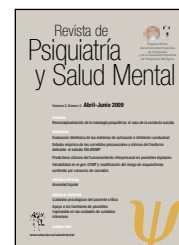


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## ORIGINAL

## An empirical study of psychosocial and clinical correlates of delusional disorder: the DELIREMP study

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### KEYWORDS

Delusional disorder;  
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### Abstract

**Objective:** We aim to describe psychosocial and clinical correlates of DD and its types. This approach is important because most knowledge on DD does not come from empirical data collected using a validated systematic research method.

**Methods:** A cross-sectional study was conducted in a sample of 86 patients fulfilling DSM-IV criteria for DD as established using the SCID-I. Variables were evaluated using a systematic methodology and standardized instruments, and included possible psychosocial risk factors (low socioeconomic status or social isolation, immigration, sensory deficits, older age at onset), family history of psychiatric disorders and premorbid personality (SAP), psychotic psychopathology (PANSS), depressive syndrome (MADRS), global cognitive functioning (MMSE), axis I comorbidity (MINI) and other clinical aspects such as global functionality (GAF), and disability (SDI). A sociodemographic and clinical questionnaire was also completed.

**Results:** The mean age at onset was 39.6 years and 61.6% of the cases were female. The most frequent DD types were persecutory (59.3%) and jealous (22.1%). Nearly 21% had a family history of schizophrenia and 17.4% had DD (significantly higher among those with the jealous subtype). Sixty-four percent had a premorbid personality disorder (38.4% paranoid, 12.8% schizoid). The grandiose type was significantly associated with higher scores on the PANSS positive subscale and the mixed type with lower scores on the PANSS negative subscale. Depression affected 45.3% of subjects (mainly mild depression) and 45.3% had hallucinations (20.9% tactile, 16.3% olfactory), which were more common among somatic cases. The mean MMSE was 27.6 (SD=2.5) suggesting a preserved cognitive

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function. Mean GAF was 63.9 (SD=11.3) indicating a moderate degree of disability, which was significantly worse amongst grandiose cases.

**Conclusion:** This study provides unique empirical and reliable evidence on the real psychosocial, clinical, and psychopathological correlates of DD and its types.

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## PALABRAS CLAVE

Trastorno delirante;  
Paranoia;  
Psicopatología;  
Psicosis;  
Síntomas

## Un estudio empírico de los correlatos psicosociales y clínicos del trastorno delirante: el estudio DELIREMP

### Resumen

**Objetivo:** La finalidad de este estudio es describir los correlatos psicosociales y clínicos del trastorno delirante (TD) y sus tipos. Este enfoque es importante porque la mayor parte del conocimiento existente sobre el TD no procede de datos empíricos obtenidos con el empleo de un método de investigación sistemático validado.

**Métodos:** Se llevó a cabo un estudio transversal en una muestra de 86 pacientes que cumplían los criterios del DSM-IV para el TD según lo determinado con la aplicación del SCID-I. Las variables estudiadas se evaluaron con una metodología sistemática y con instrumentos estandarizados, e incluyeron los posibles factores de riesgo psicosocial (bajo nivel socioeconómico o aislamiento social, inmigración, deficiencias sensoriales, edad avanzada al inicio), los antecedentes psiquiátricos familiares y personalidad premórbida (SAP), la psicopatología psicótica (PANSS), el síndrome depresivo (MADRS), la función cognitiva general (MMSE), la comorbilidad de eje I (MINI) y otros aspectos clínicos, como el funcionamiento general (GAF) y la discapacidad (SDI). Se completó también un cuestionario sociodemográfico y clínico.

**Resultados:** La media de edad al inicio del TD era 39,6 años y un 61,6% de los pacientes eran mujeres. Los tipos más frecuentes de TD fueron el persecutorio (59,3%) y el celotípico (22,1%). Casi un 21% de los pacientes tenían antecedentes familiares de esquizofrenia y el 17,4%, de TD (en un porcentaje significativamente mayor en el tipo celotípico). El 64% de los pacientes tenían trastorno de la personalidad premórbida (el 38,4% paranoide, y el 12,8% esquizoide). El tipo de TD de grandiosidad se relacionaba de manera significativa con unas puntuaciones más altas de la subescala positiva de la PANSS, y el tipo mixto, con puntuaciones más bajas de la subescala negativa de la PANSS. La depresión afectaba al 45,3% de los pacientes (principalmente, depresión leve) y un 45,3% tenía alucinaciones (el 20,9% táctiles, y el 16,3% olfatorias), que eran más frecuentes en los casos de tipo somático. La media  $\pm$  desviación estándar de la MMSE era  $27,6 \pm 2,5$ , lo cual indicaba una función cognitiva preservada. La media de GAF era  $63,9 \pm 11,3$ , que corresponde a un grado moderado de discapacidad; este aspecto era significativamente peor en los casos del tipo de grandiosidad.

**Conclusiones:** Este estudio aporta una evidencia única, de carácter empírico y fiable, sobre los correlatos psicosociales, clínicos y psicopatológicos reales del TD y sus tipos.

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## Introduction

Delusional disorder (DD) is an uncommon disorder (estimated incidence 1 to 3 new cases per 100,000 annually)<sup>1</sup> characterized by the presence of a persistent non-bizarre delusional system<sup>2</sup>. DSM-IV describes seven different types of DD based on the predominant theme of delusions (persecutory, jealous, somatic, grandiose, erotomanic, mixed, and not otherwise specified).<sup>2</sup> The rarity of this disorder and the fact that many DD patients do not seek psychiatric help has made study difficult.<sup>3</sup> Thus, there

are few empirical studies on DD, and many of them are based on small samples, use different diagnostic criteria, and have diverse designs providing conflicting results for the psychosocial and/or clinical differences between the different types of DD.

Over the last decade, four epidemiological studies on DD have reported that the most prevalent DD cases are of the persecutory type.<sup>4-7</sup> When the mixed type was excluded, Yamada et al found, in their 54 DSM-III-R DD cases, that the persecutory type was the most frequent (51.0%), followed by the somatic type (27.5%).<sup>4</sup> Similarly, Maina et al, with 64

patients diagnosed using structured clinical interviews for DSM-IV, also found a higher prevalence of the persecutory type (54.4%), followed by the somatic type (17.4%).<sup>5</sup> Hsiao et al, in a retrospective study with 86 cases of DD according to DSM-IV criteria, also reported that the persecutory type was the most frequent, although with a higher percentage (70.9%), whereas the mixed type was the second most frequent (14.0%).<sup>6</sup> In one recent retrospective descriptive study of 370 cases of DD, we also found the most common specific type to be the persecutory type (47.4%), followed by the mixed type (11.5%).<sup>7</sup>

Kendler's 1982 meta-analysis and most later studies found that the mean age at onset ranged from 35 to 45 years.<sup>1,4-9</sup> Yamada et al reported the oldest age at onset for the persecutory type and the youngest for the somatic type.<sup>4</sup> Kendler also found that female patients slightly outnumbered male patients (the female-to-male ratio was 1.2:1),<sup>1</sup> whereas smaller studies on DD found an even higher female-to-male ratio (ranging from 1.9:1 to 3:1).<sup>4,5,8</sup> Several studies revealed that most of the patients with DD were married, employed, lived with their own family, and belonged to a low educational and socioeconomic group.<sup>1,5,9</sup>

While there are many theories about the cause of DD, empirical evidence is limited.<sup>3,10</sup> Potentially relevant risk factors for DD include low older age at onset, low socioeconomic status or social isolation,<sup>1,5</sup> immigration,<sup>11</sup> sensory deficits,<sup>12,13</sup> premorbid personality "cluster-A" traits,<sup>7,14-16</sup> and family transmission. The latter is the most documented risk factor. Families with a history of DD have increased rates of jealousy, suspiciousness, paranoid personality disorder, and DD, although rates of schizophrenia or mood disorders are not higher.<sup>1,17-24</sup> In addition, in recent years, emphasis has been placed on the significance of subtle organic factors, such as premorbid head trauma with loss of consciousness, premorbid substance abuse, or advanced age may be important in inducing onset of DD.<sup>25,26</sup> As for most of the above possible risk factors, our previous study did not find significant differences between DD types.<sup>7</sup>

Several authors have reported a high frequency (20-53%) of depressive symptoms among DD patients.<sup>5-9</sup> Two study groups compared prevalence of depression between the types of DD and did not find significant differences.<sup>4,7</sup> The same studies found that hallucinations were not rare among DD patients (almost 15%), with non-prominent auditory hallucinations being the most frequent (9.6-11.6%), followed by tactile hallucinations (4.4-5.8%).<sup>4,7</sup> Surprisingly, to the best of our knowledge, no studies assess the psychotic psychopathology of DD and its types using a standard structured interview for psychotic disorders. Maina et al studied the co-occurrence of DSM-IV axis I disorders with DD, establishing that 71.9% had at least one lifetime (and 31.3% current) comorbid disorder, mainly mood disorders, particularly among persecutory cases.<sup>5</sup>

The first psychiatric consultation usually takes place between four and six years after onset.<sup>4,5,9</sup> Onset was insidious in most patients, precipitating factors were identified in almost 40%, and between 63% and 90% of cases of DD had an uninterrupted chronic course.<sup>9,27</sup> With respect

to the characteristics of the course of DD, no studies compare the differences between the different types of DD. We previously showed a low level of global functioning that was significantly worse among erotomaniac and grandiose cases.<sup>7</sup>

This shortage of empirical and systematic descriptive studies on DD provides us with a unique opportunity to explore the clinical correlates of DD using a relatively large and thoroughly studied sample. We empirically describe and quantify the frequency of DD types and explore the psychosocial correlates and clinical features of DD and its types.

## Methods

### The sample

A cross-sectional sample of 106 individuals with a diagnosis of DD was selected randomly from a computerized case register of five Community Mental Health Centers (CSM) belonging to Sant Joan de Déu-Mental Health Services (SJD-MHS).<sup>7</sup> SJD-MHS is a state-funded institution providing comprehensive psychiatric care through both community and hospital facilities and serving a population of 607,494 inhabitants in a well-defined area of the south of Barcelona, Spain. Inclusion criteria were: a) fulfilling diagnostic criteria for DD (DSM-IV)<sup>2</sup> after administering the Structured Clinical Interview for DSM-IV Axis I Disorders (psychosis module)<sup>28,29</sup> b) being older than 18 years of age; c) living inside the catchment area of the participating CSMs; d) having attended the outpatient clinic (CSM) at least once over the previous six months; and e) patient's agreement to participate. Exclusion criteria were: a) not completely fulfilling diagnostic criteria for DD, b) having a diagnosis of mental retardation. Six patients refused to participate in the study, eight were not included as their clinical psychiatrists did not invite them to participate and the remaining six patients did not completely fulfilled DSM-IV DD criteria (3 turned out to fulfil DSM-IV criteria for schizophrenia, one for schizoaffective disorder, one for psychotic disorder due to medical disease and another one for psychotic disorder due to substance abuse). Hence, eighty six patients finished the evaluation, constituting this way the final sample of our study (n=86). All the patients were provided with a complete description of the study and gave their written informed consent to participate after they had been invited to do so by in a letter from their psychiatrist. The study was approved by the ethics committee of the SJD-MHS.

### Variables and instruments

**DD diagnosis.** All patients were evaluated by a post-graduate clinical psychology PhD student fully trained for the administration of all the instruments of the study. The diagnosis of DD was validated using the psychosis module of the Structured Clinical Interview for DSM-IV Axis I Disorder, clinical version (SCID-I CV)<sup>28,29</sup>. Patients were assigned to one of seven DD DSM-IV types (persecutory, jealous, somatic, erotomaniac, grandiose, mixed, and otherwise not specified).

**Sociodemographic and general data.** A systematic inventory was used to gather demographic variables (age, sex, marital status, educational level, status socioeconomic based on income), family history of mental disorder in first- and second-degree relatives, premorbid deafness (defined as a hearing loss leading to communication difficulties), premorbid immigration, premorbid head trauma with loss of consciousness, premorbid substance abuse (according to DSM-IV criteria), attempted suicide, marital problems, episodes of physical hetero-aggressiveness against people, legal problems and imprisonment, precipitant factors according to axis IV of DSM-IV, age at onset of DD, age at first psychiatric consultation, form of onset (acute [ $< 3$  months] or insidious [ $> 3$  months]), time since onset, course of condition (uninterrupted chronic or phasic course with total remission), and use of psychiatric resources (number of lifetime psychiatric admissions and visits to the emergency room in the past five years).

**Premorbid personality.** The Standardised Assessment of Personality (SAP)<sup>30</sup> was used to assess premorbid personality. The SAP detects the presence and type of a personality disorder regardless of the nature of the disease using a short, semi-structured interview with an informant (relative or close friend). Questions are adapted to the ICD-10 and DSM-IV criteria for diagnosis of personality disorders. The informant must have known the patient for at least five years before onset and should be familiar with his/her behaviour in a wide variety of situations.

**Psychotic symptoms.** Psychotic symptoms were assessed using the Positive and Negative Syndrome Scale for Schizophrenia (PANSS)<sup>31,32</sup>. A history of psychotic symptoms was evaluated using Module B (psychotic and associated symptoms) of the SCID-I CV.<sup>28,29</sup>

**Depressive symptoms.** Presence and severity of depressive symptoms were assessed using the Montgomery-Asberg Depression Rating Scale (MADRS)<sup>33,34</sup>. The MADRS consists of 10 items, each scored from 0 to 6 points. The interpretation criteria of the overall score, ranging from 0 to 60 points, state that a score of 7-19 points indicates mild depression, a score of 20-34 points suggests moderate depression, and a score higher than 35 indicates severe depression.

**Global cognitive functioning.** This was evaluated with the Mini-Mental State Examination, 30-item version (MMSE-30),<sup>35,36</sup> a test designed for the detection of cognitive impairment through 30 items that explore cognitive areas such as the time and space direction, immediate memory, concentration and calculation, deferred memory, language, and praxis. A score of 23 points or less is considered indicative of possible cognitive impairment.

**Psychiatric comorbidity.** Coexisting DSM-IV axis I psychiatric disorders and suicide risk were diagnosed using the Mini International Neuropsychiatric Interview (MINI) for DSM-IV<sup>37-39</sup>.

**Global functioning.** Global functioning was assessed using the Global Assessment of Functioning (GAF) scale.<sup>40</sup> The GAF scale consists of a single-item global patient activity that is scored using a scale from 100 (satisfactory activity) to 1 (clear expectation of death).

**Disability.** Disability was assessed using the Sheehan Disability Inventory (SDI).<sup>41,42</sup> The SDI consists of five items that are grouped into three scales: (1) disability, consisting of the first three items and assessing the extent to which symptoms interfere with three domains of the patient's life, ie, work, social life, and family life; (2) perceived stress, which assesses the extent to which stressful events and personal problems have impaired life; and (3) social support, which assesses the support obtained by the patient as compared to the support needed. The first four items are scored on a Likert scale from 0 (none at all) to 10 (extremely). Values 1 to 3 are considered to be "mild," 4 to 6 "moderate," and 7 to 9 "marked." The fifth item is scored with a percentage scale where 100% means that patients receive all the support they need. Three scores are obtained, one for each scale. The disability scale score is obtained by adding the scores from each of the 3 items of the scale.

## Statistical analyses

The sociodemographic and clinical characteristics were analyzed with descriptive statistics (frequencies, mean with standard deviation). In the analysis by DD types, nonparametric tests were used due to the small size of the sample and nonfulfillment of the assumption of normality. In order to analyze the statistical differences between the quantitative variables and each type of DD, Mann-Whitney U tests were used. The statistical relationship between qualitative variables and each type of DD was determined using the chi-square test. The Fisher exact test was used in the case of 2x2 contingency tables with an expected frequency of less than 5.

## Results

### Frequency of DD types and psychosocial correlates

All 86 subjects had complete data and were included in the analysis. The persecutory type was the most common, accounting for 59.3% of cases, followed by the jealous type (22.1%). Mean age was 54.0 years ( $SD=14.4$ ) and mean age at onset of DD was 39.6 years ( $SD=14.3$ ). Women accounted for 61.6% of the total sample. Mean number of years in full-time education was 7.3 ( $SD=1.1$ ). The erotomaniac type was significantly associated with fewer years in education. The most common marital status (52.3%) was married or with partner, and this was significantly associated with the jealous type. Over half of the patients lived with their own family (53.5%) whereas 19.8% lived alone. Table 1 summarizes the sociodemographic characteristics for DD and its types.

Table 2 shows the possible risk factors for DD and its types. A family history of schizophrenia, DD, and affective disorders in first- and second-degree relatives was found in 20.9%, 17.4% and 25.6% of patients, respectively. The jealous type was significantly associated with a family history of DD. Sixty-four percent had a premorbid

personality disorder, the most common being paranoid (38.4%), followed by schizoid (12.8%). The persecutory type was significantly associated with a higher frequency of schizotypal personality disorders and the somatic type was associated with obsessive personality disorders. Almost a quarter of the cases of DD (24.4%) were in older patients (>50 years). Eighteen percent had premorbid deafness and 9.3% were immigrants at onset. Premorbid head trauma with loss of consciousness affected 17.4% and premorbid substance abuse 18.6%. The persecutory type tended to be significantly associated with premorbid head trauma with loss of consciousness, whereas the mixed type was significantly associated with premorbid substance abuse.

### Clinical and psychopathological correlates of DD and its types

Table 3 shows the psychopathology and comorbid DSM-IV axis I for DD and its types. Mean scores in the positive

and negative PANSS subscales were 13.8 (SD=4.5) and 9.9 (SD=2.8), respectively, and the mean general PANSS score was 23.8 (SD=4.8). The grandiose type was significantly associated with higher scores on the PANSS positive subscale and the mixed type with lower scores on the PANSS negative subscale. Forty-five percent of subjects were depressed according to the MADRS (mild depression in 37.2% and moderate depression in 8.1% of patients), and 20.9% had attempted suicide. Hallucinations were reported by 45.3% of patients (tactile hallucinations were the most common [20.9%], followed by olfactory hallucinations [16.3%]). The somatic type presented a significantly higher frequency of tactile hallucinations. The jealous type was significantly associated with more episodes of physical hetero-aggressiveness against people and marital problems. The mean MMSE-30 was 27.6 (SD=2.4). Major depressive disorder, dysthymia, and anxiety disorder were found in 16.2%, 17.4% and 13.9% of patients, respectively. The persecutory type was significantly associated with a lower frequency of depressive disorders, whereas the mixed type

**Table 1** Sociodemographic characteristics of DD and its types

| Delusional disorder (n=86) |               |                             |       |                         |                    |                       |       |                           |                    |                         |       |                     |       |
|----------------------------|---------------|-----------------------------|-------|-------------------------|--------------------|-----------------------|-------|---------------------------|--------------------|-------------------------|-------|---------------------|-------|
|                            | Total<br>n=86 | Persecutory<br>n=51 (59.3%) |       | Jealous<br>n=19 (22.1%) |                    | Somatic<br>n=3 (3.5%) |       | Erotomaniac<br>n=4 (4.7%) |                    | Grandiose<br>n=4 (4.7%) |       | Mixed<br>n=5 (5.8%) |       |
|                            | %             | %                           | p     | %                       | p                  | %                     | p     | %                         | p                  | %                       | p     | %                   | p     |
| Age (years)                | 54.0±14.4     | 52.5±14.4                   | 0.368 | 54.6±11.6               | 0.759              | 56.6±26.2             | 0.841 | 62.2±7.9                  | 0.251              | 56.6±24.3               | 0.667 | 55.0±16.0           | 0.934 |
| Age at onset (years)       | 39.6±14.3     | 40.0±14.6                   | 0.829 | 39.4±9.8                | 0.588              | 44.6±33.2             | 0.859 | 38.0±20.7                 | 0.704              | 30.75±7.4               | 0.186 | 40.4±14.7           | 0.775 |
| Sex                        | —             | —                           | 0.797 | —                       | 0.705              | —                     | 0.556 | —                         | 0.296              | —                       | 0.636 | —                   | 1.000 |
| Men                        | 38.4          | 22.1                        | —     | 9.3                     | —                  | 2.3                   | —     | 0.0                       | —                  | 2.3                     | —     | 2.3                 | —     |
| Women                      | 61.6          | 37.1                        | —     | 12.7                    | —                  | 1.1                   | —     | 4.6                       | —                  | 2.3                     | —     | 3.4                 | —     |
| Marital status             | —             | —                           | 0.188 | —                       | 0.006 <sup>b</sup> | —                     | 0.814 | —                         | 0.430              | —                       | 0.551 | —                   | 0.247 |
| Single                     | 24.4          | 16.3                        | —     | 0.0                     | —                  | 1.1                   | —     | 1.1                       | —                  | 2.3                     | —     | 3.4                 | —     |
| Married                    | 52.3          | 25.6                        | —     | 18.6                    | —                  | 2.3                   | —     | 1.1                       | —                  | 2.3                     | —     | 2.3                 | —     |
| Separate / divorced        | 16.3          | 11.6                        | —     | 3.5                     | —                  | 0.0                   | —     | 1.1                       | —                  | 0.0                     | —     | 0.0                 | —     |
| Widower                    | 7.0           | 5.8                         | —     | 0.0                     | —                  | 0.0                   | —     | 1.1                       | —                  | 0.0                     | —     | 0.0                 | —     |
| Years in education         | 7.3±1.1       | 7.6±1.5                     | 0.339 | 6.3±1.7                 | 0.489              | 8.0±15.9              | 0.863 | 2.9±4.2                   | 0.042 <sup>a</sup> | 6.5±5.2                 | 0.957 | 11.1±10.9           | 0.335 |
| Lives with                 | —             | —                           | 0.156 | —                       | 0.096              | —                     | 0.663 | —                         | 0.001 <sup>b</sup> | —                       | 0.319 | —                   | 0.120 |
| No-one                     | 19.8          | 15.1                        | —     | 2.3                     | —                  | 0.0                   | —     | 1.1                       | —                  | 1.1                     | —     | 0.0                 | —     |
| Original family            | 19.8          | 12.8                        | —     | 0.0                     | —                  | 1.2                   | —     | 1.1                       | —                  | 1.1                     | —     | 3.5                 | —     |
| Own family                 | 53.5          | 27.9                        | —     | 18.6                    | —                  | 2.3                   | —     | 1.1                       | —                  | 1.1                     | —     | 2.3                 | —     |
| Institutions               | 6.9           | 3.5                         | —     | 1.1                     | —                  | 0.0                   | —     | 1.1                       | —                  | 1.1                     | —     | 0.0                 | —     |
| Income (€/ month)          | 673±354       | 673±354                     | 0.799 | 888±566                 | 0.394              | 1021±252              | 0.238 | 542±347                   | 0.399              | 720±426                 | —     | 375±487             | 0.203 |

The data is expressed as mean ± standard deviation except other indication.

<sup>a</sup>p<0.05.

<sup>b</sup>p<0.01.

was significantly associated with a higher frequency of anxiety disorders.

Table 4 shows the course, functionality, and consumption of resources of DD and its types. Mean age at DD onset was 39.6 years ( $SD=14.3$ ) and age at the first psychiatric consultation was 43.4 years ( $SD=14.9$ ). Onset was insidious in 70.9% of patients, 47.7% presented at least 1 precipitating factor, and 90.7% had an uninterrupted chronic course. Mean GAF was 63.9 ( $SD=11.3$ ). Global functioning was significantly

worse amongst grandiose cases. The domain that presented the highest degree of disability was working life ( $SDI$  work: mean=5.2 and  $SD=3.5$ )

## Discussion

To the best of our knowledge, this is the first study of a relatively large sample of DD patients to empirically explore

**Table 2** Possible risk factors for DD and its types

|                             | Delusional disorder (n=86) |                             |                    |                         |                    |                       |                    |                           |       |                         |       |                     |                    |
|-----------------------------|----------------------------|-----------------------------|--------------------|-------------------------|--------------------|-----------------------|--------------------|---------------------------|-------|-------------------------|-------|---------------------|--------------------|
|                             | Total<br>n=86              | Persecutory<br>n=51 (59.3%) |                    | Jealous<br>n=19 (22.1%) |                    | Somatic<br>n=3 (3.5%) |                    | Erotomaniac<br>n=4 (4.7%) |       | Grandiose<br>n=4 (4.7%) |       | Mixed<br>n=5 (5.8%) |                    |
|                             | %                          | %                           | p                  | %                       | p                  | %                     | p                  | %                         | p     | %                       | p     | %                   | p                  |
| Family history              | 61.6                       | 37.3                        | 0.797              | 13.9                    | 0.877              | 3.5                   | 0.282              | 2.3                       | 0.663 | 2.3                     | 0.636 | 2.3                 | 0.367              |
| Schizophrenia               | 20.9                       | 13.9                        | 0.474              | 3.5                     | 0.751              | 1.1                   | 0.510              | 0.0                       | 0.575 | 2.3                     | 0.192 | 0.0                 | 0.579              |
| Delusional disorder         | 17.4                       | 5.8                         | 0.024 <sup>a</sup> | 9.3                     | 0.003 <sup>b</sup> | 1.1                   | 0.442              | 1.1                       | 0.542 | 0.0                     | 1.000 | 0.0                 | 0.582              |
| Affective disorder          | 25.6                       | 11.6                        | 0.125              | 6.9                     | 0.556              | 1.1                   | 0.160              | 1.1                       | 1.000 | 0.0                     | 0.568 | 3.4                 | 0.103              |
| Premorbid personality (SAP) | 64.0                       | 33.7                        | 0.170              | 13.9                    | 0.970              | 3.4                   | 0.291              | 2.3                       | 0.626 | 3.4                     | 1.000 | 5.8                 | 0.152              |
| Paranoid                    | 38.4                       | 19.7                        | 0.246              | 10.4                    | 0.361              | 2.3                   | 0.556              | 1.1                       | 1.000 | 2.3                     | 0.636 | 2.3                 | 1.000              |
| Schizoid                    | 12.8                       | 8.1                         | 1.000              | 2.3                     | 1.000              | 0.0                   | 1.000              | 0.0                       | 1.000 | 0.0                     | 1.000 | 2.3                 | 0.121              |
| Schizotypal                 | 8.1                        | 8.1                         | 0.038 <sup>a</sup> | 0.0                     | 0.340              | 0.0                   | 1.000              | 0.0                       | 0.542 | 0.0                     | 1.000 | 0.0                 | 1.000              |
| Antisocial                  | 0.0                        | 0.0                         | —                  | 0.0                     | —                  | 0.0                   | —                  | 0.0                       | —     | 0.0                     | —     | 0.0                 | —                  |
| Bordeline                   | 2.3                        | 2.3                         | 0.512              | 0.0                     | 1.000              | 0.0                   | 1.000              | 0.0                       | 1.000 | 0.0                     | 1.000 | 0.0                 | 1.000              |
| Histrionic                  | 2.3                        | 1.1                         | 1.000              | 0.0                     | 1.000              | 0.0                   | 1.000              | 1.1                       | 0.091 | 0.0                     | 1.000 | 0.0                 | 1.000              |
| Narcissistic                | 4.7                        | 2.3                         | 1.000              | 0.0                     | 0.571              | 0.0                   | 1.000              | 1.1                       | 0.176 | 1.1                     | 0.176 | 0.0                 | 1.000              |
| Obsessive                   | 11.6                       | 6.9                         | 1.000              | 1.1                     | 0.447              | 3.4                   | 0.001 <sup>b</sup> | 0.0                       | 1.000 | 0.0                     | 1.000 | 0.0                 | 1.000              |
| Dependent                   | 5.8                        | 1.1                         | 0.153              | 0.0                     | 0.582              | 1.1                   | 0.166              | 1.1                       | 0.217 | 1.1                     | 0.217 | 1.1                 | 0.264              |
| Avoidant                    | 9.3                        | 4.6                         | 0.710              | 2.3                     | 1.000              | 1.1                   | 0.257              | 0.0                       | 1.000 | 0.0                     | 1.000 | 1.1                 | 0.394              |
| Premorbid immigration       | 9.3                        | 5.8                         | 1.000              | 2.3                     | 1.000              | 0.0                   | 1.000              | 0.0                       | 1.000 | 0.0                     | 1.000 | 1.1                 | 0.394              |
| Premorbid deafness          | 18.6                       | 11.8                        | 0.773              | 4.6                     | 0.746              | 1.1                   | 0.465              | 0.0                       | 1.000 | 1.1                     | 0.586 | 0.0                 | 0.579              |
| Older age at onset (>50)    | 24.4                       | 15.2                        | 0.780              | 4.7                     | 1.000              | 1.1                   | 1.000              | 1.1                       | 1.000 | 0.0                     | 0.568 | 2.3                 | 0.592              |
| Premorbid head trauma       | 17.4                       | 13.9                        | 0.073              | 3.4                     | 1.000              | 0.0                   | 1.000              | 0.0                       | 1.000 | 0.0                     | 1.000 | 0.0                 | 0.582              |
| Premorbid substance abuse   | 18.6                       | 8.1                         | 0.160              | 4.6                     | 0.746              | 1.1                   | 0.465              | 1.1                       | 0.568 | 0.0                     | 1.000 | 3.4                 | 0.043 <sup>a</sup> |

<sup>a</sup>p<0.05.

<sup>b</sup>p<0.01.

SAP, Standard Assessment of Personality.

**Table 3** Severity of psychopathology and comorbid axis I for DD and its types

| Delusional disorder (n=86)     |               |                             |                    |                         |                    |                       |                    |                           |       |                         |                    |                     |                    |
|--------------------------------|---------------|-----------------------------|--------------------|-------------------------|--------------------|-----------------------|--------------------|---------------------------|-------|-------------------------|--------------------|---------------------|--------------------|
|                                | Total<br>n=86 | Persecutory<br>n=51 (59.3%) |                    | Jealous<br>n=19 (22.1%) |                    | Somatic<br>n=3 (3.5%) |                    | Erotomaniac<br>n=4 (4.7%) |       | Grandiose<br>n=4 (4.7%) |                    | Mixed<br>n=5 (5.8%) |                    |
|                                | %             | %                           | p                  | %                       | p                  | %                     | p                  | %                         | p     | %                       | p                  | %                   | p                  |
| Disorder                       | 4.6           | 4.6                         | 0.142              | 0                       | 0.571              | 0                     | 1                  | 0                         | 1     | 0                       | 1                  | 0                   | 1                  |
| Hallucinations (SCID-I)        | 45.3          | 23.2                        | 0.168              | 11.6                    | 0.470              | 3.4                   | 0.089              | 1.1                       | 0.623 | 1.1                     | 0.623              | 4.6                 | 0.172              |
| Non-prominent auditory         | 15.1          | 10.4                        | 0.429              | 2.3                     | 0.724              | 0.0                   | 1.000              | 0.0                       | 1.000 | 1.1                     | 0.487              | 1.1                 | 0.569              |
| Non-prominent visuals          | 8.1           | 4.6                         | 1.000              | 0.0                     | 0.340              | 0.0                   | 1.000              | 0.0                       | 1.000 | 1.1                     | 0.292              | 2.3                 | 0.051              |
| Tactile                        | 20.9          | 8.1                         | 0.047 <sup>a</sup> | 4.6                     | 1.000              | 3.4                   | 0.008 <sup>b</sup> | 1.1                       | 1.000 | 0.0                     | 0.575              | 3.4                 | 0.060              |
| Olfactory                      | 16.3          | 5.8                         | 0.050              | 5.8                     | 0.288              | 1.1                   | 0.417              | 0.0                       | 1.000 | 0.0                     | 1.000              | 3.4                 | 0.029 <sup>a</sup> |
| Non-prominent gustatory        | 4.7           | 2.3                         | 1.000              | 0.0                     | 0.571              | 1.1                   | 0.135              | 0.0                       | 1.000 | 0.0                     | 1.000              | 1.1                 | 0.217              |
| Attempted suicide              | 20.9          | 10.6                        | 0.366              | 3.4                     | 0.751              | 2.3                   | 0.110              | 2.3                       | 0.192 | 0.0                     | 0.575              | 2.3                 | 0.280              |
| Physical aggressiveness        | 10.4          | 4.6                         | 0.476              | 5.8                     | 0.022 <sup>a</sup> | 0.0                   | 1.000              | 0.0                       | 1.000 | 0.0                     | 1.000              | 0.0                 | 1.000              |
| Legal problems                 | 27.9          | 17.6                        | 0.387              | 5.8                     | 0.450              | 0.0                   | 0.557              | 1.1                       | 0.894 | 2.3                     | 0.310              | 1.1                 | 1.000              |
| Imprisonment                   | 6.9           | 5.8                         | 0.214              | 1.1                     | 1.000              | 0.0                   | 1.000              | 0.0                       | 1.000 | 0.0                     | 1.000              | 0.0                 | 0.528              |
| Marital problems               | 74.4          | 39.7                        | 0.047 <sup>a</sup> | 22.1                    | 0.002 <sup>b</sup> | 2.3                   | 1.000              | 3.4                       | 1.000 | 2.3                     | 0.269              | 4.6                 | 1.000              |
| Positive PANSS                 | 13.8±4.5      | 13.7±4.3                    | 0.996              | 12.1±3.1                | 0.079              | 13.0±3.6              | 0.850              | 16.2±4.1                  | 0.210 | 23.0±5.4                | 0.003 <sup>b</sup> | 12.6±3.6            | 0.560              |
| Negative PANSS                 | 9.9±2.8       | 9.7±2.6                     | 0.473              | 9.4±1.8                 | 0.854              | 8.0±1.7               | 0.170              | 8.0±1.1                   | 0.105 | 13.25±5.2               | 0.081              | 13.4±2.4            | 0.005 <sup>b</sup> |
| General PANSS                  | 23.8±4.8      | 23.1±4.4                    | 0.156              | 23.6±4.7                | 0.680              | 28.6±5.6              | 0.078              | 22.0±1.8                  | 0.491 | 28.25±8.5               | 0.188              | 26.2±2.4            | 0.077              |
| Presence of depression (MADRS) | 45.3          | 23.2                        | 0.058              | 11.6                    | 0.624              | 3.4                   | 0.104              | 3.4                       | 0.344 | 0.0                     | 0.118              | 5.8                 | 0.022 <sup>a</sup> |
| Depression (MADRS)             | 7.8±7.3       | 7.1±7.5                     | 0.162              | 8.6±7.4                 | 0.532              | 9.0±3.4               | 0.403              | 10.7±6.8                  | 0.261 | 2.0±2.8                 | 0.048 <sup>a</sup> | 12.4±7.6            | 0.053              |
| Cognitive Functioning (MMSE)   | 27.6±2.4      | 27.6±2.2                    | 0.778              | 27.3±2.8                | 0.987              | 29.0±1.7              | 0.232              | 28.5±1.2                  | 0.525 | 27.0±4.0                | 0.917              | 26.6±2.7            | 0.325              |
| Comorbidity in axis I (MINI)   | 46.5          | 24.4                        | 0.231              | 11.6                    | 0.545              | 3.4                   | 0.097              | 2.3                       | 1.000 | 0.0                     | 0.120              | 4.6                 | 0.179              |
| Depressive disorders           | 32.5          | 15.1                        | 0.041 <sup>a</sup> | 9.3                     | 0.314              | 2.3                   | 0.246              | 2.3                       | 0.593 | 0.0                     | 0.299              | 3.4                 | 0.324              |
| Major depressive disorder      | 16.2          | 9.3                         | 0.857              | 4.6                     | 0.500              | 1.1                   | 0.415              | 0.0                       | 1.000 | 0.0                     | 1.000              | 1.1                 | 1.000              |
| Recurrent MDD                  | 8.1           | 3.4                         | 0.355              | 2.3                     | 0.647              | 1.1                   | 0.227              | 0.0                       | 1.000 | 0.0                     | 1.000              | 1.1                 | 0.353              |
| Dysthymia                      | 17.4          | 6.9                         | 0.094              | 4.6                     | 0.773              | 1.1                   | 0.442              | 2.3                       | 0.139 | 0.0                     | 1.000              | 2.3                 | 0.208              |
| Anxiety disorders              | 13.9          | 6.9                         | 0.536              | 1.1                     | 0.286              | 1.1                   | 0.367              | 1.1                       | 0.458 | 0.0                     | 1.000              | 3.4                 | 0.018 <sup>a</sup> |
| Eating disorders               | 1.1           | 1.1                         | 1.000              | 0.0                     | 1.000              | 0.0                   | 1.000              | 0.0                       | 1.000 | 0.0                     | 1.000              | 0.0                 | 1.000              |
| Disorders by substance abuse   | 4.6           | 4.6                         | 0.142              | 0.0                     | 0.571              | 0.0                   | 1.000              | 0.0                       | 1.000 | 0.0                     | 1.000              | 0.0                 | 1.000              |
| Suicide risk (MINI)            | 15.1          | 8.1                         | 0.664              | 2.3                     | 0.724              | 1.1                   | 0.392              | 1.1                       | 0.487 | 0.0                     | 1.000              | 2.3                 | 0.162              |

SCID-I, Structured Clinical Interview for DSM-IV Axis I Disorders; PANSS, Positive and Negative Syndrome Scale for Schizophrenia; MADRS, Montgomery-Asberg Depression Rating Scale; MMSE, Mini Mental State Examination, 30-item version; MINI, Mini International Neuropsychiatric Interview. Interview for DSM-IV Axis I Disorders.

<sup>a</sup>p<0.05.

<sup>b</sup>p<0.01.

The data is expressed as mean ± standard deviation except other indication.



psychosocial and clinical correlates of DD and its types using standardized valid measures of diagnosis, psychotic symptoms, comorbid psychopathology and functionality. We have fulfilled our objective of empirically describing potential psychosocial and clinical risk factors or correlates of DD and investigating their association with specific DD types.

### Frequency of DD types and sociodemographic findings

in agreement with most previous studies, we found that the most prevalent DD type was the persecutory type.<sup>4-8</sup>

However, unlike previous reports, our findings suggest that the jealous type is the second most prevalent and the somatic type shows comparatively lower prevalence rates.<sup>4,5,8</sup> We show that DD is a mid-to-late life psychosis which is more frequent among women (the female-to-male ratio was 1.6:1). This proportion of women is higher than that reported by the largest study on the topic based on in-patients (the female-to-male ratio was 1.2:1),<sup>1</sup> but lower than that reported by smaller studies (female-to-male ratios ranging from 1.9:1 to 3:1).<sup>4,5,8</sup> As in previous reports,<sup>1,5,9</sup> about half of our DD patients were married and lived with their own family. However, a larger than expected

**Table 4** Course, functionality, and consumption of resources of DD and its types

| Delusional disorder (n=86) |               |                             |                    |                         |       |                       |       |                           |       |                         |                    |                     |       |
|----------------------------|---------------|-----------------------------|--------------------|-------------------------|-------|-----------------------|-------|---------------------------|-------|-------------------------|--------------------|---------------------|-------|
|                            | Total<br>n=86 | Persecutory<br>n=51 (59.3%) |                    | Jealous<br>n=19 (22.1%) |       | Somatic<br>n=3 (3.5%) |       | Erotomaniac<br>n=4 (4.7%) |       | Grandiose<br>n=4 (4.7%) |                    | Mixed<br>n=5 (5.8%) |       |
|                            | %             | %                           | p                  | %                       | p     | %                     | p     | %                         | p     | %                       | p                  | %                   | p     |
| Age at onset (years)       | 39.6±14.3     | 40.0±14.6                   | 0.829              | 39.8±9.5                | 0.588 | 44.6±33.2             | 0.859 | 38.0±20.7                 | 0.704 | 30.7±7.4                | 0.186              | 40.4±14.7           | 0.775 |
| Age at 1st consultation    | 43.4±14.9     | 42.5±15.2                   | 0.431              | 46.7±10.4               | 0.171 | 46.6±31.4             | 0.803 | 45.0±24.2                 | 0.819 | 39.0±14.2               | 0.549              | 41.0±15.1           | 0.865 |
| Form of onset              | —             | —                           | 0.378              | —                       | 0.398 | —                     | 0.553 | —                         | 0.576 | —                       | 1.000              | —                   | 0.625 |
| Insidious                  | 70.9          | 44.1                        | —                  | 13.9                    | —     | 3.4                   | —     | 2.3                       | —     | 3.4                     | —                  | 3.4                 | —     |
| Acute                      | 29.1          | 15.1                        | —                  | 8.1                     | —     | 0.0                   | —     | 2.3                       | —     | 1.1                     | —                  | 2.3                 | —     |
| Precipitating factor       | 47.7          | 32.5                        | 0.105              | 8.1                     | 0.284 | 1.1                   | 1.000 | 2.3                       | 0.618 | 2.3                     | 1.000              | 2.3                 | 1.000 |
| Type of course             | —             | —                           | 0.464              | —                       | 0.678 | —                     | 1.000 | —                         | 1.000 | —                       | 1.000              | —                   | 0.394 |
| Phasic                     | 9.3           | 6.9                         | —                  | 1.1                     | —     | 0.0                   | —     | 0.0                       | —     | 0.0                     | —                  | 1.1                 | —     |
| Chronic                    | 90.7          | 53.3                        | —                  | 20.9                    | —     | 3.4                   | —     | 4.6                       | —     | 4.6                     | —                  | 4.6                 | —     |
| Years of evolution         | 14.6±12.2     | 12.8±11.3                   | 0.113              | 14.8±11.1               | 0.743 | 11.9±7.1              | 0.859 | 24.0±23.7                 | 0.652 | 28.9±15.8               | 0.031 <sup>a</sup> | 14.2±6.3            | 0.574 |
| GAF                        | 63.9±11.3     | 63.8±11.9                   | 0.936              | 68.1±8.8                | 0.069 | 65.0±8.6              | 0.838 | 60.0±4.0                  | 0.325 | 50.0±14.1               | 0.034 <sup>a</sup> | 62.0±8.3            | 0.679 |
| SDI                        |               |                             |                    |                         |       |                       |       |                           |       |                         |                    |                     |       |
| Disability                 | 13.8±7.8      | 14.4±8.6                    | 0.377              | 11.8±6.6                | 0.195 | 12.0±10.8             | 0.814 | 11.2±3.8                  | 0.485 | 13.7±6.3                | 0.992              | 17.6±5.1            | 0.206 |
| Worklife                   | 5.2±3.5       | 5.5±3.7                     | 0.448              | 4.1±3.2                 | 0.117 | 6.6±5.7               | 0.342 | 5.5±2.3                   | 0.959 | 4.5±3.3                 | 0.508              | 7.0±3.3             | 0.28  |
| Social life                | 4.3±2.9       | 4.5±3.0                     | 0.470              | 3.4±2.5                 | 0.174 | 1.3±2.3               | 0.083 | 3.2±1.2                   | 0.439 | 5.7±3.8                 | 0.265              | 7.0±1.8             | 0.050 |
| Family life                | 4.2±3.1       | 4.3±3.4                     | 0.891              | 4.2±2.8                 | 0.871 | 4.0±3.6               | 0.915 | 2.5±2.0                   | 0.255 | 3.5±3.1                 | 0.649              | 5.4±2.3             | 0.347 |
| Perceived stress           | 2.3±2.9       | 2.3±2.8                     | 0.581              | 1.7±3.2                 | 0.153 | 2.6±4.6               | 0.823 | 4.7±2.9                   | 0.055 | 0.0±0.0                 | 0.046              | 3.4±1.5             | 0.106 |
| Social support             | 69.3±33.4     | 64.9±36.7                   | 0.338              | 73.6±24.9               | 1.000 | 90.0±17.3             | 0.243 | 47.5±45.7                 | 0.294 | 87.5±18.9               | 0.290              | 88.0±13.0           | 0.278 |
| Psychiatric admissions     | 48.8          | 25.5                        | 0.202              | 10.4                    | 0.885 | 2.3                   | 0.612 | 3.4                       | 0.355 | 3.4                     | 0.355              | 3.4                 | 0.673 |
| No. of admissions          | 0.9±1.3       | 0.6±0.9                     | 0.038 <sup>a</sup> | 0.9±1.3                 | 0.978 | 1.33±1.1              | 0.394 | 2.2±2.2                   | 0.138 | 1.5±1.2                 | 0.240              | 2.0±2.1             | 0.213 |
| No. of the emergency       | 1.5±3.0       | 1.1±3.6                     | 0.118              | 0.7±1.3                 | 0.709 | 1.5±0.7               | 0.108 | 2.0±2.1                   | 0.090 | 0.6±1.1                 | 0.962              | 2.6±3.0             | 0.138 |

GAF, Global Assessment of Functioning; SDI, Sheehan Disability Inventory.

The data is expressed as mean ± standard deviation except other indication.

<sup>a</sup>p<0.05.



proportion of unmarried patients (24.4%) suggests that DD patients find it more difficult to start or maintain stable relationships. Interestingly, being married is associated with jealousy—in Mediterranean cultures this may be related to local assumptions about marriage. The low educational and socioeconomic level we observed is consistent with the findings of most previous studies<sup>1,5,9</sup>, and with those of our group.<sup>7</sup>

### Psychosociocultural correlates of DD and its types

Our findings agree with those of previous reports that do not use standardized assessment methodology,<sup>7,14-16</sup> suggesting that DD often occurs alongside personality disorder (64.0%), particularly among patients from the so-called cluster A and, even more particularly, among those with paranoid personality disorder (38.4%). The association between the persecutory type and schizotypal personality disorder relates this type of DD to the schizophrenic spectrum.<sup>43</sup> The somatic type was associated with obsessive personality disorder, which is consistent with studies that report a close relationship between DD of the somatic type and the obsessive spectrum.<sup>44-46</sup> Our findings suggest that DD patients may share vulnerability with schizophrenic and other psychotic patients, including an excess of DD among immigrants (9.3%)<sup>11</sup> or people with sensory deficits (18.6%).<sup>12,13</sup> We found a high frequency of schizophrenia (20.9%) among the relatives of our DD patients, in contrast with the results of previous familial studies.<sup>17,18,20,21,23</sup> Indeed, this frequency does not differ from that expected among the relatives of schizophrenia patients<sup>47</sup>. Thus, our results could support the notion that DD forms part of the paranoid spectrum in which psychotic disorders such as schizophrenia and schizotypal personality disorder are part of a continuum and are bound by a shared inheritance.<sup>43,48</sup> A family history of DD is significantly more frequent among the jealous type, in line with descriptions of family patterns of jealous behaviour.<sup>23,49</sup> The high frequency of premorbid head trauma with loss of consciousness (17.4%), premorbid substance abuse (18.6%), and onset at an advanced age (24.4%) supports the notion suggested by Munro et al that both could be risk factors for DD<sup>25</sup>. Premorbid head trauma with loss of consciousness is associated with the persecutory type, which is consistent with studies on brain injury and paranoid psychosis.<sup>50</sup>

### Clinical and psychopathological correlates of DD and its types

As expected, we found that the results of the PANSS positive subscale were higher than those of the PANSS negative subscale. The grandiose type was significantly associated with higher positive PANSS scores and the mixed type with lower negative PANSS scores. Although these findings are difficult to compare with those of other studies because almost none uses a standard structured interview for psychotic disorders, they suggest that a limited degree of negative symptomatology does exist in DD patients; however, the extent to which antipsychotic medication can be a contributor here was not measured. Depressive symptoms as

evaluated by MADRS were common (45.3%) in our patients, in line with earlier results.<sup>5,6,8,9</sup> Scores of depressive symptoms were significantly lower amongst grandiose DD types than in the remaining types. We report a higher frequency of hallucinations (45.3%) than two previous retrospective studies that possibly underestimated results because of incomplete reporting.<sup>6,7</sup> The most frequent hallucinations in our sample were tactile followed by olfactory, unlike other studies,<sup>6,7</sup> in which the most frequent hallucinations were non-prominent auditory followed by tactile. In agreement with an earlier study, we found that tactile hallucinations were significantly associated with the somatic type.<sup>7</sup> The finding that the presence of marital problems is significantly associated with the jealous type is consistent with most of the literature.<sup>51,52</sup> Our study reveals a slight involvement of global cognitive function within the range of normality, a finding that is consistent with the few neuropsychological reports about DD.<sup>53-55</sup> Finally, our results are almost similar to those of Maina et al regarding the co-occurrence of DD and other DSM-IV axis I disorders (46.5%),<sup>5</sup> mainly affective disorders (32.5%). These may exert an important influence on the phenomenology of DD, which could be considered as one of the most “affective” types of psychotic disorder. Nonetheless, we found that affective disorders were inversely associated with the persecutory type.

### Course, functionality, and consumption of resources of DD and its type

Age at onset (39 years) and age at the first psychiatric consultation (44 years) of our sample are similar to those observed in previous reports.<sup>1,4-7,8,9</sup> In contrast with the Yamada study, we did not find significant differences between age at onset and the different types of DD.<sup>4</sup> With regard to the form of onset, presence of precipitating factors, and type of course of DD, our results are consistent with those of previous reports. Thus, our findings confirm that DD presents a precipitating factor in almost half of the cases, in approximately two-thirds of cases it has an insidious onset, and in more than three-quarters of cases it has an uninterrupted chronic course.<sup>9,27,56</sup> We found that global functionality (GAF=63.9) was slightly better than in previous studies,<sup>7,8</sup> but still suggest that moderate disability seems to alter working life and is significantly worse among grandiose cases.<sup>7</sup>

### Limitations and future research directions

The low prevalence of DD (<0.1%) and the low number of delusional patients seeking treatment<sup>1,3</sup> makes it difficult to recruit a large sample. Nevertheless, although it examines only 86 patients, the DELIREMP study is the largest DD sample to date that has undergone a thorough valid psychosocial, psychopathological and clinical assessment. Selection bias may also exist, as we had to follow the recommendations of our local ethics committee that only patients whose reference psychiatrist agreed to their participation were enrolled, which may have led to a selection of patients with less severe DD. Our descriptive study may open up

future research lines such as exploring the validity of current DD types by an analysis of the symptom structure of each subtype, rather than relying on delusional content alone. Thus, both psychotic and cognitive psychopathology can help to better define current categorical subdivisions of DD types. Similarly, comparing empirical findings on DD patients with those present in other psychoses may clarify the debate on the validity of current psychotic nosology. Finally, genetic or neurophysiological studies may also help to find endophenotypes of DD that enable us to better describe DD and other psychotic categories.

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