

Effectiveness and feasibility of telepsychiatry in resource constrained environments?

A systematic review of the evidence

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Abstract

Objective: A review of systematic reviews of the effectiveness and feasibility of videoconference-based telepsychiatry services for resource constrained environments was conducted. Specifically with the aim of producing an evidence-based review of the effectiveness and feasibility of videoconference-based telepsychiatry services in resource constrained countries like South Africa.

Methods: Eight key questions on telepsychiatry effectiveness and feasibility were identified and inclusion and exclusion criteria were developed. Review of citations from 2000-2011 from CINAHL, Medline, Pubmed, PsycInfo, EBSCOhost, SABINET, Cochrane Database of Systematic Reviews (CCTR), Cochrane Controlled Trial Registry (CCTR), Database of Abstracts of Reviews of Effectiveness (DARE), unpublished abstracts through NEXUS and internet search engines (Google/Google scholar) was conducted. **Results:** Ten systematic reviews were included for review. Despite the methodological limitations and heterogeneity of the systematic reviews, there appears to be good evidence of effectiveness (reliability and improved outcomes) and feasibility (use, satisfaction, acceptability and cost) for videoconference-based telepsychiatry internationally. The application of this evidence in lower middle income countries is dependent on the integration of telepsychiatry into local health system contexts. **Conclusion:** Based on the evidence, resource constrained countries such as South Africa should be encouraged to develop telepsychiatry programs along with rigorous evaluation methods.

Keywords: Videoconferencing; Psychiatry; Education; South Africa

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Introduction

In common with many other countries, South Africa faces challenges in providing specialist mental healthcare where there is a lack of psychiatrists. This problem is especially acute in rural areas with poor access to in-hospital mental health care. In the international field of telehealth, telepsychiatry has been a success story with multiple published reports of successful implementations of telepsychiatry services to address the needs of mental health care users.¹ The ability to provide remote consultations through telepsychiatry, has been suggested

as a potential solution to the problem of addressing the mental health needs of mental health care users living in remote and rural areas in resource constrained environments such as South Africa.²

There appears to be widespread implementation of telepsychiatry across countries³⁻⁴, across different treatment modalities⁵ and across different service settings⁶⁻⁹ from Child and Adolescent services (CAMHS)¹⁰⁻¹⁷ to Geriatric services.¹⁸⁻²¹ Telepsychiatry has been used for assessment and diagnosis, ongoing management, medication review, development of clinical care plans, psychotherapy, neuropsychological testing, forensic evaluations and certain psychiatric emergencies.²²⁻²³ For the purpose of this paper telepsychiatry is defined as the use of live interactive audio-video communication, also known as videoconferencing, to provide psychiatric clinical services from a distance.²² Videoconferencing

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involves a video screen, camera and sound system, enabling mental health care users (MHCUs) and psychiatrists to see each other on a video system. Video systems vary in terms of the degree of resolution of the video image. Connectivity between sites also varies ranging from high-speed communication networks with high bandwidth (HB) to telephone lines for communication and transmission with low bandwidth (LB).²⁴

From as early as 1957²⁵, there have been numerous telepsychiatry publications. Generally the literature of telepsychiatry is characterised by descriptive and poor evaluation studies, with few high quality evidence studies regarding the effectiveness of telepsychiatry to be found.²⁶⁻²⁸ In addition, there are only a handful of reported telepsychiatry papers from the developing world²⁹⁻³² and only one reported out of Africa.³³ Before considering the implementation of telepsychiatry in South Africa, it is important to assess the existing evidence for telepsychiatry before making recommendations for the application of telepsychiatry to this environment³⁴ based on the level of evidence found.

The current paper provides a systematic review of the systematic reviews on telepsychiatry in order to address the question: What is the evidence for the effectiveness and feasibility of videoconference-based telepsychiatry services in South Africa?

Methods

Due to the large number of systematic reviews in the current telepsychiatry literature and one systematic review of systematic reviews of telemedicine³⁵, a systematic review of systematic reviews was carried out in order to retrieve evidence of feasibility and effectiveness for videoconference-based telepsychiatry. The reviewers considered evidence of effectiveness and feasibility as detailed in Table I.

Table I: Elements of Effectiveness and Feasibility	
Effectiveness	Reliability for Assessment Reliability for Treatment Improvement of Outcomes
Feasibility	Utilization Satisfaction Cost Cultural Acceptance Integration into health systems

The first step was to identify whether there were any existing systematic reviews published in the literature. The search strategy was designed to access both published and unpublished reviews from 2000 onwards. A limited search of Cumulative Index of Nursing and Allied Health Literature (CINAHL) and Medline was initially undertaken to identify relevant keywords contained in the title, abstract and subject descriptors. The reviewers then identified MeSH terms and the synonyms used by respective databases which were then used in an extensive search of the literature.

Search Terms and Data Sources

The search terms were: (Telemedicine) AND (psychiatry OR mental) OR (telepsychiatry) OR (telemental) AND (Review). In Pubmed the terms: (Telemedicine [MeSH] and psychiatry [MeSH]) AND review) were used. The following databases were searched: EBSCOhost (Academic Search Complete, Africa-wide information, CINAHL, Medline, Pubmed, PsychARTICLES, PsycINFO, ERIC, Health Source: Nursing Academic), Cochrane Database of Systematic Reviews (CCTR), Cochrane Controlled Trial Registry (CCTR), Database of Abstracts of Reviews of Effectiveness (DARE), Joanna Briggs Institute (JBI), unpublished abstracts through NEXUS and internet search engines (Google/Google scholar). Articles older than 2000 were excluded. The reference lists of identified reviews were searched and appropriate articles identified and accessed. Searches for grey literature such as published reports, theses and conference proceedings were also conducted.

Study Selection

The type of papers considered for inclusion in this review included papers where: 1) systematically reviewed evidence was presented; 2) the participants were mental health care users or patients; 3) the intervention described was telepsychiatry, i.e. live synchronous videoconference-based clinical psychiatry using either ISDN or IP connections; 4) the outcomes were synthesized and presented; 5) the reviews were moderate to good quality systematic reviews with high quality studies such as randomized controlled trials (RCTs).

English abstracts of non-English articles were reviewed where available. Exclusions included reviews older than 2000, non-systematic reviews, and those of internet and phone based telepsychiatry.

Review process

The review process was undertaken in two stages. Firstly, the titles and abstracts of reviews were identified and independently screened and classified for extraction of full review for further analysis by two reviewers. Disagreements between the two reviewers were resolved and a third reviewer was not needed. Secondly, the retrieved articles were reviewed for suitability for inclusion for full article review based on the quality of the systematic review. An evaluation sheet for the 'revised assessment of multiple reviews' (RAMSTAR) was used to assess systematic reviews.³⁶⁻³⁷ This tool consists of 11 items with a rating scale and has good face and content validity for measuring the methodological quality of systematic reviews. A total "quality score" (QS) out of 44 was computed by counting ratings per item.³⁶ Reviews with a QS of ≥22 were classified as eligible for full review and assessment of quality. Data from the reviews and the underlying studies were extracted and entered into Microsoft Excel. Two reviewers (first and second authors) independently assessed the methodological quality of the reviews.

Only systematic reviews of effectiveness of videoconference telepsychiatry were included (QS ≥22). Non-systematic reviews, overviews, clinical trials and reviews of non-clinical investigations were excluded. Data extracted were: 1) information on the setting; 2) information on the participants; 3) detailed intervention description including bandwidth of videoconference transmission; 4)

studies included; and 5) reported outcomes for telepsychiatry.

The recommendations extracted from the different studies in the systematic reviews were subjected to evidence and video application grading based on the clinical coding methodology developed by the American Telemedicine Association cited in Grady (2011) (Table II).³⁸ As Hyler (2005) found that bandwidth was a confounder in evaluation studies³⁹, bandwidth was included in the video application classification and each study used in a review was classified by letters (HD - LB) according to bandwidth and resolution. The recommendations from the studies were assigned evidence grading by numbers (1-3), equivalent to standard recommendations ratings A-C, for research quality confidence.

Table II: Recommendations Evidence Grading Table³⁸

Table II: Recommendations Evidence Grading Table ³⁸	
Video Application Classification:	
-	HB+ - High Bandwidth >=256kbps (HB); Video resolution High Definition
-	HB - High Bandwidth >=256kbps (HB); Video resolution >= Standard Definition
-	MB - Medium Bandwidth >=128 but <256kbps (MB); Video resolution >= Standard Definition
-	LB - Low Bandwidth <=128kbps (HB) ; Video Resolution >= Standard Definition
Evidence Grading for Recommendations:	
-	1 - with considerable confidence (Well designed RCTs or Experimental Designs) [A]*
-	2 - with reasonable confidence (Quasi-experimental or Comparative Designs) [B]
-	3 - with some support - may consider depending on the particular clinical objective and application. (Case studies or series with post test reports) [C]
*Letters A, B, C similar to standard evidence based recommendation gradings	

Results

Three hundred and thirty-eight (338) general telepsychiatry article abstracts published from 2000 onwards were retrieved. Twenty-nine review abstracts were identified. Twenty-eight abstracts were of reviews or systematic reviews of the literature and one was an evidence based policy document.³⁸ The characteristics of the 29 reviews are described in Table III. Most of the reviews were published after 2005 (66%) and primarily in psychiatric journals (55%).

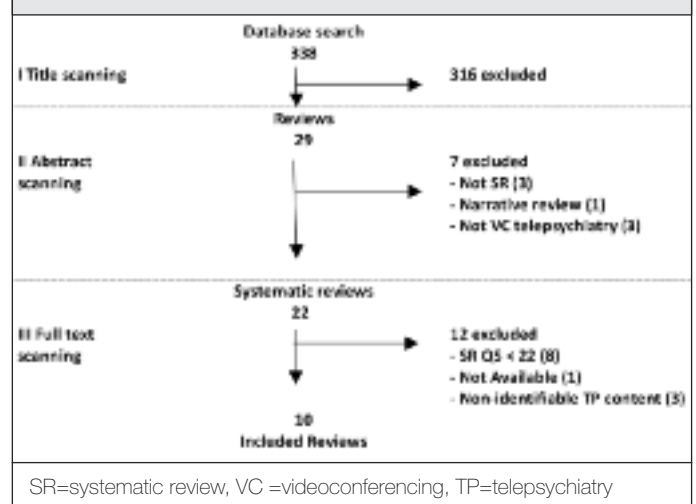
Twenty-two systematic reviews were suitable for full paper retrieval based on review methodology (Figure 1). Seven reviews were excluded. Reasons for exclusion of reviews were: no quantitative systematic review process (n=3)^{14,33,40}, a narrative review (n=1)⁴¹ and non-focused videoconferencing interventions (n=3), namely an e-therapy systematic review on internet therapy⁴², a safety systematic review of telephone support⁴³, and evidence based interventions for children and adolescents.²⁹ There was very good agreement between reviewers with a Kappa 0.9 [95% CI, 0.6-0.1].

Of the remaining 22 identified systematic reviews, 12 were excluded. Eight reviews were excluded for poor quality

Table III: Characteristics of the 29 reviews

	Number n=29	Per cent
Publication Year		
2000 – 2005	10	34%
2006 – 2011	19	66%
Publication Journal		
Psychiatry	16	55%
Telemedicine	7	24%
Other	6	21%
Relevance		
Yes (Participants, Intervention & Outcomes)	22	76%
No	7	24%
Quality		
Relevant and Moderate to Good (QS>=60%)	10	34%
Irrelevant or Poor Quality (QS <60%)	19	66%

Figure 1: Systematic review retrieval process



(QS<22).^{1,13,44-49} Two reviews had no quantifiable telepsychiatry content⁵⁰⁻⁵¹, one focused only on forensic telepsychiatry⁵² and one was a thesis with insufficient information to assess the quality of the review.⁵³ In addition, three of these reviews were updated.^{48-49,51}

Ten systematic reviews were selected (QS ≥22) for detailed extraction of findings and evidence based recommendations (Table IV).^{23,26-28,38-39,54-57} One of these was a policy document which provided detailed grading of evidence-based recommendations.³⁸ Two of these systematic reviews were non-effectiveness reviews included to provide synthesised information on utilization and cost.⁵⁶⁻⁵⁷

Quality of Systematic Reviews

Excluding the reviews on telepsychiatry use⁵⁷, cost⁵⁶ and the policy document³⁸, the remaining seven systematic reviews ranged from moderate to good quality with an average R-AMSTAR Quality Score of 25.4 ± out of 44 (range 22 – 28). All the systematic reviews had information on videoconference bandwidth, had a good quality research design, performed searches of more than two electronic sources (average 3.9

Table IV: Characteristics of 10 included systematic reviews

General Information and quality rating of each systematic review	Details of systematic review	Details of Studies within systematic review	Studies' Outcome Measurements / Results
<p>Grady (2011)³⁸ Quality of Review= NA 1. Search strategy comprehensive 2. Adequate quality assessment 3. Adequate data to support conclusions</p>	<p>Focus: Evidence Based Guidelines Countries: Multiple Search period: – 2008</p>	<p>Setting: Mental Health Services Intervention: Clinical Consultation via VC at 128kbps – 768kbps Study quality Moderate - High</p>	<p>Reliability: VC ↔ F2F Detailed well graded recommendations</p>
<p>Garcia-Lizana (2010)²⁸ Quality of Review: Good (QS=27) 1. Search strategy comprehensive 2. Adequate quality assessment 3. Adequate data to support conclusions</p>	<p>Focus: Feasibility & Effectiveness Countries: USA, Canada & Spain Primary studies = 10 10 RCTs > 10 participants Search period: 1997 – 2008 Number of databases searched: 5</p>	<p>Participants: 1054 Setting: Mental Health Services Intervention: Clinical Consultation via VC at 128kbps – 768kbps Study quality Moderate - High</p>	<p>Reliability: VC ↔ F2F Symptoms: VC ↔ F2F ns Patient Satisfaction: VC ↔ F2F ns Staff Satisfaction: VC ↓ Quality of Life: VC ↔ F2F ns Treatment adherence: VC ↔ F2F ns</p>
<p>Garcia-Lizana (2010)⁵⁴ Quality of Review: Good (QS=27) 1. Search strategy comprehensive 2. Adequate quality assessment 3. Adequate data to support conclusions</p>	<p>Focus: Treatment of Depression Countries: USA, Canada Primary studies = 4 4 RCTs > 10 participants Search period: 1997 – 2008 Number of databases searched: 5</p>	<p>Participants: 485 Setting: Mental Health Services Intervention: Clinical Consultation via VC at 128kbps – 384kbps Study quality Moderate - High</p>	<p>Symptoms: VC F2F ns (1 study p<.05) Patient Satisfaction: VC ↔ F2F ns Treatment adherence: VC ↔ F2F ns Cost: VC = F2F ns</p>
<p>Hayley (2009)⁵⁷ Quality of Review: NA 1. Search strategy comprehensive Systematic review of utilization of Telepsychiatry</p>	<p>Focus: Utilisation Countries: USA, Canada Primary studies = 11 Studies with enough information to determine use Search period:– 2008 Number of databases searched: 6</p>	<p>Setting: Mental Health Services Intervention: Clinical Consultation via VC at 128kbps – 768kbps Small populations with low utilization with few clients sites</p>	<p>Use: 1.3 - 3.5 patients per program per month 4.7 - 34 consultations per program per month</p>
<p>Antonacci (2008)²⁶ Quality of Review: Good (QS=22) 1. Search strategy comprehensive 2. Adequate quality assessment 3. Adequate data to support conclusions 4. No discrimination in study quality in conclusions</p>	<p>Focus: Effectiveness and Routine use Countries: USA, Canada Primary studies = 34 6 RCTs only Search period: 1950 – 2007 Number of databases searched: 2</p>	<p>Participants: 1195* Setting: Mental Health Services & Forensic Intervention: Clinical Consultation via VC at 384 kbps - IP Moderate – High</p>	<p>Reliability: VC ↔ F2F Symptoms: F2F ↑ Patient Satisfaction: VC ↔ F2F ns Treatment adherence: VC ↔ F2F ns Cost VC ↔ F2F ns</p>
<p>Hayley (2008)²⁷ Quality of Review: Good (QS=25) 1. Search strategy comprehensive 2. Adequate quality assessment 3. Adequate data to support conclusions 4. No discrimination in study quality in conclusions Countries: USA, Canada</p>	<p>Focus: Successful implementation of Telemental Health (inc Phone & Internet) Primary studies = 77 (20TP) 5 RCTs Search period: -2006 Number of databases searched: 5</p>	<p>Participants: 21 VC studies Setting: Mental Health Services Intervention: Not Given Study quality: 1 High 2 Good 6 Fair to good 6 Poor to fair 6 Poor</p>	<p>Depression: VC ↔ F2F Treatment of depression effective in VC Mild Dementia: VC ↔ F2F Agoraphobia: VC ↔ F2F</p>
<p>Hylar (2005)³⁹ Quality of Review: Good (QS=28) 1. Search strategy comprehensive 2. Adequate quality assessment 3. Based decision on control studies (no RCTs)</p>	<p>Focus: Reliability Countries: USA, Canada , Australia, Japan, France Primary studies = 14 5 RCTs & 9 Controlled studies Search period: 1956 – 2002 Number of databases searched: 2</p>	<p>Participants: 500 Setting: Mental Health Services Intervention: Clinical Consultation via VC at 128kbps – 384kbps Study quality: Moderate - High</p>	<p>Reliability: VC ↔ F2F Symptoms: VC ↔ F2F ns Patient Satisfaction: VC ↔ F2F ns</p>
<p>Hilty (2004)²³ Quality of Review: Good (QS=22) 1. Search strategy comprehensive 2. Adequate quality assessment 3. No discrimination in study quality in conclusions</p>	<p>Focus: Reliability, Satisfaction & Outcomes Countries: Multiple Primary studies = 52 Reliability: 2 RCTs 11 Controlled Outcomes: 1 RCT 9 Controlled Satisfaction: 2 RCT 19 Controlled Search period: 1965-2003 Number of databases searched: 5</p>	<p>Participants: Reliability: 273 Outcomes: 905 Satisfaction: 1669 Setting: Mental Health Services Intervention: Clinical Consultation via VC at 128kbps – 384kbps Study quality: Low to Moderate</p>	<p>Reliability: VC ↔ F2F Symptoms: VC ↔ F2F ns Patient Satisfaction: VC ↔ F2F ns</p>
<p>Pesaama (2004)⁵⁵ Quality of Review: Good (QS=27) 1. Search strategy comprehensive 2. Adequate quality assessment 3. No discrimination in study quality in conclusions</p>	<p>Focus: Effectiveness in C&A Countries: USA, Canada Primary studies = 2 2 RCTs > 10 participants Search period: 1996 – 2003 Number of databases searched: 2</p>	<p>Participants: 51 Setting: CAMHs Intervention: Clinical Consultation via VC at 128kbps – 336kbps Study quality Moderate - High</p>	<p>Reliability: VC (96%) ↔ F2F ns Symptoms: VC ↑** Patient Satisfaction: VC high</p>
<p>Hylar (2003)⁵⁶ Quality of Review: NA 1. Search strategy comprehensive Systematic review of utilization of Telepsychiatry</p>	<p>Focus: Cost Countries: USA, Canada, Australia, Hong Kong, & multiple Primary studies = 12 Studies with enough information to determine cost Search period:1995 - 2002 Number of databases searched: 2</p>	<p>Setting: Mental Health Services Intervention: Clinical Consultation via VC at 128kbps – 768kbps Small number of studies, weak methodologies, lack of explicit presentation of costs, lack of consistency in presentation of cost, non-comparability of cost & old studies</p>	<p>Costs: Positive return on investment (2.7years – 1 study) TP ↑ (less expensive) F2F (6) Breakeven (Varies)</p>

VC=videoconference F2F Face to face; ns = not significant; ↔ no difference; ↓ worse; ↑ better *RCTs only**Significant

sources, range 2 – 8), had duplicate study selection and data extraction, rated the quality of the studies and provided information on the studies. Six of the seven systematic reviews included grey literature and used appropriate methods to combine the findings of the studies. Three systematic reviews rated the quality of the studies but did not use this information to make recommendations and none of them assessed the likelihood of publication bias. Common limitations in the systematic reviews were: grading of the evidence was not evident in the recommendations; studies were assessed for quality but were not linked to recommendations; all of the systematic reviews reported on the same 10 RCTs;^{6,58-66} two child and adolescent RCTs⁶⁷⁻⁶⁸ and two of the systematic reviews^{23,39} included information from a further 8 moderate quality control studies.⁶⁹⁻⁷⁶ The systematic reviews also only included studies up until 2008. The authors identified a further four RCTs published post 2008 which showed similar evidence to the studies in the systematic reviews.^{20,60,77-78}

All the systematic reviews included psychiatric consultations provided by both face to face (F2F) and videoconferencing (VC). Connections were via ISDN or IP with bandwidth ranging from 128-768kbps.

Effectiveness of Telepsychiatry

Eight systematic reviews addressed the questions on effectiveness of telepsychiatry.^{23,26-28,38-39,54-55}

Question 1: Are telepsychiatry assessments equivalent to face to face (F2F) assessments?

All eight effectiveness systematic reviews provided evidence-based recommendations. The reviews are in agreement that telepsychiatry is a reliable means of conducting assessments in situations where it is difficult or impractical to arrange face to face (F2F) assessments. There is also evidence that neuropsychological tests can be done using videoconferencing.³⁸ Telepsychiatry also provides the unintended benefit of enabling two professional opinions rather than one.²³

Summary of reviews analyzed:

- Diagnostic assessments conducted via videoconference (VC) are equivalent to face to face (F2F) assessments [HB1, MB2, LB3].^{27-28,38}
- Bandwidth and resolution must be sufficient for mental status examination to identify non-verbal behaviors such as tics, dysmorphia, or abnormalities in affect [HB/MB2].³⁸⁻³⁹
- Depending on bandwidth, there is some support for the reliability and validity of VC administration of the Brief Psychiatric Rating Scale [HB/MB/LB3]²³, the Hamilton Depression Rating Scale [HB2]³⁸, and the PANSS in psychosis trials.⁴⁴ [HB2]
- The use of VC in patient discharge planning is beneficial [HB/MB2, LB3].³⁸

Question 2: Are telepsychiatry treatments equivalent to face to face (F2F) treatments?

Six systematic reviews provided evidence-based recommendations.^{23,26-28,38,54} Reviews were mainly on medication management³⁸ and short courses of cognitive behavioral therapy (CBT).^{27,38} Though it was felt that

telepsychiatry for therapy requires more study, the fact that patients quickly adapt and establish rapport with their therapists³⁸, the adherence of therapists to practice guidelines and the equivalence in clinical outcomes from therapy⁶⁴, (primarily CBT)²⁶ suggest that telepsychiatry can replace follow up therapy.^{38,54} In addition, there are no data that telepsychiatry services are harmful, so it is believed to be safe.^{26,28}

Summary of reviews analyzed

- Access to VC psychiatric medication management practiced in compliance with regulations, in a timely manner and in keeping with local protocols, is a significant benefit [HB/MB2, LB3].³⁸
- Outpatients can be reliably treated with medication via VC [MB2].³⁸
- Use of telepsychiatry appears to have minimal effect on the therapeutic working alliance with children and parents [HB/MB2, LB3].³⁸
- Telepsychiatry requires an adjustment of communication style to optimise rapport [HB/MB2].³⁸
- Psychotherapy appears to be amenable to VC [HB/MB2, LB3].^{27,38}
- In Child and Adolescent Mental Health Services (CAMHS), comparable improvements were found with CBT in youth telepsychiatry services [HB/MB2].^{27,38}
- Early reports on family therapy via VC indicate excellent acceptance and primarily beneficial outcomes [HB/MB3].³⁸

Question 3: Does telepsychiatry improve clinical outcomes?

Six systematic reviews provided evidence-based recommendations.^{23,26-27,38,54-55} Findings from these reviews suggest that to date very few studies have reviewed the effectiveness of telepsychiatry in improving the outcomes for patients or clients.^{23,54} Positive outcomes have been reported for the management of depression, post-traumatic stress disorder, bulimia nervosa and psychosis²⁷, but there is not enough evidence to strongly conclude effectiveness.⁵⁴

Geriatric telepsychiatry is becoming a major focus of health care delivery to older persons as they are often a highly isolated group in rural areas.⁷⁹⁻⁸⁰ Despite 17 articles since 2000 specifically addressing geriatric telepsychiatry, there were limited evidence-based outcome data on the provision of psychiatric services to geriatric patients in nursing facilities.³⁸

Child and Adolescent mental health services (CAMHS) are highly specialized and telepsychiatry is an important way to provide access to these services.⁵⁵ There was only one systematic review focusing on CAMHS which reported high satisfaction with telepsychiatry.⁵⁵ Telepsychiatry in CAMHS has been described across most developmental groups and diagnostic categories [HB/MB1]³⁸ and it is believed that it may be helpful to inpatient settings [HB/MB/LB3].³⁸

Summary of reviews analyzed

- **Quality of Life:** Positive quality of life results were reported for telepsychiatry services.⁵⁴ [HB2]
- **Depression:** Though telepsychiatry can obtain the same outcome as F2F, there is insufficient scientific evidence

regarding the effectiveness of VC use in the management of depression⁵⁴ [HB/LB2]. However, collaborative telepsychiatry care for depression is considered an evidence based treatment.²⁶ [HB2]

- **Bulimia Nervosa:** CBT delivered via VC was both acceptable to patients and roughly equivalent in outcome to therapy delivered face to face.⁶⁰ [level 2]
- **Geriatric psychiatry:** There is limited evidence-based support for the provision of telepsychiatry services to geriatric patients in nursing facilities [HB/MB/LB3].³⁸
- **CAMHS:** VC was shown to be a method of diagnosis and treatment in children and adolescents equivalent to F2F [HB/LB2].^{38,55}

Feasibility of Telepsychiatry Programs

None of the included systematic review specifically addressed satisfaction, cultural acceptance, and integration into programs. One review did address the issue of utilization⁵⁷ and one the issue of cost.⁵⁶

Question 4: What are the levels of satisfaction with the use of telepsychiatry?

None of the ten systematic reviews specifically addressed satisfaction with telepsychiatry, though studies in three of the reviews reported satisfaction resulting in evidence-based recommendations. An excluded systematic review on satisfaction literature revealed satisfaction study limitations with a lack of RCTs and small sample sizes.⁵⁰ This was supported in another systematic review of satisfaction literature in telemedicine which revealed limitations in the study designs.²³ Though there appears to be no difference in satisfaction between telepsychiatry and face to face services, it is unclear whether the satisfaction was generated by the program or the technology.⁵⁴ This is similar to findings in telemedicine with a Cochrane review concluding that, overall, people were satisfied with video consultations.⁸¹ Reasons for satisfaction have not yet been addressed, though picture quality seems important.²³

Summary of reviews analyzed

- Patients reported levels of satisfaction possibly due to access to specialist care and reduced waiting time.⁵⁴⁻⁵⁵ [HB/LB2-3]
- There is no difference in patient satisfaction in telepsychiatry at HB and LB.³⁹ [HB/LB3]

Clinician satisfaction is less well evaluated²³, though acceptance was reported to be high in most studies.^{5,24,82} The degree of satisfaction was often related to concerns about 'presence' or establishing a therapeutic alliance which may be directly related to the audio and video quality.²³ High satisfaction was often reported with high bandwidths.⁶⁷

Question 5: Is telepsychiatry culturally acceptable?

None of the systematic reviews addressed this issue, though there are a number of articles published on this. Cultural acceptance of telepsychiatry is important, especially in cultures that emphasize personal relationships.³⁰ It is imperative for any clinician to have cultural competency in the population he or she is working

with.³⁸ This should include understanding of the health beliefs and practices of the local community and clients from different cultural backgrounds.¹⁷ Telepsychiatry is reported to provide a unique opportunity for psychiatrists to communicate with patients in their mother tongue rather than through interpreters⁸³⁻⁸⁴, and patients reported a high level of acceptance and satisfaction with transcultural telepsychiatry.⁸³ However, in a country such as South Africa most psychiatry services require the use of interpreters.⁸⁵

Question 6: What is the reported utilization of telepsychiatry?

Though the use of telepsychiatry is reported to be widespread, only one systematic review specifically addressed utilisation.⁵⁷ The reviewers concluded that programs that used videoconferencing offered clinical services to relatively small patient populations (1.3 - 3.5 patients per program per month) and had low utilization (average 16 consultations, range 4.7 - 34 per program per month) with few client sites.⁵⁷

Question 7: Is telepsychiatry cost effective?

Only one systematic review addressed cost effectiveness specifically.⁵⁶ The systematic review identified a number of limitations of cost studies. These limitations were the small number of available studies on cost, weak methodologies, lack of explicitly presented sources of funding, the lack of consistency in presentation of costs, and the heterogeneity of the included studies as a limitation.⁵⁶ A meta-analysis of costs by Whitten (2000) in telemedicine also found that only 7% of studies reported quantifiable data.²³ Notwithstanding the limitations, two systematic reviews provided evidence-based recommendations (Table IV), and concluded that telepsychiatry could be cost-effective in selected settings and financially viable if used beyond the break-even point in relation to the cost of providing face to face services.⁵⁶ The break-even point is thought to be closely tied to the volume of use.^{22,56} In studies in Canada, where costs were determined, findings indicate that at 396 consultations a year or seven consultations per week²², the costs were the same as a travelling psychiatrist.^{2,51,86-87} Setup and operating costs can be substantially reduced by utilizing the equipment for other clinical, administrative and educational services.²²⁻²³

Summary of reviews analyzed

- Telepsychiatry seemed to improve accessibility to services, and produced savings of time cost and travel.^{23,28} [HB/LB2]

Question 8: What is the evidence of the benefits of integrating programs such as telepsychiatry into health systems?

No telepsychiatry systematic reviews addressing this question were found. A general health intervention systematic review by Atun et al looked at integration in terms of governance, financing, planning, service delivery, monitoring and evaluation and demand generation, and concluded that the purpose, nature and extent of integration vary enormously and that understanding the local context is critical to the integration of programs into

the health system.⁸⁸ Hayley emphasized this stating that the studies reviewed gave limited consideration to the healthcare systems in which telepsychiatry was provided and to the use of conventional mental health services.²⁷

Discussion

None of the studies included in the systematic reviews were conducted in developing countries. To some extent this brings into question the degree to which the evidence-based recommendations produced by these studies have applicability to developing countries like South Africa. To address any potential bias in application, it is essential that only evidence of the highest quality is applied to other settings.

Hylar stated that, "without exception, project descriptions and simple surveys have conveyed a positive picture of telepsychiatry in the settings used".³⁹ However, evaluation of the effectiveness of telepsychiatry can only be addressed by well designed studies comparing videoconferencing with F2F outcomes. It is well accepted in evidence-based literature that systematic reviews are regarded as highest quality of evidence-based recommendations for practice and implementation, followed by good quality RCTs.

The systematic reviews on effectiveness (Questions 1,2 and 3) were based on only a small number of high quality studies. The systematic reviews were of moderate to good quality and included a range of recommendations of varying confidence. The authors conclude that there is reasonable confidence in the international evidence of effectiveness of telepsychiatry.

Summary of Evidence-Based Recommendations

- There is considerable evidence that telepsychiatry is reliable for diagnosis and assessment at high bandwidth and reasonable evidence at low bandwidth.
- There is reasonable evidence for the improvement of symptoms at high and low bandwidth.
- There is reasonable evidence for administering neuropsychiatric tests, psychiatric medication and establishing rapport at high bandwidth with some support at low bandwidth.
- There is some support for using videoconferencing in geriatrics with concerns about the use of telepsychiatry for older people with possible sensory impairment and the possible unfamiliarity of the use of telepsychiatric equipment.¹
- There is reasonable evidence for CAMHS at high bandwidth with some support at low bandwidth.

There were few systematic reviews on feasibility, with studies reporting inconsistent records of costs and utilization. Notwithstanding this finding, there is reasonable confidence that telepsychiatry increases access to specialist services and possible savings in time, cost and travel. Based on the systematic reviews which included satisfaction as an outcome, there is also reasonable confidence in the satisfaction of users with both high and low bandwidth telepsychiatry, but well designed studies must be conducted to collect evidence on cultural satisfaction.

Implementations of telepsychiatry in new environments should have a comprehensive research strategy and clear evaluation frameworks.⁸⁹⁻⁹⁰ All the systematic reviews recommended that more high quality evaluation studies such as randomized controlled trials in telepsychiatry are needed to address the limited quality evidence in the field. It is acknowledged that RCTs are difficult to conduct for various forms of telemedicine.⁸⁹ These studies should measure standard patient outcomes, patient and professional satisfaction, quality of care, care distribution and accessibility, the technical performance of the equipment used, and cost.²² In addition it should be complemented with action-research, context-specific, participatory research processes.³⁴

Conclusion

Based on the evidence, resource constrained settings like South Africa should be encouraged to develop telepsychiatry programs along with appropriate evaluation strategies. The major challenge associated with the implementation of telepsychiatry services lies not in the availability of evidence, but the development and integration of a model of telepsychiatry into the South African health care system.

References

1. Monnier J, Knapp RG, Frueh BC. Recent advances in telepsychiatry: an updated review. *Psychiatr Serv* 2003;54(12):1604-1609.
2. Doze S, Simpson J, Hailey D, Jacobs P. Evaluation of a telepsychiatry pilot project. *J Telemed Telecare* 1999;5(1):38-46.
3. Buist A, Coman G, Silvas A, Burrows G. An evaluation of the telepsychiatry programme in Victoria, Australia. *J Telemed Telecare* 2000;6(4):216-221.
4. Gammon D, Bergvik S, Bergmo T, Pedersen S. Videoconferencing in psychiatry: a survey of use in northern Norway. *J Telemed Telecare* 1996;2(4):192-198.
5. Clarke PH. A referrer and patient evaluation of a telepsychiatry consultation-liaison service in South Australia. *J Telemed Telecare* 1997;3 (Suppl 1):12-14.
6. 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(3):341-350.
7. Holden D, Dew E. Telemedicine in a rural gero-psychiatric inpatient unit: comparison of perception/satisfaction to onsite psychiatric care. *Telemed J E Health* 2008;14(4):381-384.
8. Yellowlees P, Burke MM, Marks SL, Hilty DM, Shore JH. Emergency telepsychiatry. *J Telemed Telecare* 2008;14(6):277-281.
9. Rabinowitz T, Murphy KM, Amour JL, Ricci MA, Caputo MP, Newhouse PA. Benefits of a telepsychiatry consultation service for rural nursing home residents. *Telemed J E Health* 2010;16(1):34-40.
10. Myers KM, Vander Stoep A, McCarty CA, Klein JB, Palmer NB, Geyer JR, et al. Child and adolescent telepsychiatry: variations in utilization, referral patterns and practice trends. *J Telemed Telecare* 2010;16(3):128-133.
11. Myers KM, Valentine JM, Melzer SM. Child and adolescent telepsychiatry: utilization and satisfaction. *Telemed J E Health* 2008;14(2):131-137.
12. Hilty DM, Yellowlees PM, Sonik P, Derlet M, Hendren RL. Rural

- child and adolescent telepsychiatry: successes and struggles. *Pediatr Ann* 2009;38(4):228-232.
13. Diamond JM, Bloch RM. Telepsychiatry assessments of child or adolescent behavior disorders: a review of evidence and issues. *Telemed J E Health* 2010;16(6):712-716.
 14. Nelson EL, Bui TN, Velasquez SE. Telepsychology: research and practice overview. *Child Adolesc Psychiatr Clin N Am* 2011;20(1):67-79.
 15. Spaulding R, Belz N, DeLurgio S, Williams AR. Cost savings of telemedicine utilization for child psychiatry in a rural Kansas community. *Telemed J E Health* 2010;16(8):867-871.
 16. Szeftel R, Mandelbaum S, Sulman-Smith H, Naqvi S, Lawrence L, Szeftel Z, et al. Telepsychiatry for children with developmental disabilities: applications for patient care and medical education. *Child Adolesc Psychiatr Clin N Am* 2011;20(1):95-111.
 17. Savin D, Glueck DA, Chardavoyne J, Yager J, Novins DK. Bridging cultures: child psychiatry via videoconferencing. *Child Adolesc Psychiatr Clin N Am* 2011;20(1):125-134.
 18. Shores MM, Ryan-Dykes P, Williams RM, Mamerto B, Sadak T, Pascualy M, et al. Identifying undiagnosed dementia in residential care veterans: comparing telemedicine to in-person clinical examination. *Int J Geriatr Psychiatry* 2004;19(2):101-108.
 19. 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(5):476-478.
 20. Egede LE, Frueh CB, Richardson LK, Acierno R, Mauldin PD, Knapp RG, et al. Rationale and design: telepsychology service delivery for depressed elderly veterans. *Trials* 2009;10:22.
 21. Westphal A, Dingjan P, Attoe R. What can low and high technologies do for late-life mental disorders? *Curr Opin Psychiatry* 2010;23(6):510-515.
 22. Pineau G, Moqadem K, St-Hilaire C, Perreault R, Levac E, Hamel B, et al. Telehealth: clinical guidelines and technological standards for telepsychiatry. *Agence d'Evaluation des Technologies et des Modes d'Intervention en Sante (AETMIS). ; 2006 [cited 75.]; Available from: www.bibliotheque.assnat.qc.ca/01/mono/2006/09/912275.pdf. Accessed 26 March 2012.*
 23. Hilty DM, Marks SL, Urness D, Yellowlees PM, Nesbitt TS. Clinical and educational telepsychiatry applications: a review. *Can J Psychiatry* 2004;49(1):12-23.
 24. Ball CJ, McLaren PM, Summerfield AB, Lipsedge MS, Watson JP. A comparison of communication modes in adult psychiatry. *J Telemed Telecare* 1995;1(1):22-26.
 25. Wittson CL, Dutton R. Interstate telecommunication. *Ment Hos* 1957;2:15-17.
 26. Antonacci DJ, Bloch RM, Sy Atezas S, 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(3):253-269.
 27. Hailey D, Roine R, Ohinmaa A. The effectiveness of telemental health applications: a review. *Can J Psychiatry* 2008;53(11):769-778.
 28. Garcia-Lizana F, Munoz-Mayorga I. What about telepsychiatry? A systematic review. *Prim Care Companion J Clin Psychiatry* 2010;12(2).
 29. Graeff-Martins AS, Flament MF, Fayyad J, Tyano S, Jensen P, Rohde LA. Diffusion of efficacious interventions for children and adolescents with mental health problems. *J Child Psychol Psychiatry* 2008;49(3):335-352.
 30. Guzman CS, Pignatiello A. The benefits of implementing telepsychiatry in the Brazilian Mental Health System. *Rev Bras Psiquiatr* 2008;30(3):300-301.
 31. Srinivasaraghavan J, Felthous AR. Introduction to this issue: International perspectives on videoconferencing and the law. *Behav Sci Law* 2008;26(3):249-251.
 32. Thara R, John S, Rao K. Telepsychiatry in Chennai, India: the SCARF experience. *Behav Sci Law* 2008;26(3):315-322.
 33. Wynchank S, Fortuin J. Telepsychiatry in South Africa - present and future. *S Afr J Psychiatry* 2010;16(1):16-19.
 34. Boydell KM, Greenberg N, Volpe T. Designing a framework for the evaluation of paediatric telepsychiatry: a participatory approach. *J Telemed Telecare* 2004;10(3):165-169.
 35. Ekland AG, Bowes A, Flottorp S. Effectiveness of telemedicine: a systematic review of reviews. *Int J Med Inform* 2010;79(11):736-771.
 36. Kung J, Chiapelli F, Cajulis O, Avezova R, Kossan G, Chew L, et al. From Systematic Reviews to Clinical Recommendations for Evidence Based Health Care: Validation of Revised Assessment of Multiple Systems Review (R-AMSTAR) for Grading CLinical Relevance. *Open Dent J* 2010;4:84-91.
 37. Shea B, Grimshaw J, Wells G, Boers M, Andersson N, Hamel C, et al. Development of AMSTAR: a measurement tool to assess the methodological quality of systematic reviews. *BMC Med Res Methodol* 2007;7(1):10.
 38. Grady B, Myers KM, Nelson EL, Belz N, Bennett L, Carnahan L, et al. Evidence-based practice for telemental health. *Telemed J E Health* 2011;17(2):131-148.
 39. Hyler SE, Gangure DP, Batchelder ST. Can telepsychiatry replace in-person psychiatric assessments? A review and meta-analysis of comparison studies. *CNS Spectrum* 2005;10(5):403-413.
 40. Van Allen J, Davis AM, Lassen S. The use of telemedicine in pediatric psychology: Research review and current applications. *Child Adolesc Psychiatr Clin N Am* 2011;20(1):55-66.
 41. Moffatt JJ, Eley DS. The reported benefits of telehealth for rural Australians. *Aust Health Rev* 2010;34(3):276-281.
 42. Postel MG, De Haan. H.A, De Jong CAJ. E-Therapy for Mental Health Problems: A Systematic Review. *Telemed J E Health* 2008;14(7):707-714.
 43. Luxton DD, Sirotni AP, Mishkind MC. Safety of telemental healthcare delivered to clinically unsupervised settings: a systematic review. *Telemed J E Health* 2010;16(6):705-711.
 44. Sharp IR, Kobak KA, Osman DA. The use of videoconferencing with patients with psychosis: A review of the literature. *Ann Gen Psychiatry* 2011;10(1):14.
 45. Melaka A, Edirippulige S. Psych-technology: A Systematic Review of the Telepsychiatry Literature. *Psych Online* 2010.
 46. Norman S. The use of telemedicine in psychiatry. *J Psychiatr Ment Health Nurs* 2006;13(6):771-777.
 47. Frueh BC, Deitsch SE, Santos AB, Gold PB, Johnson MR, Meisler N, et al. Procedural and methodological issues in telepsychiatry research and program development. *Psychiatr Serv* 2000;51(12):1522-1527.
 48. Hilty DM, Luo JS, Morache C, Marcelo DA, Nesbitt TS. Telepsychiatry: an overview for psychiatrists. *CNS Drugs* 2002;16(8):527-548.
 49. Hilty DM, Liu W, Marks S, Callahan EJ. The Effectiveness of Telepsychiatry. *CPA Bul de l'APC [serial on the Internet]. 2003; October: Available from: <http://www1.cpa-apc.org:8080/Publications/Archives/Bulletin/2003/october/hilty.asp>. Accessed 26 March 2012.*
 50. 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(4):293-316.
 51. Roine R, Ohinmaa A, Hailey D. Assessing telemedicine: a systematic review of the literature. *CMAJ* 2001;165(6):765-771.

52. Khalifa N, Saleem Y, Stankard P. The use of telepsychiatry within forensic practice: A literature review on the use of videolink. *J Forensic Psychiatry Psychol* 2008;19(1):2-13.
53. Armstrong WG. A meta-analysis comparing face-to-face psychiatry and telepsychiatry. US: Mississippi State University, 2006.
54. Garcia-Lizana F, Munoz-Mayorga I. Telemedicine for depression: a systematic review. *Perspect Psychiatr Care* 2010;46(2):119-126.
55. Pesamaa 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(4):187-192.
56. Hyler SE, Gangure DP. A review of the costs of telepsychiatry. *Psychiatr Serv* 2003;54(7):976-980.
57. Hailey D, Ohinmaa A, Roine R. Limitations in the routine use of telepsychiatry. *J Telemed Telecare* 2009;15(1):28-31.
58. Bouchard S, Payeur R, Rivard V, Allard M, Paquin B, Renaud P, et al. Delivering cognitive-behavior therapy for panic disorder with agoraphobia in videoconference. *J Telemed Telecare* 2004;10(1):13-25.
59. 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(4):217-221.
60. Mitchell JE, Crosby RD, Wonderlich SA, Crow S, Lancaster K, Simonich H, et al. 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(5):581-592.
61. Ruskin PE, Silver-Aylala M, Kling MA, Reed SA, Bradham DD, Hebel JR, et al. Treatment outcomes in depression: comparison of remote treatment through telepsychiatry to in-person treatment. *Am J Psychiatry* 2004;161(8):1471-1476.
62. 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(3):285-286.
63. Fortney JC, Pyne JM, Edlund MJ, Williams DK, Robinson DF, Mittal D, et al. A Randomized Trial of Telemedicine-based Collaborative Care for Depression. *J Gen Intern Med* 2007;22(8):1086-1093.
64. 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(3):142-147.
65. Manguno-Mire GM, Thompson JW, Jr., 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(4):481-489.
66. 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(6):836-843.
67. Elford R, White H, Bowering R, Ghandi A, Maddigan B, St John K, et al. A randomized, controlled trial of child psychiatric assessments conducted using videoconferencing. *J Telemed Telecare* 2000;6(2):73-82.
68. Nelson E-L, Barnard M, Cain S. Treating Childhood Depression over Videoconferencing. *Telemed J E Health* 2003;9(1):49-55.
69. Baer L, Elford DR, Cukor P. Telepsychiatry at forty: what have we learned? *Harv Rev Psychiatry* 1997;5(1):7-17.
70. Baigent MF, Lloyd CJ, Kavanagh SJ, Ben-Tovim DI, Yellowlees PM, Kalucy RS, et al. Telepsychiatry: 'tele' yes, but what about the 'psychiatry'? *J Telemed Telecare* 1997;3 (Suppl 1):3-5.
71. Montani C, Billaud N, Tyrrell J, Fluchaire I, Malterre C, Lauvernay N, et al. Psychological impact of a remote psychometric consultation with hospitalized elderly people. *J Telemed Telecare* 1997;3(3):140-145.
72. Zarate CA, Jr., Weinstock L, Cukor P, Morabito C, Leahy L, Burns C, et al. Applicability of telemedicine for assessing patients with schizophrenia: acceptance and reliability. *J Clin Psych* 1997;58(1):22-25.
73. Brodey BB, Claypoole KH, Motto J, Arias RG, Goss R. Satisfaction of forensic psychiatric patients with remote telepsychiatric evaluation. *Psychiatr Serv* 2000;51(10):1305-1307.
74. Matsuura S, Hosaka T, Yukiyaama T, Ogushi Y, Okada Y, Haruki Y, et al. Application of telepsychiatry: a preliminary study. *Psychiatry Clin Neurosc* 2000;54(1):55-58.
75. Jones BN, 3rd, Johnston D, Reboussin B, McCall WV. Reliability of telepsychiatry assessments: subjective versus observational ratings. *J Geriatr Psychiatry Neurol* 2001;14(2):66-71.
76. Yoshino A, Shigemura J, Kobayashi Y, Nomura S, Shishikura K, Den R, et al. Telepsychiatry: assessment of televideo psychiatric interview reliability with present- and next-generation internet infrastructures. *Acta Psychiatr Scand* 2001;104(3):223-226.
77. Mitchell SA, MacLaren AT, Morton M, Carachi R. Professional opinions of the use of telemedicine in child & adolescent psychiatry. *Scott Med J* 2009;54(3):13-16.
78. Morland LA, Greene CJ, Grubbs K, Kloezeman K, Mackintosh M-A, Rosen C, et al. Therapist adherence to manualized cognitive-behavioral therapy for anger management delivered to veterans with PTSD via videoconferencing. *J Clin Psychol* 2011;67(6):629-638.
79. Alessi N. Geriatric telepsychiatry: no matter the population, the questions remain the same—a commentary. *J Geriatr Psychiatry Neurol* 2001;14(2):88-90.
80. Ball C, Puffett A. The assessment of cognitive function in the elderly using videoconferencing. *J Telemed Telecare* 1998;4 (Suppl 1):36-38.
81. Currell R, Urquhart C, Wainwright P, Lewis R. Telemedicine versus face to face patient care: effects on professional practice and health care outcomes. *Cochrane Database of Systematic Reviews [serial on the Internet]* 2000; (2).
82. Boydell KM, Volpe T, Kertes A, Greenberg N. A review of the outcomes of the recommendations made during paediatric telepsychiatry consultations. *J Telemed Telecare* 2007;13(6):277-281.
83. Mucic D. Transcultural telepsychiatry and its impact on patient satisfaction. *J Telemed Telecare* 2010;16(5):237-242.
84. Yeung A, Johnson DP, Trinh N-H, Weng W-CC, Kvedar J, Fava M. Feasibility and effectiveness of telepsychiatry services for Chinese immigrants in a nursing home. *Telemed J E Health* 2009;15(4):336-341.
85. Jack C, Mars M. Telemedicine—A Need For Ethical And Legal Guidelines in South Africa. *SA Fam Pract* 2008;50(2):60.
86. Doze S, Simpson J, Hailey D, Jacobs P. Evaluation of a telepsychiatry pilot project. *Journal of Telemedicine and Telecare* 1999;5(1):38-46.
87. Roine R, Ohinmaa A, Hailey D. Assessing telemedicine: a systematic review of the literature. *Canadian Medical Association Journal* 2001;165(6):765-771.
88. Atun R, de Jongh T, Secci F, Ohiri K, Adeyi O. A systematic review of the evidence on targeted interventions into health systems. *Health Policy Plan* 2010;25(1):1-14.
89. Bashshur RL. On the definition and the evaluation of Telemedicine. *Telemed J E Health* 1995;1(1):19-30.
90. Bashshur RL, Reardon TG, Shannon GW. Telemedicine: a new health care delivery system. *Ann Rev Public Health* 2000;21:613-637.