TECHNICAL COMMENTARY

Telemental health

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Introduction

There is a growing need to deliver low-cost treatments tailored to individual needs and delivered in a continuous way (e.g. all year long) from any location. Telemental health (or "ehealth") has the potential to meet this need.

Telemental health refers to any mental health treatment that is provided electronically, either by telephone or internet (such as online health programs, or video conferencing). This type of intervention involves structured counselling and generally aims to increase medication adherence and prevent relapse. Importantly, it also removes geographic barriers to care.

Method

We have included only systematic reviews (systematic literature search, detailed methodology with inclusion/exclusion criteria) published in full text, in English, from the year 2000 that report results separately for people with a diagnosis of schizophrenia, schizoaffective disorder, schizophreniform disorder or first episode schizophrenia. Reviews were identified by searching the databases MEDLINE, EMBASE, CINAHL, Current Contents, PsycINFO and the Cochrane library. Hand searching reference lists of identified reviews was also conducted. When multiple copies of reviews were found, only the most recent version was included. Reviews with pooled data are prioritised for inclusion.

Review reporting assessment was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist that describes a preferred way to present a meta-analysis[1]. Reviews with less than 50% of items checked have been excluded from the Library. The PRISMA flow diagram is a suggested way of providing information about studies included and excluded with reasons for exclusion. Where no flow diagram has been presented by individual reviews, but identified studies have been described in the text, reviews have been checked for this item. Note that early reviews may have been guided by less stringent reporting checklists than the PRISMA, and that some reviews may have been limited by journal guidelines.

Evidence was graded using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) Working Group approach where high quality evidence such as that gained from randomised controlled trials (RCTs) may be downgraded to moderate or low if review and study quality is limited, if there is inconsistency in results, indirect comparisons, imprecise or sparse data and high probability of reporting bias. It may also be downgraded if risks associated with the intervention or other matter under review are high. Conversely, low quality evidence such as that gained from observational studies may be upgraded if effect sizes are large or if there is a dose dependent response. We have also taken into account sample size and whether results are consistent, precise and direct with low associated risks (see end of table for an explanation of these terms)[2]. The resulting table represents an objective summary of the available evidence, although the conclusions are solely the opinion of staff of NeuRA (Neuroscience Research Australia).

Results

We found four systematic reviews that met inclusion criteria[3-6], presented below in alphabetical order.

- Moderate to high quality evidence suggests small effects of increased quality of life and decreased symptoms with social media interventions. However social support and self-management were decreased with social media interventions. Low quality

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evidence from one small RCT is unable to determine the effects of social media interventions on self-rated stress levels.

- Moderate to low quality evidence suggests a large effect of increased medication adherence with telemental medication management compared to standard care, pill counting, or early warning signs of relapse checklist.
- Moderate to low quality evidence suggests a small effect of greater satisfaction with telemental communication compared to standard care, non-web-based communications, or provision of information.
- Moderate to low quality evidence suggests no differences between telemental psychoeducation and conventional psychoeducation for improving knowledge about the disorder.

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Telemental health

Alvarez-Jimenez M, Alcazar-Corcoles MA, González-Blanch C, Bendall S, McGorry PD, Gleeson JF

Online, social media and mobile technologies for psychosis treatment: A systematic review on novel user-led interventions

Schizophrenia Research 2014; 156: 96-106

View review abstract online

Comparison	**Telemental health interventions (telephone or online treatment programs) vs. standard care or no control.**
Summary of evidence	**Low quality evidence (unable to assess consistency or precision, small samples) is unclear as to the benefits of telemental interventions.**

Mental state

Authors conclude:

Web-based CBT may improve hallucination severity in patients with persistent auditory hallucinations.

Web-based psychoeducation in combination with social networking may improve positive symptoms when both patients and their carers are involved.

Integrated online therapy, social networking and expert and peer support moderation may improve social connectedness and depression in first-episode psychosis patients.

Mobile-based interventions may provide a useful medium to monitor early warning signs of relapse and may prevent hospital admissions.

Tailored SMS-based interventions may improve social contacts and hallucination severity.

Authors state that description of methodology and results was poor in many studies and no study utilized assessors blind to study purpose and/or methodology.

Acceptability and feasibility

Authors conclude:

Web-based psychoeducation and CBT delivered in controlled environments (usually inpatient) were feasible and acceptable, with 79-81% of patients completing the majority of sessions.

Online psychoeducation in conjunction with social networking delivered in real world settings (outpatient, home) was also feasible and acceptable to patients and carers.

Mobile-based SMS interventions were feasible and acceptable, with 76% of patients completing the intervention.

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Authors state that description of methodology and results was poor in many studies and no study utilised assessors blind to study purpose and/or methodology.	
Consistency in results‡	No measure of consistency is reported.
Precision in results§	No measure of precision is reported.
Directness of results‖	Direct

Hailey D, Roine R, Ohinmaa A

The Effectiveness of Telemental Health Applications: A Review

Canadian Journal of Psychiatry-Revue 2008; 53(11): 769-778

View review abstract online

Comparison	**Telemental health interventions (telephone or online treatment programs) vs. standard care.**
Summary of evidence	**Low quality evidence (unable to assess consistency or precision, unclear sample size) is unclear as to the benefits of telemental interventions.**
General and mental state	
1 study found participants receiving internet-based treatments showed lower levels of stress compared to standard care. 1 study found participants receiving telephone interventions showed a trend towards lower rates of hospital readmission and increased community participation. 1 study found participants receiving telemonitoring showed increased medication adherence and reduced emergency hospital admissions.	
Consistency in results	No measure of consistency is reported.
Precision in results	No measure of precision is reported.
Directness of results	Direct

Valimaki M, Athanasopoulou C, Lahti M, Adams CE

Effectiveness of Social Media Interventions for People With Schizophrenia: A Systematic Review and Meta-Analysis

Journal of Medical Internet Research 2016; 18(4): e92

View review abstract online

Comparison	**Social media interventions (12 months duration; online psychoeducation or peer support) vs. standard care.**
Summary of evidence	**Moderate to high quality evidence (large sample, some inconsistency, precise, direct) suggests small effects of increased quality of life and decreased symptoms with social media interventions. However social support and self-management were decreased with social media interventions. Low quality evidence from one small RCT (imprecise) is unable to determine the effects of social media interventions on self-rated stress levels.**
Symptoms, quality of life, social support, self-management and perceived stress	
A significant, small increase in quality of life in the social media group at 12 months; 2 RCTs, N = 600, median difference 0.15, 95%CI 0.14 to 0.17, $p < 0.001$, I^2 83%, $p = 0.02$ *A significant, small decrease in symptoms in the social media group at 6 months;* 1 study, N = 300, median difference -0.14, 95%CI -0.15 to -0.13, $p < 0.001$ *A significant, small decrease in level of social support in the social media group at 6 months;* 2 RCTs, N = 330, median difference 0.22, 95%CI 0.02 to 0.42, $p = 0.03$, I^2 40%, $p = 0.20$ *A significant, small decrease in self-management in the social media group at 12 months;* 2 RCTs, N = 600, median difference 0.07, 95%CI 0.07 to 0.08, $p < 0.001$, I^2 80%, $p = 0.03$ *A significant, small decrease in self-rated stress in the social media group at 6 months;* 1 study, N = 30, median difference -0.51, 95%CI -0.90 to -0.12, $p = 0.01$	
Consistency in results	Consistent for social support, inconsistent for self-management and quality of life, not applicable for symptoms and stress (1 study).
Precision in results	CIs appear precise, apart from self-rated stress.
Directness of results	Direct

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

Psychiatric services 2014; 65(1): 33-49

View review abstract online

Comparison 1	**Telemental medication management vs. standard care, pill counting, or early warning signs checklist.**
Summary of evidence	**Moderate to low quality evidence (unable to assess consistency, precise, indirect, large sample) suggests a large effect of increased medication adherence with telemental medication management.**
Medication adherence	
A large, significant effect of increased medication adherence with telemental medication management; 3 RCTs, N = 422, g = 0.920, 95%CI 0.509 to 1.331, p < 0.001	
Consistency in results	No measure of consistency is reported.
Precision in results	Precise
Directness of results	Indirect comparison (mixed control conditions).
Comparison 2	**Telemental communication/shared decision making vs. standard care, non-web-based communications, or provision of information.**
Summary of evidence	**Moderate to low quality evidence (unable to assess consistency, precise, indirect, large sample) suggests a small effect of greater satisfaction with telemental communication.**
Satisfaction	
A small, significant effect of greater satisfaction with telemental communication; 3 RCTs, N = 834, g = 0.205, 95%CI 0.030 to 0.380, p = 0.022	

Consistency in results	Heterogeneity measure not reported
Precision in results	Precise
Directness of results	Indirect comparison (mixed control conditions).
Comparison 3	**Telemental psychoeducation vs. conventional psychoeducation or medication instruction.**
Summary of evidence	**Moderate to low quality evidence (unable to assess consistency, precise, indirect, large sample) suggests no differences between telemental psychoeducation and conventional psychoeducation for improving knowledge.**
Knowledge	
No significant differences between groups; 3 RCTs, N = 342, *g* = 0.369, 95%CI -0.065 to 0.803, *p* = 0.096	
Consistency in results	No measure of consistency is reported.
Precision in results	Precise
Directness of results	Indirect (mixed control conditions).

Explanation of acronyms

CBT = Cognitive Behavioural Therapy, CI = Confidence Interval, *g* = Hedges' *g,* standardised mean differences (see below for interpretation of effect size), N = number of participants, *p* = statistical probability of obtaining that result (*p* < 0.05 generally regarded as significant), vs. = versus

Explanation of technical terms

* Bias has the potential to affect reviews of both RCT and observational studies. Forms of bias include; reporting bias – selective reporting of results; publication bias - trials that are not formally published tend to show less effect than published trials, further if there are statistically significant differences between groups in a trial, these trial results tend to get published before those of trials without significant differences; language bias – only including English language reports; funding bias - source of funding for the primary research with selective reporting of results within primary studies; outcome variable selection bias; database bias - including reports from some databases and not others; citation bias - preferential citation of authors. Trials can also be subject to bias when evaluators are not blind to treatment condition and selection bias of participants if trial samples are small[7].

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† Different effect measures are reported by different reviews.

Prevalence refers to how many existing cases there are at a particular point in time. Incidence refers to how many new cases there are per population in a specified time period. Incidence is usually reported as the number of new cases per 100,000 people per year. Alternatively some studies present the number of new cases that have accumulated over several years against a person-years denominator. This denominator is the sum of individual units of time that the persons in the population are at risk of becoming a case. It takes into account the size of the underlying population sample and its age structure over the duration of observation.

Reliability and validity refers to how accurate the instrument is. Sensitivity is the proportion of actual positives that are correctly identified (100% sensitivity = correct identification of all actual positives) and specificity is the proportion of negatives that are correctly identified (100% specificity = not identifying anyone as positive if they are truly not).

Weighted mean difference scores refer to mean differences between treatment and comparison groups after treatment (or occasionally pre to post-treatment) and in a randomised trial there is an assumption that both groups are comparable on this measure prior to treatment. Standardised mean differences are divided by the pooled standard deviation (or the standard deviation of one group when groups are homogenous). which allows results from different scales to be combined and compared. Each study's mean difference is then given a weighting depending on the size of the sample and the variability in the data. Less than 0.4 represents a small effect, around 0.5 a medium effect, and over 0.8 represents a large effect[7].

Odds ratio (OR) or relative risk (RR) refers to the probability of a reduction (< 1) or an increase (> 1) in a particular outcome in a treatment group, or a group exposed to a risk factor, relative to the comparison group. For example, a RR of 0.75 translates to a reduction in risk of an outcome of 25% relative to those not receiving the treatment or not exposed to the risk factor. Conversely, a RR of 1.25 translates to an increased risk of 25% relative to those not receiving treatment or not having been exposed to a risk factor. A RR or OR of 1.00 means there is no difference between groups. A medium effect is considered if RR > 2 or < 0.5 and a large effect if RR > 5 or < 0.2[8]. lnOR stands for logarithmic OR where a lnOR of 0 shows no difference between groups. Hazard ratios

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measure the effect of an explanatory variable on the hazard or risk of an event.

Correlation coefficients (eg, r) indicate the strength of association or relationship between variables. They can provide an indirect indication of prediction, but do not confirm causality due to possible and often unforseen confounding variables. An r of 0.10 represents a weak association, 0.25 a medium association and 0.40 and over represents a strong association. Unstandardised (*b*) regression coefficients indicate the average change in the dependent variable associated with a 1 unit change in the independent variable, statistically controlling for the other independent variables. Standardised regression coefficients represent the change being in units of standard deviations to allow comparison across different scales.

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‡ Inconsistency refers to differing estimates of effect across studies (i.e. heterogeneity or variability in results) that is not explained by subgroup analyses and therefore reduces confidence in the effect estimate. I^2 is the percentage of the variability in effect estimates that is due to heterogeneity rather than sampling error (chance) - 0% to 40%: heterogeneity might not be important, 30% to 60%: may represent moderate heterogeneity, 50% to 90%: may represent considerable heterogeneity and over this is considerable heterogeneity. I^2 can be calculated from Q (chi-square) for the test of heterogeneity with the following formula[7];

$$I^2 = \left(\frac{Q - df}{Q}\right) \times 100\%$$

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§ Imprecision refers to wide confidence intervals indicating a lack of confidence in the effect estimate. Based on GRADE recommendations, a result for continuous data (standardised mean differences, not weighted mean differences) is considered imprecise if the upper or lower confidence limit crosses an effect size of 0.5 in either direction, and for binary and correlation data, an effect size of 0.25. GRADE also recommends downgrading the evidence when sample size is smaller than 300 (for binary data) and 400 (for continuous data), although for some topics, these criteria should be relaxed[9].

‖ Indirectness of comparison occurs when a comparison of intervention A versus B is not available but A was compared with C and B was compared with C that allows indirect comparisons of the magnitude of effect of A versus B. Indirectness of population, comparator and/or outcome can also occur when the available evidence regarding a particular population, intervention, comparator, or outcome is not available and is therefore inferred from available evidence. These inferred treatment effect sizes are of lower quality than those gained from head-to-head comparisons of A and B.

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