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 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 2010 that report results separately for people with a diagnosis of bipolar or related disorders. Reviews were identified by searching the databases MEDLINE, EMBASE, and PsycINFO. Hand searching reference lists of identified reviews was also conducted. When multiple copies of review topics were found, the most recent and/or comprehensive review 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 three systematic reviews that met inclusion criteria[3-5].

- Moderate to low quality evidence suggests good retention with the Bipolar Education and Recovery Road programs, although there were no additional benefits for symptoms over treatment as usual. There were improvements in symptoms, particularly mania symptoms, with the Mood Swings program, improvements in depression symptoms with the Personalized Real-Time Intervention for Stabilizing Mood (PRISM) mobile program over the short-term, but not the longer term (24+ weeks), and improvements in quality of life, functioning and well-being with the Living With Bipolar program.

Margarete Ainsworth Building, Barker Street, Randwick NSW 2031. Phone: 02 9399 1000. Email: info@neura.edu.au

- Low quality evidence is unable to determine the benefits of the My Recovery Plan, Beating Bipolar, Parenting Self-help Intervention programs, MoodChart, Online Recovery-focused Bipolar Individual Therapy (ORBIT), Internet-based Cognitive Behavioural Therapy (iCBT), and Improving Adherence in Bipolar Disorder (IABD).
- Moderate to low quality evidence suggests that in general, apps for bipolar disorder are mostly developed independently of research data, and without reference to best practice clinical guidelines or privacy issues.

Margarete Ainsworth Building, Barker Street, Randwick NSW 2031. Phone: 02 9399 1000. Email: info@neura.edu.au

Gliddon E, Barnes SJ, Murray G, Michalak EE

Online and mobile technologies for self-management in bipolar disorder: A systematic review

Psychiatric Rehabilitation Journal 2017; 40: 309-19

View review abstract online

Comparison	**Psychological interventions delivered via the internet or mobile apps vs. treatment as usual (TAU) with or without other interventions.**
Summary of evidence	**Moderate to low quality evidence (unable to assess consistency or precision, direct, small to medium-sized sample) suggests improvements in depression symptoms with the Personalized Real-Time Intervention for Stabilizing Mood (PRISM) mobile program over the short-term, but not the longer term (24+ weeks) when compared to paper and pencil mood charting. Both programs had good retention and high satisfaction.** **Low quality evidence (small pilot studies) is unable to determine the benefits of MoodChart, Online Recovery-focused Bipolar Individual Therapy (ORBIT), Internet-based Cognitive Behavioural Therapy (iCBT) and Improving Adherence in Bipolar Disorder (IABD).**

Education, relapse, recovery and functioning

We include here only the additional programs assessed that were not included in Higalgo-Mazzei et al., 2015.

Authors report on the same studies as Hidalgo-Mazzei, which assessed the Bipolar Education Program, Recovery Road, Mood Swings, Living with Bipolar, My Recovery Plan, and Beating Bipolar. See the table below for details on the studies assessing these programs.

Personalized Real-Time Intervention for Stabilizing Mood (PRISM)

PRISM is a brief psychoeducation-based intervention delivered via a Personal Digital Assistant (PDA) on mobile devices. The program was developed as an extension to the face-to-face Life Goals psychoeducation intervention. Two clinician-led sessions first identify participants' symptoms, triggers, and adaptive responses. Participants are then provided with a PDA for up to 2 weeks, which prompts them to fill out mood ratings and identify illness triggers four times daily. Following each mood entry, a preselected SMS (based on the adaptive responses identified during the clinician-led sessions) appear on screen to encourage participants to take action.

1 RCT (N = 104) involved 10 weeks of PRISM delivered via smartphone or 10 weeks of paper-and-pencil mood charting. Those allocated to PRISM were provided with a phone, and received prompts twice daily to complete a mood survey for 10 weeks. Those participants allocated to the paper-and-

pencil condition were provided with paper mood charts to be completed daily for 10 weeks. A significant reduction in depression symptoms was detected in the PRISM group at 6-and 12-weeks follow-up, but not at 24-weeks follow-up. Both conditions had good retention (93%) and high satisfaction.

A follow-up pilot study (N = 40) was conducted with participants from the RCT, and also compared the PRISM smartphone-based mood rating system with a paper-and-pencil mood chart. Results indicated significantly higher adherence to mood ratings in the paper-and-pencil group. More days in the study was associated with lower adherence in the smartphone group only. There was also a greater within-person and between-person variability in the phone condition for mood ratings. Mood ratings for this group were significantly correlated with clinician-rated depression and mania scores at 6 weeks.

1 pilot study (N = 10) showed a significant decrease in depression symptoms and, overall, participants were satisfied with the intervention, found it usable and said they would use it again.

MoodChart

The MoodChart program is based on the social rhythm component of interpersonal and social rhythm therapy. The MoodChart program encourages participants to record their daily activities and monitor their mood over a 90-day period.

1 pilot study (N = 64) assessed mood symptoms and 'daily rhythms'; the average number of daily tasks performed at a similar time of day, and found a 31% increase in daily rhythms, and improvements in mood.

Online Recovery-focused Bipolar Individual Therapy (ORBIT)

ORBIT focuses on improving quality of life through emotion regulation, sleep regulation, and sense-of-self mechanisms.

1 pilot study (N = 26) found that those who completed the 3-week program showed significant improvements in quality of life.

Improving Adherence in Bipolar Disorder (IABD)

IABD consists of a 2-week, Personal Digital Assistant (PDA) based ecological momentary intervention (EMI) to identify potential risks for nonadherence, and provide immediate methods to encourage adherence.

1 pilot study (N = 14) aimed to assess the feasibility and acceptability of the IABD program. Participants were provided with a PDA and were prompted twice daily to complete EMI sessions. Each session consisted of a yes/no questionnaire, with items relating to potential risk factors for treatment nonadherence. Results showed good adherence (92% completion rate for EMI sessions), and high ratings in terms of satisfaction, helpfulness, and ease of use. There was also improvement in depression, but not mania symptoms.

Internet-based Cognitive Behavioural Therapy (iCBT)

iCBT consists of 6 weekly informational modules, worksheets, and at-home tasks. The iCBT

program aims to deliver psychoeducation, reduce residual symptoms of depression, and improve emotional regulation and sleep. 1 pilot study (N = 7) including people with bipolar disorder type II found that of the 4 participants who completed the program 3 showed improvements in depression symptoms and good adherence.	
Consistency in results‡	No measure of consistency is reported.
Precision in results§	No measure of precision is reported.
Directness of results‖	Direct

Hidalgo-Mazzei D, Mateu A, Reinares M, Matic A, Vieta E, Colom F

Internet-based psychological interventions for bipolar disorder: Review of the present and insights into the future

Journal of Affective Disorders 2015; 188: 1-13

View review abstract online

Comparison	**Evidence-based psychological interventions delivered via the internet vs. treatment as usual (TAU) with or without other interventions.**
Summary of evidence	**Moderate to low quality evidence (unable to assess consistency or precision, medium to large sample sizes, direct) suggests good retention in the Bipolar Education and Recovery Road programs, but no additional benefit for symptoms over treatment as usual. There were improvements in symptoms, particularly mania symptoms, with the Mood Swings program, and improvements in quality of life, functioning and well-being with the Living With Bipolar program.** **Low quality evidence (small samples and/or pilot studies) is unable to determine the benefits of My Recovery Plan, Beating Bipolar, or Parenting Self-help Interventions.**
Education, relapse, recovery and functioning	
Bipolar Education Program (BEP) BEP offers non-interactive, audio and visual, sequential, psychoeducation modules. It also includes behavioral tasks to practice between sessions, alongside mood monitoring tools. There is an enhanced version that includes personalised coaching by trained peers using email (BEP+IS). 1 RCT (N = 407) assessed BEP + TAU vs. BEP+IS + TAU vs. mood monitoring + brief online text + TAU, and found good completion rates (70%), but no significant differences between groups in	

symptoms or perceived control over the illness.

Recovery Road (RR)

RR is a relapse-prevention program that includes symptom monitoring through questionnaires and mood charting with instant feedback on progress or relapse risks, alongside specific psychoeducation and CBT. Clinicians were informed about relapse risk situations by email, given the patient's consent.

1 RCT (N = 233) assessing RR + TAU vs. healthy lifestyle website + TAU showed high completion rates, but no significant differences between groups in the number of episode recurrences.

Mood Swings (MS)

MS involves two versions of an online web-based platform; one consisting of text-based contents (MS), and the other using interactive tools (MS-Plus), which included mood, medication, life events monitoring tools, personal coping and preventive strategies. Both versions included support forums and were administered through five sequentially core modules available two weeks apart and three complementary booster modules at 3, 6 and 12 months.

1 trial (N = 156) assessed MS-Plus + TAU vs. MS + TAU and found more than 75% of the total sample completed at least 3 core modules. Telephone interviews and self-reported questionnaires at baseline, 3, 6 and 12 months found no significant differences in terms of relapses, although there was a slight, but significant, reduction in manic symptoms in the MS-Plus group. Within-group results showed improvement in manic and depressive symptoms at six months in both groups, improvement of manic symptoms at the end of the follow-up and an improvement of other secondary outcomes measures such as medication adherence and functioning in the MS-Plus group.

Living with Bipolar (LWB)

LWB focuses on empowering and engaging patients in recovery and "living fulfilling lives alongside symptoms" rather than being centered on relapse or recurrence prevention. LWB was designed as a self-management intervention based on the principles of cognitive behavioural therapy (CBT) and psychoeducation. The intervention consisted of 10 interactive web modules, worksheets, example cases as well as a mood-monitoring tool. Users could choose to complete a module depending on their needs and interests in a non-sequential manner. The program incorporates email reminders encouraging the use of the program alongside a support forum with peers moderated by a professional who answered questions about the program in case of risk situations.

1 RCT (N = 122) assessed LWB +TAU vs. waitlist + TAU and found the LWB group showed significantly greater improvements in quality of life, functioning and well-being. Retention was high in both groups.

My Recovery Plan (MRC)

MRC also focuses on recovery, and is developed around psychoeducation, but emphasises peer-to-peer support. It includes interactive educational modules (text, slide-shows and videos) aimed to build a recovery plan, self-monitoring tools of different aspects of the disorder (mood, medication,

warning signs, and side effects) as well as several peer networking components (chat rooms, discussion boards and peer-to-peer messaging). Trained-peer coaching is also offered, who answered questions about users' personal recovery plan or strategies, and moderated chat rooms and discussion boards encouraging participation through personal messages. This allowed users to self-design and track their own recovery plan with the support of trained-peers, and exchange information between participants to accomplish their goals.

A one-year pilot study (N = 88) analysed adherence comparing the program with and without peer support and demonstrated that 75% of participants receiving coaching returned to the program at least one more time after signing-up. Moreover, participation across all the modules was higher in the coaching group, stressing the importance of peer support in order to maintain retention rates amongst users.

Beating Bipolar (BB)

BB includes web-based interactive psychoeducation modules and a peer-support forum. It is focused on improving quality of life rather than symptom reduction. After a face-to-face introductory and explanatory meeting about the program, the patients had eight psychoeducation modules to complete online, which included video information and interactive exercises over four months.

1 RCT (N = 50) found that almost 66% of subjects completed at least 75% of the program. Face-to-face interviews found no significant differences between groups (BB + TAU vs. TAU), except marginally significant improvements were found for the psychological quality of life in the BB group. A subsequent qualitative analysis reported high users' acceptance and satisfaction with the program.

Parenting Self-help Intervention (PSI)

PSI aimed to improve parenting skills in patients and the mental health outcomes in their children. The program is based on the Positive Parenting Program (Triple P), and consists of a 10-week course delivered through a web-based platform containing text, video and audio contents grouped in weekly chapters according to a self-help workbook. The material included several topics such as encouraging desirable behaviours, coping with difficult behaviours, managing sleep routines and stress within the family.

A pilot study (N = 39) found significant improvements in perceived parenting behaviour and child behaviour problems in the PSI + TAU group when compared with controls (waitlist + TAU), although only 42% of the intervention group completed the program.

Consistency in results	No measure of consistency is reported.
Precision in results	No measure of precision is reported.
Directness of results	Direct

Margarete Ainsworth Building, Barker Street, Randwick NSW 2031. Phone: 02 9399 1000. Email: info@neura.edu.au

Nicholas J, Larsen ME, Proudfoot J, Christensen H

Mobile Apps for Bipolar Disorder: A Systematic Review of Features and Content Quality

Journal of Medical Internet Research 2015; 17: e198

View review abstract online

Comparison	**Assessment of mobile apps for bipolar disorder.**
Summary of evidence	**Moderate to low quality evidence (unable to assess consistency or precision, direct) suggests that apps for bipolar disorder are developed independently of research data, and without reference to best practice clinical guidelines or privacy issues.**
Adherence to best-practice guidelines, psychoeducation principles, and privacy	
32 apps provided information on bipolar disorder, 50 apps were management tools including screening and assessment (10 apps), symptom monitoring (35 apps), community support (4 apps), and treatment (1 app). Authors report that only 22% of apps (18/82 apps) addressed privacy and security by providing a privacy policy. Apps providing information covered only 36% (4 of 11) of the core psychoeducation principles and only 15% (2 of 13) best-practice guidelines. Only 31% (10/32 apps) cited their information source. Comprehensiveness of psychoeducation information and adherence to best-practice guidelines were not significantly correlated with average user ratings. 57% of symptom monitoring apps generally failed to monitor critical information such as medication use (20/35 apps) and sleep (18/35 apps), and 60% of self-assessment apps did not use validated screening measures (6/10apps).	
Consistency in results	No measure of consistency is reported.
Precision in results	No measure of precision is reported.
Directness of results	Direct

Explanation of acronyms

N = number of participants, 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[6].

† 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[6].

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[7]. lnOR stands for logarithmic OR where a lnOR of 0 shows no difference between groups. Hazard ratios 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.

‡ 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[6];

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

§ 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[8].

‖ 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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