Article

Underdiagnosis of psychiatric disorders in people with intellectual disabilities: Differences between psychiatric disorders and challenging behaviour

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Carlos Peña-Salazar
Hegau-Bodensee-Klinikum Singen, Germany; Universitat de Vic – Central University of Catalonia, Spain

Francesc Arrufat
Institut Pere Mata, Spain

Josep Manel Santos
Universitat de Vic – Central University of Catalonia, Spain; Associació Sant Tomás, Spain

Abel Fontanet
Germanas Hospitalarias Benito Menni, Spain

Gretel González-Castro
Consorci Hospitalari de Vic, Spain

Silvia Más
Germanas Hospitalarias Benito Menni, Spain

Pere Roura-Poch
Consorci Hospitalari de Vic, Spain

Juan Valdés-Stauber
Zentrum für Psychiatrie Südwürttemberg, Germany; University of Ulm, Germany

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Abstract

Background and purpose: The purpose of this study was to assess the level of mental disorders and challenging behaviour in individuals with intellectual disability (ID) supported by specialized services, but without a prior psychiatric diagnosis, and to compare the levels of different disorders depending on the severity of ID. **Methods:** This is a cross-sectional study ($N = 142$) of population with ID. Inclusion criteria were the following: adult patients with ID and with no previous psychiatric diagnosis prior to this survey. The Wechsler Adults Intelligence Scale-II, the Psychiatric Assessment Schedule for Adults with Developmental Disability checklist and clinical interview, the Diagnostic Assessment for the Severely Handicapped scale and the Inventory for Client and Agency Planning were the assessment tools. **Results:** A previously undiagnosed mental disorder was found in 29.6% of the sample. The most prevalent mental disorders were major depressive and anxiety disorders. An association between psychiatric comorbidity and challenging behaviour was found only for mild/moderate ID, especially for affective disorders. **Conclusions:** The presence of a psychiatric as well as a medical comorbidity is associated with severe ID, unlike challenging behaviour. Clinical limitations of the study have been discussed.

Keywords

intellectual disabilities, challenging behaviour, psychiatric comorbidity, underdiagnosis, psychiatric assessment tools

Corresponding author:
Juan Valdés-Stauber, Zentrum für Psychiatrie Südwürttemberg, Weingartshofer Straße 2, 88214 Ravensburg, Germany.
Email: juan.valdes-stauber@zfp-zentrum.de

Introduction

Intellectual disability (ID), or intellectual developmental disorder, affects approximately 1% of the world's population (American Psychiatric Association, 2014). ID starts during the early developmental period and includes limitations of intellectual and adaptive functioning. Challenging behaviour has been defined as culturally abnormal behaviour(s) of such an intensity, frequency or duration that (1) the physical safety of the individual or others is placed in serious jeopardy or (2) seriously limits the use of, or leads to denial of access to ordinary community facilities (Emerson and Einfeld, 2011).

The reported prevalence of mental disorders in individuals with ID varies from 10% to 60% (Koskentausta et al., 2007). In one of the largest samples assessed to date, Cooper et al. (2007) studied 1023 individuals with different degrees of ID and found a prevalence ranging from 15.7% to 40.0%, depending on the assessment tools and classification system. However, the prevalence of behavioural disorders in the population with ID ranges from 30% to 60% (Cohen et al., 2010). Schützwohl et al. (2016) carried out a multicentre study comprised of 371 participants with mild/moderate ID and reported a prevalence of behavioural disorders of about 45.3%. Among individuals with severe/profound ID, the rate of challenging behaviour is reported to be three times higher than the average (Sheehan et al., 2015). At this point, it is important to mention the concept of 'diagnostic overshadowing', which is a tendency for professionals to assign psychopathological symptoms to a mental/cognitive condition rather than to a psychiatric comorbidity, which can lead to an underdiagnosis of psychiatric disorders among people with ID compared with people without cognitive impairment (Reiss et al., 1982). While psychiatric disorders and challenging behaviour have typically been investigated separately, some studies have focused on the relationship between both conditions in individuals with ID. Similar to Schützwohl et al.'s (2016) research, the present study examines the prevalence of mental and behavioural disorders among people with ID, but we focus specifically on individuals without a previous diagnosis of a comorbid mental disorder and investigate the associations between mental and behavioural disorders according to four levels of ID.

Studies on the co-occurrence of mental disorder and ID have found very divergent figures (Munir, 2016; Nettelbladt et al., 2009). This lack of consistency between challenging behaviour and psychiatric disorders has been explained as being due to diagnostic difficulties (Salvador-Carulla and Novell-Alsina, 2002), the use of different diagnostic criteria (Cooper et al., 2007) and the existence of functional 'precursors' of challenging behaviour. Furthermore, it is of interest to highlight the heterogeneity of the population assessed due to the variety of syndromes, different localizations and causes of brain damage, most of which have an unclear aetiology (Chiurazzi and Pirozzi, 2016; Mehregan et al., 2016) and multiple behavioural phenotypes (Nyhan, 1972).

Newman et al. (2015) found a positive association between severe challenging behaviour and psychiatric comorbidity in a study assessing 47 children with Fragile X syndrome and different degrees of ID. A decade earlier, in a sample of 180 individuals with severe ID, Rojahn et al. (2004) found that challenging behaviour tended to be associated with psychiatric disorders; this association was more pronounced for stereotypes and neurodevelopmental disorders and less pronounced for psychotic disorders.

The purpose of this study was to (1) assess the prevalence of mental disorders and challenging behaviour in individuals supported by special educational and social services without a prior-diagnosed psychiatric comorbidity and (2) compare the figures of different disorders depending on the severity of ID.

Materials and methods

Procedure/recruiting

One hundred and forty-two adults with ID were recruited sequentially from different wards of the targeted funding association in Catalonia (Spain), which is a well-known organization providing social, educational and medical support for people with ID in its catchment area. It is estimated that 95% of the population with ID in the catchment area receive some support from this organization. The studied funding association is composed of different internal stakeholders (special education schools, day care centres, nursing and social worker home support, targeted training programs and social rehabilitation) with the objective of improving the quality of life of people with ID and their families. We assessed ID using the Wechsler Adults Intelligence Scale (WAIS)-II during admission into the services as an intake criterion.

The study was conducted from 10th September 2013 until 15th December 2014.

The informed consent form was sent via mail to all participants or to their legal guardian and returned signed before beginning the assessment. The study was approved by the Ethics Committee of the Academic Hospital of Vic (Catalonia-Spain).

Selection of the sample

Inclusion criteria for the study were the following: (i) existence of ID, (ii) support from the targeted funding association, (iii) lack of a previously diagnosed mental disorder, (iv) consent to participate in the study and (v) being an adult (18 years or older). Exclusion criteria were the following: (i) individuals less than 18 years old, (ii) having a prior diagnosis of a mental disorder and (iii) declining to sign the informed consent. The authors decided to exclude people with a prior psychiatric diagnosis from the study in order to ensure the homogeneity of the sample. Regular intake of medication was not an exclusion criterion. Initially, the sample (full survey) comprised 294 individuals; after excluding minors, the sample was reduced to 210 adults who met the inclusion criteria. Overall, 162 adults or their legal guardians signed the informed consent; of the 162 individuals consenting, 20 were excluded because they displayed a previously diagnosed mental disorder, leaving 142 participants who met the full inclusion criteria (see Figure 1).

Assessment instruments

The level of ID of the participants was assessed based on the Diagnostic and Statistical Manual of Mental Disorders (DSM)-IV criteria by using the WAIS-II during admission into the services described (Figure 2). Hence, the full sample was previously assessed using the WAIS-II as an admission criterion in the targeted funding association. There are no Spanish norms for the WAIS-II in the target population, but one relevant publication used the WAIS-II in the target population in association with the validated assessment tools used in the present research (Irazábal et al., 2012). We created two different ID groups according to the scales: The first group was composed of people with mild and moderate ID, and the second group was composed of people with severe and profound ID.

The following instrument was used to assess mental disorders in the population with mild/moderate ID: the Spanish version of the Psychiatric Assessment Schedule for Adults with Developmental Disability (PAS-ADD; García González-Gordon, 2002), which is based on the International Statistical Classification of Diseases and Related Health Problems (World Health Organization, 2004) and DSM-IV-Text Revision (DSM-IV-TR; American Psychiatric

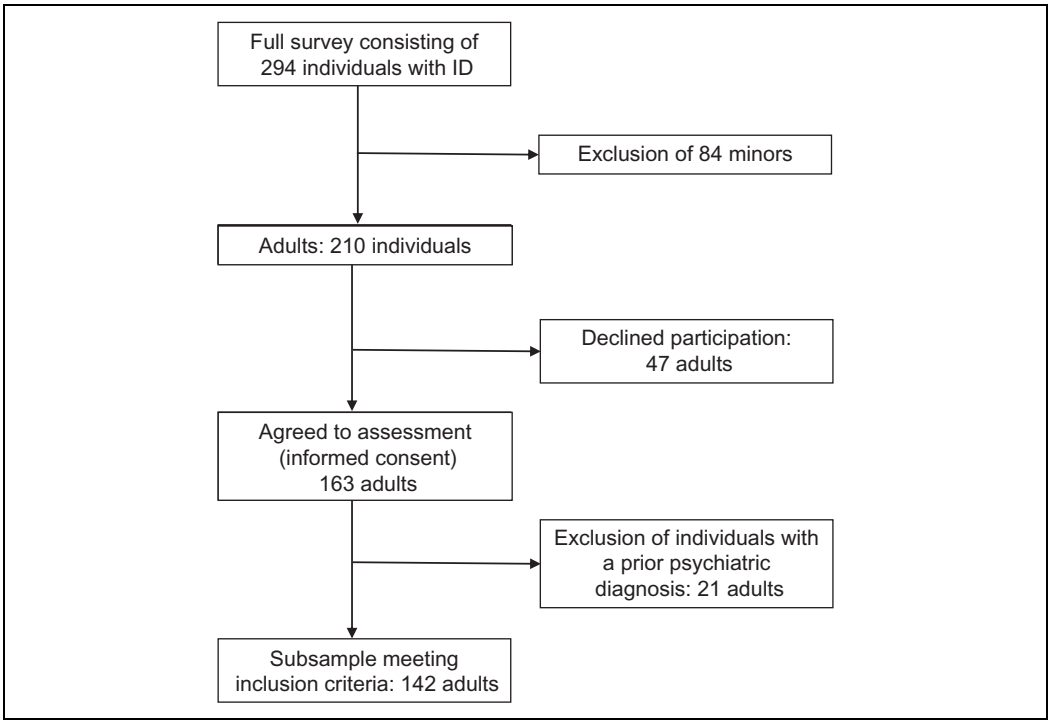

Figure 1. Progressive reduction of sample applying consecutive inclusion/exclusion criteria from 294 down to 142.

Association, 2000). This instrument contains the following sections: (i) the PAS-ADD checklist, aimed at performing a psychopathological screening in at-risk populations, which is administered by professionals or family members who have close contact with the participants; (ii) the Mini PAS-ADD, a scale targeted at detecting symptoms and used as a diagnostic guide; and (iii) the PAS-ADD interview, a semi-structured interview administered by clinical psychiatrists or psychologists trained in working with people suffering from ID.

The following instrument was used to assess mental disorders in the population with severe/profound ID: the Spanish version of the Diagnostic Assessment for the Severely Handicapped scale (DASH-II; Vargas-Vargas et al., 2014), which is an expert scale consisting of 96 items following the criteria of the DSM-IV-TR (American Psychiatric Association, 2000). This scale is administered by caregivers or family members. Medical conditions were gathered from medical records.

The PAS-ADD scale covers the whole range of ID, but has higher specificity for people with mild and moderate ID, whereas the DASH-II was designed to assess mental disorders in people with severe and profound ID. The correlation between the PAS-ADD and the DASH-II is stronger for the sum scores than for each individual scale (Myrbakk and von Tetzchner, 2008). Therefore, the authors decided to use the PAS-ADD to assess mental disorders among people with mild/moderate ID and the DASH-II among people with severe and profound ID.

Challenging behaviour in the population with ID was assessed using the Spanish version of the Inventory for Client and Agency Planning (ICAP; Montero Centeno, 1996), initially developed by

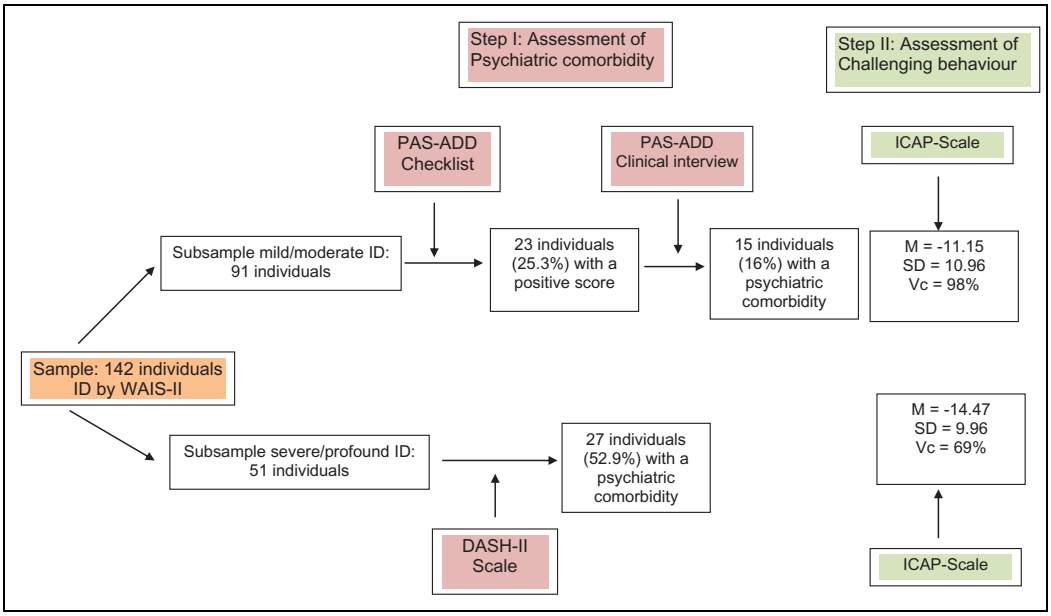

Figure 2. Diagnostic steps and corresponding assessment tools. WAIS-II: Wechsler Adults Intelligence Scale – Revised; PAS-ADD: Psychiatric Assessment Schedule for Adults with Developmental Disability; DASH-II: Diagnostic Assessment for the Severely Handicapped; ICAP: Inventory for Client and Agency Planning; *M* = mean; SD = standard deviation; Vc = variation coefficient (SD × 100/*M*).

Bruininks et al. (1986). The ICAP is a diagnostic tool that generates a systematic record of individual data and assesses both adaptive and challenging behaviours. This inventory, consisting of 77 items scored on a range from 0 to 3 (0 = *never or rarely*; 1 = *does, but not well*; 2 = *does fairly well*; 3 = *does independent*), was created for individuals with disabilities but is applicable to the general population. It consists of three sections: (i) systematic recording of socio-demographic, medical and functional data of individuals; (ii) testing of adaptive behaviour and measurement of the capabilities that individuals must develop to become more autonomous in their environment (motor, social and communicative, personal living and community living skills); and (iii) testing of challenging behaviour based on eight areas and four normative indexes (internalized, externalized, asocial and general Maslach Burnout Inventory). The scores are based on the severity and frequency of the challenging behaviour. We used the *problem behaviour index* to assess the severity of challenging behaviour: the participant–domain difference (average domain for the age-reference group) ICAP scores ranged from −10 until +10 (normal) to −41 and below (very serious) with a mean of 0 and a standard deviation (SD) of 10. The Spanish version showed good internal consistency (Cronbach's $\alpha > 0.80$) and good inter-rater reliability when assessing people with ID during its Spanish validation (Montero Centeno, 1996).

In the first phase of the study, the authors administered the ICAP interview to all the participants. The psychologists and social workers of the targeted funding association were trained to administer the questionnaire. In the second phase, the authors administered the PAS-ADD checklist to the participants with mild/moderate ID. Psychologists and social workers who had trained at the targeted funding association also administered this questionnaire. The PAS-ADD

interview was subsequently administered to those participants who had scored positively in the PAS-ADD checklist. For this purpose, the authors considered the cut-off scores set by the diagnostic criteria of the PAS-ADD checklist (affective/neurotic category: six points; organic category: five points; psychotic category: two points). The PAS-ADD interview was conducted by a psychiatrist with ID expertise. A retest was performed by administering the PAS-ADD interview to 10% of the participants who had scored negatively in the screening in order to rule out possible false-negatives.

The Spanish version of the DASH-II scale was also administered to individuals with severe and profound ID by clinical psychologists who had trained at the targeted funding association.

Data concerning the aetiology of the ID were collected retrospectively from the medical records of the patients.

Statistical analysis

Statistical analyses were conducted using the Statistical Package for the Social Sciences (Version 20.0). The metric variables are described by their statistical summary (mean and SD) if they displayed a normal distribution or by medians and percentiles if they did not. The categorical variables are described using absolute frequencies and percentages. The analysis of group differences was performed using Student's *t*-test for dichotomous dependent variables (two groups) or its non-parametric equivalent (the Mann–Whitney *U*-test). The Mann–Whitney *U*-test is a non-parametric test that assesses distribution differences between two independent variables rather than associations; thus, a significant result from the test means there are differences between the distributions of both variables and not an association in the sense of parametric tests. The statistical significance level was fixed at $p < 0.05$.

Results

Description of the sample

Of the 142 participants, 91 displayed mild/moderate ID (mild ID: 43, moderate ID: 48) and 51 severe/profound ID (severe ID: 44, profound ID: 7). There were 58 men and 33 women in the group with mild/moderate ID. The group of severe/profound ID was composed of 26 men and 25 women. The most frequent reason for the disability in this sample was idiopathic, followed by Down syndrome and prenatal brain damage. The most frequent medical comorbidity was epilepsy (22.5% of sample), especially in the subsample with serious/profound ID (39.2%; see Table 1).

Psychopathological assessment of the sample

Psychiatric disorders. The share of people in the assessed sample with at least one mental disorder was 29.6% (42 cases). There were no significant differences between the subgroup showing at least one psychiatric diagnosis and the subgroup without psychiatric comorbidity for gender or age. There were also no significant differences between mild/moderate and severe/profound ID or between the four ID subgroups (mild, moderate, severe and profound ID) regarding psychiatric comorbidity. Of the 91 participants, 23 with mild/moderate ID scored positively in the screening and were therefore interviewed with the PAS-ADD checklist. The time gap between the screening process and the application of the PAS-ADD interview was 3 months $\pm$ 4 weeks. Fifteen individuals showed a previously undiagnosed mental disorder (16%). The most prevalent mental disorder in the group with mild/moderate ID was major depressive disorder (see Table 2). In the

Table 1. Aetiology of intellectual disability and medical comorbidity of the sample.

	Total individuals	Mild/moderate	Severe/profound
	N (%)	*n* (%)	*n* (%)
Gender			
Male	84 (59)	58 (69)	26 (31)
Female	58 (41)	33 (57)	25 (43)
Average age (mean)			
Male	42.76	42.48	39.52
Female	40.90	39.52	45.42
Aetiology of intellectual disability			
Down syndrome	16 (11.6)	9 (9.9)	7 (13.7)
Fragile X syndrome	3 (2.1)	2 (2.2)	1 (2.0)
Prenatal brain damage	15 (10.6)	9 (9.9)	6 (11.8)
Perinatal brain damage	12 (8.5)	7 (7.7)	5 (9.8)
Postnatal brain damage	12 (8.5)	7 (7.7)	5 (9.8)
Others	84 (58.7)	57 (62.6)	17 (33.3)
Medical comorbidity			
Epilepsy	32 (22.5)	12 (13.2)	20 (39.2)
Cardiovascular diseases	4 (2.8)	2 (2.2)	2 (3.9)
Gastrointestinal diseases	8 (5.6)	2 (2.2)	6 (11.8)

Table 2. Scope of psychiatric comorbidity according to the level of ID.

Intellectual disability	Psychiatric disorder	*n*	%
Mild/moderate			
	Bipolar/schizoaffective disorder	4	4.40
	Not otherwise specified psychotic disorder	3	3.30
	Major depressive disorder	5	2.20
	Obsessive compulsive disorder	1	1.10
	Without psychiatric disorder	76	83.50
Severe/profound[a]			
	Anxiety disorder	15	29.40
	Major depressive disorder	2	3.90
	Bipolar/schizoaffective disorder	4	9.80
	Organic disorder	1	2.00
	Without disorder	24	47.10
	Patients with >2 disorders in DASH-II	9	
	Patients with 2 disorders in DASH-II	7	
	Patients with 1 disorder in DASH-II	11	

DASH-II: Diagnostic Assessment for the Severely Handicapped scale; ID: intellectual disability.
[a] Using the DASH-II scale, patients with more than one mental disorder were found more frequently in the severe/profound ID subgroup.

subgroup of individuals with mild ID ($n = 43$), five showed a previously undiagnosed mental disorder (11.6%); in the subgroup of individuals with moderate ID ($n = 48$), 10 showed a previously undiagnosed mental disorder (20.8%).

Table 3. Distribution differences between mental disorders and challenging behaviour (Mann–Whitney *U*-test).

Intellectual disability	*n* (%)	ICAP (average) (SD)	*p*
Mild/moderate			
Without mental disorder	76 (83.5)	−9.16 (9.25)	
With mental disorder	15 (16.5)	21.27 (13.55)	<0.001
Total	91 (100)	11.15 (10.96)	
Severe/profound			
Without mental disorder	24 (47.1)	−13.08 (9.39)	
With mental disorder	27 (52.9)	−15.70 (9.96)	>0.05
Total	51 (100)	14.47 (9.69)	
Total	142 (100)		

ICAP: Inventory for Client and Agency Planning; SD: standard deviation.

In the retest (PAS-ADD interview) of 12 individuals (10% of the sample who scored negative on the PAS-ADD checklist), no individuals showed a mental disorder. This result reinforces the assessment's accuracy. The time gap between the semi-structured PAS-ADD interview and the retest was 2 months $\pm$ 2 weeks.

Of the 51 participants with severe/profound ID, 27 (52%) showed a previously undiagnosed psychiatric disorder. The most prevalent mental disorder in the group with severe/profound ID was anxiety disorder. Two or more psychiatric disorders were diagnosed in 16 participants (31%; Table 2). Comparisons between subgroups showed that 22 of the 42 (53%) individuals with severe ID suffered from at least one previously undiagnosed mental disorder. Within the subgroup of individuals with profound ID, five of seven (71.4%) suffered from a previously undiagnosed mental disorder. In both subgroups, the most prevalent mental disorder was anxiety disorder.

Challenging behaviour. The following eight domains of the ICAP were assessed: (1) hurtful to self, (2) hurtful to others, (3) destructive to property, (4) disruptive behaviour, (5) unusual/repetitive habits, (6) socially offensive behaviour, (7) withdrawn or inattentive behaviour and (8) uncooperative behaviour. For each domain, two assessment criteria were used: frequency and severity. Finally, the partial scores were added, and domain difference scores (comparison with the average domain for the age-reference group) were computed. The average score on the ICAP in the subgroup of individuals with mild/moderate ID was −11.15 (SD = 10.96). The average score in the subgroup of individuals with severe/profound ID was −14.47 (SD = 9.69; see Table 3).

The average score on the ICAP (problem behaviour index) was −10.76 (SD = 10.43) in the subgroup with mild ID. In the subgroup with moderate ID, the average score on the ICAP (problem behaviour index) was −11.50 (SD = 11.52). In the subgroup with severe ID, the average score on the ICAP was −15.02 (SD = 10.20), whereas in the subgroup with profound ID, the average score on the ICAP was −11.00 (SD = 4.58). These results correspond to each level of ID beyond the global results displayed in Table 3.

Relationship between challenging behaviour and psychiatric disorders. The Mann–Whitney *U*-test was used for patients with mild/moderate ID (because the distribution of scores was not normal); the results showed significantly poorer scores on the ICAP scale ($p < 0.001$) when the patients suffered from a psychiatric comorbidity in comparison with the subsample without psychiatric comorbidity.

This difference was not found among patients displaying severe/profound ID ($p > 0.05$; see Table 3). No significant distribution differences were found when using the non-parametric Mann–Whitney *U*-test for each subgroup of ID and challenging behaviour, with the exception of moderate ID (not displayed in the table).

Individuals suffering from affective disorders showed challenging behaviour more frequently, both in the group with mild/moderate ID ($p < 0.001$) and in the group with severe/profound ID ($p < 0.001$). Serious medical conditions such as epilepsy were not significantly related to challenging behaviour.

Discussion

The most important result of this epidemiological investigation is the detection of an undiagnosed psychiatric comorbidity in almost a third (29.6%) of institutionalized individuals with ID. The co-occurrence of mental disorder and challenging behaviour was more frequent in individuals with moderate ID than in those with severe ID. Mental disorders and challenging behaviour (as an important kind of behaviour disorder) seem to be related among people with mild/moderate ID, but not among individuals with severe/profound ID. These results are congruent with those of Axmon et al. (2017), who also found that challenging behaviour was more frequent among people suffering from mild ID and comorbid mental disorders. The share of individuals displaying mental disorders among people with ID found in this investigation was higher than that reported in other studies (Deb et al., 2001; Schützwohl et al., 2016; Sheehan et al., 2015).

The finding that depressive disorders were the most frequent mental disorders in the subgroup with mild/moderate ID is consistent with results in the general population in Spain (Haro et al., 2006) and specifically with the mild/moderate ID population in other countries (Cooper et al., 2007). Nevertheless, our findings are not consistent with the results of other authors who have observed a higher proportion of psychosis, personality disorder or autism among people with ID (Deb et al., 2001; Turygin et al., 2014).

When we focus specifically on the group with severe/profound ID, anxiety disorder was the most prevalent mental disorder. This is in contrast to other studies that reported a higher prevalence of psychosis (Rojahn et al., 2004). The subgroup with severe/profound ID more frequently showed a psychiatric comorbidity (31%), usually consisting of two or more mental disorders. These results are consistent with the findings of Kozlowski et al. (2011), where 61.8% of the individuals scored positively in two or more dimensions of the DASH-II scale. In contrast to our results, Axmon et al. (2017) found even lower rates of psychiatric comorbidity in the severe/profound ID subgroup than in the mild/moderate ID subgroup. The authors suggest that brain damage could be a reason for the higher incidence of psychiatric comorbidity in the light of some findings by other researchers and considering that 40% of the subsample with severe/profound ID suffered from epilepsy. The following neurological conditions were suggested by other authors: agenesis of the corpus callosum (Mohapatra et al., 2015), schizencephaly (Melo et al., 2013) and lissencephaly (Chang et al., 2007), as well as cerebral atrophy, leucomalacia and hypoxic and traumatic damage. Such neurological damage could facilitate, via the breakdown of integrative cerebral functioning, the onset of mental disorders in general. The high proportion of epilepsy among people with a psychiatric comorbidity in the current sample could be viewed as a common pathway that makes people with ID more vulnerable to both mental and neurological disorders, as similarly argued by other authors (Matsuura et al., 2005; Sperli et al., 2009). Moreover, the high prevalence of mental disorders in the subgroup with severe/profound ID could reflect the epistemic difficulties in diagnosing mental

disorders among people with severe ID (Borthwick-Duffy, 1994; Rush and Frances, 2000). The limitations in communicating thoughts and feelings among people with severe/profound ID (Matson et al., 1999) and the quite different clinical features of mental disorders in the population with ID (Walton and Kerr, 2016) constrain the epistemic way of measuring behaviour features. This could lead to diagnostic overshadowing as a propensity to overlook real psychopathological phenomena among people with ID, causing a biased assessment of mental comorbidity (Jopp and Keys, 2001) and diagnostic inaccuracy (Smiley and Cooper, 2003). This phenomenon could lead to insufficient medical recommendations and therapeutic decisions.

Individuals in the subgroup with mild/moderate ID suffering from a mental disorder were more at a risk of displaying serious behavioural disorders, unlike the subgroup with severe/profound ID. Tsiouris et al. (2011) and Newman et al. (2015) reported more challenging behaviour among individuals with ID and psychiatric comorbidity in comparison with people with ID not suffering from a mental disorder. This association was stronger among people suffering from affective disorders (Moss et al., 2000; Reiss and Rojahn, 1993).

Considering the subgroup with severe/profound ID, the proportion of individuals displaying challenging behaviour found in the present investigation differs from the results of previous studies (Rojahn et al., 2004), because we did not find any relationship between severe behaviour and mental disorders. In our opinion, this finding could be explained by considering the presence of a confounding factor, due to the high prevalence of challenging behaviour linked to severe/profound ID (Sheehan et al., 2015). Self-stimulation, stereotypies and restricted forms of communication can increase behavioural problems among individuals with severe/profound ID, regardless of psychiatric comorbidity.

Before initiating pharmacological therapy for people with ID and challenging behaviour, medical conditions such as epilepsy, pain, gastrointestinal problems, etc. should be excluded as being the cause of behavioural disorders. At the same time, the individual's level of functioning has to be assessed (Iwata et al., 1994) in order to identify environmental influences on the challenging behaviour, such as alternative ways of communicating, reducing self-stimulating behaviour and more intensive support as a positive reinforcement. Also, negative reinforcement, such as limiting demands and escape from noisy stimuli, must be implemented (Delgado-Casas et al., 2014). Additionally, a proper psychiatric diagnosis leads to more accurate pharmacological treatment. Considering that depressive disorders were the most prevalent mental disorders in our study, antipsychotic drugs must be prescribed with caution for people with ID, because of their depressant effect (Tsiouris et al., 2011). The finding that nearly a third of the assessed sample showed the underdiagnosis of a mental comorbidity in people with ID indicates the medical necessity of implementing adapted diagnostic tools, especially among individuals with behavioural disorders due to the higher comorbidity rates in this subgroup.

Limitations

The most important limitation of this study is the restricted representativeness for the population with ID, because the survey was carried out in a single funding association with a scope of different services; therefore, the findings should be carefully generalized. Because of the differences in sampling methods, exclusion criteria and measurement scales used across the studies, an accurate comparison of results is only possible with interpretive restrictions.

Only bivariate associations were investigated; influencing/risk factors can be better investigated by means of logistic or multivariate regression models, but the sample size was not large enough for this purpose (thus, the power was too low for these statistical models).

Finally, there are some potentially clinical limitations. Psychotropic medication could generate false-positive as well as false-negative diagnostic assessments, but medication was not considered an influencing variable in this study. No associations between mental disorder and major brain damage were investigated.

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ORCID iD

Francesc Arrufat http://orcid.org/0000-0002-2788-9204

References

American Psychiatric Association (2000) *Diagnostic and Statistical Manual of Mental Disorders. DSM-IV*. Washington: American Psychiatric Association.

American Psychiatric Association (2014) *Diagnostic and Statistical Manual of Mental Disorders*. *DSM-5*. Washington: American Psychiatric Association.

Axmon A, Björne P and Nylander L (2017) Psychiatric diagnoses in relation to severity of intellectual disability and challenging behaviors: a register study among older people. *Aging & Mental Health* 21: 1–7.

Borthwick-Duffy SA (1994) Epidemiology and prevalence of psychopathology in people with mental retardation. *Journal of Consulting and Clinical Psychology* 62(1): 17–27.

Bruininks RH, Hill BK, Weatherman RF, et al. (1986) *ICAP. Inventory for Client and Agency Planning. Examiner's Manual*. Allen: DLM Teaching Resources.

Chang B, Duzcan F, Kim S, et al. (2007) The role of RELN in lissencephaly and neuropsychiatric disease. *American Journal of Medical Genetics. Part B, Neuropsychiatric Genetics: The Official Publication of the International Society of Psychiatric Genetics* 144B(1): 58–63.

Chiurazzi P and Pirozzi F (2016) Advances in understanding – genetic basis of intellectual disability. *F1000Research* 5: Faculty of 1000.

Cohen IL, Tsiouris JA, Flory MJ, et al. (2010) A large scale study of the psychometric characteristics of the IBR modified overt aggression scale: findings and evidence for increased self-destructive behaviors in adult females with autism spectrum disorder. *Journal of Autism and Developmental Disorders* 40(5): 599–609.

Cooper SA, Smiley E, Morrison J, et al. (2007) Mental ill-health in adults with intellectual disabilities: prevalence and associated factors. *The British Journal of Psychiatry* 190: 27–35.

Deb S, Thomas M and Bright C (2001) Mental disorder in adults with intellectual disability: the rate of behaviour disorders among a community-based population aged between 16 and 64 years. *Journal of Intellectual Disability Research: JIDR* 45(6): 506–514.

Delgado-Casas C, Navarro JI, Garcia-Gonzalez-Gordon R, et al. (2014) Functional analysis of challenging behavior in people with severe intellectual disabilities. *Psychological Reports* 115(3): 655–669.

Emerson E and Einfeld SL (2011) *Challenging Behaviour*. New York: Cambridge University Press.

García González-Gordon R (2002) *Adaptación Española de la Entrevista PAS-ADD. Una Entrevista Estandarizada* [In Spanish]. Cadiz: Universidad de Cadiz, S. Publicaciones.

Haro JM, Palacín C, Vilagut G, et al. (2006) Prevalence of mental disorders and associated factors: results from the ESEMeD-Spain study. *Medicina Clínica* 126(12): 445–451.

Irazábal M, Marsà F, García M, et al. (2012) Family burden related to clinical and functional variables of people with intellectual disability with and without a mental disorder. *Research in Developmental Disabilities* 33(3): 796–803.

Iwata BA, Dorsey MF, Slifer KJ, et al. (1994) Toward a functional analysis of self-injury. *Journal of Applied Behavior Analysis* 2(27): 197–209.

Jopp DA and Keys CB (2001) Diagnostic overshadowing reviewed and reconsidered. *American Journal of Mental Retardation: AJMR* 106(5): 416–433.

Koskentausta T, Iivanainen M and Almqvist F (2007) Risk factors for psychiatric disturbance in children with intellectual disability. *Journal of Intellectual Disability Research: JIDR* 51(1): 43–53.

Kozlowski AM, Matson JL, Sipes M, et al. (2011) The relationship between psychopathology symptom clusters and the presence of comorbid psychopathology in individuals with severe to profound intellectual disability. *Research in Developmental Disabilities* 32(5): 1610–1614.

Matson JL, Rush KS, Hamilton M, et al. (1999) Characteristics of depression as assessed by the Diagnostic Assessment for the Severely Handicapped-II (DASH-II). *Research in Developmental Disabilities* 20(4): 305–313.

Matsuura M, Adachi N, Muramatsu R, et al. (2005) Intellectual disability and psychotic disorders of adult epilepsy. *Epilepsia* 46(1): 11–14.

Mehregan H, Najmabadi H and Kahrizi K (2016) Genetic studies in intellectual disability and behavioral impairment. *Archives of Iranian Medicine* 19(5): 363–375.

Melo M, Albuquerque S, Luz J, et al. (2013) Schizencephaly and psychosis: a rare association. *Case Reports in Medicine* 2013: 210868.

Mohapatra S, Panda U, Sahoo A, et al. (2015) Neuropsychiatric manifestations in a child with agenesis of the corpus callosum. *Journal of Neurosciences in Rural Practice* 6(3): 456.

Montero Centeno D (1996) *Evaluación de la Conducta Adaptativa en Personas con Discapacidades: Adaptación y Validación del ICAP* [In Spanish]. Bilbao: Mensajero.

Moss S, Emerson E, Kiernan C, et al. (2000) Psychiatric symptoms in adults with learning disability and challenging behaviour. *The British Journal of Psychiatry: The Journal of Mental Science* 177: 452–456.

Munir KM (2016) The co-occurrence of mental disorders in children and adolescents with intellectual disability/intellectual developmental disorder. *Current Opinion in Psychiatry* 29(2): 95–102.

Myrbakk E and von Tetzchner S (2008) Psychiatric disorders and behavior problems in people with intellectual disability. *Research in Developmental Disabilities* 29(4): 316–332.

Nettelbladt P, Göth M, Bogren M, et al. (2009) Risk of mental disorders in subjects with intellectual disability in the Lundby cohort 1947-97. *Nordic Journal of Psychiatry* 63(4): 316–321.

Newman I, Leader G, Chen J, et al. (2015) An analysis of challenging behavior, comorbid psychopathology, and Attention-Deficit/Hyperactivity Disorder in Fragile X Syndrome. *Research in Developmental Disabilities* 38: 7–17.

Nyhan WL (1972) Behavioral phenotypes in organic genetic disease: presidential address to the Society for Pediatric Research, May 1, 1971. *Pediatric Research* 6(1): 1–9.

Reiss S, Levitan GW and Szyszko J (1982) Emotional disturbance and mental retardation: diagnostic overshadowing. *American Journal of Mental Deficiency* 86(6): 567–574.

Reiss S and Rojahn J (1993) Joint occurrence of depression and aggression in children and adults with mental retardation. *Journal of Intellectual Disability Research: JIDR* 37(3): 287–294.

Rojahn J, Matson JL, Naglieri JA, et al. (2004) Relationships between psychiatric conditions and behavior problems among adults with mental retardation. *American Journal on Mental Retardation* 109(1): 21–33.

Rush AJ and Frances A (2000) Expert consensus guideline series: treatment of psychiatric and behavioral problems in mental retardation. *American Journal of Mental Retardation: AJMR* 105(3): 159–226.

Salvador-Carulla L and Novell-Alsina R (2002) *Guía Práctica de la Evaluación Psiquiátrica en el Retraso Mental* [In Spanish]. Madrid: Aula Medica Ediciones.

Schützwohl M, Koch A, Koslowski N, et al. (2016) Mental illness, problem behaviour, needs and service use in adults with intellectual disability. *Social Psychiatry and Psychiatric Epidemiology* 51(5): 767–776.

Sheehan R, Hassiotis A, Walters K, et al. (2015) Mental illness, challenging behaviour, and psychotropic drug prescribing in people with intellectual disability: UK population based cohort study. *British Medical Journal* 351: 1–9.

Smiley E and Cooper SA (2003) Intellectual disabilities, depressive episode, diagnostic criteria and Diagnostic Criteria for Psychiatric Disorders for Use with Adults with Learning Disabilities/Mental Retardation (DC-LD). *Journal of Intellectual Disability Research: JIDR* 47(1): 62–71.

Sperli F, Rentsch D, Despland PA, et al. (2009) Psychiatric comorbidity in patients evaluated for chronic epilepsy: a differential role of the right hemisphere? *European Neurology* 61(6): 350–357.

Tsiouris JA, Kim SY, Brown WT, et al. (2011) Association of aggressive behaviours with psychiatric disorders, age, sex and degree of intellectual disability: a large-scale survey. *Journal of Intellectual Disability Research* 55(7): 636–649.

Turygin N, Matson JL and Adams H (2014) Prevalence of co-occurring disorders in a sample of adults with mild and moderate intellectual disabilities who reside in a residential treatment setting. *Research in Developmental Disabilities* 35(7): 1802–1808.

Vargas-Vargas C, Rafanell A, Montalvo D, et al. (2014) Validity and reliability of the Spanish version of the Diagnostic Assessment for the Severely Handicapped (DASH-II). *Research in Developmental Disabilities* 36C: 537–542.

Walton C and Kerr M (2016) Severe intellectual disability: systematic review of the prevalence and nature of presentation of unipolar depression. *Journal of Applied Research in Intellectual Disabilities: JARID* 29(5): 395–408.

World Health Organization (2004) ICD-10 guide for mental retardation. Available at: http://apps.who.int/iris/bitstream/handle/10665/63000/WHO_MNH_96.3.pdf?sequence=1&isAllowed=y (accessed 5 June 2018).