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The prevalence and clinical associations of mood instability in adults living in England: Results from the Adult Psychiatric Morbidity Survey 2007

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Abstract

Mood instability is under investigated but potentially clinically important. This study aimed to describe the prevalence of mood instability in adults living in England and test whether it is important in explaining the extent of symptoms of common mental disorders, suicidality and healthcare use. An analysis of data from the Adult Psychiatric Morbidity Survey 2007, a household survey of private households in England (N=7403) was completed. The prevalence of mood instability was 13.9%. In univariate analysis it was strongly associated with socio-demographic and clinical variables. In regression modelling mood instability was

independently associated with non-psychotic psychopathology increasing the odds by 9.89. It was also linked with suicidal ideas (OR: 2.04) but not suicidal acts, and associated with being in receipt of medication, counselling or therapy for mental health problems (OR: 1.88), independent of a diagnosis of Borderline Personality Disorder. Mood instability is relatively common in the adult population, occurs frequently in common mental disorders and appears to be an important symptom in its own right. It is associated with two important measures in psychiatry, namely suicidal thinking and healthcare service use. It warrants more widespread recognition and further research is required to understand if, when and how to intervene.

Key words: mood disorders, anxiety disorders, personality disorder, epidemiology, suicide / self-harm

1. Introduction

Affective experience tends to differ for individuals along several dimensions including intensity, lability, valence (pleasant/unpleasant), consciousness of affect and occurrence of specific affects (such as shame and guilt) and their emotional expression (Westen et al., 1997; Schimmack et al., 2000). Mood instability is an understudied aspect, probably because of a lack of a clear, accepted and well validated definition. However, the 4th edition of the Diagnostic and Statistical Manual (American Psychiatric Association 1994) in describing the

characteristics of Borderline Personality Disorder highlights mood instability as due to a "marked reactivity of mood".

Mood instability may be seen alongside a number of common psychiatric disorders such as depression and Post Traumatic Stress Disorder (PTSD) (Koenigsberg, 2010) though epidemiological evidence of this association is lacking. However previous research using the method of ecological momentary assessment has examined the changeability of mood in mental disorders. These studies suggest greater positive affect during the day and greater diurnal mood variation in negative affect, in people with major depression compared to matched controls (Peeters et al., 2006). Similarly people with Borderline Personality Disorder (BPD) appear to have much greater mood instability especially with regards to valence and distress than healthy controls (Ebner-Priemer et al., 2007). They also have a greater instability of mood than people with a current depressive disorder in the out-patient setting (Trull et al., 2008).

Mood instability is a feature of Bipolar Affective Disorder (Paris, 2004; Smith et al., 2004) also. There may be differing patterns of emotional flux such that patients with BPD experience more change between euthymia and anger and depression and anxiety, whilst those with Bipolar Disorder more oscillation from depression to elation (Henry et al., 2001; Koenigsberg et al., 2002).

There is a steadily expanding evidence base that if significant in children, symptoms such as irritability that tend to be associated with problems of mood regulation can predict future

common mental disorders such as depression and anxiety (Stringaris et al., 2009). Indeed work on both mood (Correll et al., 2007) and personality disorders (Chanen et al., 2008; Miller et al., 2008) each independently suggest mood swings and episodic changes in mood can be the earliest signs of illness.

Therefore current evidence suggests mood instability is a potentially important psychopathological construct in a range of psychiatric problems. However its prevalence in the general population is unknown and its attributes and associations require much clearer delineation. We use data from a household survey to begin to address the many gaps in our knowledge about mood instability. The primary aims of this analysis are to describe the prevalence of mood instability in the general population in England and to test whether it is important in explaining the extent of non-psychotic psychopathology, suicidality and healthcare use.

2. Methods

This analysis uses data from the Adult Psychiatric Morbidity Survey (APMS) 2007, a household survey designed to be representative of adults living in private households in England (UK). A detailed description of the survey and the sampling methods employed is provided in the main survey report (McManus et al 2009). The Royal Free Hospital and Medical School (U.K) Research Ethics Committee gave ethical approval for the household survey.

2.1 Sampling of participants

In summary a multi-stage stratified probability sampling design was adopted for the survey with postal addresses which receive less than 50 items of mail each day being the sampling frame. One adult aged 16 years or over was selected for interview in each household. There was no upper age limit for participants.

There were two phases of assessments for participants. In the first phase structured assessments and screening instruments for mental disorders were applied using interviews lasting approximately 90 minutes. Clinically trained interviewers conducted more detailed assessments applying clinical judgments in a subsample of participants in the second phase of the survey. Phase two assessments were specifically to obtain information which would allow diagnoses such as Borderline Personality Disorder (BPD). The probability of being selected for a phase two assessment for BPD was dependent on a process of score sampling fractions being applied to the phase one responses to the SCID-II BPD screening questions. Thus those who endorsed less than and including 3 items in the screen were excluded from the phase 2 sampling and those who endorsed more than 8 items were all sampled. The probability of selection for phase 2 given a SCID BPD screen score of 4, 5, 6, 7 was 0.25, 0.4, 0.52 and 0.63 respectively.

Seven thousand, four hundred and three participants were interviewed in the first phase of the study and of the 746 people approached for phase two, data was available for 606.

2.2 Measures

Phase one

An item from the Structured Clinical Interview for DSM-IV Axis II Personality Disorders (SCID-II) (First et al., 1997) was used as the measure of mood instability. The item asks “Do you have a lot of sudden mood changes?” with the timescale for this symptom being “suffered this over the last several years”. This item in the SCID-II is designed to elicit the mood instability component of the DSM-IV Borderline Personality Disorder (BPD) diagnosis. Respondents can answer yes or no. This data was collected in phase one of the survey.

The presence of non-psychotic symptoms associated with the common mental disorders (depression, anxiety disorders, phobic disorders, etc.) was assessed using the Clinical Interview Schedule- Revised (CIS-R) (Lewis et al., 1992) which has a reliability of between 0.74 to 0.91. This is an interviewer administered questionnaire addressing non-psychotic symptoms. An initial question asks if the respondent has suffered from the symptom in the last month. If the respondent answers yes then further questions enquire about the extent of symptoms in the past week. A question also asks about the length of time the person has had symptoms for beyond this one week period. Scores are coded on a continuous scale, which represents the degree of psychopathology. A score of 12 or more suggests a significant level of symptoms, and can be used to indicate that a clinical assessment for the range of common mental disorders is required. We used this cut off level in the current analyses. Answers to the CIS-R can also be used to derive ICD-10 diagnoses using a computer algorithm, which takes into account that symptoms should have occurred for at least 2 weeks.

Two aspects of suicidality that were collected for the survey were used. These were suicidal thoughts which were strictly defined as having had “thoughts of taking your own life” and secondly suicidal acts defined as “having made an attempt to end your life” (McManus et al., 2009).

The extent of alcohol misuse was measured using the Alcohol Use Disorders Identification Test (AUDIT) (Saunders et al., 1993) which uses the last year as the period of reference. The median reliability coefficient for the AUDIT from studies published since 2002 is 0.83 (0.75 to 0.97) (Reinert and Allen 2007). Hazardous drinking is indicated by an AUDIT score of 8 or more and harmful drinking by a score of more than 16.

A number of healthcare service use items were collected from all respondents. The item used in this analysis was “currently receiving any medication, counselling or therapy” for mental health problems.

Phase two

The full set of items in the SCID-II was used in the context of a detailed clinical interview in order to enable a diagnosis of BPD. This interview which included assessment of sub-threshold symptoms was conducted with the subsample of respondents who were selected for phase two.

2.3 Data Analysis

In order to account for non-response the survey data were weighted so that the results were representative of the population living in private households and aged over 16 years. Weighting took account of the probabilities of respondents coming from households of a different size and household non response bias. Then calibration weighting was used based on age, sex and region in order to ensure representativeness. Exact details of what weights were applied to each variable are available in the primary report from the survey (McManus et al., 2009) (section 13.7). All analyses of statistical significance in the current investigation were based on weighted data, with the absolute sizes of the weights having no particular significance.

Data from the full dataset (phase one and two) were used in all analyses. The first stage of the analysis investigated univariate associations between individual measures, e.g. age, marital status and CIS-R, and mood instability using chi-squared tests. Tests were considered to provide evidence of significance if p-values were less than 0.05 (5% level).

This initial analysis was followed by more formal modelling using multiple logistic regression analysis to assess the significance of mood instability after adjustment for a range of important factors identified in the first stage analysis. The strategy in regression modelling was firstly to examine whether mood instability was independently associated with CIS-R scores and then to analyse whether it was associated with suicidality and health services use when other important relevant explanatory variables were taken into account.

The logistic regression models allowed odds ratios to be estimated that quantified the associations between mood instability and (i) CIS-R score, (ii) service use, (iii) thoughts of suicide over the last year and (iv) suicidal acts. These output variables were binary (no/yes). Modelling proceeded by first fitting the following subset of patient characteristics: age group, gender, ethnic status, employment status, equivalised household income, marital status, Borderline Personality Disorder, alcohol use (AUDIT scores), drug use and CIS-R (models 2-4) .

Mood instability was then introduced into the models in order to test its association with the outcome variables after adjusting for all the other model factors. The most parsimonious models were identified using a combination of a stepwise fitting algorithm and observed changes in the odds ratio of the mood instability term after dropping insignificant patient characteristic terms from the full model. Significance was assessed at the 5% level; 95% robust confidence intervals were constructed using estimated log odds ratios and robust standard errors based on asymptotic normality. Analysis was undertaken in the statistical software R (Team, 2010).

3. Results

3.1 Prevalence

Overall 7403 people were interviewed in phase one with a response rate of 57% of those eligible to participate in the study. Data was available for 606 out of the 746 individuals approached for the second stage of the survey. The prevalence of mood instability was 13.9% of the population over 16 years of age. Rates of mood instability by ICD-10 diagnostic

category were as follows: Generalised Anxiety Disorder 49.2% (176/358), Panic Disorder 56.1% (46/82), Depressive episode (any severity) 60.9% (153/251), and Post Traumatic Stress Disorder 63.3% (136/215) and Obsessive Compulsive Disorder 67.1% (57/85). The socio-demographic patterns of people reporting mood instability in the general population and univariate associations with non-psychotic psychopathology, suicidality and health service use are shown in Table 1.

Table 1 here

3.2 Unadjusted analyses

Mood instability was strongly associated with age, employment, household income, marital status, non-psychotic psychopathology, suicidal thoughts and suicidal attempts, alcohol and drug use and unsurprisingly BPD. There was also an association with health services use for mental health problems. Ethnicity failed to show an effect but all other associations were highly significant (<0.001). There was a significant age, gender interaction (Figure 1).

Figure 1 here

3.3 Adjusted analyses

The first regression model showed that mood instability was a significant variable in explaining the statistical variance of clinically important non-psychotic symptoms (CIS-R score >= 12) and increased the odds of experiencing them by 9.89 (CI 8.1-12.08) after controlling for other factors. Mood instability was also a significant explanatory variable of service use and increased the odds by 1.88 (CI 1.27-2.8) of receiving any medication, counselling or therapy. Whilst mood instability doubled the odds (OR 2.04 (CI 1.17-3.57) of having experienced suicidal thoughts over the last year, it did not significantly add to a

regression model of factors associated with suicidal acts. Tables 2 and 3 show the results of the three regression models in which mood instability was a significant explanatory variable of the dependent variable

Tables 2 and 3 here

4. Discussion

4.1 Prevalence of mood instability

The overall prevalence of mood instability in the adult population, as defined by the SCID-II item was high at 13.9% and consistent with the prevalence in Gulf War veterans as measured by the Schedule for Non-adaptive and Adaptive Personality (Black et al., 2006). Rates of mood instability were high (>49%) in a range of different common mental disorders consistent with the strong association with CIS-R scores.

There appears to be a significant age gender effect on the prevalence of mood instability. The peak prevalence was in young women aged 16-24 with 1 in 3 reporting this problem. In men mood instability was half as common in the youngest age group compared to women. Mood instability then, is relatively common in young men and women and the prevalence falls with age. A cross sectional assessment of mood instability in children and adolescents (Stringaris and Goodman, 2009), revealed a prevalence of around 6%. Whilst it is difficult to be certain, the findings of that study as well as the current analysis do suggest that mood instability is a difficulty which can occur throughout the lifespan and argues against the view that it dramatically improves with maturity into early adulthood.

It is also interesting to compare our results with the wider psychological literature on emotional regulation across the lifespan. Age has been associated with people reporting better mood regulation in a number of previous studies (Lawton et al., 1993), although one difficulty with much of the literature is that it based on retrospective self-reports. This means that positive results might be explicable by implicit beliefs by older people that their emotional regulation should be better than when they were younger. However a methodologically robust study examining self-reported emotions prospectively over a 1 week period reported the emotions of older adults were more temporally stable than those of younger people, indicating a better ability to regulate them (Carstensen et al., 2000). Less emotional variability in older people in comparison to those who are younger was also found in a laboratory based micro-longitudinal study (45 days) (Rocke et al., 2009). Our finding that the rate of mood instability as measured by the SCID-II item decreases with age from early adulthood, compliments and extends this previous literature by the use of a representative epidemiological household sample to examine this phenomenon.

As in a number of other psychiatric problems such as depression, anxiety and obsessive compulsive disorder (McManus et al., 2009), mood instability was more common in the unemployed, those with low income and in people whose marital status was single. Rates of mood instability were lowest in the widowed (8.1%) and married (10.7%). Whilst we cannot be sure about the direction of causality it may that being unemployed contributes to mood instability or that those with this problem have difficulties in maintaining employment. Similarly mood instability may affect marital status as those with higher levels of instability tend to have more difficulty in relationship functioning (Miller & Pilkonis, 2006).

There are a number of potential reasons for the finding of a relatively high prevalence of mood instability (13.9%) and its strong association with non-psychotic psychopathology. One possibility is that mood instability is a significant difficulty in and of itself; a symptom that might be clinically useful in explaining non-psychotic psychopathology. Given that the current analysis was a cross sectional one, it is not feasible to say whether mood instability can lead to significant non-psychotic psychopathology but clearly this is one possibility that cannot be refuted without further research.

An alternative explanation is that mood instability is a marker of disorders that we did not control for, but could have confounded the association. For example mood instability is associated with attention deficit hyperactivity disorder (ADHD) (Asherson et al., 2007) and is a common symptom in the prodrome of Bipolar Affective Disorder (Howes et al., 2011) and in established illness (Henry et al., 2001). Further given the especially high prevalence of mood instability in young women there may be overlap between those who reported this problem and women who have premenstrual syndrome. Finally mood instability can be seen in major depression (Bowen et al., 2011) and the two may be associated both cross sectionally and prospectively (Thompson et al., 2011; Thompson, 2012), with those experiencing major depression having greater variability in negative than positive affect.

It is possible that mood instability in all these disorders may play some part in the high prevalence and association we found it. However it is unlikely to be the whole explanation

given that mood instability was associated with suicidality and mental health service use independent of the effect of CIS-R score.

4.2 Mood instability, service use and suicidality

There was a complex relationship between mood instability and suicidality. Experiencing this type of mood changeability appears to be sufficient to be associated with suicidal thoughts over the last year even when controlling for psychiatric disorder. The size of the effect however was moderate, possibly because we had controlled for many other factors such as alcohol and substance misuse as well as BPD which tend to be strongly associated with suicidal thinking. We did not find an association between mood instability and suicidal acts.

In contrast to our findings, affective instability assessed using the Diagnostic Interview for DSM-IV Personality Disorders was found to be associated with suicidal attempts in a prospective sample (Yen et al., 2004). However the number of co-variates controlled for in that study was small. MacKinnon et al (MacKinnon et al., 2005) found sudden mood changes or so called rapid switching in people with Bipolar Disorder was associated with suicidal thinking but not suicidal acts. This was similar to the pattern evident in the current analysis. It may be that factors that we did not include into the model such as past history of deliberate self-harm, irritability or impulsivity are an additional step or requirement for mood instability to be linked with suicidal actions. Alternatively our analysis may have been underpowered to detect such an association.

Mood instability increased the odds of using services for mental health problems by a factor of 2 even after controlling for the effects of alcohol and drug use problems, the degree of non-psychotic psychopathology and a diagnosis of BPD. The order of the effect was similar to all the other significant variables apart from CIS-R scores. This makes it unlikely that the influence of mood instability on service use is as a consequence of non-psychotic psychopathology.

Patients with BPD are well known to use a considerable amount of healthcare services. Previous evidence suggests those with BPD are more likely to be using greater amounts of psychosocial treatments in comparison to people with major depression but also those with other personality disorders (Bender et al., 2001). Number of BPD traits in veterans was found to be associated strongly with the likelihood of utilising healthcare services, although the relative effects of each of the different BPD traits was not tested (Black et al., 2006). Our findings extend this previous evidence by showing that a single trait of BPD, namely mood instability could be significant enough for individuals to seek treatment from healthcare services, although we cannot be sure of causality.

The fact that mood instability was associated with service use and suicidality independent of the influence of non-psychotic psychopathology, a range of other mental health problems and socio-demographic variables would suggest that this difficulty is clinically significant in its own right.

4.3 Strengths and Limitations

To our knowledge this is the first investigation of the prevalence of mood instability in the adult general population and a major strength of this study is that is based on a large representative sample of over 7000 people living in the community. There is also little previous literature on mood instability as a unitary trait and its association with common mental disorders and health service use, despite the suggestion it should be studied as a singular attribute (Murray et al., 2002).

A significant issue in this study was the way the attribute of interest was defined and used. In this analysis we handled the latent variable mood instability as a discrete observable factor and therefore the results reflect this approximation. A single question from the SCID-II was used as the measure of mood instability, which participants could answer either "yes" or "no" to, although this attribute is likely to exist on a continuum. However the single question was simple to understand and appropriate given its use in a very large sample of people.

Subjective reports of the severity or frequency of mood instability were not part of the standard assessment of the APMS. This is potentially important given that instability may be influenced by two genetic components representing emotional intensity and reactivity (Livesley and Jang, 2008). Men and women answered the single question on mood instability differently. This effect may partly be a function of men and women possibly responding differently to the entire SCID instrument. Participants were not specifically asked

to compare themselves to other people they knew as a reference when answering this question, although they may have done so.

There is no clear unequivocal definition of mood instability used in the literature or a standard assessment (Bowen et al., 2006) and the terms affective instability, mood instability or lability are often used interchangeably and differently by researchers. Indeed there are considerable difficulties in operationalizing mood instability (MacKinnon and Pies, 2006), although there have been mathematical methods suggested that may allow more precision (Ebner-Priemer et al., 2007). The definition used in this analysis has the advantage of being anchored to a description already in place as part of the diagnostic system of the DSM-IV. The mood instability question in the SCID-II is also very similar in characteristic to part of the assessment of mood lability carried out in a large sample of young people (Stringaris and Goodman, 2009).

We did not investigate the association of mood instability with particular diagnoses, although we did report on the prevalence in different diagnostic groups. Whilst this may moderate the direct application of results into clinical practice, our approach reflects the Research Domain Criteria (RDoC) project of the NIMH (Cuthbert and Insel, 2010; Insel et al., 2010) which emphasises biology and clinical phenomenology, specifically mentioning functional constructs including positive and negative affect, and arousal/regulatory systems as being the most likely way of linking symptoms to neural changes. As such, the NIMH advocates researchers study constructs rather than discrete diagnoses and this current analysis is consistent with those recommendations.

4.4 Implications

Mood instability increased the odds of two important measures in psychiatry, implying that this mood regulation problem warrants more widespread recognition and management whether it is associated with BPD or not. There is no clear pathway of care or management framework for those presenting with this problem, although our findings suggest a further assessment for the full range of non-psychotic disorders and quantification of suicidal risk is indicated.

Further research is clearly required into this construct in order to understand whether the associations we found, persist in cohorts. Prospective studies of children suggest mood lability in combination with other problems in emotional functioning are linked to adult psychiatric disorders (Caspi, 2000) and therefore it may be that similar mechanisms exist in adulthood. Ratings in further studies should ideally be based on more detailed clinical assessments of mood instability.

Research is also required in order to understand the course of mood instability. It is possible it is a self-limiting problem, persistent but stable, or nascent and part of an emergence of a more severe mental disorder. Longitudinal research is required to understand if, when and how to intervene.

Declaration of Interest

The authors declare there are no conflicts of interest.

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