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An epidemiological investigation of affective disorders with a population-based cohort of 1023 adults with intellectual disabilities

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ABSTRACT

Background. Intellectual disabilities (ID) are common and lifelong. People with ID have health inequalities compared with the general population, but little is known about the epidemiology of affective disorders in this population. This study was undertaken to determine the point prevalence of affective disorders, and to investigate factors associated with depression.

Method. This population-based study ($n=1023$) included comprehensive individual assessments with each person. A two-stage process was used for diagnosis of affective disorders. Factors independently associated with depression were investigated through logistic regression analysis.

Results. The point prevalence was higher than that reported previously for the general population; DC-LD yielded 3·8% for depression and 0·6% for mania. Additionally, 1·0% had bipolar disorder currently in remission, and 0·1% first episode of mania currently in remission. Similar to general population findings, depression was associated with female gender, smoking, number of preceding family physician appointments, and preceding life events. Important differences were the association of not having a hearing impairment, and the trends for not living in deprived areas, and being married. Unlike general population findings, not having daytime occupation and obesity were not independently associated; nor was previous long-stay hospital residence, severity of ID, or sensory impairments.

Conclusions. This study has found a high point prevalence of affective disorders in adults with ID. The factors associated with depression have differences to general population findings. An understanding of this is important in order to develop appropriate interventions, public strategy and policy, to reduce existing health inequalities.

INTRODUCTION

Intellectual disabilities (ID) is a common and lifelong state. It has been calculated that the USA 2000 incident cohort with ID has lifetime costs (in excess of costs for people without ID) of US$44.1 billion (Honeycutt *et al.* 2003). Excess and poorly addressed additional health needs contribute to these costs, and it is now well established that people with ID experience mental and physical health inequalities and disadvantages compared with the general population (Cooper *et al.* 2004; NHS Health Scotland, 2004; Gustavson *et al.* 2005; Scheepers *et al.* 2005). It is important to

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understand the types, extent and causation of health needs within this population, in order to identify possible modifying interventions for subsequent trial, and if demonstrated to be effective, implementation in practice, public health strategy and policy.

Depression is a major public health challenge, and the World Health Organization (WHO) predicts it will be the second leading contributor to the global burden of disease by 2020 (WHO, 2001). Little is known of the epidemiology of depression in adults with ID. Existing studies have methodological limitations, and we are not aware of any recent large-scale population-based epidemiological studies using contemporary methods of assessment and diagnosis. Limitations of published studies include biased sampling; reliance upon existing case-note information, or instruments designed as screening tools only; lack of information on the extent of detail within assessments, the instruments, or diagnostic criteria used; and population-based studies limited by small cohort sizes. Other limitations include failure to indicate whether rates are lifetime or point prevalence; reporting combined prevalence for children and adults; and studying selected subgroups such as adults only with verbal communication skills. These limitations prevent replication of findings and account for the current inconsistencies within the existing literature.

The aims of this study were to determine the point prevalence of affective disorders among adults with ID and to investigate the factors that we hypothesized to be independently associated with depression in this population. We hypothesized that affective disorders would be prevalent, and that associated factors would differ from those reported previously for the general population.

METHOD

Ethics

The project was approved by the relevant Research Ethics Committee. Individual consent to participate in the project was taken from each person with ID as far as they had decision-making capacity to consent, with assent taken from the person's nearest carer when the person her/himself did not have capacity to give or withhold consent to participate.

Population ascertainment

A comprehensive process of population ascertainment of persons with ID was conducted in the Greater Glasgow Health Board area, Scotland. Adults with ID aged 16 years and over were identified by social work services for people with ID, Local Authority funding arrangements for persons receiving paid support of any kind, including day opportunities, local specialist health services for people with ID, the Health Board and primary health-care services. All (100%) of Greater Glasgow's general practitioners (GPs)/family physicians ($n=631$) worked with the project, and were paid an item-of-service fee for each person with ID whom they identified as registered with them and within the project remit. This process led initially to an over-identification of people, such as persons with IQs in the 70–80 range; such persons were subsequently excluded from the research. We consider the population ascertainment process to have been comprehensive, yielding a rate of 3·33/1000 adult general population, which is similar to other large-scale ascertainments (Farmer *et al*. 1993; McGrother *et al*. 2001; Emerson, 2004; van Schrojenstein Lantman-de Valk *et al*. 2006).

Process

Each participant underwent a detailed assessment from a team of six qualified nurses who had specialist qualifications in working with adults with ID and who were trained in the use of the assessment instruments, and three GPs/family physicians who had a special interest in working with adults with ID. They reviewed each participant's primary health-care case-notes using a semi-structured format, then undertook a detailed face-to-face assessment with each participant, supported by their paid or family carer. In all cases, assessments completed by the nurses were discussed with one of the three GPs/family physicians. Persons identified as possibly, probably or definitely having mental ill-health were notified to the project psychiatrists who specialize in working with adults with ID. They undertook a review of the person's current and previous ID psychiatry, general psychiatry, child psychiatry and psychology case-notes, where such notes existed, and where indicated, other secondary physical

health-care case-notes, and conducted psychiatric assessments with the person with ID, supported by their carers, for diagnostic clarification. Diagnoses were derived according to clinical, DC-LD (Royal College of Psychiatrists, 2001), DCR-ICD-10 (WHO, 1993) and DSM-IV-TR (APA, 2000) diagnostic criteria.

Materials

The initial assessments were conducted using:

- A purpose-designed semi-structured form to review primary health-care case-notes.
- The C21st Health Check (Glasgow UAP, 2001). This instrument includes assessment sections on mental ill-health, problem behaviours, autistic spectrum disorders and developmental level/support needs, as well as general physical health, and has been demonstrated to have good utility (Curtice *et al.* 2001). It also has a section for a selected physical examination, including assessment of vision and hearing, and measurement of body mass index.
- The Psychiatric Assessment Schedule for Adults with Developmental Disabilities Checklist (PAS-ADD Checklist; Moss *et al.* 1998). This instrument was designed as a mental health screening tool for use with adults with ID. As its specificity was not relevant in this project, to improve its sensitivity from that reported previously (Moss *et al.* 1998; Simpson, 1999; Sturmey *et al.* 2005), and following a pilot exercise with 50 people (Curtice *et al.* 2001), we used a lower cut-off threshold of any two symptoms (excluding specific phobias) or any one high-risk symptom, which we defined to include the items for suicidal attempts or thoughts, persecutory behaviour, hallucinations or delusions, and we counted identified symptoms whether or not they were thought by the carer to be a problem. We added items, using the same format, to detect possible symptoms of mania. The PAS-ADD Checklist also includes a schedule to measure life events in the preceding 12-month period.
- A purpose-designed demographic form, including full postcode from which Carstairs scores were derived (an area-based measure of material deprivation, commonly used in Scotland).
- A phlebotomy protocol, to ensure, for example, that every person with Down's syndrome had up-to-date thyroid function testing.

An ID psychiatric assessment, where appropriate, was conducted using:

- A purpose designed semi-structured form to review case-notes.
- A standard comprehensive assessment format, covering all aspects of a psychiatric history, and mental state examination.
- The Psychiatric Present State – Learning Disabilities (PPS-LD; Cooper, 1997) instrument. This is a semi-structured psychopathology schedule specifically designed for use with adults with ID, and designed to allow classification of psychopathology by clinical, DC-LD, DCR and DSM-IV-TR criteria.
- Purpose-designed instruments containing items to detect psychopathology within autistic spectrum disorders, hyperkinetic disorders and problem behaviours, as defined by DC-LD, and suitable for use by trained psychiatrists.
- The Test for Severe Impairment (Albert & Cohen, 1992). This instrument provides an assessment of current cognitive ability.
- The Vineland Scale (Survey Form) (Sparrow *et al.* 1984). This instrument provides a measure of current level of adaptive functioning. It was also used to measure best-ever level of functioning, in cases where functional level had regressed.

Analyses

Data were entered onto a PC and analysed using SPSS version 11.5 (SPSS Inc., Chicago, IL, USA). The point prevalence was calculated for subtypes of affective disorders. A two-stage procedure was undertaken to determine the factors associated with depression. Investigations were conducted to compare persons with a DC-LD diagnosis of depression, currently in episode, with persons who were found to have no mental ill-health of any type. (In this context, the term mental ill-health is used to include all psychiatric disorders currently in episode, including problem behaviours and dementia, and also schizophrenia currently in remission, but not specific phobia or autism

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Table 1. *Prevalence of affective disorders as defined by clinical, DC-LD, DCR-ICD-10 and DSM-IV diagnostic criteria*

Diagnostic category	Clinical	DC-LD	DCR-ICD-10	DSM-IV
Depression, currently in episode	47 (4·6)	39 (3·8)	31 (3·0)	21 (2·1)
Bipolar disorder, currently depressed	5 (0·5)	3 (0·3)	2 (0·2)	1 (0·1)
Unipolar depression, currently in episode	42 (4·1)	36 (3·5)	29 (2·8)	20 (2·0)
Mania, currently in episode	6 (0·6)	6 (0·6)	6 (0·6)	5 (0·5)
Bipolar disorder, currently manic	4 (0·4)	3 (0·3)	3 (0·3)	1 (0·1)
First episode of mania, currently in episode	2 (0·2)	3 (0·3)	3 (0·3)	4 (0·4)
Bipolar disorder, currently in remission	12 (1·2)	10 (1·0)	9 (0·9)	11[a] (1·1)
First episode of mania, currently in remission	—	1 (0·1)	1 (0·1)	—
Cyclothymia	3 (0·3)	2 (0·2)	2 (0·2)	0 (0)

Values are *n* (%).
[a] Of these 11 persons, two have had a DSM-IV first episode of mania only.

spectrum disorders.) First, a series of bivariate analyses was undertaken to investigate associations with whether or not the person had depression (as defined by DC-LD), using a two-tailed Student's *t* test, the χ^2 test and regressions. Variables were selected for study on the basis that they had previously been reported to be associated with depression in the general population, and from clinical impression from work with persons with ID. The initial analyses were used to identify the variables to enter into the second stage, a logistic regression analysis to determine factors independently associated with the dependent variable depression (as defined by DC-LD). A backwards stepwise model was used, with the removal of a variable from the model being based on the significance of change in the log-likelihood. The removal criterion was set at 0·05 rather than the SPSS default of 0·1. The items investigated were:

- *Personal characteristics*: older age, female gender, ethnicity.
- *Physical health and disabilities*: lower ability (four categories of mild, moderate, severe or profound ID), the presence of Down's syndrome, visual impairment, hearing impairment, epilepsy, severe physical disabilities (quadriplegia), communication impairment, urinary incontinence, bowel incontinence.
- *Support*: not being married, type of living/support arrangements, greater deprivation of the area the person was living in, having no daytime occupation, having previously been a long-stay hospital resident.
- *Health service use within the preceding 12-month period*: higher number of consultations with the GP/family physician, higher number of days admitted to hospital.
- Having experienced life events in the preceding 12-month period.
- *Lifestyle choices*: being a smoker, being obese.

RESULTS

Cohort characteristics

Full assessments were completed on 70·6% of the total eligible adult population with ID (1023). The cohort comprised 562 men (54·9%) and 461 women (45·1%), and had a mean age of 43·9 years (range 16–83 years). Level of ability ranged from mild in 398 (38·9%), through moderate in 248 (24·2%), severe in 193 (18·9%), to profound ID in 184 (18·0%). Three hundred and ninety people (38·1%) lived with a family carer, 467 (45·7%) lived with paid support, 102 (10·0%) lived independently of paid support, and 64 (6·3%) lived in a congregate care setting such as a nursing home designed to care for older, frail people. Of the cohort, 95·7% were single, and 96·4% were Caucasian. The point prevalence of mental ill-health was 40·9%, and 605 adults (59·1%) had no mental ill-health.

Prevalence of affective disorders

Table 1 reports the prevalence of affective disorders in the cohort. Findings are presented separately for diagnoses using clinical, DC-LD,

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DCR-ICD-10 and DSM-IV-TR diagnostic criteria. The terms used in the table to describe the diagnostic categories are not identical to those used in all the diagnostic manuals as they differ between the manuals, but the correct operationalized diagnostic criteria as outlined in each manual are used.

The age-specific prevalence of depression (as defined by DC-LD) for the 10-year age groups 16–19·9, 20–29·9, 30–39·9, 40–49·9, 50–59·9, 60–69·9, 70+ was 4·9, 3·4, 4·5, 3·0, 5·1, 4·0 and 0% respectively. The point prevalence of depression (as defined by DC-LD) was 3·8% for the group with mild, 4·4% for the group with moderate, 4·6% for the group with severe, and 2·2% for the group with profound ID.

One hundred and twenty-two people (11·9%) were taking an antidepressant. Drugs that have mood-stabilizing properties (lithium, carbamazepine, sodium valproate, lamotrigine) were being taken by 266 people (26·0%); for 240 of the 266 the prescription was for management of epilepsy, and for two people, for management of problem behaviours, rather than for mood.

Characteristics of persons in episode with depression

Of the 39 persons who met DC-LD criteria for depressive episode at the time of their assessment, 41·0% were male and 59·0% were female. The mean age of this group was 42·8 years (range 17–67 years): 38·5% had mild, 28·2% had moderate, 23·1% had severe, and 10·3% had profound ID. Most lived with paid carer support (64·1%), with 23·1% living with a family carer, 10·3% independently, and 2·6% living within a congregate care setting. The majority were Caucasian (92·3%), and only a minority were married or had a live-in partner (7·7%).

Associations with depression

Results from the initial analyses are presented in Table 2. Some of the initial analyses found reverse associations/trends compared with those that were expected from the general population literature; for example, being married/having a live-in partner, and not having a hearing impairment, which were associated with being depressed; and living in areas of greater socio-material deprivation where there was a (non-significant) trend for not being depressed.

On the basis of these initial results, the following factors were entered into the logistic regression: gender, marital status, type of accommodation/support, having no daytime occupation, having experienced a life event in the preceding 12-month period, smoking status, hearing impairment, Down's syndrome, and the number of GP/family physician consultations in the preceding 12-month period. Table 3 shows the odds ratios (ORs) and 95% confidence intervals (CIs) for the variables retained within the model as independently associated with depression (as defined by DC-LD). The associations were: a higher number of GP appointments in the preceding 12-month period, having experienced a life event in the preceding 12-month period, being a smoker, not having a hearing impairment, and being female.

DISCUSSION

Strengths and limitations

The strengths of the investigation lie in it being a population-based study with a large cohort size, a high participation rate, and comprehensive and well-described methods of assessment. Our first stage of analyses of hypothesized associations included 22 factors. The main limitation of the study is its cross-sectional design, which means that we have reported associated factors and do not know at this stage whether they are predictive of depression or associated for other reasons (e.g. caused through being depressed). For example, the high rate of GP/family physician consultation in the preceding 12-month period may have resulted directly from being depressed, and the occurrence of life events may be the consequence or the cause of depression. However, at this stage, it is clear that such findings do highlight means of identifying people for whom there is a higher likelihood that the person is depressed, and provide necessary information to inform the required longitudinal investigations.

We are confident that our process of population ascertainment of ID will have identified close to the entire population with moderate to profound ID. It will not have identified all persons with an IQ in the mild ID range. Some persons with mild ID in childhood, through their continuing development during adult life, do learn, acquire and practice the life-skills

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Table 2. *Results of initial bivariate analyses*

Variable	Current DC-LD depressive episode	No mental ill-health	*p* or OR (95% CI)
Mean age (years)	42·8	43·9	0·669
Female gender (%)	59·0	43·6	0·061
Caucasian (%)	92·3	96·8	0·133
Ability (%)			
Mild ID	38·5	41·3	Reference
Moderate ID	28·2	24·8	1·222 (0·549–2·722)
Severe ID	23·1	17·1	1·449 (0·617–3·403)
Profound ID	10·3	16·8	0·655 (0·213–2·016)
Down's syndrome (%)	7·7	21·7	0·036
Visual impairment (%)	38·5	46·7	0·317
Hearing impairment (%)	15·4	28·8	0·046
Epilepsy (%)	23·7	34·6	0·165
Severe physical disabilities (%)	10·3	7·7	0·560
Communication impairment (%)	38·5	46·9	0·301
Urinary incontinence (%)	43·6	30·4	0·084
Bowel incontinence (%)	17·9	22·6	0·497
Single status (%)	92·3	97·8	0·031
Accommodation (%)			
With a family carer	23·1	43·9	Reference
Independent of carer	10·3	10·1	1·924 (0·576–6·427)
With paid carer support	64·1	40·6	3·006 (1·379–6·551)
Congregate care setting	2·6	5·4	0·910 (0·112–7·387)
Mean deprivation score	2·26	2·67	0·628
No daytime occupation (%)	38·5	22·6	0·023
Ex long-stay hospital resident (%)	20·5	15·2	0·374
Mean number of GP consultations	8·54	4·43	0·002
Mean number of days in hospital	0·2	1·0	0·500
Life event in preceding 12 months (%)	71·8	44·1	0·001
Smoker (%)	20·5	7·8	0·006
Body mass index (%)			
Acceptable weight	27·0	30·4	Reference
Underweight	2·7	5·2	0·530 (0·066–4·263)
Overweight	35·1	30·6	1·327 (0·568–3·099)
Obese	21·6	28·5	0·862 (0·333–2·231)
Morbidly obese	13·5	5·3	2·882 (0·928–8·955)

OR, Odds ratio; CI, confidence interval; ID, intellectual disabilities; GP, general practitioner.

Table 3. *Logistic regression analysis results*: *retained variables independently associated with DC-LD depression*

Variable	OR (95% CI)	If removed, change in −2 log likelihood	If removed, significance of the change
Female gender	2·180 (1·070–4·443)	4·727	0·030
Life event in preceding 12 months	2·661 (1·269–5·577)	7·251	0·007
No. of GP appointments in preceding 12 months	1·080 (1·028–1·136)	8·942	0·003
Smoker	3·360 (1·342–8·412)	5·682	0·017
Hearing impairment	0·372 (0·140–0·984)	4·839	0·028

OR, Odds ratio; CI, confidence interval; GP, general practitioner.

to cope independently, and live without requiring any external support, hold down jobs, marry and raise families. Our procedures will not have identified this group, whose GPs/family physicians are unlikely to identify as having ID (indeed, diagnostic criteria for ID in DCR-ICD-10 and DSM-IV-TR would also not identify persons in these situations as having ID due to lack of requirement for support).

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It was not possible to identify past episodes of depression unless they had presented to services at the time, and it is well recognized that much depression in this population is not recognized by paid carers and that health care is often not sought on the person's behalf, except when associated with problem behaviours (Patel *et al.* 1993; Cooper *et al.* 2006). Paid carers are a mobile work-force, and hence such changes over time render it often not possible to attempt to retrospectively identify depressive episodes that occurred in the past. For these reasons we choose to study point prevalence, rather than period prevalence. It is possible, therefore, that the rate we present for bipolar disorder is lower than the actual rate. We reported the factors associated with the group in episode with depression, compared with the group not in episode with mental ill-health; the group not in episode with mental ill-health will inevitably include some individuals who have had past episodes of depression of which we are unaware.

Principal findings and their interpretation

Depression occurs commonly among adults with ID, with a point prevalence higher than that reported for the general population (Singleton *et al.* 2001), or similar if the DCR-ICD-10 or DSM-IV-TR rates for adults with ID are used for comparison. Bipolar disorder occurs at about double the prevalence rate of that reported for the general population (Singleton *et al.* 2001). Given the numerous biological, psychological, social and developmental disadvantages experienced by adults with ID compared with the general population, the higher prevalence of depression was expected, although it should be noted that a high proportion of the cohort were taking drugs that have mood-stabilizing properties (typically for the management of epilepsy, which is common in this population), which might reduce the prevalence of affective episodes. The higher prevalence of bipolar disorder is likely to be of biological origin yet to be determined. Some genetic causes of ID have specific behavioural phenotypes; for example, Down's syndrome appears to protect from mania (Sovner *et al.* 1985; Cooper & Collacott, 1993), whereas Prader–Willi syndrome is associated with affective psychosis (Beardsmore *et al.* 1998; Boer *et al.* 2002), and there remains much to learn regarding the genetics of ID and of bipolar disorder.

Some of the factors found to be independently associated with depression are similar to those reported for the general population and so may have similar underlying causative mechanisms; that is, female gender (Singleton *et al.* 2001), smoking (Hughes *et al.* 1986; Glassman *et al.* 1990; Kendler *et al.* 1993), the number of appointments with the GP/family physician in the year (Munoz-Arroyo *et al.* 2006), and having experienced at least one life event in the preceding 12-month period (Meltzer *et al.* 2004).

There are also important differences compared with the general population, in particular the lack of association with living in areas of socio-material deprivation (indeed, the trend was reversed; Meltzer *et al.* 2004); hearing impairment (the trend was reversed; Hindley & Kitson, 2000); marital status (the trend was reversed; Meltzer *et al.* 2002); being obese (Carpenter *et al.* 2000; Onyike *et al.* 2003); and not having any daytime occupation (Meltzer *et al.* 2004). We postulate that adults with ID may not have the same life-style characteristics as the general population living in the same area, due to being 'placed' in areas dissimilar from those they originated from and within which they acquired lifelong habits and preferences, and through ongoing important relationships with family members whose own views and actions may be of greater influence than those of their paid carers or local community. It may be that the biological, social and developmental causes and consequences of ID far outweigh some of the factors of relevance to the general population, in the aetiology of depression. The finding that depression was associated with not having a hearing impairment was unexpected, and out of keeping with findings from general population investigations, and we do not know the explanation for this.

Contrary to our expectations, we did not find any association between previously having lived in a long-stay hospital or having functional impairments (severity of ID, communication impairments or sensory impairments) with depression, suggesting that these factors do not have the longer-term disadvantages that are sometimes assumed.

The reported point prevalence of depression depends upon the diagnostic criteria used, with

the highest rate found with the ID psychiatrists' own judgement, followed by DC-LD, then DCR-ICD-10, and with the lowest rate for DSM-IV-TR. The operationalized criteria were more similar in function for diagnosis of mania, although there were still differences; the higher point prevalence of first episodes of mania with DSM-IV-TR was due to previous episodes not fully meeting DSM-IV-TR criteria whereas they had met criteria for DC-LD and DCR-ICD-10 episodes. As these findings are from a population-based cohort, the distribution of psychopathology within the participants represents its presentation in the population with ID (rather than being a biased sample such as persons referred for psychiatric treatment). Given this, plus the comprehensiveness of the individual assessments, we conclude that DSM-IV-TR and DCR-ICD-10 are not appropriate manuals to use in work on affective disorders with persons with ID.

Comparisons with previous literature

Corbett (1979) reported 4·0% of 402 adults with ID to have affective disorders (including current episodes and bipolar disorder, currently euthymic). He used a two-stage process to identify whom to investigate further, with a carer interview, and classified affective disorders using non-operationalized ICD-8 criteria (WHO, 1968). This is essentially the psychiatrists' own judgement. Our equivalent figure of 6·6% is higher, and may be explained by the fact that all of the cohort had their mental health assessed, in a standardized way. Lund (1985) conducted assessments on 302 adults with ID, and reported 1·7% to have affective disorders (including current episodes and bipolar disorder, currently euthymic). This rate is lower than the one we report. Lund reported using DSM-III modified criteria; as the modifications are not described it is not clear the extent to which the disorder he reported is representative of affective disorders in this population, or remains closer to that seen in the general population presentation, which would account for an undercount. Information provided in the text suggests that Lund's tool to measure psychopathology contained only a limited range of items, which may also have limited case detection. Cooper & Bailey (2001) found a point prevalence rate of affective disorders of 6·0% (including current episodes and bipolar disorder, currently euthymic). Their methods of assessment are similar to those reported in this paper, and the criteria they outlined are also similar to DC-LD; the main limitation of their study is the small cohort size ($n=207$). Our DC-LD rate is 5·5%, hence these two studies provide similar results. The larger-scale study ($n=1155$) of Taylor *et al.* (2004) reported data from a carer-completed psychiatric screening tool only (without subsequent psychiatric assessment) and hence does not specifically provide data on depression, mania or affective disorders.

Further investigation related to the study of Taylor *et al.* (2004) has demonstrated that a positive score for 'affective/neurotic disorders', as defined by the screening tool, is associated with preceding life events in adults with ID (Hastings *et al.* 2004), and Owen *et al.* (2004) found an association for 93 adults in a long-stay hospital. Hamilton *et al.* (2005) reported an association between life events and scores on the Developmental Behaviour Checklist for Adults (Einfeld *et al.* 2002) for 624 adults with ID, but the effect of life events in this population has received little other attention. Unlike our finding, and unlike findings from the general population, most studies have not found any association between gender and depression in this population, although some studies examining this have been of selected samples rather than being population-based (Meins *et al.* 1993; Dagnan & Sandhu, 1999); Taylor *et al.* (2004) did find women to have higher scores than men on their 'affective/neurotic disorders' subdomain. Although there has been study, with inconsistent findings, of the relationship between ability level and mental ill-health, the relationship between depression and ability level in this population has not been the focus of much work. Other factors have similarly not been the subject of rigorous investigation (Smiley, 2005), and our investigations therefore largely present new findings. Although it has been suggested that Down's syndrome is associated with depression, our findings do not support this view.

Implications and future directions

Depression and bipolar disorder are common among the population with ID. Although there are some similarities with the general population

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in the factors associated with depression, there are also important differences. This suggests that further prospective study specifically of persons with ID is essential, if we are to understand the relevant causative factors for depression, so that interventions can be developed that are appropriate to the needs of this population, and current health inequalities tackled.

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DECLARATION OF INTEREST

None.

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