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Employment outcomes in people with bipolar disorder: A systematic review

*Dr Steven Marwaha (corresponding author)

Associate Clinical Professor of Psychiatry

Division of Mental Health and Wellbeing

Warwick Medical School

University of Warwick

Coventry

CV4 7AL

United Kingdom

Tel: 024 76151046

Fax: 024 7652 8375

s.marwaha@warwick.ac.uk

AND

Consultant Psychiatrist

Early intervention in psychosis service

Coventry and Warwickshire Partnership Trust

Swansell point

Stoney Stanton Lane

Coventry

CV1 4FH

United Kingdom

Dr Amanullah Durrani

Consultant Psychiatrist

NHS Lanarkshire

49 Airbles Road

Motherwell

ML1 2TP

United Kingdom

amandurrani@gmail.com

Professor Swaran Singh

Head of Division, Mental Health and Wellbeing

Warwick Medical School

University of Warwick

Coventry

CV4 7AL

United Kingdom

s.p.singh@warwick.ac.uk

Abstract

Objective Employment outcome in bipolar disorder is an under investigated but important area. The aim of this study is to identify the long term employment outcomes of people with bipolar disorder *Method* A systematic review using the Medline, PsychInfo and Web of Science databases. *Results* Out of 1962 abstracts retrieved, 151 full text papers were read. Data was extracted from 25 papers representing a sample of 4892 people with bipolar disorder and a mean length of follow-up of 4.9 years. Seventeen studies had follow-up periods of up to 4 years and 8 follow-up of 5-15 years. Most studies with samples of people with established bipolar disorder suggest approximately 40-60% of people are in employment. Studies using work functioning measures mirrored this result. Bipolar disorder appears to lead to workplace underperformance and 40-50% of people may suffer a slide in their occupational status over time. Employment levels in early bipolar disorder were higher than in more established illness *Conclusion* Bipolar disorder damages employment outcome in the longer term, but up to 60% of people may be in employment. Whilst further studies are necessary the current evidence provides support for extending the early intervention paradigm to bipolar disorder.

Key words: bipolar disorder, employment, work, outcome

Summations	
1.	Bipolar disorder can damage employment prospects but up to 60% of people are in employment over the longer term
2.	In bipolar disorder there appears to be a downward drift in occupational status over time. Whilst a proportion of people with bipolar disorder continue to be able to work, they may have a tendency to change their jobs to ones which are less demanding and perhaps of lower status than would have otherwise been the case

3.	People early in their illness course had higher rates of employment than those with more established bipolar disorder and this provides some support for the idea of intervening early before functional losses accumulate.
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Considerations	
1.	The majority of studies found used questionnaires about work functioning rather than measuring absolute employment rates. There was a wide variety of work functioning instruments used by different researchers resulting in a lack of uniformity of how the attribute was measured between studies.
2.	The evidence base is mainly from the US with a small number of European studies.
3.	There was a noticeable lack of studies examining the long term course of incident or early cases of bipolar disorder with regards to employment outcome

Introduction

Employment is highly valued by people with mental illness, seen as integral to their notion of recovery (1) and is a marker of social inclusion and status. In terms of global burden of disease bipolar disorder is the 22nd highest cause of life years lost to premature mortality and years lived with disability, higher than schizophrenia or asthma (2). The magnitude of functional losses associated with bipolar disorder is large, with the World Health Organization identifying bipolar disorder as among the top ten causes of years lost to disability (3). In 1991, the financial cost associated with the unemployment of bipolar disorder patients in the US was \$38 billion (4). In the UK the costs of bipolar disorder to society were £5.2 billion in 2007 (5).

These substantial costs of bipolar disorder make an understanding of employment outcome and its patterns critical. Our knowledge of employment outcome in schizophrenia and the factors that might influence it has rapidly expanded over the last two decades (6), but in bipolar disorder this is a relatively under researched area. Information about the outcome of employment in bipolar disorder is necessary to be able to identify the relative losses from pre-morbid to morbid states and gains during recovery, and to measure these against the effectiveness of interventions. Also it enables an exploration of the interplay between the effects of mental illness per se and the influence of societal impediments. Thus an examination of long term trajectory enables a much fuller and deeper understanding of the disorder, enabling better treatment and service planning and information to patients.

Aims of the study

We therefore conducted a systematic review to identify the longer term employment outcome of people with bipolar disorder. We aimed to answer three main questions: a) the proportions

working over time b) the pattern of employment status change over time, and c) whether employment rates in early bipolar disorder are different to rates in established illness.

Methods

We focussed on employment rate, an objective measure of work outcome. For the purpose of this review we defined employment as work that is paid (7). As a secondary measure, we also included studies that focussed specifically on work functioning if this was clearly identified, but not more general measures of psycho-social functioning. We use the Meta-analysis Of Observational Studies in Epidemiology (MOOSE) guidelines (8) as a framework for reporting this systematic review.

Databases and search terms

S.M completed the main search. Medline (1950-current), PsychInfo (earliest to current) and Web of Science (1914-current) databases were searched for English language papers that met the inclusion criteria (below). Social science citations were included in the Web of Science database search. Search terms were used in groups and subsequently results were amalgamated. The search terms were Bipolar, Manic Depression, Affective psychosis (group 1) and work, employment, occupation, job, vocation, functioning (group 2) and outcome or treatment outcome, follow-up, course, prospective, epidemiology, cohort (group 3). The search was completed in September 2009 and then updated in November 2011.

The reference lists of review papers were scrutinised for any relevant further studies. We also searched specifically for analyses of employment from large on-going naturalistic surveys of bipolar disorder.

Method of handling abstracts

In anticipation of a limited number of relevant publications, we decided on a strategy of being over-inclusive at this stage. This view was based on S.M's previous experience of conducting a literature review on employment and schizophrenia and in recognition of less published data on bipolar disorder as compared to schizophrenia (9).

All abstracts were read and SM applied a set of pre-agreed rules to identify papers for full text retrieval. Papers were included if a) the sample included bipolar disorder I or II or the sample was described as having severe mental illness b) irrespective of whether early or established cases of bipolar disorder were sampled c) they were therapeutic trials as long as treatment as usual or a control arm was mentioned, thus RCTs were not excluded d) sample size was more than 15 e) and the sample was prospective. At the abstract review stage we included any studies that met the above criteria and described employment rate or work functioning or social functioning. Social functioning was included as an identifier in anticipation that some studies that used this term in the abstract may provide employment rate or work functioning data in the full text paper.

Abstracts were excluded if a) attrition rate at follow-up was more than 50%, b) the vocational outcome was sheltered employment or c) if follow up was less than 6 months

Check of reliability of decision tree

A.D independently coded 50% (N=470) of the abstracts (from the 2009 search) applying the inclusion and exclusion criteria to identify papers for full text retrieval. The results were compared with S.M. A.D coded 54 papers for inclusion that had not been identified as such by S.M. All three authors met to review these discrepancies, with SS making a final decision

on contentious papers. The discrepancies to a very large extent were due to S.M not including studies, which only mentioned General Assessment of Functioning (GAF) scores but not work functioning. Consistent with the aims of the review we excluded studies which only mentioned GAF scores in the abstract and also those that sampled children. This resulted in 10 abstracts being added for full text extraction at this stage although none of these provided usable data for the final review analysis.

To confirm that our decision tree was now reliable in extracting full text papers S.M and A.D both then coded a further random sample of 100 abstracts from the total number of abstracts. Equivalent numbers were identified for inclusion and exclusion. S.M reviewed the abstracts again to confirm that they met the rules for full text retrieval.

Data Extraction

All full text papers were read and if suitable, data were extracted on: sample size, proportion of people retained at follow-up, sampling frame, type of study, length of follow up, and employment rate or work functioning at each time point.

Analysis

The nature of data extracted and the heterogeneity in studies and measures used precluded a formal meta-analysis. There is no validated and widely accepted quality criterion for observational studies (10). Therefore *a priori* we developed an assessment framework based on attributes of a robust study design for our research question addressing the long term employment outcome of people with bipolar disorder. Each paper was assigned a quality mark based on these criteria. Each included study was given one star for each of the following criterion:

- a) Sample size > 100
- b) Length of follow-up equal to or more than 2 years
- c) At least 2 data points for employment given.
- d) Epidemiologically representative sample; that is the sample largely represents the bipolar disorder population
- e) Employment rate described as opposed to a measure of work functioning

Results

The search strategy identified 1962 abstracts; when repeats were excluded this dropped to 1313. A total of 151 papers were identified for full text retrieval but most of these did not yield information for final data extraction and analysis. The main reasons for studies being excluded subsequent to full text retrieval were: sample of bipolar disorder was not clearly defined, employment or work functioning data/ figures were not given, study design / analysis was not prospective, or the control group in randomized controlled trials were also having a specialist intervention. If employment figures referred solely to types of unpaid work then the study was excluded. If there was more than one paper from the same sample, the paper providing the most relevant information was included. The entire review process is outlined in Figure 1.

(Figure 1 about here)

The studies included in the final analysis are shown in Table 1 ordered by our rating of the quality and relevance of the study and within these categories grouped, depending on whether they report employment rate or work functioning. Within individual studies we have

indicated if the employment rate included voluntary work or work as a homemaker if this was described in the original papers and have given the figures for these subcategories. Only results from the control arm of trials are included in the table as we did not seek to examine the effects of interventions.

(Table 1 about here)

Nature of studies identified

Overall 25 studies met our criteria for final data extraction with a total sample of 4892 people with bipolar disorder and a mean length of follow-up of 4.9 years (range 6 months to 15 years). Most were longitudinal naturalistic outcome studies and were published in the last 20 years. Using our quality assessment framework there were no studies rated as 5 star. Three were rated as 4 star, ten as 3 star, eight as 2 star and four as 1 star. The main difference between the 3 and 2 star studies was that the former tended to use absolute employment rates. Only a minority of studies had follow-up periods over 5 years. The numbers of studies in different follow-up bands were: up to 4 years (17), 5-9 years (2) and 10-15 years (6). Therefore the bulk of patients within our total pool of studies were followed-up for less than 5 years (3974). The quality of studies with follow-up periods of 5 years or over were rated as follows: one study as 4 star, five as 3 star and two as 2 star with 50% having sample sizes over 100.

Employment levels over time

The studies included in our final analysis had periods of follow-up ranging from 6 months to 15 years, and most of these reported approximately 40-60% of people are in employment. Of the studies with follow-up periods of 5 years and over, 7 out of 8 studies reported rates of

employment or good work functioning of 40-60%. All three higher quality papers (4 star) supported this finding as did many of the others.

Studies that reported on work functioning also mirrored this result, including a high quality (4 stars) study. They suggest that in the main about 30 to 40% of people have significant difficulties in work functioning, but conversely the majority do not appear to have major problems. As an example, the large European prospective observational survey, the EMBLEM study examined work functioning over 2 years, from initiation or change of medication for a manic episode. At two years around 60% of entrants had either none or a low level of work impairment, with a gradual improvement of numbers in this group over time, presumably due to some element of recovery (11). Over a longer period of 15 years, Coryell et al (12) found 34% of participants with bipolar disorder to be impaired in employment or self-employment.

One significant outlier to this trend was a 2 year follow-up of people with bipolar disorder which reported that occupational outcome was good, only for 28% of participants (13). The sample size of this study was less than a hundred and the measure of work functioning a hybrid combining job role, social and family functioning. No further explanation is given of how occupational outcome was derived and therefore the result is difficult to interpret, and compare with other studies.

Employment status change over time

As well as the absolute rates of employment, five studies reported on employment status change either over the timeframe of the study or compared outcome with pre-morbid functioning or lifetime best. In one study there was a 16-20% change from employment status

between employment and to unemployment (and vice versa) (14) over one year. Reed et al (11) reported that follow-up of those with a low level of work impairment at baseline revealed around three quarters maintained this work functioning at two years whilst about 25% transitioned into the high work impairment group.

Other comparisons indicate a downward drift in employment status over time. Thus one assessment revealed that in a five year period, 54.5 % of people with bipolar disorder in the original sample had suffered a slide in their occupational status compared to their lifetime best (15). In another, but smaller study (N=53) (16) a similar proportion (44%) were reported to have dropped in their employment functioning, either in terms of frequency of work or in the status of jobs taken, compared to pre-morbidly. Using the Modified Vocational Status index with 63 patients at 1 year after hospital discharge for Mania, Jiang et al (17) report that only around 12% were employed at the expected level, supporting the idea of damage to occupational functioning over time.

Employment in early Bipolar Disorder vs employment in established illness

Only five studies were found which sampled incident cases (defined as index hospitalisation). Goldberg and colleagues used the Work Adjustment Scale (18) as opposed to employment rate to define outcomes. There were three reports from this study which appeared to have largely overlapping small samples but critically, reported work functioning every 2.5 years. Employment functioning as a worker, homemaker or student judged by mean scores on the Work Adjustment scale was largely static over the 2-10 year period of follow-up with 56-64% functioning in “primary work role” for at least half the time in preceding year at 2.5, 5, 7.5 and 10 year follow-up (19). Work functioning was consistently lower over time for those with bipolar disorder compared to those with unipolar depression.

Dickerson et al (20) report on the follow-up of 75 people with bipolar disorder who were admitted to hospital early in their illness course defined as being within 5 years of their first admission. At 6 months 75% were full or part time workers or students. Another study, albeit with methodological problems, followed up incident cases for 6 months and found that 71% worked less than 3 out of the previous 6 months, although the lack of baseline value limits any interpretation (21).

We found two studies, which whilst not following early cases long term, did compare employment rates of those with bipolar disorder who had had 1 admission with those admitted many times. One of these studies, which was rated as of moderate quality, reports that the rate of employment recovery of those with a first episode (64%) is approximately double those who have had multiple episodes (22) 6 months after admission. Similar figures were reported in Chinese patients at 1 year post discharge (17).

Discussion

To the best of our knowledge this is the first systematic review of employment outcome in people with bipolar disorder.

Overall quality of studies found

The studies identified, did not usually set out to examine employment outcome and our data are derived from samples collected, usually to examine functional recovery more generally. This confirms that employment outcome in bipolar disorder is a neglected and under-researched area.

Most studies used questionnaires about work functioning in general as opposed to measuring absolute employment rates. A variety of instruments of work functioning were used by different researchers resulting in a lack of uniformity of how the attribute was measured between studies. For example the Strauss-Carpenter Work Adjustment Scale codes “performance as a worker, homemaker or student” on a five-point scale whilst the Community Psychiatric Rating Scale provides no further delineation than “work function”. Some researchers developed their own bespoke assessments further reducing the ability to compare results with other studies. The output of some studies that used work functioning measures was “work impairment” and different instruments may also have defined this term inconsistently.

There was variance in the timeframe over which employment was defined with some researchers reporting employment over 3 months and others, over the last 6 or 12 months. Again some caution is necessary in comparing results. Some studies reported employment outcome at a single point of time, often at 10 or 15 year assessment point. These studies therefore did not allow any assessment of change over time including insights about the effects of treatment. No study gave any descriptive analysis of the categories of occupation.

There was little in the way of differentiation of the different types of bipolar disorder and a noticeable lack of studies examining the long term course of incident or early cases. Those that did used first admission as a proxy for early or incident bipolar disorder though it is possible that significant numbers in these samples had extensive unrecognized illness preceding this event or previous treatment. There is a lack of clarity in some of these about whether the admission was for mania or depression.

Employment levels over time

Overall in the studies included in this analysis which had a mean follow-up period of 4.9 years with a follow-up period range of 6 months to 15 years we found that people with bipolar disorder have an employment rate of 40-60%. Most moderate quality and all high quality studies supported the upper end of this range. The employment rate in the general population in people aged 16-64 years during 2000-2010 in Europe ranged from 62-66% and in the US from 66-74% according to the Statistical Office of the European Communities (EUROSTAT) (23). Whilst it is clear that bipolar disorder can harm employment prospects this comparison with the general population also indicates that the extent of this damage may not be large at least for a proportion of the bipolar population who achieve a significant recovery in this aspect of functioning.

Caution is necessary when interpreting this comparison between employment rates in bipolar disorder and the rates in the general population. There are well known problems in population level international and longitudinal comparisons of employment data (24) primarily related to changes in definitions of employment over time and between countries. Employment in the US where the bulk of the studies originated from would usually be defined as doing a paid job and or temporarily away from work, but not voluntary work, caring or working within your own home. Some studies that we found may have included students and those who work at home as part of the employed group and this would have overestimated the bipolar disorder employment rate, reducing the difference from the general population rates as defined by EUROSTAT.

A second caveat to this generally optimistic interpretation is the relatively small number of high quality studies and the biases within these. One of the high quality papers in our review, used an insured population sample within the US (14). Those within the public mental health system where levels of morbidity are likely to be higher and therefore employment levels lower ((25) were excluded. Thus this study is likely to have over-represented those with a good outcome. In the very large prospective European study (11, 26), EMBLEM, 59% of people had low work impairment and 41% high work impairment at 2 year follow-up. However a major issue with the assessments was that work functioning was actually clinician rated and this may also have under estimated the extent of disability.

A further issue with comparing employment levels in bipolar with the general population is that the latter group contains bipolar patients, including those with depression. Therefore the general population employment rates may not accurately reflect employment levels in bipolar patients had they not been ill. Hence in reality there may be a more significant difference between employment levels in those with bipolar (40-60%) and the general population (62-74%).

The nature of employment over time

Movement from unemployment to work was only described in a limited number of studies in our review (14), although this and a further report (27) demonstrates a moderate level of turnover in employment status in people with bipolar disorder. Thus approximately 15-20% of people transition into work over 1-2 years with a slightly smaller proportion moving in the opposite direction into worklessness.

The studies which examined occupational status at two time points indicate a downward drift over time. It appears that a proportion of people with bipolar disorder whilst continuing to be able to find work, may have a tendency to change their jobs to ones which are less demanding and perhaps of lower status than would have been the case. As well as factors such as the discrimination of the mentally ill (28) this decline in occupational status may be due to underperformance whilst at work. In a Dutch household survey, absenteeism in those with bipolar disorder was much higher than in most other psychiatric disorders (29) and over 80% of those with bipolar disorder may take time off work for psychiatric reasons in a five year period (30). Poor work functioning whilst in employment is also more frequent in people with bipolar disorder (31).

This suggests that the workplace functioning of people with bipolar disorder, may not be without problems and is probably consistent with the substantial rates of sub-syndromal symptoms that are generally experienced (32). These symptoms may not prevent people finding work, but may be preventing them functioning well within it.

Employment in people with early bipolar disorder compared to more established illness

The early intervention in psychosis movement is at least partly based on the premise that biological, psychological and social damage accumulates early in illness course and with the number of episodes of illness (33, 34). We found some evidence for this hypothesis with regards to employment in people with bipolar disorder although studies were not completely consistent.

Those with early bipolar disorder as defined by a first admission had somewhat higher (approximately double) rates of employment than those with multiple admissions, suggesting

that damage occurs to prospects of recovery over the first few years. Similarly 60% of people who had been admitted for an index episode of Mania were able to work or study full time at 6 months (35) again supporting the notion that recovery can be good early in course. A longer term study of incident cases suggested work performance was moderate and largely static from 2-8 years after an incident episode (36), with 54-66% of people having “reasonable work functioning” at each time point.

Whilst caution is necessary because of the heterogeneity between studies, these findings taken together with studies of those with established illness that reported a drop in occupational role compared to lifetime best or premorbid level do largely support the premise of an accumulation of social damage over the course of the illness. This damage over time may not solely be in absolute employment levels but also in the form of deterioration in the status and pay of the work roles taken by people with bipolar disorder. Another plausible or perhaps complimentary explanation for deteriorating employment rates over time is the cognitive decline associated with mood episodes (37), which in turn might be due to accumulated damage of the brain (38).

Strengths and weaknesses of this review

We were over-inclusive in our search strategy making it likely we would have obtained relevant available papers that could answer our review objectives. Because papers on employment as an outcome are likely to have been distributed widely in the literature, we did not hand search journals. We were unable to include studies not in the English language as we did not have translation resources. We ultimately found a relatively small number of high quality studies to base our conclusions on, despite the importance of employment as an outcome measure to patients, services and governments.

Publication bias may have played a part in our results. It may be that although employment rate is routinely collected as an outcome measure, authors may not have chosen to make this a major part of investigation or analysis. Therefore there may be datasets of naturalistic cohorts which have not as yet reported employment rates or work functioning over time.

Although our research aims and thus findings have clinical utility we were not able to be very specific about the subpopulations of people with bipolar disorder in our analyses because of the limited extent of the literature. An overlapping difficulty was that few studies differentiated those who continued to work from baseline to follow-up and those who regained employment during the period. This made any detailed interpretation of recovery in this disorder difficult.

Although we excluded any study that solely reported unpaid work, it is possible that there may be discrepancies in how different researchers defined employment in terms of number of days worked per month, necessary to qualify as employed. Also some figures included voluntary work. As far as possible we reported the figures for these subcategories if these were given.

Finally there was little geographical spread of samples with the studies found being mainly from the US, with a few notable exceptions from Europe. This limited any broad interpretation of the influence of country on employment outcome, even though country of origin might have an effect by virtue of differing health care and welfare systems, treatments used and general population employment rates (39, 40) independent of illness factors

Guidelines for future research

Because of the dearth of studies in the current literature that answered the question of employment outcome in bipolar disorder, this is an area that warrants further research. There are a number of pre-existing and on-going large epidemiological follow-up studies which are likely to have collected relevant information and we would call for this data to be published. This would improve the degree of relevant literature in a parsimonious way. Given the majority of the current literature appears to originate from the US, further European studies are especially warranted. Also future studies should identify job roles as part of employment outcome to further examine the reasons behind the occupational decline that appears to take place in bipolar disorder. Finally further research is required to explore whether the various subtypes of bipolar disorder have differing employment outcomes.

Whilst work functioning measures may be important, researchers should report employment outcome specifically and define it in a comparable way to that done in general population labour force surveys. Functioning of people with bipolar disorder or for that matter other mental illnesses, does not occur in a vacuum and it is only by using measures such as employment rate, that allow comparison with the general population that we can fully understand the level of damage that the illness is causing.

The employment rate may vary in those with bipolar disorder as it does in the general population depending on whether the economy is booming or in a recession. Much of the evidence for this trend comes from randomised controlled trials of supported employment programmes (41) and is not consistent. What is also unclear is whether the bipolar population is especially vulnerable at times of economic downturns by virtue of either some aspect of the nature of illness or due to a higher rate of underperformance whilst in work.

Our review suggests employment patterns may be different dependent on the phase of the disorder with rates being highest early in illness course. Damage to employment outcome appears to accumulate over time and the more episodes people have. The onset and early course of bipolar occurs most typically in youth and early adulthood, a period when work is first obtained. Bipolar episodes which prevent a job history being developed may leave a long lasting effect, which accrues over time, given that previous employment is strongly correlated to future work (39). Education is an additional predictor of future employment in bipolar disorder (42) and its disruption in youth due to illness may also compound the direct effects of mood episodes. These findings as well as the cognitive decline associated with mood episodes (37) would support the extension of the early intervention paradigm to bipolar disorder. Service configurations and stage specific treatments require further research but one particular success of early intervention in psychosis has been vocational recovery (43) and hence it is worth considering whether this success can be replicated in bipolar disorder.

Patients with bipolar disorder should be informed about the range of different employment outcomes, emphasising that a substantial proportion of people with this condition appear to work over the longer term. People with schizophrenia face major problems in obtaining employment and then keeping it. To some extent the position in bipolar disorder is different in that a higher proportion of people appear to be employed but may be experiencing difficulty in performance at work and maintaining occupational roles previously held.

Bipolar disorder and schizophrenia are seldom distinguished in studies of interventions to promote employment outcomes, although our findings suggest they should. Further research is needed to help develop more specific interventional strategies that reflect the patterns of differing vocational difficulty seen in each disorder. For bipolar disorder, psychiatric and

vocational interventions need to focus much more on maximising the functioning of people whilst they are working, whilst those with schizophrenia may require much more attention on helping them get work. As such it may be that the effectiveness of supported employment models such as individual placement and support (IPS) (44) could be further enhanced by taking diagnosis into consideration and directing resource where the greatest difference can be made.

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Declaration of Interest

The authors confirm there are no conflicts of interest

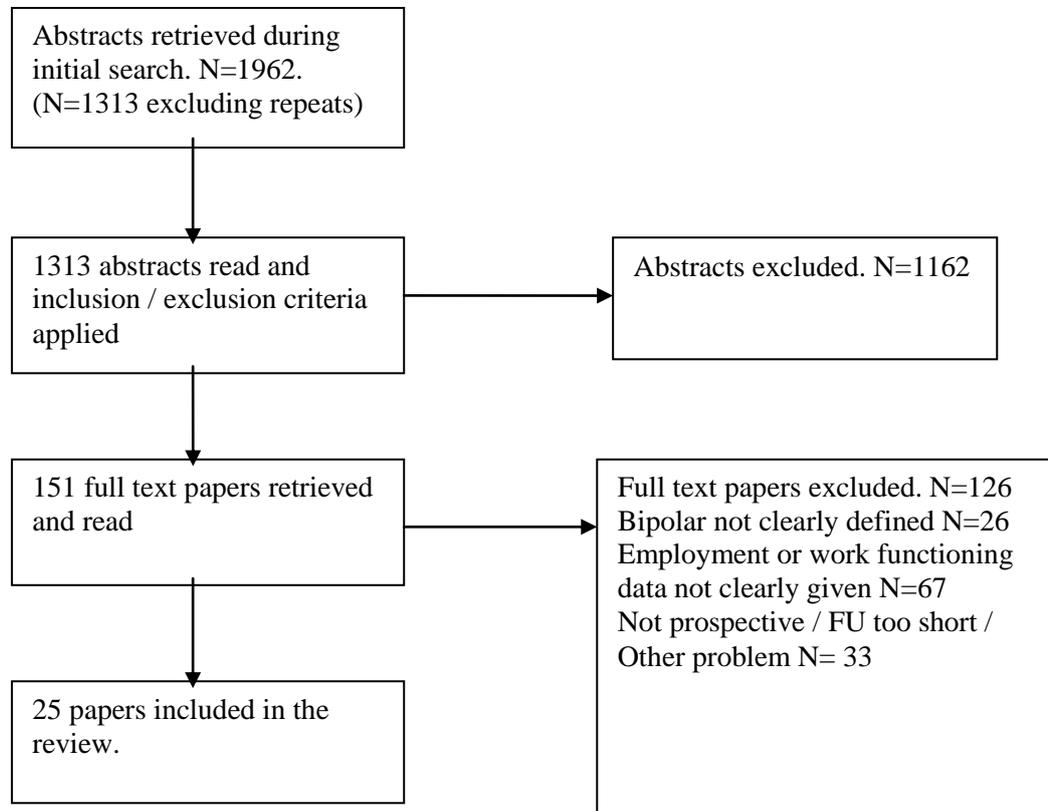
Figure 1: Flow diagram of review process

Table 1: Outcome of employment in bipolar disorder

Authors	Sample Size At baseline At follow-up	Proportion of people retained.	Type of study design	Sampling frame and country of sample	Length of FU (yrs)	Employment Rate %	Work functioning	*Quality stars
(14) Simon et al 2008	412	6mths=87% 12m=85%; 24m=80%	Prospective observational study	OP from 5 mental health clinics Insured population. USA	2	Baseline: 66% in paid employment 6m: 64% 12m: 63% 24m=62%	1 year: Employed to unemployed : 16% Unemployed to employed: 20%	4 (a,b,c,e)
(15) Coryell et al 1993	148	unknown	Comparison study with matched controls	Presentation to treatment centres. USA	5	61% employed in last year	At follow-up better status vs lifetime best: 14.7% Worse status vs lifetime best: 54.5%	4 (a,b,d,e)
Reed et al 2010 (11)	EMBLEM 2289 baseline 1795 FU	78%	Prospective observational study	New medication for mania / mixed episode Inpatient or outpatient. 14 European countries	2		Longitudinal interval follow-up evaluation (LIFE). Low impairment (LI),High impairment (HI) Baseline LI=31%, HI= 69% 1 yr, LI =55%, HI =45% 2yr, LI = 59%, HI = 41 %	4 (a, b, c, d)
(16) Carlson et al 1974	53 FU: 47	89%	Prospective observational study	Hospitalised at National Institute of Mental Health USA	Mean follow- up 32 months 0.5- 9		Employment in comparison to pre-morbid functioning 41% return to same or better job, 23%=full time work but in lesser status 21% employed irregularly	3 (b, d, e)
(45) Goikolea et al 2007	325 (BPAD I and II)	23 excluded	Prospective observational study.	Tertiary referral (1 third) and catchment area Spain	10	At ten years 57% "work for pay"		3 (a, b, e)
(46) Chengappa	113	100%	Open label extension of	Patients hospitalised for a	1	Employed for pay 60 % at		3

et al 2005			RCT	week with mania USA		baseline At endpoint: 31%		(a, c, e)
(47) Mur et al 2008	33 bipolar and 33 controls FU 33 and 33	100%	Comparison study with matched controls	Recruited from Lithium clinic Spain	2	Baseline BP=54.5%, Control 90.9% 2 years BP=42.4%, Control 97%		3 (b, c, e)
(22) Dion et al 1988	67 FU 44	66%	Prospective observational study.	Admitted to Mc Clean Hospital unit with Bipolar Disorder manic or Mixed USA	6 months	14% employed at admission 43% employed at follow-up 64% of first admission patients employed at follow-up vs 33% of multiple admission		3 (c, d, e)
(48) Tsai, Chen and Yeh 1997	101 FU 101	unknown	Retrospective study	Teaching hospital inpatients / OP Co-morbid substance misuse China	15	38.6% were 'employed or skilled housewife'	Community Psychiatric Rating Scale (CPRS) 29.8% had 'poor working function' on CPRS	3 (a,b,e)
(12) Coryell et al 1998	206 26 died FU 113	62.8%	Prospective observational study.	Within week of 1 st admission or with 1 month of initial out-patient USA	15		73 people were rated: 34.2% found to be impaired in employment or self employment	3 (a, b, d)
(36) Goldberg and Harrow	35	80% at 7-8 years	Comparison study with unmatched comparison	Index hospitalisation (Chicago Follow- up study)	2 4.5 7-8		Strauss and Carpenter scale. 5 point scale Performance as worker, homemaker or student	3 (b, c, d)

2005			group	USA			At 2 years mean 2.4 At 4.5 years: mean 2.5 At 7-8 years: mean 2.6	
(49) Goldberg, Harrow and Grossman 1995	51	unknown	Comparison study with unmatched comparison group.	Index Hospitalisation for mania or depression (80% of sample from Chicago follow-up study; supplemented from Illinois) USA	2 4.5		Strauss and Carpenter At 2 years mean 2.3 At 4.5 years: mean 2.5	3 (b, c, d)
(19) Goldberg et al 2004	34	Unknown at 10 years	Comparison study with unmatched comparison group	Inpatient USA	10		56-64% functioning effectively in primary work role for at least half the time in preceding year at 2.5, 5, 7.5 and 10 year FU.	3 (b, c, d)
(50) Loftus and Jaeger 2006	51	unknown	Prospective observational study.	Inpatients and outpatients from large suburban hospital. USA	1	Good outcome 41.2% FT paid 29.4% student 7.8% caregivers 3.9% Poor outcome 58.8% sporadic employment 5.9% not working 25.5%	Multidimensional scale for independent functioning	2 (d,e)

Gilbert et al 2010 (51)	154 FU 148	96%	Prospective observational study.	Admission to open treatment study USA	15-43 m	Working (FT, PT, homemaker, volunteer) Employed at baseline and FU =46.6% Not working at baseline and FU =30.4% Not working at baseline, working at FU =14.2% Working at baseline and not at FU = 8.8%		2 (a,b)
(52) Perry et al 1999	69	100%	RCT	Admissions across 4 NHS trusts. Relapse within last 12m UK	18 months		Scale 0-3 assessing employment difficulties. 0=fair to good performance 3= inability to carry out activity Baseline score for controls: 1.51 Change at 6m: 0.09, 12m 0.17, 18m: 0.11	2 (c,d)
(53) McGlashan et al 1984	23 FU 19	83%	Comparison study with unmatched comparison group	Long term residential treatment. Mostly treatment resistant USA	Mean 191 months		38% worked full time since discharge	2 (b,e)

(17) Jiang 1999	63 FU 59	94%	Prospective observational study.	63 consecutive admissions for acute mania and diagnosed with Bipolar China	1 yr post discharge		Modified Vocational Status 80% unable to 'work competitively' one month before admission 40% unable to work competitively at 1 year follow up Employed at expected level: 3.4%); 1 year (11.9%) First vs multiple admissions Follow up: 70.2% vs 31.8% patients employed at their best vocational level	2 (c,d)
Tohen et al 1990 (35)	75 FU 75	100%	Prospective observational study.	Admission for index episode of Mania and recovered by time of discharge USA	4		Modified Vocational Status index: Able to work or study (only full time) 6M=60%, 48M = 72% Unable to work or study 6M= 40%, 48M= 28 %	2 (b, c,)
Goldberg et al 2011 (54)	46 Chicago follow up study 49 UP depression	74% completion for whole sample	Prospective observational study.	Index Hospitalization for bipolar mania at public and private hospitals USA	15		Strauss Carpenter work disability scale. 50% functioning effectively at least half the time as worker, student or homemaker in preceding yr	2 (b, d)
(55) Post et al 2003	258 FU 258	100%	Prospective observational study.	Outpatients across multiple sites USA/Netherlands	1		40.6% self report limited occupational functioning	2 (a,d)
(21) Bromet et al 1996	64 for BPAD	90% for total sample	Prospective observational study.	Psychotic patients 1 st admitted to one of 10 centres USA	6 months	Baseline: unknown 71% worked less than 3 of previous 6 M	Occupational functioning; number of months employed in follow-up period	1 (d)

Dickerson et al 2010 (20)	75 FU 52	69%	Prospective observational study.	Admission for mania or depression within 5 years of 1 st admission non for profit hospital USA	6 months	At 6 months: 54% were in FT competitive employment or FT student 21% PT workers or students	Modified Vocational Status index: "Fulltime gainful employment" highest life time 69%, 6 m=33% "Part time student or employment" highest lifetime 2%, 6m=21%	1 (e)
Yan-Meier et al 2011 (56)	65	unknown	Prospective observational study.	Admission for treatment of mania to inpatients and outpatients. USA	Up to 9 months		Life functioning questionnaire. 0= no problems, 4 = severe problems. Functional recover = mean score <1.5 = 77%	1 (d)
(13) Gitlin et al 1995	82 (at least 2 consecutive years of FU)	100%	Prospective observational study.	Admitted for OP treatment for at least 3 months USA	2		Bespoke scale combining job status, social functioning and family interaction "occupational outcome" good for 28%, fair for 37% and poor for 39%	1 (b)

*Quality star rating based on: (a)sample size > 100, (b)length of follow-up equal to or more than 2 years, (c)at least 2 data points for employment, (d) epidemiologically representative sample and (e) employment rate given.

RCT= Randomized Controlled Trial. PT= Part time. FT= Full time

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