved Hispanics. *Psychiatr Serv* 2012; **63**: 1213-1217 [PMID: 23026854 DOI: 10.1176/appi.ps.201100274]

100 **Dunstan DA**, Tooth SM. Treatment via videoconferencing: a pilot study of delivery by clinical psychology trainees. *Aust J Rural Health* 2012; **20**: 88-94 [PMID: 22435769 DOI: 10.1111/j.1440-1584.2012.01260.x]

101 **Fortney JC**, Pyne JM, Mouden SB, Mittal D, Hudson TJ, Schroeder GW, Williams DK, Bynum CA, Mattox R, Rost KM. Practice-based versus telemedicine-based collaborative care for depression in rural federally qualified health centers: a pragmatic randomized comparative effectiveness trial. *Am J Psychiatry* 2013; **170**: 414-425 [PMID: 23429924 DOI: 10.1176/appi.ajp.2012.12050696]

102 **Stubbings DR**, Rees CS, Roberts LD, Kane RT. Comparing in-person to videoconference-based cognitive behavioral therapy for mood and anxiety disorders: randomized controlled trial. *J Med Internet Res* 2013; **15**: e258 [PMID: 24252663 DOI: 10.2196/jmir.2564]

103 **Choi NG**, Marti CN, Bruce ML, Hegel MT, Wilson NL, Kunik ME. Six-month postintervention depression and disability outcomes of in-home telehealth problem-solving therapy for depressed, low-income homebound older adults. *Depress Anxiety* 2014; **31**: 653-661 [PMID: 24501015 DOI: 10.1002/da.22242]

104 **Choi NG**, Hegel MT, Marti N, Marinucci ML, Sirrianni L, Bruce ML. Telehealth problem-solving therapy for depressed low-income homebound older adults. *Am J Geriatr Psychiatry* 2014; **22**: 263-271 [PMID: 23567376 DOI: 10.1016/j.jagp.2013.01.037]

105 **Godleski L**, Darkins A, Peters J. Outcomes of 98,609 U.S. Department of Veterans Affairs patients enrolled in telemental health services, 2006-2010. *Psychiatr Serv* 2012; **63**: 383-385 [PMID: 22476305 DOI: 10.1176/appi.ps.201100206]

106 **Meyer F**, Peteet J, Joseph R. Models of care for co-occurring mental and medical disorders. *Harv Rev Psychiatry* 2009; **17**: 353-360 [PMID: 19968450 DOI: 10.3109/10673220903463325]

107 **García-Lizana F**, Muñoz-Mayorga I. Telemedicine for depression: a systematic review. *Perspect Psychiatr Care* 2010; **46**: 119-126 [PMID: 20377799 DOI: 10.1111/j.1744-6163.2010.00247.x]

108 **Kinley A,** Zibrik L, Cordeiro J, Novak Lauscher H, Ho K. Telehealth for mental health and substance use. Literature review. Available from: URL: http://med-fom-ehealth-office.sites.olt.ubc.ca/files/2013/04/TeleMental-Health-Literature-Review-FINAL.pdf

109 **Foroushani PS**, Schneider J, Assareh N. Meta-review of the effectiveness of computerised CBT in treating depression. *BMC Psychiatry* 2011; **11**: 131 [PMID: 21838902 DOI: 10.1186/1471-244X-11-131]

110 **Barak A,** Hen L, Boniel-Nissim M, Shapira N. A comprehensive review and a meta-analysis of the effectiveness of internet-based psychotherapeutic interventions. *Journal of Technology in Human Services* 2008; **26**: 109-160 [DOI: 10.1080/15228830802094429]

111 **Andersson G**, Cuijpers P. Internet-based and other computerized psychological treatments for adult depression: a meta-analysis. *Cogn Behav Ther* 2009; **38**: 196-205 [PMID: 20183695 DOI: 10.1080/16506070903318960]

112 **Bee PE**, Bower P, Lovell K, Gilbody S, Richards D, Gask L, Roach P. Psychotherapy mediated by remote communication technologies: a meta-analytic review. *BMC Psychiatry* 2008; **8**: 60 [PMID: 18647396 DOI: 10.1186/1471-244X-8-60]

113 **Wootton BM,** Titova N. Distance treatment of obsessive–compulsive disorder. *Behaviour Change* 2010; **27**: 112-118 [DOI: 10.1375/bech.27.2.112]

114 **Germain V**, Marchand A, Bouchard S, Drouin MS, Guay S. Effectiveness of cognitive behavioural therapy administered by videoconference for posttraumatic stress disorder. *Cogn Behav Ther* 2009; **38**: 42-53 [PMID: 19235601 DOI: 10.1080/16506070802473494]

115 [**Marchand A**](http://www.ncbi.nlm.nih.gov/pubmed/?term=Marchand%20A%5BAuthor%5D&cauthor=true&cauthor_uid=23687441)**,** [Beaulieu-Prévost D](http://www.ncbi.nlm.nih.gov/pubmed/?term=Beaulieu-Pr%C3%A9vost%20D%5BAuthor%5D&cauthor=true&cauthor_uid=23687441), [Guay S](http://www.ncbi.nlm.nih.gov/pubmed/?term=Guay%20S%5BAuthor%5D&cauthor=true&cauthor_uid=23687441), [Bouchard S](http://www.ncbi.nlm.nih.gov/pubmed/?term=Bouchard%20S%5BAuthor%5D&cauthor=true&cauthor_uid=23687441), [Drouin MS](http://www.ncbi.nlm.nih.gov/pubmed/?term=Drouin%20MS%5BAuthor%5D&cauthor=true&cauthor_uid=23687441), [Germain V](http://www.ncbi.nlm.nih.gov/pubmed/?term=Germain%20V%5BAuthor%5D&cauthor=true&cauthor_uid=23687441). Relative Efficacy of Cognitive-Behavioral Therapy Administered by Videoconference for Posttraumatic Stress Disorder: A Six-Month Follow-Up. *J Aggress Maltreat Trauma* 2011; **20**: 304-321 [PMID: 23687441 DOI: 10.1080/10926771.2011.562479]

116 **Morland LA**, Pierce K, Wong MY. Telemedicine and coping skills groups for Pacific Island veterans with post-traumatic stress disorder: a pilot study. *J Telemed Telecare* 2004; **10**: 286-289 [PMID: 15494087]

117 **Germain V**, Marchand A, Bouchard S, Guay S, Drouin MS. Assessment of the therapeutic alliance in face-to-face or videoconference treatment for posttraumatic stress disorder. *Cyberpsychol Behav Soc Netw* 2010; **13**: 29-35 [PMID: 20528290]

118 **Paul LA**, Hassija CM, Clapp JD. Technological advances in the treatment of trauma: a review of promising practices. *Behav Modif* 2012; **36**: 897-923 [PMID: 22956588 DOI: 10.1177/0145445512450733]

119 **Sloan DM**, Gallagher MW, Feinstein BA, Lee DJ, Pruneau GM. Efficacy of telehealth treatments for posttraumatic stress-related symptoms: a meta-analysis. *Cogn Behav Ther* 2011; **40**: 111-125 [PMID: 21547778 DOI: 10.1080/16506073.2010.550058]

120 **Crow SJ**, Mitchell JE, Crosby RD, Swanson SA, Wonderlich S, Lancanster K. The cost effectiveness of cognitive behavioral therapy for bulimia nervosa delivered via telemedicine versus face-to-face. *Behav Res Ther* 2009; **47**: 451-453 [PMID: 19356743 DOI: 10.1016/j.brat.2009.02.006]

121 **Ertelt TW**, Crosby RD, Marino JM, Mitchell JE, Lancaster K, Crow SJ. Therapeutic factors affecting the cognitive behavioral treatment of bulimia nervosa via telemedicine versus face-to-face delivery. *Int J Eat Disord* 2011; **44**: 687-691 [PMID: 22072405 DOI: 10.1002/eat.20874]

122 **Young LB**. Telemedicine interventions for substance-use disorder: a literature review. *J Telemed Telecare* 2012; **18**: 47-53 [PMID: 22101610 DOI: 10.1258/jtt.2011.110608]

123 **Sharp IR**, Kobak KA, Osman DA. The use of videoconferencing with patients with psychosis: a review of the literature. *Ann Gen Psychiatry* 2011; **10**: 14 [PMID: 21501496 DOI: 10.1186/1744-859X-10-14]

124 **Kasckow J**, Felmet K, Appelt C, Thompson R, Rotondi A, Haas G. Telepsychiatry in the assessment and treatment of schizophrenia. *Clin Schizophr Relat Psychoses* 2014; **8**: 21-27A [PMID: 23428781 DOI: 10.3371/CSRP.KAFE.021513]

125 **van der Krieke L**, Wunderink L, Emerencia AC, de Jonge P, Sytema S. E-mental health self-management for psychotic disorders: state of the art and future perspectives. *Psychiatr Serv* 2014; **65**: 33-49 [PMID: 24129842 DOI: 10.1176/appi.ps.201300050]

126 **Godleski L**, Nieves JE, Darkins A, Lehmann L. VA telemental health: suicide assessment. *Behav Sci Law* 2008; **26**: 271-286 [PMID: 18548515 DOI: 10.1002/bsl.811]

127 **Krysinska KE**, De Leo D. Telecommunication and suicide prevention: hopes and challenges for the new century. *Omega* (Westport) 2007; **55**: 237-253 [PMID: 18214070 DOI: 10.2190/OM.55.3.e]

128 **Diamond JM**, Bloch RM. Telepsychiatry assessments of child or adolescent behavior disorders: a review of evidence and issues. *Telemed J E Health* 2010; **16**: 712-716 [PMID: 20575615 DOI: 10.1089/tmj.2010.0007]

129 **Pesämaa L**, Ebeling H, Kuusimäki ML, Winblad I, Isohanni M, Moilanen I. Videoconferencing in child and adolescent telepsychiatry: a systematic review of the literature. *J Telemed Telecare* 2004; **10**: 187-192 [PMID: 15273027]

130 **Hakak R,** Szeftel R. Clinical use of telemedicine in child psychiatry. *Focus* 2008; **6**: 293-296

131 **Palmer NB**, Myers KM, Vander Stoep A, McCarty CA, Geyer JR, Desalvo A. Attention-deficit/hyperactivity disorder and telemental health. *Curr Psychiatry Rep* 2010; **12**: 409-417 [PMID: 20625857 DOI: 10.1007/s11920-010-0132-8]

132 **Pakyurek M**, Yellowlees P, Hilty D. The child and adolescent telepsychiatry consultation: can it be a more effective clinical process for certain patients than conventional practice? *Telemed J E Health* 2010; **16**: 289-292 [PMID: 20406115 DOI: 10.1089/tmj.2009.0130]

133 **Myers KM**, Palmer NB, Geyer JR. Research in child and adolescent telemental health. *Child Adolesc Psychiatr Clin N Am* 2011; **20**: 155-171 [PMID: 21092919 DOI: 10.1016/j.chc.2010.08.007]

134 **Slone NC**, Reese RJ, McClellan MJ. Telepsychology outcome research with children and adolescents: a review of the literature. *Psychol Serv* 2012; **9**: 272-292 [PMID: 22867120 DOI: 10.1037/a0027607]

135 **Boydell KM**, Hodgins M, Pignatiello A, Teshima J, Edwards H, Willis D. Using technology to deliver mental health services to children and youth: a scoping review. *J Can Acad Child Adolesc Psychiatry* 2014; **23**: 87-99 [PMID: 24872824]

136 **Carlisle LL.** Child and adolescent telemental health. In: Myers K, Turvey CL, editors. Telemental health. Clinical, technical, and administrative foundations for evidence-based practice. Amsterdam: Eslevier Inc., 2013: 197-221

137 **Xie Y**, Dixon JF, Yee OM, Zhang J, Chen YA, Deangelo S, Yellowlees P, Hendren R, Schweitzer JB. A study on the effectiveness of videoconferencing on teaching parent training skills to parents of children with ADHD. *Telemed J E Health* 2013; **19**: 192-199 [PMID: 23405952 DOI: 10.1089/tmj.2012.0108]

138 **Innes A**, Morgan D, Kosteniuk J. Dementia care in rural and remote settings: a systematic review of informal/family caregiving. *Maturitas* 2011; **68**: 34-46 [PMID: 21093996 DOI: 10.1016/j.maturitas.2010.10.002]

139 **Ramos-Ríos R**, Mateos R, Lojo D, Conn DK, Patterson T. Telepsychogeriatrics: a new horizon in the care of mental health problems in the elderly. *Int Psychogeriatr* 2012; **24**: 1708-1724 [PMID: 22687259 DOI: 10.1017/S1041610212000981]

140 **Sheerana T,** Dealya J, Rabinowitz T. Geriatric telemental health. In: Myers K, Turvey CL, editors. Telemental health. Clinical, technical, and administrative foundations for evidence-based practice. Amsterdam: Eslevier Inc., 2013: 171-195

141 **Khalifaa N,** Saleem Y, Stankard P. The use of telepsychiatry within forensic practice: A literature review on the use of videolink. *J Forens Psychiatry Psychol* 2008; **19**: 2-13 [DOI: 10.1080/14789940701560794]

142 **Mars M**, Ramlall S, Kaliski S. Forensic telepsychiatry: a possible solution for South Africa? *Afr J Psychiatry* (Johannesbg) 2012; **15**: 244-247 [PMID: 22829226 DOI: 10.4314/ajpsy.v15i4.31]

143 **Deslich SA**, Thistlethwaite T, Coustasse A. Telepsychiatry in correctional facilities: using technology to improve access and decrease costs of mental health care in underserved populations. *Perm J* 2013; **17**: 80-86 [PMID: 24355894 DOI: 10.7812/TPP/12-123]

144 **Batastini AB,** McDonald BR, Morgan RD. Videoteleconferencing in forensic and correctional practice. In: Myers K, Turvey CL, editors. Telemental health. Clinical, technical, and administrative foundations for evidence-based practice. Amsterdam: Eslevier Inc., 2013: 251-271

145 **Yellowlees P**, Burke MM, Marks SL, Hilty DM, Shore JH. Emergency telepsychiatry. *J Telemed Telecare* 2008; **14**: 277-281 [PMID: 18776070 DOI: 10.1258/jtt.2008.080419]

146 **Williams M,** Pfeffer M, Boyle J, Hilty DM. Telepsychiatry in the emergency department: Overview and case studies. Sacramento, CA: California HealthCare Foundation, 2009. Available from: URL: http://www.chcf.org/~/media/MEDIA%20LIBRARY%20Files/PDF/T/PDF%20TelepsychiatryProgramsED.pdf

147 **Shore JH**, Savin DM, Novins D, Manson SM. Cultural aspects of telepsychiatry. *J Telemed Telecare* 2006; **12**: 116-121 [PMID: 16638232]

148 **Shore JH**, Brooks E, Savin D, Orton H, Grigsby J, Manson SM. Acceptability of telepsychiatry in American Indians. *Telemed J E Health* 2008; **14**: 461-466 [PMID: 18578681 DOI: 10.1089/tmj.2007.0077]

149 **Maar MA**, Seymour A, Sanderson B, Boesch L. Reaching agreement for an Aboriginal e-health research agenda: the Aboriginal Telehealth Knowledge Circle consensus method. *Rural Remote Health* 2010; **10**: 1299 [PMID: 20108996]

150 **Dorstyn DS**, Saniotis A, Sobhanian F. A systematic review of telecounselling and its effectiveness in managing depression amongst minority ethnic communities. *J Telemed Telecare* 2013; **19**: 338-346 [PMID: 24163298 DOI: 10.1177/1357633X13501767]

151 **Simpson S.** Psychotherapy via videoconferencing: A review. *British Journal of Guidance and Counselling* 2009; **37**: 271-286 [DOI: 10.1080/03069880902957007]

152 **Backhaus A**, Agha Z, Maglione ML, Repp A, Ross B, Zuest D, Rice-Thorp NM, Lohr J, Thorp SR. Videoconferencing psychotherapy: a systematic review. *Psychol Serv* 2012; **9**: 111-131 [PMID: 22662727 DOI: 10.1037/a0027924]

153 **Goetter EM**, Herbert JD, Forman EM, Yuen EK, Thomas JG. An open trial of videoconference-mediated exposure and ritual prevention for obsessive-compulsive disorder. *J Anxiety Disord* 2014; **28**: 460-462 [PMID: 24873883 DOI: 10.1016/j.janxdis.2014.05.004]

154 **Gilkey SL,** Carey J, Wade SL. Families in crisis: considerations for the use of web-based treatment models in family therapy. *Families in Society: The Journal of Contemporary Social Services* 2009; **90**: 37-45 [DOI: 10.1606/1044-3894.3843]

155 **Steel K**, Cox D, Garry H. Therapeutic videoconferencing interventions for the treatment of long-term conditions. *J Telemed Telecare* 2011; **17**: 109-117 [PMID: 21339304 DOI: 10.1258/jtt.2010.100318]

156 **Spek V**, Cuijpers P, Nyklícek I, Riper H, Keyzer J, Pop V. Internet-based cognitive behaviour therapy for symptoms of depression and anxiety: a meta-analysis. *Psychol Med* 2007; **37**: 319-328 [PMID: 17112400]

157 **Smits JA**, Berry AC, Tart CD, Powers MB. The efficacy of cognitive-behavioral interventions for reducing anxiety sensitivity: a meta-analytic review. *Behav Res Ther* 2008; **46**: 1047-1054 [PMID: 18687421 DOI: 10.1016/j.brat.2008.06.010]

158 **Reger MA**, Gahm GA. A meta-analysis of the effects of internet- and computer-based cognitive-behavioral treatments for anxiety. *J Clin Psychol* 2009; **65**: 53-75 [PMID: 19051274 DOI: 10.1002/jclp.20536]

159 **Andersson G**. Using the Internet to provide cognitive behaviour therapy. *Behav Res Ther* 2009; **47**: 175-180 [PMID: 19230862 DOI: 10.1016/j.brat.2009.01.010]

160 **Australian Psychological Society.** Internet supported psychological interventions. A guide to navigating the online world of psychological programs. Victoria: Australian Psychological Society, 2013. Available from:URL: http://www.acpor.ro/files/file/resurse\_articole/APS\_2012\_internet\_supported\_interventions.pdf

161 **Glueck D.** Establishing therapeutic rapport in telemental health. In: Myers K, Turvey CL, editors. Telemental health. Clinical, technical, and administrative foundations for evidence-based practice. Amsterdam: Eslevier Inc., 2013: 29-46

162 **Miller EA**. Telemedicine and doctor-patient communication: a theoretical framework for evaluation. *J Telemed Telecare* 2002; **8**: 311-318 [PMID: 12537917]

163 **Hilty DM,** Nesbitt TS, Marks SL, Callahan EJ. Effects of telepsychiatry on the doctor-patient relationship: communication, satisfaction, and relevant issues. *Prim Psychiatry* 2002; **9**: 29-34

164 **Miller EA**. Telemedicine and doctor-patient communication: an analytical survey of the literature. *J Telemed Telecare* 2001; **7**: 1-17 [PMID: 11265933]

165 **Miller EA.** Telepsychiatry and doctor-patient communication: an analysis of the empirical literature. In: Wootton R, Yellowlees P, McClaren P, editors. Telepsychiatry and E-Mental Health. London: Royal Society of Medicine Press, 2003: 39-71

166 **Sucala M,** Schnur JB, Constantino MJ, Miller SJ, Brackman EH, Montgomery GH. The therapeutic relationship in e-therapy for mental health: a systematic review. *J Med Internet Res* 2012; **14**: e110 [DOI: 10.2196/jmir.2084]

167 **Turvey CL,** Myers K. Research in telemental health: review and synthesis. In: Myers K, Turvey CL, editors. Telemental health. Clinical, technical, and administrative foundations for evidence-based practice. Amsterdam: Eslevier Inc., 2013: 397-419

168 **Mair F**, Whitten P. Systematic review of studies of patient satisfaction with telemedicine. *BMJ* 2000; **320**: 1517-1520 [PMID: 10834899]

169 **Williams TL**, May CR, Esmail A. Limitations of patient satisfaction studies in telehealthcare: a systematic review of the literature. *Telemed J E Health* 2001; **7**: 293-316 [PMID: 11886667]

170 **Whitten P**, Love B. Patient and provider satisfaction with the use of telemedicine: overview and rationale for cautious enthusiasm. *J Postgrad Med* 2005; **51**: 294-300 [PMID: 16388172]

171 **Wade VA**, Karnon J, Elshaug AG, Hiller JE. A systematic review of economic analyses of telehealth services using real time video communication. *BMC Health Serv Res* 2010; **10**: 233 [PMID: 20696073 DOI: 10.1186/1472-6963-10-233]

172 **Hyler SE**, Gangure DP. A review of the costs of telepsychiatry. *Psychiatr Serv* 2003; **54**: 976-980 [PMID: 12851433]

173 **Norman S**. The use of telemedicine in psychiatry. *J Psychiatr Ment Health Nurs* 2006; **13**: 771-777 [PMID: 17087682]

174 **Pyne JM**, Fortney JC, Tripathi SP, Maciejewski ML, Edlund MJ, Williams DK. Cost-effectiveness analysis of a rural telemedicine collaborative care intervention for depression. *Arch Gen Psychiatry* 2010; **67**: 812-821 [PMID: 20679589 DOI: 10.1001/archgenpsychiatry.2010.82]

175 **Glueck D.** Business aspects of telemental health in private practice. In: Myers K, Turvey CL, editors. Telemental health. Clinical, technical, and administrative foundations for evidence-based practice. Amsterdam: Eslevier Inc., 2013: 111-133

176 **Hailey D**, Ohinmaa A, Roine R. Limitations in the routine use of telepsychiatry. *J Telemed Telecare* 2009; **15**: 28-31 [PMID: 19139217 DOI: 10.1258/jtt.2008.080609]

177 **Brooks E**, Turvey C, Augusterfer EF. Provider barriers to telemental health: obstacles overcome, obstacles remaining. *Telemed J E Health* 2013; **19**: 433-437 [PMID: 23590176 DOI: 10.1089/tmj.2013.0068]

178 **Simms DC,** Gibson K, O’Donnell S. To use or not to use: clinicians' perceptions of telemental health. *Canadian Psychology/Psychologie canadienne* 2011; **52**: 41-51 [DOI: 10.1037/a0022275]

179 **Luxton DD**, Sirotin AP, Mishkind MC. Safety of telemental healthcare delivered to clinically unsupervised settings: a systematic review. *Telemed J E Health* 2010; **16**: 705-711 [PMID: 20583951 DOI: 10.1089/tmj.2009.0179]

180 **Kramer GM,** Mishkinda MC, Luxton DD, Shore JH. Managing risk and protecting privacy in telemental health: an overview of legal, regulatory, and risk-management issues. In: Myers K, Turvey CL, editors. Telemental health. Clinical, technical, and administrative foundations for evidence-based practice. Amsterdam: Eslevier Inc., 2013: 83-107

181 **Hyler SE**, Gangure DP. Legal and ethical challenges in telepsychiatry. *J Psychiatr Pract* 2004; **10**: 272-276 [PMID: 15552552]

182 **Nelson EL,** Davis K, Velasquez SE. Ethical considerations in providing mental health services over videoteleconferencing. In: Myers K, Turvey CL, editors. Telemental health. Clinical, technical, and administrative foundations for evidence-based practice. Amsterdam: Eslevier Inc., 2013: 47-62

183 **Mars M**. Telepsychiatry in Africa -- a way forward? *Afr J Psychiatry* (Johannesbg) 2012; **15**: 215, 217 [PMID: 22829223 DOI: 10.4314/ajpsy.v15i4.27]

184 **Lee O**. Telepsychiatry and cultural barriers in Korea. *Stud Health Technol Inform* 2009; **144**: 145-148 [PMID: 19592752 DOI: 10.3233/978-1-60750-017-9-145]

185 **Minhas FA,** Nizami A. Telepsychiatry: answer to psychiatric rehabilitation of earthquake affected population in Pakistan. *Journal of Pakistan Psychiatric Society* 2005; **2**: 62

186 **Rahman A,** Nizami A, Minhas A, Niazi R, Slatch M, Minhas F. E-mental health in Pakistan: A pilot study of training and supervision in child psychiatry using the internet. *The Psychiatrist* 2006; **30**: 149-152 [DOI: 10.1192/pb.30.4.149]

187 **Balasinorwala VP**, Shah NB, Chatterjee SD, Kale VP, Matcheswalla YA. Asynchronous telepsychiatry in maharashtra, India: study of feasibility and referral pattern. *Indian J Psychol Med* 2014; **36**: 299-301 [PMID: 25035555 DOI: 10.4103/0253-7176.135384]

188 **Tang WK**, Chiu H, Woo J, Hjelm M, Hui E. Telepsychiatry in psychogeriatric service: a pilot study. *Int J Geriatr Psychiatry* 2001; **16**: 88-93 [PMID: 11180491]

189 **Jefee-Bahloul H**. Telemental health in the middle East: overcoming the barriers. *Front Public Health* 2014; **2**: 86 [PMID: 25101255 DOI: 10.3389/fpubh.2014.00086]

190 **Thara R**, John S, Rao K. Telepsychiatry in Chennai, India: the SCARF experience. *Behav Sci Law* 2008; **26**: 315-322 [PMID: 18548517 DOI: 10.1002/bsl.816]

191 **Thara R**, Sujit J. Mobile telepsychiatry in India. *World Psychiatry* 2013; **12**: 84 [PMID: 23471809 DOI: 10.1002/wps.20025]

192 **Malhotra S,** Chakrabarti S. Telepsychiatry: A new paradigm for mental health care delivery. *JPGIMER* 2012; **46**: 61-62

193 **Malhotra S**, Chakrabarti S, Shah R, Gupta A, Mehta A, Nithya B, Kumar V, Sharma M. Development of a novel diagnostic system for a telepsychiatric application: a pilot validation study. *BMC Res Notes* 2014; **7**: 508 [PMID: 25106438 DOI: 10.1186/1756-0500-7-508]

194 **Cresswell K**, Majeed A, Bates DW, Sheikh A. Computerised decision support systems for healthcare professionals: an interpretative review. *Inform Prim Care* 2012; **20**: 115-128 [PMID: 23710776]

195 **Malhotra S,** Chakrabarti S, Shah R, Kumar V, Nithya B. Computerised system of diagnosis and treatment in telepsychiatry: development and feasibility study of a pharmacological treatment module. *Indian J Psychiatry* 2013; **55** (Suppl): S129

196 **Malhotra S**, Chakrabarti S, Gupta A, Mehta A, Shah R, Kumar V, Sharma M. A self-guided relaxation module for telepsychiatric services: development, usefulness, and feasibility. *Int J Psychiatry Med* 2013; **46**: 325-337 [PMID: 24922985 DOI: 10.2190/PM.46.4.a]

**P- Reviewer:** Gazdag G, Myers CS **S- Editor:** Gong XM

**L- Editor:** **E- Editor:**

**Table 1 Reliability of videoconferencing-based assessments: comparisons with face-to-face evaluations**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Ref.** | **Patient group** | **Scale used** | **Study design** | **Results** |
|  |  |  |  |  |
| Baer *et al*[40] | 16 adults with OCD | YBOCS, HAM-D, HAM-A | Non-RCT | VC = F2F |
| Montani *et al*[41] | 10 elderly psychiatric inpatients with no cognitive impairment | MMSE, CFT | Non-RCT | VC inferior to F2F |
| Montani *et al*[42] | 15 elderly psychiatric inpatients with no cognitive impairment | MMSE, CFT | Non-RCT | VC inferior to F2F in certain aspects |
| Baigent *et al*[43] | 63 adult inpatients | BPRS | Non-RCT | BPRS ratings similar; differences in ratings of affect |
| Zarate *et al*[44] | 45 patients with schizophrenia | BPRS, SANS, SAPS | Non-RCT | Global severity and BPRS similar, SANS not reliably rated, higher BW better |
| Montani *et al*[45] | 25 elderly psychiatric inpatients, 10 with dementia | MMSE, CFT | Non-RCT | VC inferior to F2F in non-cognitively impaired elderly; VC = F2F in those with dementia |
| Ruskin *et al*[46] | 30 adult inpatients | SCID | Non-RCT | VC = F2F |
| Ball *et al*[47] | 11 elderly psychiatric patients | CAMCOG | Non-RCT | VC = F2F |
| Ball *et al*[48] | 99 responses of elderly psychiatric patients | MMSE | Non-RCT | VC = F2F |
| Stevens *et al*[49] | 40 adult psychiatric patients | SCID | RCT | Similar satisfaction with both methods |
| Kirkwood *et al*[50] | 27 inpatients with history of alcohol abuse | Neuropsychological battery | Non-RCT | Cognitive assessment by VC = F2F |
| Chae *et al*[51] | 30 adult patients with schizophrenia | BPRS | Non-RCT | VC = F2F; BW did not matter |
| Elford *et al*[52] | 23 children referred for psychiatric assessments | Semi-structured interview | RCT | VC = F2F |
| Jones *et al*[53] | 30 elderly patients | BPRS | Non-RCT | Reliability better for objective than subjective items; BW did not matter |
| Yoshino *et al*[54] | 42 adult inpatients with chronic schizophrenia | BPRS | Non-RCT | Reliability low with narrow BW |
| Grob *et al*[55] | 27 elderly nursing home residents | BPRS, MMSE, GDS | Non-RCT | VC = F2F |
| Bishop *et al*[56] | 24 adult psychiatric patients | CSQ | RCT | VC = F2F on patient satisfaction |
| Guilfoyle *et al*[57] | 12 elderly nursing home residents | Health assessments | Non-RCT | VC = F2F |
| Loh *et al*[58] | 20 elderly psychiatric patients | MMSE, GDS | Non-RCT | VC = F2F |
| Kobak[59] | 42 patients with mood disorders | HAM-D | Non-RCT | VC = F2F |
| Poon *et al*[60] | 22 community-dwelling elderly with mild dementia or mild cognitive impairment | MMSE, RBMT, HDS | RCT | VC = F2F |
| Cullum *et al*[61] | 33 elderly with mild cognitive impairment or dementia | Neuropsychological battery | Non-RCT | VC = F2F |
| Lexcen *et al*[62] | 72 adult psychiartric patients in forensic settings | BPRS, Mac CAT-CA | Non-RCT | VC = F2F |
| Loh *et al*[63] | 20 elderly patients with dementia | MMSE, GDS and other scales | Non-RCT | VC = F2F |
| [Martin-Khan](http://www.ncbi.nlm.nih.gov/pubmed?term=Martin-Khan%20M%5BAuthor%5D&cauthor=true&cauthor_uid=22572552) *et al*[64] | 42 patients over 50 yr referred for cognitive assessment | Neuropsychological battery | Non-RCT | VC = F2F |
| Singh *et al*[65] | 37 adult patients with psychiatric disorders | DSM-IV | RCT | VC = F2F |
| Shore *et al*[66] | 53 male American Indian veterans with psychiatric disorders | SCID | RCT | VC = F2F |
| Manguno-Mire *et al*[67] | 21 inpatients from a forensic psychiatric facility | GCCT-MSH | RCT | VC = F2F |
| Kobak *et al*[68] | 35 adult patients with mood disorders | MADRS | Non-RCT | VC = F2F |
| McEachern *et al*[69] | 71 elderly patients from a memory clinic | MMSE | RCT | VC = F2F |
| Ciemins *et al*[70] | 73 elderly patients with diabetes | MMSE | Non-RCT | VC = F2F |
| Porcari *et al*[71] | 20 male veterans with PTSD | CAPS | Non-RCT | VC = F2F |
| Thompson *et al*[72] | 138 transplant recipients receiving follow-up | CES-D | RCT | VC = F2F |
| Morgan *et al*[73] | 169 elderly from a memory clinic | Satisfaction assessment | RCT | Similar satisfaction with both methods |
| Stain *et al*[74] | 11 adolescents/young adults (14-30 yr) with early psychosis | Diagnosis, quality of life, neurocognition on standardized scales | Non-RCT | VC = F2F |
| Bui[75] | 30 undergraduates with subclinical OC symptoms | YBOCS | Non-RCT | VC = F2F |
| [Martin-Khan](http://www.ncbi.nlm.nih.gov/pubmed?term=Martin-Khan%20M%5BAuthor%5D&cauthor=true&cauthor_uid=22572552) *et al*[76] | 205 patients over 50 yr referred for cognitive assessment | Neuropsychological battery | Non-RCT | VC = F2F |
| Wong *et al*[77] | 42 elderly psychiatric inpatients | RUDAS | Non-RCT | VC = F2F |
| Seidel*et al*[78] | 73 adult psychiatric patients in emergency settings | Interview | RCT | VC = F2F |
| Litwack *et al*[79] | 75 veterans with PTSD | CAPS | Non-RCT | VC = F2F |

F2F: Face to face or in-person assessment; VC: Videoconferencing; BW: Bandwidth; RCT: Randomized controlled trial (*i.e.*, a study in which patients were randomly assigned to VC or F2F assessment); OCD: Obsessive compulsive disorder; PTSD: Posttraumatic stress disorder; YBOCS: Yale-Brown Obsessive-Compulsive Scale; HAM-D: Hamilton Rating Scale for Depression; HAM-A: Hamilton Rating Scale for Anxiety; BPRS: Brief Psychiatric Rating Scale; SANS: Scale for the Assessment of Negative Symptoms; SAPS: Scale for the Assessment of Positive Symptoms; SCID: Structured Clinical Interview for DSM-III-R; MMSE: Mini-Mental State Examination; GDS: Geriatric Depression Scale; RBMT: Rivermead Behavioural Memory test; HDS: Hierarchic Dementia Scale; CSQ: Client Satisfaction Questionnaire; CFT: Clock Face Test; RUDAS: Rowland Universal Dementia Assessment Scale; CAPS: Clinician-Administered PTSD Scale; MADRS: Montgomery-Asberg Depression Rating Scale; Mac CAT-CA: MacArthur Competence Assessment Tool-Criminal Adjudication; CES-D: Center for Epidemiologic Studies–Depression; GCCT-MSH: Georgia Court Competency Test-Mississippi State Hospital revision.

**Table 2 Outcome of videoconferencing-based interventions: randomized-controlled trials of comparisons with face-to-face interventions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Ref.** | **Patient group** | **Treatment details** | **Outcome measures** | **Results** |
| Day *et al*[87] | 80 adult clients with a wide range of problems, from weight concerns to personality disorders | 5 sessions of CBT | BSI, GAF, TC and working alliance and satisfaction scales | VC = F2F treatment on outcome and process measures |
| Nelson *et al*[88] | 28 children 8-14 yr with DSM-IV depression | Eight weekly CBT sessions with child and parent | KSADS-P, CDI, satisfaction questionnaire | VC = F2F treatment on depression scores and satisfaction |
| Ruskin *et al*[89] | 119 adult patients with depression according to SCID with HAM-D scores greater than 16 | Eight sessions over a  6 mo;  medication, psychoeducation, brief supportive counseling | Treatment response, adherence, patient and psychiatrist satisfaction, cost effects | VC = F2F treatment on all aspects; costs same if travel considered |
| Bouchard *et al*[90] | 21 adult patients with panic disorder and agoraphobia according to SCID | Weekly CBT for 12 wk; follow-up for 6 mo | Self-assessment and ratings on anxiety and disability scales | VC = F2F treatment on symptom reduction, functioning and alliance |
| Poon *et al*[60] | 22 community-dwelling elderly with mild dementia or mild cognitive impairment | Cognitive intervention programme for older patients | MMSE, RBMT, HDS | VC = F2F treatment in terms of cognitive improvement |
| De Las Cuevas *et al*[91] | 140 adult psychiatric outpatients; ICD-10 diagnoses as per CIDI | 8 consultations over 24 wk; Medication and CBT | CGI-S and CGI-I, SCL-90R | VC = F2F treatment on symptom reduction |
| O’Reilly *et al*[92] | 495 adult psychiatric patients | Medication management, psychoeducation, supportive counseling, triage to other local services | BSI, CSQ-8, SF-36 , satisfaction | VC = F2F treatment on symptom reduction and satisfaction; VC 10% less expensive per patient |
| Fortney *et al*[93] | 395 adult primary care patients with PHQ-9 depression severity scores ≥ 12 | Medication management and psychotherapy for 12 mo | Antidepressant prescribing, medication adherence, treatment response and remission health status, quality of life and satisfaction on standardized scales | VC > F2F treatment on mental health status, health-related quality of life, and satisfaction |
| Freuh *et al*[94] | 97 adult patients with combat-related PTSD | 14 weekly treatment sessions for 3 mo | Self-report, symptom severity, BDI, SCL, satisfaction, adherence and other process measures | VC = F2F treatment on symptom-severity and satisfaction |
| Hilty *et al*[95] | 121 adult patients with depression according to SCID | Intensive modules  using telepsychiatric educational  interventions provided by primary-care providers | BDI, SCL, SF 36 | VC = F2F treatment on symptom reduction; VC > F2F on satisfaction and retention |
| Mitchell *et al*[96] | 128 adults with DSM-IV bulimia nervosa or other eating disorders; binge eating or purging at least once per week | 20 sessions of manual-based, CBT for bulimia over 16 wk | HAM-D, BDI, self-esteem, quality of life, functioning, alliance and symptom-severity | VC = F2F treatment on most measures |
| Thompson *et al*[72] | 138 adult transplant recipients with depression; CES-D score > 16 | Medications and counseling over 12 mo | CES-D | VC = F2F treatment on symptom reduction |
| Morland *et al*[97] | 125 adult male veterans with PTSD according to SCID | Anger management therapy – 12 session CBT intervention over 6 wk; follow-up for 6 mo | CAPS, STAXI-2, NAS-T, attrition, adherence, satisfaction and alliance assessments | VC = F2F treatment on anger reduction and process variables; alliance better in F2F treatment |
| Chong *et al*[98] | 167 adult Hispanic patients with major depression | Monthly telepsychiatry sessions for 6 mo; medications and counselling | Appointment adherence, alliance, satisfaction, antidepressant use, depression and functional outcomes | VC > F2F treatment on adherence, alliance, satisfaction: VC = F2F treatment on depression and functional outcomes |
| Moreno *et al*[99] | 167 adult Hispanic patients with major depression according to PHQ-9 and MINI | Medication management and counseling for 6 mo | PHQ-9, MADRS, Q-LES-Q, SDS | VC > F2F treatment on all outcomes |
| Dustan *et al*[100] | 6 adults with anxiety or mixed anxiety-depressive disorder | 6-8 sessions of CBT; 1 mo follow-up | Self-reports and symptom-severity | VC = F2F treatment |
| Fortney *et al*[101] | 364 adult patients with major depression according to PHQ-9 and MINI | Telemedicine-based collaborative care versus practice-based collaborative  care for 18 mo; medication management and psychosocial treatment | Depression Outcomes Module, HSCL, QOL-DTA, DSSS, DHBI | VC > F2F treatment on depression outcomes |
| Stubbings *et al*[102] | 26 adult patients with mood or anxiety disorder according to SCID | 12 sessions of CBT; 6 wk follow-up | Symptom-severity, self-reports, alliance, quality of life and satisfaction on standardized scales | VC = F2F treatment on all outcome measures |
| Choi *et al*[103] | 158 homebound individuals > 50 yr with depression, HAM-D score > 15 | PST-telehealth problem-solving therapy *vs* IP-PST; 6 PST sessions over 6 weeks; follow-up for 36 wk | HAM-D, WHODAS | VC = F2F treatment, but VC effects more sustained |
| Choi *et al*[104] | 121 homebound individuals > 50 yr with depression, HAM-D score > 15 | PST-telehealth problem-solving therapy *vs* IP-PST; 6 PST sessions over 6 weeks; follow-up for 24 wk | Acceptability on the TEI, HAM-D | VC = F2F treatment |

VC treatment: Treatment through videoconferencing; F2F treatment: Face-to-face or in-person treatment; CBT: Cognitive behavioral therapy; PTSD: Post-traumatic stress disorder; HAM-D: Hamilton Rating Scale for Depression; SCID: Structured Clinical Interview for DSM-IV; KSADS-P: Schedule for Affective Disorders and Schizophrenia for School Age Children-Present Episode; CDI: Children’s Depression Inventory; MMSE: Mini-Mental State Examination; RBMT: Rivermead Behavioural Memory test; HDS: Hierarchic Dementia Scale; CIDI: Composite International Diagnostic Interview; CGI-S and CGI-I: Clinical Global Impressions-Severity of Illness and Improvement; SCL: Symptom Checklist; BSI: Brief Symptom Inventory; CSQ: Client Satisfaction Questionnaire; SF-36: Medical Outcomes Study Short Form; PHQ: Patient Health Questionnaire; BDI: Beck’s Depression Inventory; CES-D: Center for Epidemiologic Studies–Depression; MPSS: Modified PTSD Symptom Scale; BAI: Beck Anxiety Inventory; SF 12: SF-12 Version 2.0 Health Survey; CAPS: Clinician-Administered PTSD Scale; STAXI-2: State-Trait Anger Expression Inventory-2; NAS-T: Novaco Anger Scale total score; MINI: Mini-International Neuropsychiatric Interview; PHQ-9: Patient Health Questionnaire-nine item version; MADRS: Montgomery-Åsberg Depression Rating Scale; Q-LES-Q: Quality of Life Enjoyment and Satisfaction Questionnaire; SDS: Sheehan Disability Scale; HSCL: Hopkins Symptom Checklist; QOL-DTA: Quality Improvement for Depression Treatment Acceptability scale; DSSS: Duke Social Support and Stress Scale; DHBI: Depression Health Beliefs Inventory; WHO: World Health Organization; WHODAS: WHO Disability Assessment Schedule; TEI: Treatment Evaluation Inventory; BSI: Brief Symptom Inventory; GAF: Global Assessment of Functioning; TC: Target Complaints method.