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Original article

A descriptive case-register study of delusional disorder

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Abstract

Objective. — A few empirically based studies' data on delusional disorder (DD) exist. We aim to describe sociodemographic and clinical correlates of DD and to identify clinical profiles associated to DD and its subtypes.

Methods. — This is a case-register study based on all those subjects attending community mental health services within a geographically well-defined area. Four hundred and sixty-seven patients had been diagnosed as DD cases at psychiatric services serving a catchment area of some 607,494 inhabitants living in South Barcelona (Spain) during a three-year period (2001–2003). A thorough systematic review of computerised medical records was used to establish DSM-IV diagnosis, rendering a valid sample of 370 patients who fulfilled DSM-IV criteria for DD. Independent variables gathered include sociodemographic data, family and personal psychiatric history, and comorbid diagnoses on all DSM-IV axes (including GAF). We used descriptive and univariate statistical methods to explore sample frequencies and correlates across DD types.

Results. — The mean age of the patients was 55 years and the sample had a mean GAF score of 51 suggesting a poor functionality; 56.5% of the patients were female. The most frequent DD types were persecutory (48%), jealous (11%), mixed (11%) and somatic (5%), whilst 23% qualified for the NOS type. Most frequent symptoms identified were self-reference (40%), irritability (30%), depressive mood (20%) and aggressiveness (15%). Hallucinations were present in 16% of the patients (6% tactile; 4% olfactory). Nearly 9% had a family history of schizophrenia (higher among those with the jealous subtype) and 42% had a comorbid axis II diagnosis (mostly paranoid personality disorder). Depression was significantly more frequent among the persecutory and jealous types. Finally, global functioning was significantly better among jealous and mixed types and worse amongst erotomanic and grandiose cases ($p = 0.008$).

Conclusions. — In the absence of other similar empirical data, this modest study provides unique empirical evidence of some clinical and risk correlates of DD and its subtypes.

Keywords: Delusional disorder; Delusions; Psychotic symptoms; Psychopathology; Psychosis; Paranoia

1. Introduction

The core psychopathology of delusional disorder (DD) is the presence of a persistent non-bizarre delusional system. DSM-IV describes seven different types of DD attending mainly to the content of the delusions (persecutory, jealous, somatic, grandiose, erotomanic, mixed and not otherwise specified (NOS)). [1] DD is a surprisingly poorly researched psychotic disorder on which both clinical and epidemiological studies are extremely rare. In addition, studies to date using current diagnostic criteria are even rarer, as the majority of such studies have not used DSM-IV criteria [20]. The lack of evidence about this disorder is partly due to an assumed low prevalence of DD and also to the fact that many DD patients do not seek psychiatric help unpromptedly [24].

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1.1. Sociodemographics of DD

Kendler's meta-analysis continues to be the seminal descriptive study on the epidemiology of DD [20]. It was based on 17 existing studies about the frequency of DD, mostly based on data from patients being admitted to hospital with a diagnosis of paranoia. Estimated prevalence for DD, inferred from admissions of patients with a diagnosis of paranoia, ranged between 24 and 30 cases in every 100,000 inhabitants. The mean age of onset ranged between 35 and 45 years and female patients slightly outnumbered male patients (female/male ratio is 1.2/1). Over the last decade, there have been four other smaller epidemiological studies on DD showing an even higher female/male ratio (female/male ratios ranging from 3/1.9) [21,22,25,31]. Conversely, another study showed minimal excess numbers of male patients (female/male ratio of 0.86) [12]. Regarding marital status, 60–75% of the patients were married when they were first admitted into hospital, whilst between a quarter and a third of the remaining sample were widowers, separated or divorced [20]. However, Maina et al., studying an out-patient sample, found a lower percentage of married patients (47.8%), a higher percentage of single individuals (43.5%) and a lower percentage of divorced or separated individuals (6.5%) and widowers (2.2%) [21].

1.2. Risk factors for DD

Social risk factors of DD include low socioeconomic status, older age, family history of psychiatric disorders, immigration, sensory deficit and exposure to stressful events. Kendler found that two-thirds of DD patients belong to low socioeconomic status and estimated that 20–25% of the new cases of DD take place in old age [20]. Relatives of DD patients do not seem to be at higher risk of either schizophrenia or mood disorders but appear to show an increased rate of paranoid personality disorder and/or a premorbid tendency to jealousy, suspiciousness, and secretiveness [14–17,19,28–30]. An English study by Hitch and Rack suggested a prevalence of 16% of paranoid ideas among immigrants compared to a significantly smaller rate of 4% among English natives [11]. As mentioned earlier, sensory deficits have also been reported as a risk factor for paranoia. Cooper et al. found that 21% of deaf people tend to develop delusions and other psychotic symptoms, whilst other studies have related deafness to late paraphrenia or schizophrenia [5,6,8,26]. Deafness can more likely be seen as a correlate of psychosis rather than a specific risk factor for DD.

1.3. Comorbid psychopathology

Maina et al. studied a series of 64 cases of DSM-IV DD out-patients establishing that 31.3% had at least one comorbid axis I disorder (21.9% had a mood disorder and 3.1% had at least one comorbid anxiety disorder [21]. In another study, Hsiao et al. found that hallucinations were also common among DD patients with non-prominent auditory hallucinations being the most frequent type (11.6%), followed by the tactile hallucinations (5.8%), non-prominent visual hallucinations (2.3%) and olfactory hallucinations (2.3%) [12]. Finally, reported comorbid personality disorders include paranoid, schizotypal and schizoid personality disorders [13,18,23].

1.4. DD types

Most studies report that by and large the most prevalent DD presentation is the so-called persecutory type [21,25,31]. Excluding the mixed type, Yamada found that, among their 54 DSM-III-R DD cases, the persecutory type was the most frequent (51%), followed by the somatic type (27.5%) and the jealous type (13.7%) [31]. Similarly, Hsiao et al., in a retrospective study with 86 cases of DD according to DSM-IV criteria, also found that the persecutory type was the most frequent (70%), followed by the mixed cases (14%) and those with jealous type (8%) [12]. The latter study also found no significant differences between these four most frequent types in terms of sex, age of onset, frequency of hallucinations and the presence of depression. Maina, with patients diagnosed using DSM-IV criteria, also found a higher prevalence of the persecutory type (54.4%), followed by somatic (17.4%), mixed (15.2%) and jealous types (6.5%) [21]. This study also reported a higher frequency of comorbid mental disorder (mainly mood disorders) among persecutory cases (54.4%) and a lower rate of psychiatric comorbid conditions among the mixed cases (66.7%) [21].

1.5. Aims of the study

Provided the conspicuous shortage of empirical descriptive studies on DD, this study provides a unique opportunity to explore and describe clinical correlates of DD based on a relatively large case register of DD patients. We aim to describe and quantify frequencies of DD types, empirically describe sociodemographic and psychopathological features of DD, explore the comorbidity and global functioning of DD patients and identify clinical and risk correlates of specific DD types.

2. Methods

2.1. Setting and design

Sant Joan de Déu – Serveis de Salut Mental (SJD – SSM) is a public mental health services provider covering both community and in-patient psychiatric care for a well-defined catchment area in the South of the province of Barcelona (Spain). Psychiatric care provision within this geographic area during the study period (2001–2004) was implemented via six community mental health out-patient teams, three day-hospitals, three acute in-patient care sub-units and a rehabilitation unit. Such groups of resources served some 607,494 inhabitants. In Spain, referral to psychiatric care is generally issued by general practitioners (GP); access to these referrals is free and universal. Therefore, most cases detected by GP

would be referred to their local community mental health team for further assessment and treatment, enabling us to establish a fairly thorough case register of all DD patients being cared for by such a large community care resource setting.

In addition, SJD–SSM has developed a sophisticated computerised psychiatric medical notes software package named HCI that ensures a highly structured method for medical-notes taking and psychopathological assessment procedures. It also enforces multi-axial DSM-IV diagnoses in all cases attending SJD–SSM resources [2]. All SJD–SSM psychiatrists had been formally trained to compulsorily incorporate, as the result of each individual consultation, all axes' DSM-IV diagnoses, structured mental-state psychopathology assessments and medication updates to such software. There is no alternative way to add notes to medical records within all SJD–SSM resources. The HCI software package also records consultation types to register psychiatric resources used by each patient.

2.2. The sample

The initial sample consisted of all 467 patients who were clinically recorded as having a diagnosis of DD. A systematic structured assessment including a checklist of all DSM-IV criteria was used in a retrospective thorough evaluation of medical records included in the HCI software from January 2000 to December 2003. Following such accurate diagnostic review procedure, 370 patients were finally found to completely fulfil DSM-IV criteria for DD and constituted our final DD case-register sample ($n = 370$).

2.3. Diagnostic procedure for inclusion in the delusional disorder case register

A structured symptom checklist based on DSM-IV criteria for DD was used to perform a thorough retrospective inspection of all entries on HCI for each patient clinically registered with a diagnosis of DD (see Table 1). Retrospective assessments to check the adequacy of DD diagnoses were made twice by a fully trained psychiatrist and a trained pre-doctoral research psychologist. Both professionals discussed their findings together within an expert panel which included an additional senior psychiatric supervisor before deciding, following DSM-IV criteria, whether to consider a patient as a certain DD case to be included in the study. This panel also assigned patients to the appropriate DSM-IV DD type considering all information gathered both from the HCI software and from the retrospectively completed symptom checklist. In summary, all cases who did not strictly fulfil all DSM-IV criteria for DD were excluded. Excluded cases were mostly patients who had been originally diagnosed as DD but ended up having sufficient criteria for a diagnosis of schizophrenia or other psychoses.

2.4. Assessment of independent variables

Should patients fulfil DSM-IV criteria for DD, an additional retrospective assessment was made using a structured risk factor questionnaire for DD based on risk factors suggested by previous research (Table 1). Thus, information was gathered on a dichotomous manner (Yes versus No) from the medical records, on sociodemographic variables, associated phenomenology, family and personal history of psychoses, comorbidity with other axis I disorders, comorbid personality disorder, global functioning using the Global Assessment of Functioning (GAF) scale, medication use and psychiatric service use over a three-year period at different levels of care (out-patient, day-hospital, emergencies and in-patient admissions).

Table 1
Symptom checklist used to register clinical data from computerised medical records

(A) Checking the DSM-IV diagnosis of delusional disorder
1. The patient has presented non-bizarre delusions lasting for at least 1 month
2. The patient has never fulfilled DSM-IV diagnostic criteria for schizophrenia
3. Psychosocial activity and behaviour are relatively preserved other than in relation to delusions
4. Affective episodes, if ever happened, have been brief and secondary to DD
5. Delusions are not secondary to drug intake nor are they due to a medical condition
6. The patient fulfils DSM-IV-TR diagnostic criteria for DD
7. The patient is assigned to a DSM-IV-TR DD type depending on the content of delusion

(B) Associated phenomenology checklist
1. Are there hallucinations?
2. If so, which modality
   - Non-prominent auditory
   - Non-prominent visual
   - Olfactory
   - Gustative
   - Tactile
3. Are there self-reference ideas?
4. Is there a comorbid depressive syndrome?
5. Are there repetitive rage or violent behaviours?
6. Have there been severe marital problems?
7. Have there been gross work disturbances?

(C) Risk factors
1. Is there a comorbid sensory deficit (deafness and/or blindness? YES/NO
2. Is there a history of immigration? YES/NO
3. Have there been severe stressful life events up to 3 months prior to DD onset? YES/NO
4. Is there a family history of schizophrenia? YES/NO

2.5. Statistical methods

Univariate associations between DD types and independent variables were explored by the use of parametric (ANOVA) or non-parametric (Kruskal–Wallis test) tests as appropriate.

3. Results

3.1. Sample description

Following a systematic review of medical records of all 467 DD patients originally included in our case register as DD cases, we confirmed DSM-IV diagnostic criteria for DD in 370, who were finally included in this study ($n = 370$). Table 2 shows the samples' sociodemographic characteristics. In

brief, DD cases are more frequently middle aged married housewives with a higher than expected frequency of family history of schizophrenia. The female/male ratio in the sample was 1.29. The sample showed a low level of global functioning (mean GAF 51.7; ±14.18 SD) and a high level of mental health services use (e.g., mean number of out-patient consultations over a three-year period: 32.12; ±43.96 SD). A percentage (81.4%) of DD patients were on antipsychotic medication and of those 60% were taking an atypical antipsychotic.

3.2. Correlates of DD types

The most frequent specific DD type in the sample was persecutory type (47%), followed by mixed (11%) and jealous (9%) types. Twenty-three percent of the patients were diagnosed as DD NOS. Tables 2–4 show a summary of how different DD types compare regarding all independent variables. We present the following three consecutive analyses: (a) comparing all types (Table 2); (b) comparing persecutory versus all other types (Table 3); and (c) jealous subtypes versus the rest (Table 4). When all types were compared with each other some significant differences emerged (Table 2). Thus, compared to all other DD types, patients with grandiose type were more likely to be single, to have an onset following a stressful precipitating factor and to have a significantly worse global functioning and a higher psychiatric services use. Conversely, patients with somatic type significantly presented a higher frequency of rare perceptual abnormalities such as tactile, olfactory and non-prominent visual hallucinations. On the other hand, those with erotomanic type were significantly more likely divorced or widowed women and tended to have a poorer global functioning (see Table 2 for details).

Persecutory type was significantly associated with not being married, using more antidepressants and having the highest percentage of atypical antipsychotic use (Table 3). Persecutory type versus all other DD cases lumped together, we found the persecutory type, when compared with all other types lumped together, to be significantly associated with patients who tended significantly to have worse functionality, had a high personal history of depression and use more atypical antipsychotics (Table 3).

Finally, jealous type compared with all other types tended significantly to be more frequently married, have a comparatively better global functioning, and also have a higher frequency of antidepressant use (Table 3). Additionally, when compared with the aggregate of all other DD types, we found jealous type to be significantly associated with higher frequencies of being male, married, having a family history of schizophrenia, having immigrated, having a personal history of depression and having a high comorbidity with depressive symptoms and more antidepressant and atypical antipsychotic use (Table 4).

4. Discussion

This is one of few reports empirically exploring both clinical and psychosocial features of delusional disorder. Our objective was to empirically describe sociodemographic and clinical characteristics in a large sample of DD patients and explore potential correlates of DD types.

4.1. Strengths and limitations

The main strength of this report is that, in the light of current relative absence of empirically based knowledge, it does provide a rare clinically based description of DSM-IV DD and its types. In spite of the novelty and rareness of our findings, we have to acknowledge many potential limitations that have to be considered and therefore results should be interpreted with caution particularly on those findings based on low prevalence of symptoms or risk factors. First, this is a medical record based retrospective study exploring medical records recorded by many different, yet fully trained, psychiatrists. We did not, therefore, interview patients directly or administer diagnostic scales. Instead we gathered our study data from a systematic and structured retrospective exploration of medical records. Record accuracy can vary widely across different professionals hence providing potentially biased or even partially subjective information.

However, the fact that professionals were all trained to enter their diagnostic records on an equally structured computerised medical record system does minimise recording variability. For instance, all psychiatrists had to enter a complete multiaxis DSM-IV diagnosis, including functionality axis V, and record symptoms and medications using the same options within the software. As mentioned earlier, all psychiatrists entering data in the computerised medical records system had a three-day training course to use the software and did reliability testing of their diagnostic records. Yet, even when these and other limitations exist, the relative absence of previous similar reports make our findings an array of clinically and epidemiologically unique information on DD that may lead to more thorough and methodologically sound empirical studies. A potential advantage of the study is that it may naturalistically represent fairly well a large sample of DD patients with a mean age and other sociodemographic features within those that could be expected for a late-onset disorder.

4.2. The case register

We used computerised medical records being registered at public mental health centres in a well-defined catchment area serving some 607,494 inhabitants in South Barcelona (Spain). Such procedure enabled us to build a fairly reliable clinically based case register of delusional disorder as this public mental health service network is by and large the only public mental health option for all people living in the area. Hence, family doctors in the area very rarely would not transfer patients with a disabling disorder such as DD to our public psychiatric system. Therefore, we can be reasonably confident that most cases with DD would have been actually referred to our system and were subsequently included in our register. In addition, even when all original DD cases were diagnosed by fully trained psychiatrists, we ensured the validity of DD diagnoses in cases

Table 2
Correlates of independent variables with delusional disorder types

	Delusional disorder, $n = 370$	DD types							n	Statistic	Significance, p
		Persecutory, $n = 164$ (47.4%)	Jealous, $n = 47$ (10%)	Somatic, $n = 14$ (4.9%)	Erotomaniac, $n = 5$ (1.2%)	Grandiose, $n = 4$ (2%)	Mixed, $n = 40$ (11.5%)	NOS, $n = 95$ (23.1%)			
Age	54.65 ± 15.44	53.07 ± 15.90	55.70 ± 17.13	50.07 ± 14.00	55.25 ± 17.98	58.25 ± 17.11	52.53 ± 14.43	58.21 ± 13.90	365	$F = 1.53$	0.165
Sex									370	$\chi^2 = 9.33$	0.156
Female	218 (58.9%)	100 (60.6%)	20 (42.6%)	10 (71.4%)	3 (60.0%)	1 (25.0%)	23 (23%)	61 (61%)			
Male	152 (41.1%)	65 (39.4%)	27 (57.4%)	4 (28.6%)	2 (40.0%)	3 (3%)	3 (42.5%)	34 (35.8%)			
Marital status									340	$\chi^2 = 49.59$	0.000*
Single	94 (27.6%)	44 (29.1%)	2 (4.4%)	6 (6%)	1 (33.3%)	3 (75.0%)	12 (34.3%)	26 (28.6%)			
Married/couple	166 (48.8%)	67 (44.4%)	39 (86.7%)	4 (36.4%)	0 (0.0%)	1(25.0%)	14 (40.0%)	41(45.1%)			
Divorced/separated	53 (15.6%)	26 (17.2%)	4 (36.4%)	1 (9.1%)	1 (33.3%)	0 (0.0%)	9 (25.7%)	13 (14.3%)			
Widowed	27 (7.9%)	14 (9.3%)	1 (1%)	0 (0.0%)	1 (33.3%)	0 (0.0%)	0 (0.0%)	11 (12.1%)			
Family history of schizophrenia	15 (8.7%)	5 (6.4%)	6 (23.1%)	1 (16.7%)	0 (0.0%)	0 (0.0%)	2 (8.7%)	1 (2.9%)	172	$\chi^2 = 9.62$	0.141
Psychosocial risk factors											
Immigration	73 (23.9)	31 (24.4%)	12 (40%)	1 (10%)	0 (0%)	0 (0%)	3 (10.7%)	13 (27.1%)	305	$\chi^2 = 11.84$	0.060
Sensorial deficit	10 (5.7%)	4 (4%)	2 (7.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (8.7%)	2 (5.7%)	136	$\chi^2 = 1.33$	0.970
Precipitating factors	16 (9.2%)	8 (10.1%)	0 (0.0%)	0 (0.0%)	1 (50.0%)	1 (50.0%)	3 (13.0%)	3 (8.6%)	174	$\chi^2 = 11.82$	0.066
Comorbid personality disorder									140	$\chi^2 = 30.22$	0.066
Cluster A	56 (40.0%)	25 (35.7%)	10 (10%)	2 (40.0%)	0 (0.0%)	0 (0.0%)	8 (53.3%)	11 (35.5%)			
Cluster B	8 (5.7%)	4 (5.7%)	0 (0.0%)	0 (0.0%)	1 (100.0%)	0 (0.0%)	0 (0.0%)	3 (9.7%)			
Cluster C	6 (4.3%)	4 (5.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (6.7%)	1 (3.2%)			
NOS personality disorder	15 (10.7%)	12 (17.1%)	1 (5.6%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (6.5%)			
Associated symptoms											
Self-reference	84 (48.6%)	41 (52.6%)	15 (57.7%)	2 (28.6%)	1(50.0%)	0 (0.0%)	9 (40.9%)	16 (44.4%)	173	$\chi^2 = 5.138$	0.526
Irritability	53 (30.8%)	28 (35.4%)	5 (20.0%)	2 (28.6%)	0 (0.0%)	0 (0.0%)	11 (47.8%)	7 (20.6%)	172	$\chi^2 = 8.75$	0.188
Aggressiveness	53 (37.3%)	22 (36.7%)	8 (40.0%)	2 (40.0%)	1 (50.0%)	0 (.0%)	4 (25.0%)	16 (43.2%)	142	$\chi^2 = 3.00$	0.808
Depressive	76 (23.0%)	36 (22.5%)	16 (34.8%)	3 (21.4%)	1 (33.3%)	0 (0.0%)	8 (20.0%)	12 (19.0%)	330	$\chi^2 = 5.77$	0.449
Hallucinations	43 (16.0%)	19 (14.0%)	6 (16.2%)	5 (50.0%)	0 (0.0%)	0 (0.0%)	6 (18.2%)	7 (14.3%)	268	$\chi^2 = 9.79$	0.134
Hallucinations modality											
Non-prominent auditive	21 (7.8%)	13 (9.6%)	2 (5.4%)	2 (20.0%)	0 (0.0%)	0 (0.0%)	2 (6.1%)	2 (4.1%)	268	$\chi^2 = 4.26$	0.641
Non-prominent visual	8 (3.0%)	2 (1.5%)	1 (2.7%)	2 (20.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (6.1%)	268	$\chi^2 = 13.85$	0.031*
Non-prominent gustatory	2 (0.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (3.0%)	1 (2.0%)	268	$\chi^2 = 4.83$	0.566
Tactile	17 (6.3%)	6 (4.4%)	3 (8.1%)	3 (30.0%)	0 (0.0%)	0 (0.0%)	4 (12.1%	1(2.0%)	268	$\chi^2 = 14.05$	0.029*
Olfactory	10 (3.8%)	2 (14%)	1 (2.9%)	2 (22%)	0 (0.0%)	0 (0.0%)	4 (11.4%)	1 (2.7%)	266	$\chi^2 = 16.53$	0.011*
Global functioning (GAF)	51.69 ± 14.18	50.35 ± 12.7	56.26 ± 0.81	45.76 ± 10.57	43.33 ± 5.77	37.50 ± 29.86	54.81 ± 13.26	52.29 ± 14.18	327	$F = 2.94$	0.008*
Mental health resources used											
Out-patient consultations in 3 years	32.12 ± 43.96	27.83 ± 36.20	21.47 ± 29.08	35.14 ± 45.06	15.60 ± 23.73	37.50 ± 41.46	30.50 ± 34.37	45.66 ± 61.13	369	$F = 2.42$	0.026*
Emergency consultation in 3 years	0.87 ± 2.06	0.91 ± 2.18	0.38 ± 0.79	1.43 ± 3.93	0.40 ± 0.54	2.75 ± 4.85	1.25 ± 1.95	0.73 ± 1.77	369	$F = 1.53$	0.167
In-patient or day-patient days of stay in 3 years	0.22± 0.64	0.32 ± 0.84	0.4 ± 0.20	0.7 ± 0.26	0.20 ± 0.44	0.25 ± 0.50	0.40 ± 0.63	0.08 ± 0.27	369	$F = 2.66$	0.015*

*statistically significant.

Table 3
Persecutory versus other DD types by independent variables

	Persecutory, $n = 164$ (47.4%)	Other, $n = 205$ (32.6%)	n	Statistics	Significance, p
Age	53.07 ± 15.90	55.90 ± 14.99	365	$F = 1.15$	0.325
Sex			370	$\chi^2 = 0.35$	0.554
Females	100 (60.6%)	118 (42.4%)			
Males	65 (39.4%)	87 (57.6%)			
Marital status			340	$\chi^2 = 2.39$	0.495
Single	44 (29.1%)	50 (26.5%)			
Married/couple	67 (44.4%)	99 (52.4%)			
Divorced/separated	26 (17.2%)	27 (14.3%)			
Widowed	14 (9.3%)	13 (6.9%)			
Family history of schizophrenia	5 (6.4%)	10 (10.6%)	172	$\chi^2 = 0.95$	0.328
Psychosocial factors					
Immigration	31 (24.4%)	29 (23.8%)	249	$\chi^2 = 0.01$	0.900
Sensorial deficit	4 (4%)	6 (6.3%)	176		0.694
Precipitating factors	8 (10.1%)	8 (8.4%)	174		0.698
Cluster of personality disorder			140	$\chi^2 = 7.16$	0.127
Cluster A	25 (35.7%)	31 (44.3%)			
Cluster B	4 (5.7%)	4 (5.7%)			
Cluster C	4 (5.7%)	2 (2.9%)			
NOS personality disorder	12 (17.1%)	3 (4.3%)			
Symptoms associated					
Self-reference	41 (52.6%)	43 (45.3%)	173	$\chi^2 = 0.91$	0.339
Irritability	28 (35.4%)	25 (26.9%)	172	$\chi^2 = 1.46$	0.226
Aggressiveness	22 (36.7%)	31 (37.8)	140	$\chi^2 = 0.01$	0.890
Depressive	36 (22.5%)	40 (23.5%)	330	$\chi^2 = 0.04$	0.824
Hallucinations	19 (14.0%)	24 (18.2)	268	$\chi^2 = 0.88$	0.348
Hallucinations modality					
Non-prominent auditive	13 (9.6%)	8 (6.1%)	268	$\chi^2 = 1.13$	0.280
Non-prominent visual	2 (1.5%)	6 (4.5%)	268	$\chi^2 = 2.18$	0.140
Non-prominent gustatory	0 (0.0%)	2 (1.5%)	268	$\chi^2 = 2.07$	0.150
Tactile	6 (4.4%)	3 (8.1%)	268	$\chi^2 = 1.70$	0.182
Olfactory	4 (2.9%)	7 (5.3%)	268	$\chi^2 = 0.92$	0.133
Global functioning (GAF)	50.35 ± 12.7	52.80 ± 13.71	327	$F = 3.50$	0.008*
Mental health resources used					
Out-patient consultations in 3 years	27.83 ± 36.20	21.47 ± 49.11	369	$F = 4.60$	0.017*
Emergency consultation in 3 years	0.91 ± 2.18	0.38 ± 1.96	369	$F = 5.02$	0.663
In-patient or day-patient days of stay in 3 years	0.32 ± 0.84	0.4 ± 0.38	369	$F = 16.39$	0.000*
Treatment					
On antipsychotics	123 (84%)	123 (79%)	302	$\chi^2 = 1.40$	0.220
On atypical antipsychotics	96 (70%)	72 (51%)	278	$\chi^2 = 10.50$	0.001*
Antidepressants	39 (27%)	123 (26%)	298	$\chi^2 = 0.04$	0.800

*statistically significant.

finally included in the register by performing a thorough retrospective inspection of medical records applying a self-designed checklist (Table 1) to confirm whether patients did actually fulfil DSM-IV-RT criteria for DD.

4.3. Estimated prevalence, DD types frequencies and sociodemographic findings

We fully acknowledge that our design is inappropriate for calculating the prevalence of DD as indicated by most previous reports. Nonetheless, if we were to estimate the attended prevalence of DD in our sample, considering the population census of the areas covered by our catchment area, it would virtually double estimates as reported by previous studies (0.006%), even when such estimates are based on more selected in-patient samples [20]. Such a finding may suggest that the disorder is possibly not as rare as previously thought of and also that many DD patients might not seek professional help. However, prevalence discrepancies could also reflect differences in diagnostic criteria and variability among studied populations (i.e., community based versus hospital in-patient based). Our argument, admittedly potentially speculative, is however not based on data from a poorer quality than most of those previously reported and, in the absence of better

Table 4
Jealous versus other DD types by independent variables

	Jealous, $n = 47$ (10%)	Other, $n = 323$ (90%)	n	Statistics	Significance, p
Age	55.70 ± 17.13	54.50 ± 15.20	365	$F = 1.159$	0.282
Sex			370	$\chi^2 = 5.95$	0.015*
Females	20 (42.6%)	198 (61.3%)			
Males	27 (57.4%)	125 (38.7%)			
Marital status			340	$\chi^2 = 30.09$	0.000*
Single	2 (4.4%)	92 (31.2%)			
Married/couple	39 (86.7%)	127 (43.1%)			
Divorced/separated	4 (36.4%)	50 (16.9%)			
Widowed	1 (1%)	26 (8.8%)			
Family history of schizophrenia	6 (23.1%)	9 (6.2%)	172	$\chi^2 = 7.93$	0.005*
Psychosocial factors					
Immigration	12 (40%)	48 (21.9%)	249	$\chi^2 = 4.73$	0.030*
Sensorial deficit	2 (7.7%)	8 (5.3%)	176	$\chi^2 = 0.23$	0.631
Precipitating factors	0 (0.0%)	16 (10.8%)	174	$\chi^2 = 3.09$	0.079
Clusters of personality			140	$\chi^2 = 3.82$	0.430
Cluster A	10 (10%)	46 (37.7%)			
Cluster B	0 (0.0%)	8 (6.6%)			
Cluster C	0 (0.0%)	6 (4.9%)			
Cluster NE	1 (5.6%)	14 (11.5%)			
Symptoms associated					
Self-reference	15 (57.7%)	2 (28.6%)	147	$\chi^2 = 1.02$	0.312
Irritability	5 (20.0%)	2 (28.6%)	172	$\chi^2 = 1.60$	0.205
Aggressiveness	8 (40.0%)	45 (36.9%)	142	$\chi^2 = 0.07$	0.790
Depressive	16 (34.8%)	60 (21.1%)	330	$\chi^2 = 4.16$	0.041*
Hallucinations	6 (16.2%)	5 (50.0%)	268	$\chi^2 = 0.00$	0.976
Types of hallucinations					
Non-prominent auditive	2 (5.4%)	19 (8.2%)	268	$\chi^2 = 0.35$	0.553
Non-prominent visual	1 (2.7%)	7 (3.0%)	268	$\chi^2 = 0.01$	0.913
Non-prominent gustatory	0 (0.0%)	2 (0.9%)	268	$\chi^2 = 0.32$	0.570
Tactile	3 (8.1%)	14 (6.1%)	268	$\chi^2 = 0.22$	0.635
Olfactory	2 (5.35%)	9 (3.9%)	268	$\chi^2 = 0.15$	0.693
Functioning (GAF)	56.26 ± 0.81	50.96 ± 13.56	327	$F = 3.50$	0.062
Mental health resources used					
Out-patient consultations in 3 years	21.47 ± 29.08	33.67 ± 45.55	369	$F = 4.60$	0.033*
Emergency consultation in 3 years	0.38 ± 0.79	0.94 ± 2.18	369	$F = 5.02$	0.026*
In-patient or day-patient days of stay in 3 years	0.4 ± 0.20	0.25 ± 0.67	369	$F = 16.39$	0.000*
Treatment					
Antipsychotics	34 (94.4%)	212 (79.7%)	302	$\chi^2 = 4.52$	0.033*
Atypical antipsychotics	23 (64%)	145 (60%)	278	$\chi^2 = 0.20$	0.65
Antidepressants	15 (41.7%)	64 (24.4%)	298	$\chi^2 = 4.82$	0.028

*statistically significant.

evidence, suggest the idea that DD, yet uncommon, might not be as rare as previously thought.

We found, in agreement with most previous studies [21,22,25,31], that the most prevalent DD type is the persecutory type. However, in contrast to previous reports our findings suggest that the jealous type is the second most prevalent DD type in our sample whilst the somatic type showed sensibly lower prevalence rates [21,22,31,]. Nevertheless, such previous studies are based on considerably smaller sample sizes. Our study, based on both out- and in-patients with DD, shows that DD is a middle to late life psychoses which is more frequent among women (female/male ratio was 1.29). This finding is consistent with that reported by the largest study on the topic [20] although smaller studies, among different populations, indeed suggest an even higher female/male ratio (female/male ratios ranging from 1.91 to 3) [21,22,25,31]. In agreement to previous reports [20,21] about half of our DD patients were married, yet a larger than expected proportion of unmarried patients suggest that DD sufferers have more difficulties to either start or maintain stable relationships.

4.4. Risk correlates of DD

Our findings suggest that DD patients may share vulnerability with schizophrenia and other psychotic patients, including an excess of DD among immigrants or among people with sensory deficits [6,11]. Interestingly, opposite to what has been suggested earlier [14–17,19,28–30], we found a high frequency of schizophrenia among relatives of our DD patients. Indeed, such frequency does not differ much from that expected among relatives of schizophrenia patients [10]. Thus, it could be argued that our results support the notion that psychotic disorders run in families possibly as a general susceptibility for a psychotic syndrome rather than for specific psychotic disorder [4,7]. Family history of schizophrenia is significantly more frequent among jealous DD type, in line with descriptions of family patterns of jealous behaviour [27]. Patients with persecutory type tended to use more atypical antipsychotics, a finding supporting that of a previous study [3].

4.5. Psychopathological correlates

Depressive symptoms were common in our DD patients in line with results reported earlier [12,21,22]. Depressive symptoms were significantly more prevalent amongst persecutory and jealous DD types compared to the remaining types. Along with previous reports [13,18,22,30] DD also tends to be frequently comorbid with personality disorder, particularly those from the so-called cluster A. We report virtually parallel results to those described by Hsiao et al. regarding hallucinations [12]. Hence, the most frequent hallucinations in our sample were auditory not prominent, olfactory and tactile. Both the higher incidence of delusions in married women and the higher rates of pathological jealousy among men might reflect some Mediterranean cultural-bound influence. The so-called Othello syndrome has, nonetheless, being described after a Shakespeare's play of a morbid type of jealousy particularly frequent in men [9].

4.6. Future research directions

Our descriptive study may open up future research lines such as exploring the role of neuropsychological testing in better defining the very concept of DD. Similarly, a thorough psychopathological study is needed to rely more on empirical presence of symptoms in real patients than in a priori categorical descriptions. Finally, genetics or neurophysiological studies may also help to find endophenotypes to better describe DD and other psychotic categories.

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References

[1] American Psychiatry Association. Diagnostic and statistical manual of mental disorders. 4th ed. Washington, DC: American Psychiatry Association; 1994.
[2] Autonell J, Mochón F. Historia Clínica informática y redes asistenciales en salud mental. Available from: http://www.psiquiatria.com/interpsiquis2002/6249.
[3] Bömer I, Brüne M. Social cognition in "pure" delusional disorder. Cognit Neuropsychiatry 2006;11(5):493–503.
[4] Cardno AG, Rijsdij FV, Sham PC, Murray RM, McGuffin P. A twin study of genetic relationships between psychotic symptoms. Am J Psychiatry 2002;159:539–45.
[5] Cooper AF, Garcide RF, Kay DWK. A comparison of the deaf and non deaf patients with paranoids and affective psychoses. Br J Psychiatry 1976;129:532.
[6] Cooper AF, Kay DWK, Curry AR. Hearing loss in paranoid and affective psychoses of the elderly. Lancet 1974;2:851–4.
[7] Debanath M, Das SK, Bera NK, Nayak CR, Chaudhuri TK. Genetic associations between delusional disorder and paranoid schizophrenia: a novel etiologic approach. Can J Psychiatry 2006;51:342–9.
[8] Eastwood R, Corbin S, Reed M. Hearing impairment and paraphrenia. J Otolaryngol 1981;10:306–8.
[9] Enoch D, Ball H. The Othello syndrome. In: Enoch D, Ball H, editors. Uncommon psychiatric syndromes. 4th ed. London: Arnold; 2001. p. 50–73.
[10] Gottesman I, Irving I. Schizophrenia genesis: the origin of madness. New York; Oxford: WH Freeman; 1991. 203.
[11] Hitch P, Rack P. Mental illness among Polish and Russian refugees in Bradford. Br J Psychiatry 1980;137:206–11.
[12] Hsiao MC, Liu CY, Yang YY, Yeh EK. Delusional disorder: retrospective analysis of 86 Chinese outpatients. Psychiatry Clin Neurosci 1999;53:673–6.
[13] Jimenez D, Chinchilla A. Personality disorders in a psychiatric unit: retrospective study. Actas Luso Esp Neurol Psiquiatr Cienc Afines 1995;23:58–66.
[14] Kendler KS, Gruenberg AM, Strauss JS. An independent analysis of the Copenhagen sample of the Danish adoption study of schizophrenia III: the relationship between paranoid psychosis (delusional disorder) and the schizophrenia spectrum disorder. Arch Gen Psychiatry 1981;38:985–7.
[15] Kendler KS, Gruenberg AM, Tsuang MT. Psychiatric illness in first degree relatives of schizophrenia and surgical control patients: a family study using DSM-III criteria. Arch Gen Psychiatry 1985;42:770–9.
[16] Kendler KS, Gruenberg AM. Genetic relationship between paranoid personality disorder and the "schizophrenic spectrum" disorders. Am J Psychiatry 1982;139:1185–7.
[17] Kendler KS, Hays P. Paranoid psychosis (delusional disorder) and schizophrenia: a family history study. Arch Gen Psychiatry 1981;38:547–51.
[18] Kendler KS, Masterson CC, Ungaro R. A family history study of schizophrenia-related personality disorder. Am J Psychiatry 1984;141:424–7.
[19] Kendler KS, Walsh D. Schizophreniform disorder delusional disorder and psychotic disorder not otherwise specified: clinical features outcome and familial psychopathy. Acta Psychiatr Scand 1995;9:370–8.
[20] Kendler KS. Demography of paranoid psychosis (delusional disorder): a review and comparison with schizophrenia and affective illness. Arch Gen Psychiatry 1982;39:890–902.

[21] Maina G, Albert U, Bada A, Bogetto F. Occurrence and clinical correlates of psychiatric co-morbidity in delusional disorder. Eur Psychiatry 2001;16:222–8.
[22] Marino C, Nobile M, Bellodi L, Smeraldi E. Delusional disorder and mood disorder: can they coexist. Psychopathology 1993;26:58–61.
[23] Munro A. A delusional hypochondriasis. In: Clarke Institute of Psychiatry monograph no. 5. Toronto: Clarke Institute of Psychiatry; 1982.
[24] Munro A. Delusional disorder. Cambridge University Press; 1999.
[25] Serretti A, Lattuada E, Cusin C, Smeraldi E. Factor analysis of delusional disorder symptomatology. Compr Psychiatry 1999;40:143–7.
[26] Soni S. Relationship between peripheral sensory disturbances and onset of symptoms in elderly paraphrenics. Int J Geriatr Psychiatry 1988;3:275–9.
[27] Vauhkonen K. On pathogenesis of morbid jealousy - with special reference to personality traits of and interaction between jealous patients and their spouses. Acta Psychiatr Scand 1968;46:1–62.
[28] Watt JAG, Hall DJ, Olley PC. Paranoids states of middle life. Familiar occurrence and relationship to schizophrenia. Acta Psychiatr Scand 1980;61:413–26.
[29] Watt JAG. The relationship of paranoid states to schizophrenia. Am J Psychiatry 1985;142:1456–8.
[30] Winokur G. Familial psychopathology in delusional disorder. Compr Psychiatry 1985;26:241–8.
[31] Yamada N, Nakajima S, Noguchi T. Age onset of delusional disorder is dependent on the delusional theme. Acta Psychiatr Scand 1998;97: 122–4.