TECHNICAL COMMENTARY

Employment

Introduction

Employment status is often indicative of the extent of functional ability in people with bipolar disorder. Low rates of employment places burden on social support and disability services, and on an individual's quality of life. Employment outcomes involve rates of employment and factors that predict success in obtaining and retaining employment.

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 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 reviews assessing the same topic were found, only the most recent and comprehensive review was included.

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 (RCT) 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, there is a dose dependent response or if results are reasonably 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 our inclusion criteria[3-5].

- Moderate to low quality evidence suggests around 40% to 60% of people with chronic bipolar disorder are employed and have effective work functioning. However, around 40% to 50% report workplace underperformance and so may see a decline in their occupational status over time.
- Large associations were found between favourable employment outcomes and better interpersonal functioning and not having a comorbid personality disorder. Medium-sized associations were found between favourable employment outcomes and good cognitive functioning (in particular verbal learning, visual memory, verbal memory, concentration, insight about positive symptoms if apparent, and executive functioning), having fewer psychiatric hospitalisations, less severe positive symptoms, less severe depression, high income, more years of education shorter

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duration of illness, and being married. Small associations were found between favourable employment outcomes and being young, taking fewer psychotropic medications, less severe symptoms in general, fewer ECT treatments, less rapid cycling, being Caucasian, being older at illness onset, being in a relationship (living together), and having independent housing.

- No associations were found between favourable employment outcomes and mania symptoms, negative symptoms, or maternal education level.
- Moderate to low quality evidence finds a medium-sized, increased odds of being competitively employed following individual placement and support compared to treatment as usual. However, there were no differences in the number of hours or weeks worked.

Hellstrom L, Pedersen P, Christensen TN, Wallstroem IG, Bojesen AB, Stenager E, Bejerholm U, van Busschbach J, Michon H, Mueser KT, Reme SE, White S, Eplov LF

Vocational Outcomes of the Individual Placement and Support Model in Subgroups of Diagnoses, Substance Abuse, and Forensic Conditions: A Systematic Review and Analysis of Pooled Original Data

Journal of Occupational Rehabilitation 2021; 04

View review abstract online

Comparison	**Employment outcomes in people with bipolar disorder following individual placement and support vs. treatment as usual.**
Summary of evidence	**Moderate to low quality evidence (small sample, imprecise, unable to assess consistency, direct) finds a medium-sized, increased odds of being competitively employed following individual placement and support compared to treatment as usual. However, there were no differences in the number of hours or weeks worked.**
Employment outcomes	
A medium-sized, increased odds of being competitively employed following individual placement and support; 7 studies, N = 223, adjusted OR = 2.37, 95%CI 1.27 to 4.43, p = 0.007, I^2 not reported Adjusted for age, gender, study, and site. The effects for the number of hours and weeks in employment were not significant.	
Consistency in results‡	No measure of consistency is reported.
Precision in results§	Imprecise
Directness of results‖	Direct

Marwaha S, Durrani A, Singh S

Employment outcomes in people with bipolar disorder: a systematic review

Acta Psychiatrica Scandinavica 2013; 128: 179-93

View review abstract online

Employment

Comparison	**Employment outcomes for people with bipolar disorder.**
Summary of evidence	**Moderate to low quality evidence (large sample, direct, unable to assess precision or consistency) suggests around 40% to 60% of people with bipolar disorder are employed and have effective work functioning. However, around 40% to 50% report workplace underperformance and may suffer a slide in their occupational status over time.**
Employment outcomes	
25 studies, N = 4,892, follow-up = 6 months to 15 years (mean = 4.9 years). Between ~40% to ~60% of people with established bipolar disorder are employed and have effective work functioning. Between ~40% to ~50% of people with established bipolar disorder have workplace underperformance and may suffer a slide in their occupational status over time. Employment levels in early bipolar disorder were higher than in more established illness.	
Consistency in results	Unable to assess; no measure of consistency is reported.
Precision in results	Unable to assess; no measure of precision is reported.
Directness of results	Direct

Tse S, Chan S, Ng KL, Yatham LN

Meta-analysis of predictors of favorable employment outcomes among individuals with bipolar disorder

Bipolar Disorders 2014; 16: 217-29

View review abstract online

Comparison	**Predictors of employment outcomes for people with bipolar disorder.**
Summary of evidence	**Moderate to low quality evidence (precise, direct, some inconsistencies and some small samples) suggests large associations between favourable employment outcomes and better interpersonal functioning and not having a comorbid personality disorder.** **Medium-sized associations were found for having good cognitive functioning (in particular verbal learning, visual memory, verbal memory, concentration, insight about positive**

	symptoms if apparent, and executive functioning), having fewer psychiatric hospitalisations, less severe positive symptoms, less severe depression, high income, more years of education, shorter duration of illness, and being married. **Small associations were found for being young, taking fewer psychotropic medications, less severe symptoms in general, fewer ECT treatments, less rapid cycling, being Caucasian, being older at illness onset, being in a relationship (living together), and having independent housing.** **There were no significant associations between favourable employment outcomes and mania symptoms, negative symptoms, or maternal education level.**
Predictors of positive employment outcomes	
Significant predictors of favourable employment outcomes in order of decreasing effect size; <u>Large associations</u> Better interpersonal functioning: 1 study, N = 52, Rw = 0.58, 95%CI 0.37 to 0.74, $p < 0.05$ No comorbid personality disorder: 2 studies, N = 83, Rw = -0.49, 95%CI -0.64 to -0.30, $p < 0.05$, I^2 = 0%, $p > 0.05$ <u>Medium-sized associations</u> Good verbal learning: 1 study, N = 33, Rw = 0.42, 95%CI 0.09 to 0.67, $p < 0.05$ Good visual memory: 1 study, N = 44, Rw = 0.41, 95%CI 0.13 to 0.63, $p < 0.05$ Fewer psychiatric hospitalisations: 7 studies, N = 2,678, Rw = -0.35, 95%CI -0.43 to -0.26, $p < 0.05$, I^2 = 69%, $p < 0.05$ Good verbal memory: 2 studies, N = 194, Rw = 0.33, 95%CI 0.20 to 0.45, $p < 0.05$, I^2 = 0%, $p > 0.05$ Having insight into positive symptoms: 1 study, N = 156, Rw = 0.31, 95%CI 0.16 to 0.45, $p < 0.05$ Less severe positive symptoms: 1 study, N = 130, Rw = -0.29, 95%CI -0.44 to -0.11 Good executive functioning: 4 studies, N = 365, Rw = 0.26, 95%CI 0.16 to 0.35, $p < 0.05$, I^2 = 0%, $p > 0.05$ Good general cognition: 1 study, N = 130, Rw = 0.25, 95%CI 0.01 to 0.41, $p < 0.05$ Less severe depression: 9 studies, N = 1,703, Rw = -0.25, 95%CI -0.33 to -0.16, $p < 0.05$, I^2 = 63%, $p < 0.05$ Good concentration: 1 study, N = 114, Rw = 0.24, 95%CI 0.06 to 0.41, $p < 0.05$ Having high income: 1 study, N = 1,855, Rw = 0.24, 95%CI 0.20 to 0.28, $p < 0.05$ Having more years of education: 5 studies, N = 3,916, Rw = 0.23, 95%CI 0.09 to 0.36, $p < 0.05$, I^2 = 92%, $p < 0.05$ Having shorter duration of illness: 4 studies, N = 2,336, Rw = -0.22, 95%CI -0.32 to -0.10, $p < 0.05$, I^2 = 71%, $p < 0.05$ Being married: 2 studies, N = 2,136, Rw = 0.21, 95%CI 0.16 to 0.26, $p < 0.05$, I^2 = 7%, $p > 0.05$	

Employment

Small associations
Being younger: 5 studies, N = 2,685, Rw = -0.18, 95%CI -0.34 to -0.03, $p < 0.05$, $I^2 = 91\%$, $p < 0.05$
Taking fewer psychotropic medications: 1 study, N = 213, Rw = -0.18, 95%CI -0.31 to 0.05, $p < 0.05$
Having less severe symptoms: 5 studies, N = 3,868, Rw = -0.17, 95%CI -0.28 to -0.07, $p < 0.05$, $I^2 = 83\%$, $p < 0.05$
Fewer prior ECT treatments: 1 study, N = 1,855, Rw = -0.17, 95%CI -0.21 to -0.13, $p < 0.05$
Fewer rapid cycling episodes: 1 study, N = 1,795, Rw = -0.14, 95%CI -0.19 to -0.09, $p < 0.05$
Being caucasian: 1 study, N = 1,855, Rw = 0.15, 95%CI 0.11 to 0.20, $p < 0.05$
Being older at illness onset: 1 study, N = 281, Rw = -0.13, 95%CI -0.24 to -0.01, $p < 0.05$
Being in a relationship (living together): 1 study, N = 1,795, Rw = 0.07, 95%CI 0.02 to 0.12, $p < 0.05$
Having independent housing: 1 study, N = 1,795, Rw = 0.05, 95%CI 0.00 to 0.10, $p < 0.05$
There were no significant associations with mania or negative symptoms, or maternal education level and favourable employment outcomes.

Consistency in results	Inconsistent for psychiatric hospitalisations, depression, education, duration of illness, being younger, overall symptoms. Otherwise consistent or N/A (1 study in the analysis).
Precision in results	Appears precise.
Directness of results	Direct

Explanation of acronyms

CI = Confidence Interval, I^2 = the percentage of the variability in effect estimates that is due to heterogeneity rather than sampling error (chance), N = number of participants, N/A = not applicable, OR = odds ratio, p = statistical probability of obtaining that result ($p < 0.05$ generally regarded as significant), Rw = weighted correlation coefficient

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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].

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† Different effect measures are reported by different reviews.

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) that 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. 0.2 represents a small effect, 0.5 a medium effect, and 0.8 and over represents a large effect[6].

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).

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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