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ORIGINAL PAPER

Gender-related features of persistent delusional disorders

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Abstract This paper presents gender-related features of Delusional Disorder. It is part of the Halle Delusional Syndromes Study (HADES-Study). All inpatients fulfilling the DSM-IV/ICD-10 criteria of Delusional Disorder/Persistent Delusional Disorder (DD) during a 14-year period were included and followed up for an average of 10.8 years. Gender distribution was almost equal, women became ill significantly later than men, and almost all women had a stable diagnosis—in contrast to men. The great majority of women, at the end of the follow-up period, had an unremitted DD. Women more frequently had low social functioning at admission, but then were more compliant and received more frequently pharmacological medication. There were no differences in the delusional topic and no differences regarding long-term disability and autarky. In spite of previous reports, the HADES-Study found no gender difference in the frequency of DD. However, men tended more frequently to change into schizophrenia and schizoaffective disorder. In these cases, the DD might have been a prodrome of schizophrenia or schizoaffective disorder, which manifests later in life. Although in both female and male DD patients, the majority remained unremitted, almost none of them lost their autarky (independent living). While women more frequently received psychopharmacological medication, their DD was usually found to be unremitted.

Keywords Delusional disorder · Gender · Follow-up

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Introduction

Although Delusional Disorders succeeded the paranoia concept, which was one of the central topics of psychiatry in the nineteenth and at the beginning of the twentieth century [14], in modern times, there is only scarce research on it. The most important reason for that lack of research might be that, after the reform of the concept by Emil Kraepelin [12] and the development of the schizophrenia concept by Eugen Bleuler [4], it became marginalized. After the introduction of the new term "Delusional Disorder" by George Winokur [23], with almost the same meaning as the definition of paranoia according to Kraepelin, and its introduction into DSM-III-R [1], it became clear that Delusional Disorders are "neither rare nor common", making up between 0.4 and 1% of clinical populations [9, 13]. New epidemiological studies show that the prevalence of Delusional Disorder, which was estimated by DSM-IV at around 0.03%, is perhaps significantly higher. Perälä et al. [18] found a lifetime prevalence of 0.18 in comparison with schizophrenia 0.87%, schizoaffective disorder 0.32%, bipolar I disorder 0.24%, major depressive disorder with psychotic features 0.35%, substance-induced psychotic disorders 0.42%, and psychotic disorders due to a general medical condition 0.21%.

In spite of that fact, but compatible with the generally rare research on the topic, there are only a few comparative studies regarding gender-related issues. But perhaps such a comparison does not seem to be irrelevant, considering the gender differences in other non-organic psychotic and mood disorders. Although there is a huge literature on gender-related features in schizophrenia and mood disorders, and also some literature on other psychotic disorders like schizoaffective disorder or acute and transient

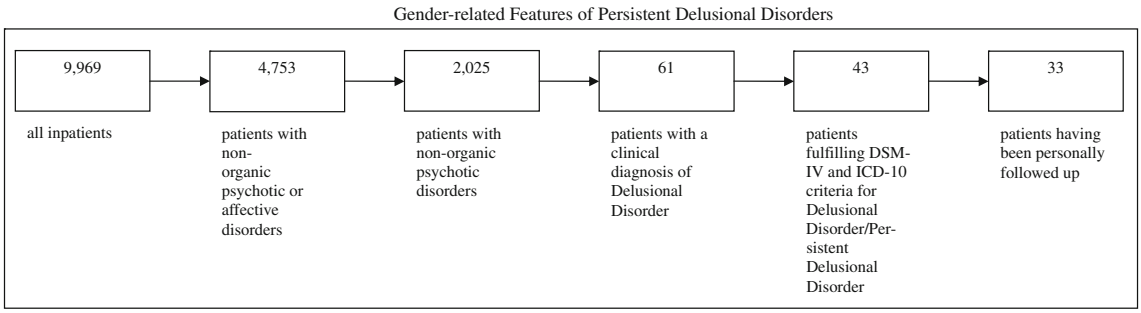

Fig. 1 Stages of patients recruitment in the HADES-Study (for details see text)

psychosis [15], only very little research on Delusional Disorder can be found [20].

The aim of this paper is to contribute to fill this vacuum in the research of psychotic disorders. The search for gender-related features in Delusional Disorder according to DSM-IV or Persistent Delusional Disorder according to ICD-10 (which, in this sample, are criteriologically identical and thus can be used as synonyms) is part of the Halle Delusional Syndrome Study (HADES-Study) investigating prevalence, sociodemographic, clinical and treatment aspects as well as longitudinal course, outcome and stability of the diagnosis.

Methods

Sample

The Halle Delusional Syndrome Study (HADES-Study) was initiated and designed by the senior author (A.M.). In the first phase of the study, we identified all consecutive cases of Persistent Delusional Disorder treated as inpatients at the Department for Psychiatry, Psychotherapy and Psychosomatics at the Martin Luther University Halle-Wittenberg/Germany, from 1994 to 2008, i.e. during a period of 14 years ($N = 9{,}969$). The hospital serves a large municipal and suburban catchment area with a non-selective admission policy. Patients with a clinical discharge diagnosis of Delusional Disorder, Persistent Delusional Disorder, Erotomania, Capgras Syndrome, Cotard Syndrome or other related conditions were considered for inclusion in the study. This initial screening procedure was deliberately over-inclusive in order not to miss eligible patients. For the final inclusion in the study, all hospital diagnoses were reviewed independently by the authors on the basis of a checklist consisting of the ICD-10 research criteria for Persistent Delusional Disorder and the DSM-IV criteria for Delusional Disorder. Only subjects who were confirmed to fulfil either the diagnostic criteria of Persistent Delusional Disorder of ICD-10 (F22) or those of Delusional Disorder of DSM-IV (297.1) were included. During this procedure, we found that all patients fulfilling the DSM-IV criteria for Delusional Disorder also fulfilled the ICD-10 criteria for Persistent Delusional Disorder. Out of initially 61 patients with a clinical diagnosis of Delusional Disorder or a related condition, 43 patients fulfilled these criteria during the above mentioned period of 14 years.

Follow-up investigations took place at 10.8 ± 4.7 years after onset of the disorder or 6.6 ± 3.8 years after the index hospitalization. The minimum duration of follow-up was 3 years and the maximum duration was 24 years. After this time, these patients were re-assessed and asked to give their informed consent to take part in an assessment of various psychiatric and psychological constructs. Of the original sample, 33 patients participated in the follow-up examination. At the time of follow-up, only 7 patients refused consent, 3 had died (one of them presumably by suicide) and the remaining 33 subjects were personally interviewed, which amounts to 82.5 % of the surviving patients (Fig. 1).

Instruments

During the study, a variety of instruments were used [14]. We systematically recorded demographic, sociobiological and clinical features. Information was gathered using a semi-structured interview already used in earlier studies [16]. Clinical and paraclinical findings as well as information gathered from the patients and their relatives or from other suitable sources during admission and treatment were systematically recorded. DSM-IV diagnoses for the index hospitalization and lifetime diagnoses were assessed with the Structured Clinical Interview for DSM-IV (SCID) [24]; ICD-10 diagnoses were assessed according to the ICD-10 research criteria [22]. The classification of socioeconomic status followed the criteria of Kleining and Moore [10, 11], who in turn largely adapted the classification of Hollingshead and Redlich [6]. Educational level was considered very low for subjects with less than 8 years of schooling or special education, low for subjects with 8 or 9 years of schooling, medium for subjects with 10 or

11 years of education and high for subjects with 12 or more years of education. For the evaluation of psychopathological parameters reviewing the index hospitalization, a symptom list derived from the Brief Psychiatric Rating Scale [17] and the AMDP system [3] was used. Items were rated as "present" or "absent".

Relapse was defined as the occurrence of a major affective syndrome or of psychotic symptoms leading either to hospitalization or to outpatient treatment, including psychiatric medication and a disruption of daily activities. A limitation of this definition is, however, given by the fact that in most of the patients with Persistent Delusional Disorder, the delusional symptoms persisted more or less during the whole follow-up period. For such patients, hospitalizations during follow-up not necessarily meant a dramatic exacerbation of symptoms or deterioration, but most frequently the re-hospitalization was a result of social conditions.

Psychopathological symptoms at follow-up were assessed with the Positive and Negative Syndrome Scale (PANSS) [8].

The level of general functioning was assessed using the Global Assessment of Functioning Scale (GAF) [2, 21]. The GAF is a widely used rating scale for the evaluation of the overall functioning of a subject during a specified period on a continuum that ranges from a state of severe psychiatric illness to a state of health. The Social and Occupational Functioning Assessment Scale (SOFAS) was used to assess the individual's level of social and occupational functioning not directly influenced by the overall severity of psychiatric symptoms. The reliability and validity of GAF and SOFAS are well documented [5]. Social disability was measured using the German version of the WHO Disability Assessment Schedule (DAS) [7].

All interviewers were physicians and staff members of the Psychiatric Department of the Martin Luther University Halle-Wittenberg and had been extensively trained in the use of the instruments by a senior consultant (F.P.). Inter-rater reliability for the instruments in our group has been determined and found to be good to excellent [19].

Statistical analyses

Statistical analyses were performed with the Statistical Package for Social Sciences (SPSS) version 17.0. Bivariate comparisons of continuous data were performed with two-tailed t tests. χ^2 tests of Fisher's exact test were used for contingency tables of categorical data where appropriate. For the comparison of quantitative data, t tests or Mann–Whitney U tests were used as appropriate. ANOVAs were calculated with Scheffé post hoc tests if indicated. Significance was assumed with $p < 0.05$.

Ethical issues

Patients were approached and asked for participation only in a mental and physical state enabling them to understand the procedure. All subjects provided written informed consent. The study protocol was approved by the ethics committee of the Medical Faculty of Martin Luther University Halle-Wittenberg.

Results

The ICD-10 criteria for Persistent Delusional Disorder (PDD) and the DSM-IV criteria for Delusional Disorder (DD)—in the following used synonymously as DD—were fulfilled by 43 patients, representing 0.43% of all inpatients ($N = 9{,}969$), 0.90% of those with non-organic psychotic and non-organic affective disorders ($n = 4{,}753$) and 2.12% of all patients with non-organic psychotic disorders ($n = 2{,}025$).

Gender distribution

Of 43 patients, 22 were men and 21 were women. There was no statistically significant difference in gender distribution from that in all inpatients during the study period (4,904 male out of 9,969; 49.2%; $p = 0.796$).

Sociobiographic profile

In spite of some arithmetical differences regarding some sociodemographic features, we did not find any statistically significant difference in any of the investigated parameters such as socioeconomic status, educational level, perinatal and developmental disturbances, broken home situation, mental disorders in first-degree relatives or stable partnership (Table 1). So, men have more frequently perinatal and developmental disturbances, more frequently belong to the lower socioeconomic classes and are more frequently single. Women have more frequently psychotic or major affective disorders in first-degree relatives, but, as already said, the arithmetical differences are not statistically significant.

Cross-sectional and clinical profile

Women became ill later than men (50.8 vs. 43.3 years), but the statistical significance is weak ($p = 0.061$). The age at first admission was significantly higher in women than in men ($p = 0.046$). Other parameters of the index hospitalization such as duration of delusions until index hospitalization, voluntariness during admission, duration of index hospitalization, depressive and anxious symptoms during the episode, psychopharmacological treatment and

Table 1 Sociodemographic data ($n = 43$)

	Women, $n = 21$ n (%)	Men, $n = 22$ n (%)	p
Perinatal complications	0 (0.0)	4 (18.2)	0.108[b]
Developmental disturbance	1 (4.8)	3 (13.6)	0.607[b]
Broken home situation	7 (33.3)	7 (31.8)	0.916[a]
Educational level			0.898[c]
Very low	1 (4.8)	2 (9.1)	
Low	10 (47.6)	8 (36.4)	
Medium	5 (23.8)	7 (31.8)	
High	5 (23.8)	5 (22.7)	
Socio-economic status of family of origin			0.517
Very high	3 (14.3)	1 (4.5)	
High	2 (9.5)	3 (13.6)	
Medium	4 (19.0)	4 (18.2)	
Low	7 (33.3)	12 (54.5)	
Very low	1 (4.8)	0 (0.0)	
Undeterminable	4 (19.0)	2 (9.1)	
Mental illness in first-degree relative			
Any disorder	5 (23.8)	5 (22.7)	>0.999[b]
Psychotic or major affective disorders	3 (14.3)	2 (9.1)	0.664[b]
Psychotic disorders	1 (4.8)	0	0.488[b]
Major affective disorders	2 (9.5)	2 (9.1)	>0.999[b]
Marital status at index admission			0.304[a]
Single	2 (9.5)	6 (27.3)	
Married/living together	13 (61.9)	12 (54.5)	
Widowed	3 (14.3)	0 (0.0)	
Separated	0 (0.0)	1 (4.5)	
Divorced	3 (14.3)	3 (13.6)	
Stable heterosexual relationship until index admission			0.863[a]
Never	2 (9.5)	3 (13.6)	
Before but not at onset	6 (28.6)	7 (31.8)	
At onset	13 (61.9)	12 (54.5)	

[a] χ^2 test
[b] Fisher's exact test
[c] Mann–Whitney U test

functioning at discharge were found without differences related to gender (Table 2). However, the global functioning at admission (GAF scores) as well as social functioning (SOFAS scores) was worse in women than in men, but GAF and SOFAS scores did not show any difference at discharge. In both genders, the discharge values were higher than those at admission.

Regarding the type of Delusional Disorder according to the topic of the delusions, in all three classification systems used in this study, there were no significant differences between women and men (Table 3).

Course and outcome

At follow-up investigation, women were significantly older (mean: 62.7 years) than men (mean: 52.9 years) (Table 4).

The most important finding regarding long-term course and outcome was that only one female (6.3%) had a syndrome shift to schizophrenia, in contrast to 35.3% of the male population changing into schizophrenia or schizoaffective disorder ($p = 0.085$). Significantly, more women (81.3%) had still an unremitted DD, but only 47.1% of the men. The time between onset and syndrome shift to schizophrenia was lower in men (7.4 years) than in women (12.8 years). Interesting is the fact that in men shifting to schizoaffective disorder, the time between onset and syndrome shift was much lower (3.9 years) than in men shifting to schizophrenia (7.4 years). There was no woman with a syndrome shift to schizoaffective disorder. Although more women than men manifested also depressive episodes during course (37.5% vs. 17.6%), the difference is not statistically significant.

Also, other features of the course, like suicide attempts or aggressive behaviour, did not show any differences between genders. But significantly more women (75%)

Table 2 Course of the disorder and characteristics of the index admission by gender

	Women, $n = 21$	Men, $n = 22$	p
Age at onset in years (mean, SD)	50.8 ± 12.6	43.3 ± 13.5	0.061[c]
Age at first hospitalization after onset of DD in years (mean, SD)	54.4 ± 11.8	46.7 ± 12.2	0.042[c]
Age at index admission (mean, SD)	56.1 ± 12.2	47.7 ± 11.7	0.025[c]
Time from onset to first hospitalization after onset of DD	3.3 ± 4.9	4.0 ± 3.2	0.140[d]
GAF at admission (mean, SD)	45.5 ± 16.4	58.2 ± 20.9	0.033[c]
SOFAS at admission (mean, SD)	52.3 ± 13.4	62.9 ± 18.2	0.036[c]
GAF at discharge (mean, SD)	58.6 ± 11.0	56.6 ± 9.9	0.538[c]
SOFAS at discharge (mean, SD)	61.7 ± 11.2	61.5 ± 11.7	0.952[c]
Depressive symptoms during episode (n, %)	12 (57.1)	12 (54.5)	0.864[a]
Anxiety during episode (n, %)	4 (19.0)	3 (13.6)	0.698[b]
Life events before onset (n, %)	9 (42.9)	10 (45.5)	0.864[a]
Life events before index hospitalization (n, %)	4 (19.0)	5 (22.7)	>0.999[b]
Involuntary admission (n, %)	5 (23.8)	3 (13.6)	0.457[b]
Discharge against advice (n, %)	6 (28.6)	3 (13.6)	0.281[b]
Antipsychotics in index admission (n, %)	20 (95.2)	19 (86.4)	0.607[b]
Antidepressants in index admission (n, %)	9 (42.9)	8 (36.4)	0.663[a]

[a] χ^2 test
[b] Fisher's exact test
[c] t test
[c] Mann–Whitney U test

Table 3 Predominant delusional topic (χ^2 test)

Predominant delusional topic…	Women, $n = 21$ n (%)	Men, $n = 22$ n (%)	p (χ^2 test)
… according to ICD-10			0.622
Persecutory delusions	9 (42.9)	11 (50.0)	
Querulous paranoia	2 (9.5)	1 (4.5)	
Delusions of reference	1 (4.8)	2 (9.1)	
Somatic delusions	7 (33.3)	5 (22.7)	
Delusional jealousy	2 (9.5)	1 (4.5)	
Erotomania	0 (0.0)	2 (9.1)	
… according to DSM-IV			0.424
Persecutory delusions	12 (57.1)	14 (63.6)	
Somatic delusions	7 (33.3)	5 (22.7)	
Delusional jealousy	2 (9.5)	1 (4.5)	
Erotomania	0 (0.0)	2 (9.1)	
… according to Marneros 2010			0.717
Erotocentric[a]	2 (9.5)	3 (13.6)	
Somatocentric[b]	7 (33.3)	5 (22.7)	
Securocentric[c]	12 (57.1)	14 (53.8)	

[a] Delusions to be loved and delusions of jealousy
[b] Delusions of health threat and somatic delusions
[c] Persecutory, querulous, or litigious delusions, partially delusions of reference

than men (35.3%) received psychopharmacological medication at the time of the follow-up investigation on—a difference that remains significant, even if we excluded patients with syndrome shift into schizophrenia or schizoaffective disorder (Table 5).

An early retirement due to the disorder was equally represented in both groups, although after excluding patients with syndrome shift into schizophrenia or schizoaffective disorder, more women (46.7%) than men (18.2%) received a disability pension, but the statistical differences are not significant. Interesting is the fact that a high proportion of patients of both groups (women 87.5%, men 88.2%) did not lose their autarky, which means they are living independently and without external support. After excluding patients with syndrome shift into schizophrenia or schizoaffective disorder, the proportions stay high. Only two women and one man with "pure" Delusional Disorder lost their autarky.

The instruments estimating social disability and general functioning, like DAS, GAF and SOFAS, revealed similar scores in both groups with no statistically significant differences (Table 6).

Table 4 Follow-up: features of long-term course by gender ($n = 33$)

	Women, $n = 16$	Men, $n = 17$	
Age at follow-up (mean, SD)	62.7 ± 11.4	52.9 ± 10.0	0.013[d]
Unremitted DD at follow-up (n, %)	13 (81.3)	8 (47.1)	0.041[a]
Remitted at follow-up (n, %)	2 (12.5)	3 (17.6)	<0.999[b]
Syndrome shift to schizophrenia/schizoaffective disorder (n, %)	1 (6.3)	6 (35.3)	0.085[b]
Without syndrome shift	15 (93.8)	11 (64.7)	0.085[b]
Syndrome shift to schizoaffective disorder (n, %)	0 (0.0)	1 (5.9)	>0.999[a]
Time from onset of DD to schizoaffective episode in years	–	3.9	–
Syndrome shift to schizophrenia (n, %)	1 (6.3)	5 (29.4)	0.175[b]
Time from onset of DD to schizophrenic episode in years	12.8	7.4 (4.7)	0.380[c]
Depressive episode during follow-up (n, %)	6 (37.5)	3 (17.6)	0.259[b]
Time from onset of DD to depressive episode in years (mean, SD)	2.8 (10.9)	3.9 (3.0)	0.606[c]
Alcohol dependency during course of disorder	1 (6.3)	1 (5.9)	>0.999[a]
Organic mental disorder during course of disorder	0 (0.0)	0 (0.0)	–
Suicide attempts during course (n, %)	4 (25.0)	3 (17.6)	0.688[b]
Aggressive behaviour during course (n, %)	4 (25.0)	3 (17.6)	0.688[b]

[a] χ^2 test
[b] Fisher's exact test
[c] Mann–Whitney U test
[d] t test

Table 5 Outcome: medication and psychosocial status at follow-up by gender

	All patients with follow-up ($n = 33$)			Patients with syndrome shift excluded ($n = 26$)		
	Women, $n = 16$ mean (SD)	Men, $n = 17$ mean (SD)	p[a]	Women, $n = 15$	Men, $n = 11$	p[a]
On psychiatric medication	12 (75.0)	6 (35.3)	0.022	11 (73.3)	3 (27.3)	0.020
Antidepressant	7 (43.8)	2 (11.8)	0.057[b]	7 (46.7)	2 (18.2)	0.217[b]
Antipsychotic	9 (56.3)	4 (23.4)	0.055	8 (53.3)	1 (9.1)	0.036[b]
Mood Stabilizer	0 (0.0)	1 (5.9)	<0.999[b]	0 (0.0)	1 (9.1)	0.423[b]
Early retirement due to mental illness	7 (43.8)	7 (41.2)	0.881	7 (46.7)	2 (18.2)	0.217
Stable partnership	9 (56.3)	6 (35.3)	0.227	8 (53.3)	4 (36.4)	0.391
Autarky (living independently)	14 (87.5)	15 (88.2)	<0.999	13 (86.7)	10 (90.9)	<0.999

[a] χ^2 test if not otherwise indicated
[b] Fisher's exact test

Discussion

Gender-related features of psychotic disorders can be an important indicator for underlying biological, psychological and sociological processes. In contrast to research regarding gender-related differences in major mental disorders like schizophrenia, schizoaffective, mood or even acute and transient psychotic disorders [15], there is extremely rare research for Delusional Disorders. As we have already shown in previous works [14], the findings regarding gender distribution are not consistent. Winokur [23], for instance, found an overrepresentation of men (70% vs. 30%), whereas other studies, like that of Kendler [9], found an overrepresentation of women (36% vs. 48%), and again others found an almost balanced proportion between both genders. Only few authors investigated gender-specific features of Delusional Disorder, for instance Rudden et al. [20]. These authors found that women have more frequent erotic and heterosexual delusions, more affective symptoms and more interpersonal precipitants than men. The present study, however, shows that there are not any differences between genders regarding the type of Delusional Disorder and the frequency of depressive symptoms. Women, however, become ill in older age than men (50.8 vs. 43.3 years of age), a finding similar to the well-known differences in other psychotic disorders. Women are also much more compliant than men and receive significantly more often psychopharmacological medication and medical help. Further, they have a more stable diagnosis, which means that the diagnosis "Delusional Disorder" or "Persistent Delusional Disorder" does not—or only exceptionally—change during course. Almost 94% of the women still had the diagnosis "Delusional Disorder" during the follow-up.

Table 6 Outcome: social disability, symptoms and general functioning at follow-up by gender

	All patients with follow-up ($n = 33$)			Patients with syndrome shift excluded ($n = 26$)		
	Women, $n = 16$ mean (SD)	Men, $n = 17$ mean (SD)	p[c]	Women, $n = 15$ mean (SD)	Men, $n = 11$ mean (SD)	p[c]
Disability assessment schedule						
Global score[a]	1.06 (1.00)	1.53 (1.33)	0.363[d]	1.07 (1.03)	1.00 (1.00)	0.919[d]
Positive and negative syndrome scale						
Positive symptoms[a]	10.6 (2.3)	12.6 (5.1)	0.154	10.8 (2.2)	11.3 (4.4)	0.721
Negative symptoms[a]	9.8 (3.9)	11.5 (8.0)	0.430	9.4 (3.8)	7.5 (0.9)	0.112
General symptoms[a]	22.3 (4.7)	22.5 (6.6)	0.937	22.6 (4.7)	22.3 (4.1)	0.203
Total score[a]	42.6 (7.9)	46.6 (17.8)	0.421	42.8 (8.1)	39.0 (8.8)	0.266
Global assessment of functioning[b]	61.1 (14.9)	58.2 (19.9)	0.649	61.1 (15.4)	64.7 (18.4)	0.593
SOFAS[b]	64.1 (14.6)	61.7 (9.7)	0.695	64.4 (15.1)	69.6 (16.9)	0.414

[a] Possible scores range from 0 to 5, higher scores indicate higher deficit

[b] Possible scores range from 0 to 100, higher scores indicate better functioning

[c] t test if not otherwise indicated

[d] Mann–Whitney U test

At the end of the follow-up period, approximately 81% of the female patients were re-diagnosed as having Delusional Disorder (6% had a syndrome shift, and in 13% DD had remitted), but only 47% of the male patients were re-diagnosed as having Delusional Disorder (35% had a syndrome shift, and in 18% DD had remitted). There were no differences regarding circumstances of admission (involuntary or not), characteristics of index admission, delusional topics, or social and functional outcome. But at admission, women were socially and functionally more handicapped than men. That means that the diagnosis *Delusional Disorder* in women is very stable and really "persistent".

Conclusions

It can be concluded that there are differences regarding stability of diagnosis, age at onset, treatment, compliance and remission. The above findings indicate that Delusional Disorder in women is more severe and more persistent than in men.

Limitations

The most important limitation of the study is, of course, the small number of patients involved, which is due to the low prevalence of the disorder. Also, the subgroups for some statistical investigations were relatively small. An international multicenter study might eliminate this limitation. Another limitation could be the fact that, although all patients were investigated under the supervision of the senior author (A.M.), it is not impossible that the recorded findings at admission were not complete. We tried to eliminate possible deficits at the follow-up of the patients, but were not always successful, because some patients had died or refused re-examination.

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