The Epidemiology and Descriptive and Predictive Validity of *DSM-IV* Delusional Disorder and Subtypes of Schizophrenia

Jaana Suvisaari [1, 2], Jonna Perälä [1], Samuli I. Saarni [1], Hannu Juvonen [1], Annamari Tuulio-Henriksson [1, 3], Jouko Lönnqvist [1, 4]

Abstract

Objective: We studied the clinical and epidemiological features of *DSM-IV* delusional disorder and schizophrenia subtypes in a general population-based sample and investigated the descriptive and predictive validity of these diagnoses. **Method:** The study was based on a nationally representative survey of 8,028 persons aged thirty years or over from Finland. *DSM-IV* psychotic disorders were diagnosed using the SCID-I interview and/or case note data. Lifetime severity of symptoms and course and outcome of the disorder were assessed using the Major Symptoms of Schizophrenia Scale. Based on information from the interview, case notes, and health care registers, we assessed current and lifetime treatment contacts, hospitalizations, and antipsychotic medication use. **Results:** The prevalences were 0.18% (95% CI 0.11–0.30) for delusional disorder; 0.24% (95% CI 0.15–0.37) for paranoid, 0.42% (95% CI 0.30–0.59) for undifferentiated and 0.16% (95% CI 0.09–0.27) for disorganized schizophrenia. Both delusional disorder and disorganized schizophrenia were distinct from the other groups. Delusional disorder was characterized by late age at onset, absence of symptoms other than delusions, and relatively good outcome. Only 50% of persons with delusional disorder had received inpatient treatment. Disorganized schizophrenia was associated with early onset, male preponderance, chronic course with long hospitalizations, and poor outcome. Paranoid and undifferentiated schizophrenia did not differ in terms of age at onset, course and outcome. **Conclusions:** The clinical utility of *DSM-IV* criteria for delusional disorder and disorganized schizophrenia is good. There are relatively few clinically significant differences between *DSM-IV* paranoid and undifferentiated schizophrenia.

Key Words: Schizophrenia, Subtypes, Delusional Disorder, Epidemiology, Validity, *DSM-IV* Criteria

[1] *Department of Mental Health and Alcohol Research, National Public Health Institute, Helsinki, Finland*
[2] *Department of Social Psychiatry, Tampere School of Public Health, University of Tampere, Finland*
[3] *Department of Psychology, University of Helsinki, Helsinki, Finland*
[4] *Department of Psychiatry, University of Helsinki, Helsinki, Finland*

Address for correspondence: Jaana Suvisaari, MD, PhD, Department of Mental Health and Alcohol Research, National Public Health Institute, Mannerheimintie 166, FIN-00300 Helsinki, Finland
Phone: +358 9 4744 8539; Fax: +358 9 4744 8478;
E-mail: jaana.suvisaari@ktl.fi

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Introduction

Diagnostic validity is a complex construct, consisting of descriptive validity (i.e., whether the diagnostic criteria specify the disorder uniquely relative to other mental disorders), predictive validity (i.e., whether the diagnosis is predictive of clinical course and outcome) and construct validity (i.e., the extent to which the diagnosis correlates with expected external validators such as neurobiological markers or genetic risk) (1-4). The validity of different definitions of paranoid psychoses and schizophrenia subtypes was investigated intensively in the 1980s and 1990s when the diagnostic operationalizations of *Diagnostic and Statistical Manual of Mental Disorders, Third Edition (DSM-III)* and *DSM-III-R* had to be formulated and their validity confirmed (5-12). As

a result of this work, the diagnosis of delusional disorder was introduced to *DSM-III-R*, and the criteria set in *DSM-III* for different schizophrenia subtypes modified. Although these criteria were refined further for *DSM-IV*, the validity of *DSM-IV* criteria has received little attention. However, even a small change in diagnostic criteria can have a large impact on the prevalence of a disorder and the validity of the diagnosis (12, 13). The diagnostic criteria for delusional disorder and schizophrenia subtypes in *DSM-III-R* and *DSM-IV* are presented in Table 1.

Supporting the validity of delusional disorder as a separate disease from schizophrenia, family studies suggested that delusional disorder may not be genetically linked to schizophrenia (6, 7, 14, 15). Nevertheless, patients with delusional disorder resemble patients with schizophrenia in many features. For example, they have abnormalities in eye movements (16), cognitive deficits (17, 18) and brain structural abnormalities (19). It has also been suggested that the etiological relationship between delusional disorder and major depressive disorder is stronger than that between delusional disorder and schizophrenia (15). Depressive symptoms are common in clinical samples of patients with delusional disorder (20, 21), and a family study of late-onset paranoia found it to be linked to depressive disorders in relatives (15). The diagnostic boundaries of paranoid schizophrenia and other paranoid psychoses have varied in different diagnostic criteria, and their prevalence and outcome vary depending on the criteria used (5, 8, 22).

The nosological history of subtypes of schizophrenia is long (23, 24). Studies comparing the course and outcome of schizophrenia subtypes, as defined by *DSM-III* or *DSM-III-R*, suggest that each subtype has distinctive course and outcome (9-12), but the familial risk for schizophrenia may not differ between the subtypes (12, 25).

Table 1 *DSM-III-R* and *DSM-IV* Criteria for Delusional Disorder and Schizophrenia Subtypes

Diagnosis	*DSM-III-R*-Criteria	*DSM-IV* Criteria
Delusional Disorder	1. Nonbizarre delusions of at least one month's duration. 2. Auditory or visual hallucinations, if present, are not prominent. 3. Apart from the delusion(s) or its ramifications, behavior is not obviously odd or bizarre. 4. If a mood syndrome has been present during the delusional disturbance, the total duration of all episodes of the mood syndrome has been brief relative to the total duration of the delusional disturbance. 5. Has never met Criterion A for schizophrenia, and it cannot be established that an organic factor initiated and maintained the disturbance.	1. Nonbizarre delusions of at least one month's duration. 2. Criterion A for schizophrenia has never been met. Tactile and offactory hallucinations may be present if they are related to the delusional theme. 3. Apart from the delusion(s) or its ramifications, behavior is not obviously odd or bizarre. 4. If mood episodes have occurred concurrently with delusions, their total duration has been brief relative to the duration of the delusional periods. 5. The disturbance is not due to the direct physiological effects of a substance or a general medical condition.
Schizophrenia Subtypes		
Paranoid	1. Preoccupation with one or more systematized delusions or with frequent auditory hallucinations related to a single theme. 2. None of the following: incoherence, marked loosening of associations, flat or grossly inappropriate affect, catatonic behavior, grossly disorganized behavior.	1. Preoccupation with one or more delusions or frequent auditory hallucinations. 2. None of the following is prominent: disorganized speech, disorganized or catatonic behavior, or flat or inappropriate affect.
Disorganized	1. Incoherence, marked loosening of associations, or grossly disorganized behavior. 2. Flat or grossly inappropriate affect. 3. Does not meet the criteria for catatonic type.	1. All of the following are prominent: a. Disorganized speech b. Disorganized behavior c. Flat or inappropriate affect 2. Does not meet the criteria for catatonic type.
Undifferentiated	1. Prominent delusions, hallucinations, incoherence, or grossly disorganized behavior. 2. Does not meet the criteria for paranoid, catatonic, or disorganized type.	1. A type of schizophrenia in which symptoms that meet Criterion A for schizophrenia are present, but the criteria are not met for the paranoid, disorganized, or catatonic type.

Our study has two objectives: 1) to provide clinical and epidemiological data on delusional disorder and schizophrenia subtypes; and, 2) to investigate the descriptive and predictive validity of delusional disorder and different subtypes of schizophrenia as defined by *DSM-IV* criteria. The study is based on the Psychoses in Finland study (26), an epidemiologically representative, comprehensive study of psychotic disorders in one country.

Method

Study Population

The Psychoses in Finland (PIF) study is based on the Health 2000 Study, a Finnish general population survey of a nationally representative two-stage cluster sample of 8,028 persons aged thirty or over (3,637 men [45.3%], 4,391 women [54.7%]). The fieldwork of the Health 2000 baseline study took place between September 2000 and June 2001, and consisted of a home interview and a health examination at the local health center, or a condensed interview and health examination of nonrespondents at home. In addition, register information was gathered on the whole sample. The Health 2000 and PIF studies were approved by the Ethics Committee of the Hospital District of Helsinki and Uusimaa. After complete description of the study to the participants, written informed consent was obtained (26, 27).

Diagnostic Assessment of Psychotic Disorders

In the PIF study, persons with possible psychotic disorder were screened from the Health 2000 study sample and interviewed using the Research Version of the Structured Clinical Interview for DSM-IV-TR (SCID-I) (28). Subjects were invited to participate in the SCID interview if they had a previously diagnosed psychotic disorder, received a diagnosis of possible or definite psychotic disorder in the health examination, or had possible psychotic or manic symptoms in the Munich version of the Composite International Diagnostic Interview (M-CIDI) (29) conducted as part of the health examination. Register-based screening was also used, including identifying possible hospital treatments for any psychotic disorder based on the National Hospital Discharge Register of the National Research and Development Centre for Welfare and Health, reimbursed antipsychotic medication based on the Medication Reimbursement Register of the Social Insurance Institution, disability pension because of psychotic disorder based on the Pension Register of the Finnish Centre for Pensions, or mood-stabilizing medication use without a diagnosis of any relevant medical condition based on the Prescription Register of the Social Insurance Institution. The screening procedure and the reliability of different screens have been described in detail in Perälä et al. (26).

In addition to the SCID interview, we collected medical records from lifetime mental health treatment contacts for all screen-positive persons. The final best-estimate diagnoses were made using *DSM-IV-TR* criteria by three experienced clinicians (JS, JP, SIS) based on systematically evaluated lifetime information on symptoms and signs from the interview and/or medical records. Definite evidence of psychotic symptoms was required for diagnosing any psychotic disorder. Subtype of schizophrenia was defined based on lifetime information of the disorder using the *DSM-IV* diagnostic hierarchy for schizophrenia subtypes. Only paranoid, undifferentiated and disorganized schizophrenia could be investigated in this study since catatonic schizophrenia was too rare. The reliability of diagnoses was tested on 136 persons, which were first rated separately by all three clinicians and then reviewed together, yielding consensus diagnoses. Kappa values between the raters ranged from 0.89 to 0.92 for schizophrenia and from 0.49 to 0.80 for delusional disorder. The kappa values for schizophrenia subtypes between the raters ranged from 0.72 to 0.74 for paranoid schizophrenia, from 0.24 to 0.76 for undifferentiated schizophrenia, and were 1.00 between all raters for disorganized schizophrenia.

Assessment of Symptoms

Lifetime duration and severity of symptoms was assessed using the Major Symptoms of Schizophrenia Scale (MSSS) (30, 31) drawing on information from the interview and medical records. The symptoms in the MSSS are rated as follows: 1=clearly not present; 2=possibly present but subthreshold; 3=moderate; 4=prominent; 5=severe. In addition, we assessed the Global Rating of Bizarre Behavior from the Scale for the Assessment of Positive Symptoms (SAPS) (32), and the Global Rating of Avolition-Apathy and of Anhedonia-Asociality from the Scale for the Assessment of Negative Symptoms (SANS) (33). These were coded on a 6-point scale, ranging from 0=not at all to 5=severe. Age at onset of psychotic symptoms was assessed based on information from the interview and case notes.

Assessment of Treatment, Course and Outcome

We assessed lifetime treatment contacts for mental health problems, and lifetime and current antipsychotic medication use based on all available information. Based on the Hospital Discharge Register information since 1970 and on case records before the time the register was established, we assessed hospitalizations and involuntary treatments for psychiatric disorders. Persons who were entitled to free outpatient antipsychotic medication were identified from the

Medication Reimbursement Register of the Social Insurance Institution. Using global clinical impression based on all available information on current symptoms and functional capacity, we grouped persons without current mental health treatment contact into those who: 1) no longer needed treatment (sustained remission); 2) had refused treatment; or, 3) would have needed treatment but did not have it available either because they had never been diagnosed as having a mental disorder or because earlier treatment contact had been terminated.

The MSSS included assessment of the course of disorder as follows: 1=single episode; 2=multiple episodes, full recovery between episodes; 3=multiple episodes, partial recovery; 4=chronic course with exacerbations; 5=chronic course without exacerbations. Outcome was rated as follows: 1=recovery; 2=mild deterioration; 3=moderate deterioration; 4=marked deterioration. These ratings were done only if information on course and outcome, based on interview and/or medical records, was adequate.

Statistical Analyses

Differences in continuous variables (age, age at onset) between the groups were tested using analysis of variance. Post hoc differences between the groups were compared with Tukey's honestly significant difference. Differences in ordinal variables (MSSS, SANS, and SAPS scores) between the groups were tested with the Kruskal-Wallis test, and differences in categorical variables with the $\chi 2$ test. The Kruskal-Wallis test was also used to analyze between-group differences in the number of hospital treatment days, which was a highly skewed variable. Interrater reliability in *DSM-IV* diagnoses was tested using unweighted kappa values. These analyses were conducted using SAS, version 9.1.3.

Lifetime prevalences of delusional disorder and schizophrenia subtypes were calculated using SUDAAN Release 9.0, which is able to take account of two-stage cluster sampling design and calculates robust standard error estimates. Weighting was applied to adjust for the oversampling of individuals aged eighty years and over. All statistical tests were two-tailed, with α level set at 0.05.

Results

The lifetime prevalence of delusional disorder was 0.18% (95% confidence interval [CI] 0.11–0.30), as reported earlier (26). The lifetime prevalence of schizophrenia subtypes was as follows: paranoid schizophrenia 0.24% (95% CI 0.15–0.37), undifferentiated schizophrenia 0.42% (95% CI 0.30–0.59), and disorganized schizophrenia 0.16% (95% CI 0.09–0.27).

There was a slight female preponderance in delusional disorder, paranoid schizophrenia, and undifferentiated schizophrenia, reflecting the female excess in the general population in these age groups. In contrast, there were significantly more men than women in the disorganized schizophrenia group compared with the other groups. The mean age at onset of psychotic symptoms was youngest in disorganized schizophrenia and oldest in delusional disorder, while paranoid and undifferentiated schizophrenia did not differ significantly from each other (see Table 2).

Differences in Symptoms between the Groups

Only one symptom dimension, the severity of delusions, did not differ between any of the groups. Paranoid schizophrenia and delusional disorder resembled each other in having low levels of negative thought disorder, catatonic symptoms, and anhedonia/asociality. Persons with delusional disorder had lower levels of hallucinations, bizarre delusions, positive thought disorder, affective deterioration, manic symptoms, bizarre behavior and avolition than persons with any of the schizophrenia subtypes. Paranoid and undifferentiated schizophrenia differed from each other in that persons with paranoid schizophrenia had less severe formal thought disorder, affective deterioration, avolition and catatonic symptoms than persons with undifferentiated schizophrenia. Persons with disorganized schizophrenia differed from all the other groups in having more severe positive and negative thought disorder, affective deterioration, bizarre behavior, and avolition (see Table 2).

Differences in Treatment and Outcome

All persons with schizophrenia had had psychiatric treatment contact, and over 70% in each subtype also had current treatment contact. Although 81% of persons with delusional disorder had also had psychiatric treatment contact, only 21% had current treatment contact and only 14% were currently using antipsychotic medication. Lifetime history of antipsychotic medication use was found in 62.5% of persons with delusional disorder and in all but one person with schizophrenia (see Table 3).

Psychiatric hospitalizations were less common in persons with delusional disorder than in persons with any schizophrenia subtype, as were involuntary hospital treatments (see Table 3). All groups differed notably from each other in lifetime duration of hospitalizations, which was shortest in delusional disorder and longest in disorganized schizophrenia (see Table 3). At the extreme ends were persons with disorganized schizophrenia, who had spent on average almost ten years in inpatient treatment, and persons with delusional disorder, whose average lifetime duration of hospitalizations was only twenty-one days. Persons with delusional disorder who had received hospital treatment tended to have more severe symptoms and course than those

Table 2 Age and Onset, Sex Distribution and Global Symptoms over the Course of Illness in Delusional Disorder and Different Subtypes of Schizophrenia

	Delusional Disorder	Schizophrenia			Statistically Significant Differences*
		Paranoid Type	Undifferentiated Type	Disorganized Type	
N	16	18	33	12	5,6
Men	7 (43.8%)	6 (33.3%)	14 (42.4%)	9 (75.0%)	
Women	9 (56.3%)	12 (66.7%)	19 (57.6%)	3 (25.0%)	
Age (years, in July 1, 2000)	66.6 (SD 11.8)	53.5 (SD 13.2)	55.8 (SD 15.4)	47.7 (SD 6.2)	1,2,3
Age at onset of psychotic symptoms	50.6 (SD 18.4)	34.9 (SD 11.3)	32.5 (SD 11.3)	19.3 (SD 4.78)	1, 2, 3, 5, 6
Hallucinations	1.38 (SD 0.62)	3.06 (SD 1.00)	2.94 (SD 0.86)	3.33 (SD 0.99)	1,2,3
Delusions	3.56 (SD 0.51)	3.94 (SD 0.64)	3.64 (SD 0.78)	4.00 (SD 0.74)	
Bizarreness of delusions	2.13 (SD 0.62)	3.06 (SD 1.06)	3.27 (SD 1.04)	3.92 (SD 1.17)	1,2,3,6
Positive thought disorder	1.25 (SD 0.58)	1.83 (SD 0.71)	2.61 (SD 0.90)	3.75 (SD 0.62)	1, 2, 3, 4, 5, 6
Catatonia	1.0 (SD 0)	1.06 (SD 0.24)	1.48 (SD 0.83)	2.42 (SD 1.0)	2, 3, 4, 5, 6
Affective deterioration	1.0 (SD 0)	2.00 (SD 0.84)	2.64 (SD 0.99)	3.92 (SD 0.67)	1, 2, 3, 4, 5, 6
Negative thought disorder	1.13 (SD 0.34)	1.44 (SD 0.62)	2.55 (SD 0.83)	3.42 (SD 0.67)	2, 3, 4, 5, 6
Depressive symptoms	1.40 (SD 0.63)	2.11 (SD 0.90)	2.21 (SD 0.70)	1.75 (SD 0.62)	1, 2, 5
Manic symptoms	1.0 (SD 0)	1.22 (SD 0.43)	1.36 (SD 0.60)	1.25 (SD 0.45)	1, 2, 3
Bizarre behavior	0.93 (SD 0.80)	2.17 (SD 1.34)	2.50 (SD 0.88)	3.83 (SD 0.83)	1, 2, 3, 5, 6
Avolition/apathy	0.57 (SD 0.94)	2.06 (SD 1.06)	2.87 (SD 1.28)	4.00 (SD 0.43)	1, 2, 3, 4, 5, 6
Anhedonia/asociality	1.38 (SD 1.39)	2.35 (SD 1.32)	2.55 (SD 1.43)	3.67 (SD 1.23)	2, 3, 5, 6

*Differences significant (P<0.05): 1=between delusional disorder and paranoid schizophrenia, 2=between delusional disorder and undifferentiated schizophrenia, 3=between delusional disorder and disorganized schizophrenia, 4=between paranoid and undifferentiated schizophrenia, 5=between undifferentiated and disorganized schizophrenia, 6=between paranoid and disorganized schizophrenia

without hospital treatments, although the differences were not statistically significant. For example, their mean age at onset was 46.2 years compared with 57.2 years in persons with delusional disorder without hospitalizations.

There was enough longitudinal information for the assessment of course on all persons with undifferentiated and disorganized schizophrenia, and for 69% of persons with delusional disorder and for 78% of persons with paranoid schizophrenia. Outcome could be assessed in 94% of persons with paranoid schizophrenia and in all persons with other schizophrenia subtypes, and in 69% of persons with delusional disorder. Based on this information, the course of delusional disorder was less chronic than in undifferentiated and disorganized schizophrenia, and the course of paranoid schizophrenia less chronic than in disorganized schizophrenia. Outcome was better in delusional disorder than in any of the schizophrenia subtypes, and better in paranoid and undifferentiated schizophrenia than in disorganized schizophrenia (see Table 3).

Of persons with delusional disorder who did not have current treatment contact, 18.2% in our opinion did not need treatment anymore (sustained remission), 27.3% had refused treatment, and 54.5% would have needed treatment but did not have it available. Of persons with schizophrenia without treatment contact, 14.3% no longer needed treatment, 57.1% had refused treatment and 21.4% did not have treatment available.

Discussion

We set out to investigate the descriptive and predictive validity of delusional disorder versus different subtypes of schizophrenia, as defined by *DSM-IV* criteria, and found good validity for *DSM-IV* delusional disorder and disorganized schizophrenia. Delusional disorder was characterized by late age at onset, absence of symptoms other than delusions, and relatively good outcome. Disorganized schizophrenia was associated with early onset, male preponderance, chronic course with long hospitalizations and poor outcome. Paranoid and undifferentiated schizophrenia did not differ in terms of age at onset, course, and outcome.

Table 3 Course, Treatment and Outcome of Delusional Disorder and Different Subtypes of Schizophrenia

	Delusional Disorder	Schizophrenia			Statistically Significant Differences*
		Paranoid Type	Undifferentiated Type	Disorganized Type	
Course					
Single episode, full recovery	4/11 (36.4%)	0	0	0	2, 3, 6
Multiple episodes, full recovery	0	2/14 (14.3%)	1/33 (3.0%)	0	
Multiple episodes, partial recovery	3/11 (27.3%)	5/14 (35.7%)	9/33 (27.3%)	1/12 (8.3%)	
Chronic course with exacerbations	4/11 (36.4%)	7/14 (50%)	22/33 (66.7%)	10/12 (83.3%)	
Chronic course w/o exacerbations	0	0	1/33 (3.0%)	1/12 (8.3%)	
Outcome					
Recovery	3/11 (27.3%)	1/17 (5.9%)	1/30 (3.3%)	0	1, 2, 3, 5, 6
Mild deterioration	8/11 (72.7%)	8/17 (47.1%)	8/30 (26.7%)	1/12 (8.3%)	
Moderate deterioration	0	7/17 (41.2%)	17/30 (56.7%)	2/12 (16.7%)	
Marked deterioration	0	1/17 (5.9%)	4/30 (13.3%)	9/12 (75.0%)	
Lifetime mental health treatment contact	81.3%	100%	100%	100%	
Current treatment contact	21.4%	70.6%	76.8%	91.7%	1, 2, 3
Lifetime antipsychotic medication	62.5%	100%	97.0%	100%	1, 2, 3
Current antipsychotic medication	14.3%	64.7%	71.9%	91.7%	1, 2, 3
Psychiatric hospitalization ever	50.0%	83.3%	87.9%	100%	1, 2, 3
Mean number of days in hospital treatment (minimum, median, maximum)	20.9 (SD 27.5) (0, 8.5, 93)	121.0 (SD 124.0) (0, 95, 390)	580.3 (SD 1183.2) (0, 196, 6084)	3460.5 (SD 3762.5) (69, 1805.5, 10091)	1, 2, 3, 4, 5, 6
Involuntary psychiatric hospitalizations	12.5%	61.1%	69.7%	91.7%	1, 2, 3
Free outpatient antipsychotic medication	31.3%	72.2%	84.8%	91.7%	1, 2, 3

*Differences significant (P<0.05): 1=between delusional disorder and paranoid schizophrenia, 2=between delusional disorder and undifferentiated schizophrenia, 3=between delusional disorder and disorganized schizophrenia, 4=between paranoid and undifferentiated schizophrenia, 5=between undifferentiated and disorganized schizophrenia, 6=between paranoid and disorganized schizophrenia

DSM-IV *Delusional Disorder versus Subtypes for Schizophrenia*

Consistent with previous research, persons with delusional disorder had significantly higher age at onset of psychotic symptoms and better outcome than persons with schizophrenia (5, 34). The mean age at onset of delusional disorder, 50.6 years, was in the range reported in previous general population studies (34), although somewhat higher than in more recent clinical samples (21, 35, 36). They had prominent delusions, but low levels of any other symptoms, regardless of whether the symptoms assessed were exclusion criteria for delusional disorder or not. In particular, they had a low level of depressive symptoms, contrary to some studies based on clinical samples (20, 21, 36). It seems that the longitudinal diagnostic process was able to identify a group that closely resembles the original description of paranoia by Kraepelin (8, 24), while persons with a high level of mood symptoms turned out to have another disorder other than delusional disorder, most often major depressive disorder with psychotic features. Interestingly, this clear-cut paranoia-like disorder was not as rare as has been previously thought: the prevalence of delusional disorder, 0.18%, was much higher than in most previous studies (34, 37). The true prevalence is even higher: there were persons in our sample

with suspected nonbizarre delusions that could not be diagnosed as having delusional disorder because we lacked definite evidence that the person's ideas actually were delusions.

Persons with delusional disorder and paranoid schizophrenia resembled each other in having a low level of negative thought disorder, anhedonia and catatonic symptoms, but otherwise these disorders were remarkably different. Paranoid schizophrenia was associated with substantially earlier age at onset, more chronic course and poorer outcome than delusional disorder. These results support the validity of current criteria for delusional disorder and paranoid schizophrenia in separating disorders with distinct clinical features and prognosis.

Only 21% of persons with delusional disorder had current treatment contact and 14% used antipsychotic medication. However, most persons with delusional disorder who did not have current treatment were judged as needing treatment, suggesting that more attention should be paid to recognition of, and treatment continuity in, delusional disorder.

Subtypes for Schizophrenia

Paranoid schizophrenia as defined by *DSM-III-R* was narrower than *DSM-IV* paranoid schizophrenia: *DSM-III-R* criteria required the presence of either systematized delusions or auditory hallucinations related to a single theme. On the other hand, disorganized schizophrenia is narrower in *DSM-IV*, which requires that disorganized speech, disorganized behavior, and flat or inappropriate affect should all be prominent, while *DSM-III-R* required only either disorganized speech or grossly disorganized behavior. Studies that examined schizophrenia subtypes as defined by *DSM-III* and *DSM-III-R* found that the age at onset was oldest in paranoid and youngest in disorganized schizophrenia, and outcome best in paranoid and worst in disorganized schizophrenia (9-12). Undifferentiated schizophrenia resembled disorganized schizophrenia more than paranoid schizophrenia in these studies (9, 11, 12, 38). In our study, disorganized schizophrenia differed notably from the other subtypes. Persons with disorganized schizophrenia had a thirteen to fifteen years earlier age at onset, more severe thought disorder, catatonic symptoms, bizarre behavior and negative symptoms, and worse outcome than persons with paranoid and undifferentiated schizophrenia, and they had spent, on average, almost ten years in inpatient treatment. Our results support the validity of disorganized schizophrenia as a schizophrenia subtype that has good descriptive and predictive validity and clinical utility in delineating a group of patients with schizophrenia with poor outcome.

In contrast, there were relatively small differences between persons with paranoid and undifferentiated schizophrenia. Although formal thought disorder and some negative symptoms were less severe in persons with paranoid than undifferentiated schizophrenia, these symptoms were in the mild-moderate range in both subtypes. Most notably, there were no significant differences in age at onset, course and outcome between paranoid and undifferentiated schizophrenia. Our results suggest that paranoid and undifferentiated schizophrenia are more similar in *DSM-IV* than in previous definitions of the subtypes.

A problem specific to the undifferentiated type was its low kappa value between two of the raters. The reliability of disorders with the most conspicuous and lasting features, particularly disorganized schizophrenia, was the best. Also, the overall reliability of schizophrenia diagnosis, without considering the subtype, was excellent between all raters. Because of the low base rate of individual schizophrenia subtypes among the kappa cases, small disagreements had a large effect on kappa values (39). However, if undifferentiated schizophrenia cannot be diagnosed reliably even in research settings where the lifetime history of symptoms and signs is carefully reviewed, its reliability in clinical practice is questionable.

Disorganized schizophrenia was more common in males than females, while there were no significant gender differences in the other two subtypes. In previous studies, there were more males than females in each subtype (12), or no gender differences (11). Our study sample is population-based but cross-sectional. Persons from the same birth cohorts who had already died were not included in the study sample. Suicide mortality is higher in persons with paranoid schizophrenia than in the other subtypes (11), and higher in males than females (40). There is also a slight female excess in persons aged thirty years and over in the general population. These factors may affect the observed gender distributions in the subtypes.

All persons with schizophrenia had had mental health treatment contact, but while all persons with disorganized schizophrenia had been hospitalized at some point of their illness, 16.7% of persons with paranoid and 12.1% of persons with undifferentiated schizophrenia had never needed inpatient treatment. The proportion of persons with current mental health treatment contact for schizophrenia was lowest among persons with paranoid subtype, 71%, and highest among persons with disorganized subtype, 92%. Considering that the mean time since the onset of the disorder was eighteen years for persons with paranoid schizophrenia and twenty-eight years for persons with disorganized schizophrenia, the rate of current treatment contact was high. Most persons with schizophrenia were also using antipsychotic medication at the time of the survey, ranging from 64% of persons with paranoid schizophrenia to 92% of persons with disorganized schizophrenia. The results were quite similar with the Northern Finland 1966 birth cohort study, in which

77% of persons with schizophrenia had a treatment contact and 71% were using antipsychotic medication after a median of eleven years since the onset of psychotic disorder (41).

Strengths and Limitations

Our study sample was based on a nationally representative sample of Finns aged thirty years and over. It differs from previous study samples in also including persons who had not received psychiatric treatment. The sample is older than in many previous studies, and represents persons with delusional disorder or schizophrenia who had lived long enough to be included in the study sample. This probably biases the sample toward slightly better outcome, since there is significant mortality in schizophrenia already at a young age (40), and may be one reason for the relatively late mean age at onset in the paranoid and undifferentiated schizophrenia groups. On the other hand, our diagnostic assessment was based on review of all lifetime treatment contacts for mental health problems in primary and mental healthcare, in addition to a personal interview. This may make our diagnostic assessment more reliable than in studies that were based on cross-sectional assessment only, since the diagnoses of delusional disorder (42) and schizophrenia subtypes (11) are inconsistent in the early phases of the illness. Also, with the longitudinal information, persons whose symptoms started with delusions but who after one to two year follow-up turned out to have dementia could be adequately diagnosed as having a psychotic disorder caused by the general medical condition rather than delusional disorder.

We did not attempt alternative classifications based, for example, on latent class analysis or other clustering methods. Although such methods could be used to validate and refine diagnostic classifications (3, 11, 43), they would have required a larger sample size. We compared only clinical features since we lacked other types of validators (43). However, our aim was to investigate the clinical utility of the diagnoses rather than to comprehensively investigate different types of validity.

Although the study was based on a general population sample of over 8,000 persons, the number of persons with delusional disorder and different schizophrenia subtypes was relatively small and, therefore, confidence intervals were wide.

Conclusions

Our study supports the descriptive and predictive validity of delusional disorder as a syndrome that closely resembles the original description of paranoia by Kraepelin and differs robustly from other schizophrenia subtypes in age at onset, symptoms, course and outcome. Only half of the persons with delusional disorder had been treated in hospital, suggesting that studies based solely on hospital-treated patient samples may give a biased picture of the epidemiology and course of delusional disorder.

Likewise, our results support the validity of disorganized schizophrenia as a subtype that is clearly different from paranoid and undifferentiated schizophrenia, with an early onset, male preponderance, and poor outcome. Thus, the clinical utility of *DSM-IV* criteria for delusional disorder and disorganized schizophrenia is good, while there appear to be relatively few clinically significant differences between *DSM-IV* paranoid and undifferentiated schizophrenia.

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