

Admission-Based Prevalence of Schizophrenia, Schizoaffective Disorder, and Bipolar I Disorder in a Catchment Area of Sinop, Turkey



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SUMMARY

Objective: To provide registry-based prevalence estimates of schizophrenia, schizoaffective, and bipolar I (BPI) disorders in a defined area of Sinop, Turkey.

Material and Methods: All patients that presented to primary and secondary health services over three year time (2009-2011) with diagnosis of psychotic disorder (F06.1, F06.2, F10.5, F12.5, F19.5, F20-29, F30-31, F32.3, F33.3, F39 in ICD-10) covering a population of 73,503 aged 15-64 were included via case registry systems. All accessed case records were pooled. Case ascertainment and diagnostic assessment were achieved through structured clinical interview for DSM-IV, phone interview, or forming a best-estimated diagnosis via records on registers.

Results: Registries provided 1,410 probable cases. The successful clinical reappraisal rate was 66.8% (n: 955) while, the final diagnoses were determined via phone interview or best-estimate diagnosis in the rest of the cases. Seven hundred twenty seven individuals were diagnosed with DSM-IV yielding a prevalence of 9.8 per 1,000 (95% confidence interval [CI]: 8.2-11.5). Registry-based prevalence of schizophrenia, schizoaffective disorder, BPI disorder, and depression with psychotic features were 3.6 (95% CI: 3.0-4.2), 1.1 (95% CI: 0.8-1.4), 2.7 (95% CI: 2.0-3.3), and 1.0 (95% CI: 0.6-1.3) per 1,000, respectively.

Conclusion: Ten individuals per 1,000 adult persons admit for any disorder with psychotic symptoms. Registry-based prevalence estimates are lower than the lifetime prevalence estimates of cross-sectional general population studies. However, analysis of administrative data appear to provide information needed for effectively plan and implement psychiatric services.

Keywords: Prevalence, schizophrenia, schizoaffective disorder, bipolar disorder, registries

INTRODUCTION

In Turkey, there is limited number of community-based epidemiological studies of psychotic disorders (Binbay et al. 2011, Binbay et al. 2014). The most comprehensive epidemiological study up to date in Turkey is the Mental Health Profile of Turkey, which excluded psychotic disorders due to methodological difficulties of screening psychosis in the general population (Kılıç 1998). A few studies in the last two decades indicated a lifetime prevalence estimate of 8 per

1,000 for schizophrenia (Binbay et al. 2011). Also other psychotic disorders with similar chronicity and burden, including schizoaffective disorder, delusional disorder, brief psychotic disorder, and mood disorders with psychotic features, have lifetime prevalence comparable to schizophrenia (Binbay et al. 2012). Furthermore, the probable societal cost is quite high and schizophrenia is the ninth leading cause of disability adjusted years in Turkey despite few studies on psychotic disorders (Bora Başara et al. 2006). Thus, novel reports of

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prevalence estimates and social correlates of psychotic disorders are quite important.

The lifetime, twelve-month, or point prevalence estimates can be detected via cross-sectional general population studies (Goldner et al. 2003, Binbay et al. 2012, Binbay et al. 2014) and health registries (Kilic et al. 1994, Anderson 2013). Using reliable, high-qualified, and comprehensive case registries for estimating the prevalence of psychotic disorders may be cost-effective and informative (Goldner et al. 2003). Otherwise screening the general population for psychotic disorders has methodological limitations such as sample size and requirement of clinical reappraisal (Goldner et al. 2003, Binbay et al. 2011).

Estimating prevalence and incidence rates of psychiatric disorders are crucial for planning, prediction, and improvement of mental health services (Goldner et al. 2003). Ineligibility of the accurate measures may lead to the neglect of individuals who are suffering, and the misallocation of precious health resources (Goldner et al. 2003). Since 2007, Turkey has implemented Community Mental Health Centers (CMHC) (Ensari 2012) that have been primarily designed to provide social rehabilitation services for schizophrenia and other psychotic disorders (Ensari et al. 2013). Providing accurate estimates of psychotic disorders are also important for allocation of rehabilitation programs (Ensari 2012, Ensari et al. 2013). The use of administrative data in a defined area to estimate prevalence and incidence of psychotic disorders is also important for services.

General population studies may provide a prevalence estimate for a lifetime or for a 12-month period (Prince 2003). All cases admitted to any health services within a defined area in a specific period are typically covered in the registry-based studies (Ford 2003). Period prevalence can be determined by dividing the number of all cases by the total number of persons (denominator population) in the defined area during a particular period (Prince 2003, Anderson 2013). Such a period prevalence can be called contact prevalence, since it is mainly based on admissions (Anderson 2013). Contact prevalence may only cover the cases admitted to health services within a defined area but may also cover patients admitted for treatment, which is also termed treatment prevalence (Ford 2003, Anderson 2013). In this case, treatment prevalence will be lower than contact prevalence. In addition, any registry-based prevalence estimate (either contact or treatment) will be unable to cover some cases that would be detected via screening (Prince 2003). Therefore, registry-based period prevalence in a defined area will be able to provide all admitted or treated cases, but will be lower than any lifetime prevalence estimate of a cross-sectional study (Goldner et al. 2003, Anderson 2013). Such an estimate will provide the lowest prevalence and will be a basis for planning the health services (Goldner et al. 2003).

In this article, the method of a study (the SinoPsy - Incidence and Prevalence of Psychotic Disorders in Sinop) is provided

with established prevalence estimates and aims to provide period prevalence and incidence of psychotic disorders in a defined area using any eligible health registry.

METHOD

The SinoPsy (Incidence and Prevalence of Psychotic Disorders in Sinop) study aims to estimate a 3-year period prevalence and incidence of any DSM-IV disorder with psychotic symptoms primarily including schizophrenia, schizoaffective disorder, and bipolar I disorder using any eligible registry of health services in a well-defined geographical area.

The Setting

Sinop is a province in the central part of the North coast of Turkey. The province is surrounded in the west and south by a mountain chain that lies along the Black Sea region and limits the sociodemographic contact of the province. The population of the province was 202,740 in 2010 (TurkStat 2011), and 52.9% of the population was resident in urban areas. The average age of the population was higher than the average of the whole country (TurkStat 2011).

There were nine districts in the province including Sinop as the province center (Figure 1). The defined area of the study included four districts: Sinop, Ayancık, Erfelek and Gerze. The included districts were in the closest distance to the sole secondary health service (Sinop Atatürk State Hospital) with outpatient, inpatient, and forensic units for mental health. Respective distances of each district to the secondary health service were as follows: Sinop 8 km., Erfelek 23 km., Ayancık 54 km., and Gerze 35 km. Other districts of the province were at longer distances to the hospital, and they were in more contact with the other health facilities (both secondary and



Figure 1. The province of Sinop and the defined area of the SinoPsy study.

tertiary) of other provinces. In order to maximize the quality and the coverage of the registry systems, the aforementioned four districts formed the defined area of the SinoPsy study.

Case Record Registries

Three registries were used to select probable cases of psychotic disorders and to cover any primary and secondary health care services in the area: (i) computerized case records of the Sinop Atatürk State Hospital; (ii) computerized case records of the local health directorate; and (iii) case lists of the family medicine units in the defined area. There was no CMHC during the research period of the SinoPsy study. Cases from three sources were pooled as 'probable' for psychotic disorders.

The data extracting procedure (checking the registries, case identification, and ascertainment) was operated with an approval of the local health directorate (date 22.07.2011 and issue number 12906) under the terms of the regulations of the Ministry of Health (the Regulation on Clinical Trials, date of approval 19.08.2011). In addition, related regulations of the Council of Higher Education (Regulations on Scientific Research and Publishing Ethics, issued on 29.08.2012 with a number of 2012.18.946) were considered. Each stage of data gathering was based on the ethical principles of the Declaration of Helsinki.

Case Registry of the Secondary Health Service: Sinop Atatürk State Hospital is the sole health care service with emergency outpatient, inpatient, and forensic units for mental health problems. Furthermore, the hospital is the only health facility in the defined area with services for other diseases (including neurology, internal medicine, and medical evaluation board of disability) where psychotic patients may also admit. Also, it is the referral center for the provincial emergency and forensic medical dispatch to tertiary mental health services in other provinces. Therefore, Sinop Atatürk State Hospital was the main health facility for admittance of patients with psychotic disorders in the defined area. Any admission to the hospital was recorded with a software using codes of the WHO's International Classification of Diseases 10 (ICD-10) (World Health Organization 1992).

Any admission to the hospital (including services of outpatient, inpatient, emergency, medical evaluation board, and forensic board units) between the 1st of January, 2009 and the 31st of December, 2011 with an ICD-10 diagnosis of F06.2, F10.5, F12.5, F19.5, F20-31.9, F32.3, F33.3, F38-39, F53.1 was included as a probable case of psychotic disorder.

Case Registry of the Local Health Directorate: The ministry of health has a case registry system to monitor and to follow-up any patient with severe mental illness referred to and/or discharged after the acute hospitalization in a regional mental health hospital (Sağlık Bakanlığı 2005). The case records were kept by the local directorate of the ministry of health and coded under four different forms (RS10, RS20, RS30, RS40 and RS50-RS, the initials of mental health [*ruh sağlığı*] in

Turkish). The RS10 form is filled by the local health directorate to refer the patient to a regional mental health hospital. The RS20 form is filled when the patient is discharged by the regional hospital, in order to inform local health directorate about the most recent situation and needs of the patient. The RS40 form is annually used by the local health directorate to report the total number, and ICD-10 diagnoses of patients in RS10 and RS20 registry system to the ministry of health (Sağlık Bakanlığı 2005).

All cases in RS10, RS20, and RS40 registry system of the local health directorate of Sinop were included between the 1st of January, 2009 and the 31st of December, 2011 without regarding their diagnoses.

Case lists of the family medicine: There were 29 family medicine units in the defined area. The family doctors record at least one diagnostic ICD-10 code for each patient to follow-up or prescribe. The local health directorate requested the case lists from all family medicine units in the defined area of any patient with a diagnosis of F06.2, F10.5, F12.5, F19.5, F20-29, F30-31.9, F32.3, F33.3, F38-39 between the 1st of January, 2009 and the 31st of December, 2011. Twenty two of the family medicine units replied the request and provided a full list of patients that were subsequently included in the probable case pool.

Inclusion Criteria

The extracted data of each registry was pooled, the repeated nominations were united, and a list of all probable cases with any psychotic disorder was obtained. The list of the probable cases included name and surname, identity number, and ICD-10 code. In cases of multiple diagnoses, all ICD-10 codes were included.

Most recent addresses of the probable cases were controlled by using the online address location system of the Atatürk State Hospital. Probable cases resident within the defined area by the 1st of June, 2010 were included. Probable cases that: i) were less than 15 and greater than 64 years (in order to include age periods similar to previous researches in Turkey) by the 1st of June, 2010, ii) resident outside the defined area, and iii) institutionalized (orphanage, nursing home, prison, military service – due to original residency were outside the defined area) were excluded.

Case Ascertainment and Final Diagnoses

Three methods were used to provide case ascertainment: i) clinical diagnostic interview, ii) structured interview on phone, and iii) forming a best-estimate diagnosis with case records. The case ascertainment via three methods was performed from 1st June, 2010 to 31st December 2012.

The scheduled case ascertainment for each probable case was primarily based on the Structured Clinical Diagnostic Interview for DSM-IV Axis I Disorders (SCID-I) (First et al. 1996). Initially, clinical interviews of the probable cases from

the case registry of secondary health service were completed whenever they admitted to the Atatürk State Hospital. When needed, each clinical interview was supported with an additional interview with at least one relative and/or spouse. Probable cases that were not admitted during the clinical interview period were contacted through their phone numbers and invited for an interview at the hospital. Whenever clinical interview was impossible, probable case was evaluated with a structured clinical interview on the phone. Structured interview covered questions from the psychosis section of SCID-I, on any inpatient admission, and most recent medication. Furthermore, the phone interview included an additional interview with at least one relative and/or spouse. When the clinical interview neither at the hospital nor on phone was possible, a best-estimate diagnosis was made by expert clinicians on the basis of diagnostic information from all medical records.

Each procedure of the study was conducted with a detailed description of the aim, goal, and extend of the study; and the oral consent was provided for each interview with probable case and/or relative.

Population at Risk

The denominator population of the area was based on any individual born between 1st of January, 1946 to 31st of December 1995. To estimate period prevalence, 2010 mid-term census population estimate of the defined area (73,893

individuals) was used as the denominator and adjusted for study duration. The denominator was derived from the on-line system (Address Based Population Registration System – www.tuik.gov.tr) of Turkish Statistics Institute (TurkStat 2011). The population at risk was stratified by sex, age (5-year age bands), marital status (ever married, single, and divorced), and residency (urban, semi-urban, and rural).

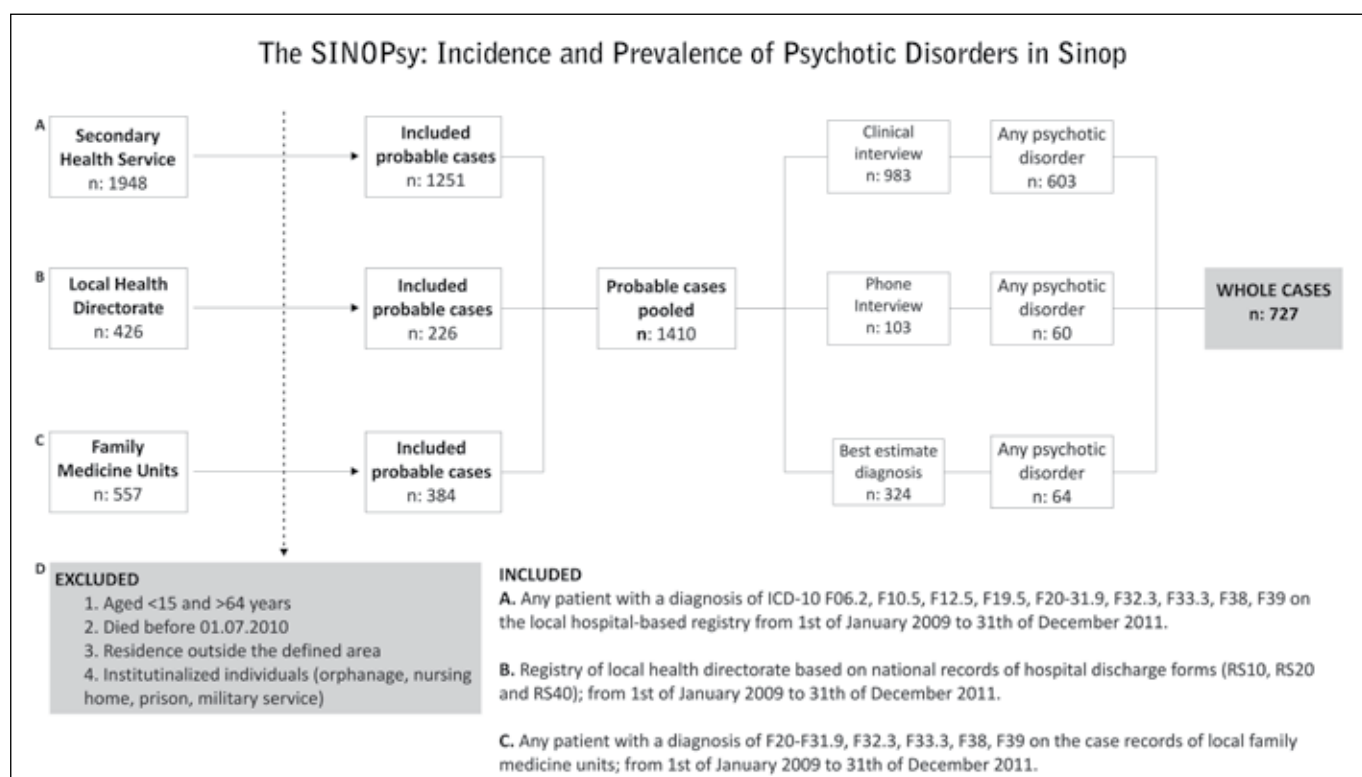
Statistical Analysis

Prevalence estimates were calculated for sex, age groups (5-year age bands: 15-24; 25-34; 35-44; 45-54; 55-64), and marital status (ever married, never married, divorced). Each estimate was reported per 1,000 and with a 95% confidence interval (CI). A multivariable regression model was used to analyze the relationship between estimates and demographic variables. The model included age and sex. Odds ratios (OR) were calculated and presented with 95% CIs, where statistical significance was $p < 0.05$. Analysis was carried out using SPSS 18.0.

RESULTS

A detailed description of the study from registries with the reported number of probable cases, pooled number of probable cases, and case ascertainment is presented in Figure 2. The case registry of the Atatürk State Hospital, the local health directorate, and the case lists of the family medicine

Figure 2. General outline of the SinoPsy study with detailed description of each registry-system



*RS: Initials of mental health (ruh sağlığı) in Turkish

Table 1. DSM-IV diagnoses of probable cases after case ascertainment procedures and their concordance with ICD-10

DSM-IV diagnosis	ICD 10 code	Number of cases (n)	Percentage of cases (%)
Schizophrenia and other psychotic disorders		417	(29.6)
<i>Schizophrenia</i>	F20	265	18.8
<i>Schizoaffective Disorder</i>	F25	83	5.9
<i>Brief Psychotic Disorder</i>	F23	15	1.1
<i>Delusional Disorder</i>	F22	24	1.7
<i>Other Psychotic Disorders^a</i>	F21; F28; F29	30	2.1
Bipolar I Disorder		197	(14.0)
<i>With psychotic features</i>	F30.2; F31.2; F31.5	141	10.0
<i>Without psychotic features</i>	F30.1; F31.1; F31.4	42	3.0
<i>Not otherwise specified</i>	F31.9	14	1.0
Depressive Disorder, with psychotic features	F32.3; F33.3	77	(5.5)
Psychotic Disorder due to General Medical Condition	F06.0; F06.1; F06.2	24	(1.7)
Substance Induced Psychotic Disorder		12	(0.8)
<i>Related to alcohol</i>	F10.5	4	
<i>Related to cannabis</i>	F12.5	8	
Any Disorder with Psychotic Symptoms (in total)		727	(51.6)
Any Disorder without Psychotic Symptom (in total)^b		664	(47.1)
Diagnosis Deferred^c		19	(1.3)
Total probable cases		1410	(100.0)

^aIncludes ICD-10 F21 Schizotypal Disorder (n: 5)

^bDementia (F00), Delirium (F05), Other mental disorders due to known physiological condition (F06), Mental and behavioral disorders due to psychoactive substance use (F10-19), major depressive disorder (F32-F33), other and unspecified mood [affective] disorders (F38-F39), persistent mood [affective] disorders (F34), phobic anxiety disorders (F40), anxiety disorders (F41), obsessive-compulsive disorder (F42), reaction to severe stress, and adjustment disorders (F43), dissociative disorders (F44), somatoform disorders (F45), personality disorders (F60), mental retardation (F70), pervasive developmental disorders (F84), Attention-deficit hyperactivity disorders (F90), neurologic diseases (G40 etc.).

^cCases with no clinical reappraisal, phone interview or best-estimate diagnosis

units provided 1948, 426, and 557 individuals, respectively. The pooled case list included 1,410 probable cases after the application of inclusion criteria such as age, residency, being deceased, and institutionalization.

For case ascertainment and final diagnosis, 69.7% (n: 983) of the probable cases were evaluated by clinical interview using SCID-I. Structured phone interview and best-estimate diagnosis were used in 7.3% (n: 103) and 23.0% (n: 324) of the

probable cases, respectively. Structured phone interview was higher in males ($\chi^2=4.4$; $p=0.036$) whereas, best-estimate diagnosis was higher in females ($\chi^2=3.5$; $p=0.048$). In addition, the best-estimate diagnosis was higher in the older age groups ($t=-5.3$; $p<0.05$).

Primary diagnoses of 47.1% (n: 664) of the probable cases were non-psychotic DSM-IV disorder (Table 1). However, each case was coded with a psychotic disorder at least once

Table 2. Denominator populations and prevalence estimates of schizophrenia, schizoaffective disorder and bipolar I disorder in the districts of the defined area

	Denominator population	Cases	Prevalence	Cases	Prevalence	Cases	Prevalence	Cases	Prevalence
		Any psychotic disorder		Schizophrenia		Schizoaffective Disorder		Bipolar I Disorder	
Defined Area	73,893	727	9.8 (8.2-11.5)	265	3.6 (3.0-4.2)	83	1.1 (0.8-1.4)	197	2.7 (2.0-3.3)
Sinop	39,018	393	10.1 (7.6-12.5)	111	2.8 (2.0-3.7)	46	1.2 (0.7-1.6)	113	2.9 (1.9-3.8)
<i>Urban</i>	27,401	286	10.4 (7.5-13.3)	71	2.6 (1.5-3.6)	36	1.3 (0.7-1.9)	85	3.1 (1.9-4.3)
<i>Rural</i>	11,617	107	9.2 (6.2-12.2)	40	3.4 (1.9-4.9)	10	0.9 (0.1-1.6)	28	2.4 (1.3-3.5)
Ayancık	14,637	136	9.3 (7.4-11.2)	57	3.9 (2.9-4.9)	15	1.0 (0.6-1.5)	42	2.9 (1.8-3.9)
<i>Urban</i>	8,444	73	8.6 (6.2-11.1)	29	3.4 (2.1-4.8)	6	0.7 (0.2-1.2)	25	3.0 (1.4-4.9)
<i>Rural</i>	6,193	63	10.2 (7.0-13.3)	28	4.5 (2.9-6.2)	9	1.4 (0.6-2.3)	17	2.7 (1.2-4.3)
Erfelek	6,930	68	9.8 (6.7-12.9)	39	5.6 (3.6-7.7)	7	1.0 (0.3-1.7)	14	2.0 (0.8-3.2)
<i>Urban</i>	2,369	23	9.7 (6.2-13.2)	14	5.9 (3.2-8.6)	2	0.8 (-0.3-2.0)	5	2.1 (0.3-3.9)
<i>Rural</i>	4,561	45	9.8 (5.5-14.2)	25	5.5 (2.7-8.3)	5	1.1 (0.2-2.0)	9	1.9 (0.4-3.6)
Gerze	13,308	130	9.7 (7.5-12.0)	58	4.4 (3.2-5.5)	15	1.1 (0.5-1.7)	28	2.2 (1.3-3.1)
<i>Urban</i>	7,943	83	10.4 (7.3-13.6)	37	4.7 (3.0-6.3)	10	1.3 (0.5-2.0)	15	1.9 (0.8-2.9)
<i>Rural</i>	5,365	47	8.8 (5.9-11.6)	21	3.9 (2.4-5.4)	5	0.9 (-0.1-1.9)	13	2.4 (0.7-4.1)

^aGiven per 1,000 with 95% confidence intervals

in one of the registries. For case ascertainment and final diagnosis, the clinical interview, structured phone interview, and best-estimate diagnosis were used in 56.9% (n: 378), 6.5% (n: 43) and 36.6% of the probable cases with non-psychotic DSM disorders, respectively. Inappropriate coding of psychotic disorders and/or bipolar disorders was significantly higher in females and older age groups ($\chi^2=22.4$; $p<0.05$ and $t=2.1$; $p<0.05$, respectively). Since there was inadequate information on registries and any interview was impossible, final diagnosis was deferred in 1.3% (n: 19) of the probable cases.

In 51.6% (n: 727) of the probable cases, primary diagnosis was DSM-IV psychotic disorder (Table 1). They constituted the total number of patients to estimate prevalence. DSM-IV category of schizophrenia and other psychotic disorders was final diagnosis in 57.3% (n: 417) of the cases with any psychotic disorder. DSM-IV affective disorders with psychotic features and substance-related psychotic disorders were diagnosed in 37.7% (n: 274) and 1.6% (n: 12) of the cases, respectively.

The registry-based prevalence estimate of any DSM-IV disorder with psychotic features was 9.8 per 1,000 individuals (95% CI: 8.2-11.5). The prevalence estimates of schizophrenia, schizoaffective disorder, and BPI disorder were 3.6 (95% CI: 3.0-4.2), 1.1 (95% CI: 0.8-1.4), and 2.7 (95% CI: 2.0-3.3) per 1,000 individuals, respectively (Table 2). The prevalence estimate of depressive disorder with psychotic features was 1.0 (95% CI: 0.6-1.3) (not presented in the table). The prevalence of any psychotic disorder varied between 8.6 and 10.4 per 1,000 individuals in the four districts. The prevalence of schizophrenia varied between 5.9 and 2.6 per 1,000 (urban residencies in Erfelek and Sinop districts, respectively) individuals. And prevalence of BPI disorder varied between 3.1 and 1.9 per 1,000 (urban Sinop and rural Erfelek-Gerze districts, respectively) individuals, respectively (Table 2).

The registry-based prevalence estimates of any DSM-IV disorder with psychotic features among females and males were 9.7 (95% CI: 7.3-12.0) and 10.0 (95% CI: 7.6-12.4) per 100 individuals (Table 3), respectively. Schizophrenia was mildly more prevalent among males than females (3.7 and 3.4 per 1,000 individuals, respectively). However, sex difference in prevalence was only significant in BPI; prevalence estimate was lower in males than females (2.2 and 3.2 per 1,000 individuals, respectively) with an adjusted OR of 0.7 (95% CI: 0.5-0.9; $p < 0.05$).

The prevalence estimates of any DSM-IV disorder with psychotic features were significantly higher, and associated with increased risk in all age groups than 15-24 ages. The difference was prominent in 35-44 ages (prevalence estimates of any psychotic disorder and schizophrenia were 14.2 and 5.3 per 1,000, respectively); whereas, schizoaffective and BPI disorders were moderately higher in 45-54 ages (1.5 and 3.5 per 1,000 individuals, respectively). Adjusted ORs varied from 1.1 (for BPI disorder in 25-34 ages) to 3.2 (for schizoaffective disorder

Table 3. Denominator populations of sociodemographic characteristics and prevalence estimates of schizophrenia, schizoaffective disorder, and bipolar I disorder in the districts of the defined area

	Denominator population	Any psychotic disorder				Schizophrenia				Schizoaffective Disorder				Bipolar I Disorder			
		Cases	Prevalence	OR ^b	Cases	Prevalence	OR ^b	Cases	Prevalence	Cases	Prevalence	OR ^b	Cases	Prevalence	OR ^b	Cases	Prevalence
Sex																	
Female	36,895	357	9.7 (7.3-12.0)	1.0 (ref)	127	3.4 (2.6-4.3)	1.0 (ref)	42	1.1 (0.7-1.6)	114	3.1 (2.1-4.1)	1.0 (ref)	83	2.2 (1.5-3.0)	0.7 (0.5-0.9)	1.0 (ref)	
Male	36,998	370	10.0 (7.6-12.4)	1.0 (0.9-1.2)	138	3.7 (2.9-4.5)	1.1 (0.8-1.4)	41	1.1 (0.7-1.5)			0.9 (0.6-1.5)					
Age																	
15-24	16,537	92	5.5 (2.7-8.4)	1.0 (ref)	28	1.7 (0.7-2.6)	1.0 (ref)	8	0.5 (0.1-0.9)	34	2.0 (0.9-3.2)	1.0 (ref)	34	2.0 (0.9-3.2)	1.0 (ref)		
25-34	15,133	152	10.0 (7.7-13.0)	1.8 (1.3-2.3)	58	3.8 (2.5-5.1)	2.2 (1.4-3.5)	19	1.2 (0.6-1.8)	35	2.3 (1.2-3.4)	2.6 (1.1-5.9)	35	2.3 (1.2-3.4)	1.1 (0.7-1.8)		
35-44	13,860	195	14.2 (9.5-18.9)	2.5 (2.0-3.3)	72	5.3 (3.6-6.9)	3.1 (2.0-4.8)	19	1.4 (0.8-1.9)	49	3.5 (1.5-5.5)	2.8 (1.2-6.5)	49	3.5 (1.5-5.5)	1.7 (1.1-2.6)		
45-54	14,931	189	12.6 (7.9-17.4)	2.3 (1.8-2.9)	73	4.9 (3.3-6.5)	2.9 (1.9-4.5)	23	1.5 (0.5-2.6)	52	3.5 (1.8-5.2)	3.2 (1.4-7.1)	52	3.5 (1.8-5.2)	1.7 (1.1-2.6)		
55-64	13,432	99	7.4 (4.3-10.4)	1.3 (1.0-1.7)	34	2.5 (1.6-3.4)	1.5 (0.9-2.5)	14	1.0 (0.4-1.7)	27	2.0 (1.0-3.0)	2.1 (0.9-5.1)	27	2.0 (1.0-3.0)	0.9 (0.6-1.6)		
Marital status																	
Ever Married ^a	50,292	336	6.7 (4.8-8.5)	1.0 (ref)	81	1.6 (1.3-1.9)	1.0 (ref)	30	0.6 (0.2-0.9)	115	2.3 (1.5-3.0)	1.0 (ref)	115	2.3 (1.5-3.0)	1.0 (ref)		
Single	21,337	282	13.2 (10.0-16.4)	3.9 (3.2-4.9)	143	6.7 (5.1-8.3)	14.1 (10.0-19.8)	36	1.7 (1.1-2.2)	60	2.8 (1.7-3.9)	8.2 (4.4-15.2)	60	2.8 (1.7-3.9)	1.6 (1.1-2.5)		
Divorced	2,224	109	49.0 (36.1-61.9)	8.0 (6.4-10.0)	41	18.4 (11.4-25.4)	12.5 (8.6-18.3)	17	7.6 (3.5-11.8)	22	9.9 (5.5-14.3)	13.9 (7.6-25.2)	22	9.9 (5.5-14.3)	4.5 (2.8-7.1)		
Residency																	
Rural	27,736	262	9.4 (7.7-11.2)	1.0 (ref)	114	4.1 (3.2-5.0)	1.0 (ref)	29	1.0 (0.6-1.5)	67	2.4 (1.7-3.1)	1.0 (ref)	67	2.4 (1.7-3.1)	1.0 (ref)		
Semi-urban	18,756	179	9.5 (7.6-11.4)	1.0 (0.8-1.2)	80	4.2 (3.2-5.3)	1.1 (0.8-1.4)	18	1.0 (0.5-1.4)	45	2.4 (1.5-3.2)	0.9 (0.5-1.7)	45	2.4 (1.5-3.2)	1.0 (0.7-1.4)		
Urban	27,401	286	10.4 (7.5-13.3)	1.1 (0.9-1.3)	71	2.6 (1.5-3.6)	0.6 (0.5-0.9)	36	1.3 (0.7-1.9)	85	3.1 (1.9-4.3)	1.3 (0.8-2.2)	85	3.1 (1.9-4.3)	1.3 (0.9-1.8)		

^aGiven per 1,000 with 95% confidence intervals. ^bAdjusted for age and sex. Odds ratios (OR) were given with 95% confidence intervals; statistical significance, $p<0.05$ was given in bold. *Includes married and widowed individuals.

in 45-54 ages), and almost associated with a two-fold increase in prevalence in all age groups compared to 15-24 ages.

The prevalence estimates were higher among never married and divorced individuals than ever married individuals. The prevalence of any DSM-IV disorder with psychotic features were 6.7, 14.2, and 49.0 per 1,000 among ever married, never married, and divorced individuals, respectively (Table 3). Adjusted ORs were reflecting the increased risk: never married individuals were 3.9 times (95% CI: 3.2-4.9) and divorced individuals were 8.0 times (95% CI: 6.4-10.0) under higher risk of any psychotic disorders than married. Increased risk was more prominent in schizophrenia and schizoaffective disorder than BPI: adjusted ORs of never married and divorced individuals for schizophrenia, schizoaffective disorder, and BPI disorder were 14.1 (95% CI: 10.0-19.8) and 12.5 (95% CI: 8.6-18.3), 8.2 (95% CI: 4.4-15.2) and 13.9 (95% CI: 7.6-25.2), and 1.6 (95% CI: 1.1-2.5) and 4.5 (95% CI: 2.8-7.1), respectively (Table 3).

The prevalence estimates of psychotic disorders in urban, semi-urban and rural areas were 10.4, 9.5, and 9.4 per 1000, respectively and were not associated with place of residency (Table 3). However, schizophrenia prevalence was higher in rural (4.1 per 1,000) and semi-urban areas (4.2 per 1,000) than urban areas (2.6 per 1,000). Adjusted OR of urban residency compared to rural residency was 0.6 (95% CI: 0.5-0.9; $p < 0.05$). On the other hand, BPI and schizoaffective disorders were slightly higher in urban areas (3.1 and 1.3 per 1,000) than rural areas (2.6 and 1.1 per 1,000) without reaching statistical significance (Table 3).

DISCUSSION

The SinoPsy is the first study to provide registry-based period prevalence estimates of any DSM-IV disorder with psychotic features for figures of population at-risk in a defined area of Turkey. The prevalence estimates of the SinoPsy indicate that 10 in every 1,000 individuals refer to a primary or secondary health services at least once for psychotic disorders in the defined area. The prevalence estimates constitute the minimum population-based rates of health service referrals of psychotic disorders in adult population of Turkey (Goldner et al. 2003). In addition, the prevalence of psychotic disorders constitutes the lowest population particularly for recently implemented Community Mental Health Centers. On the other hand, 20 in every 1,000 individuals had a registry of a psychotic disorder at least once in the case records of primary and/or secondary health services. The results indicate that half of the case records of psychotic disorders in registries may drop when clinically evaluated.

Pseudo-diagnosis of psychotic disorders may be associated with paramedical reasons such as unofficial indication (e.g.

mental retardation, impulse control, or augmentation in depression, anxiety) for prescribing an antipsychotic medication.

According to cross-sectional studies, the lifetime prevalence estimates of DSM-IV psychotic disorders, schizophrenia, schizoaffective disorders, BPI, and depressive disorders with psychotic features in Turkey were 26, 8, 2, 4, and 5 per 1,000 individuals, respectively (Binbay et al. 2011, Binbay et al. 2012, Özdemir and Doğan 2015). The prevalence estimates of the SinoPsy were lower than estimates of cross-sectional studies. There may be several reasons for the differences between estimates of general population based cross-sectional studies and studies using a health research registry based on administrative data from services. The reasons will be discussed below. However, prevalence estimate of the SinoPsy is similar to registry-based estimates from other countries (Tizon et al. 2009).

Psychotic disorders are mostly chronic with fluctuating symptomatic relapses and remissions, and only one in five patients have full remission (Muller-Oerlinghausen et al. 2002, Wittchen et al. 2003, van Os and Kapur 2009). A substantial part of the first episode patients are transited to long-term users of health services (Menezes et al. 2006). However, unmet needs, treatment non-adherence, and disengagement from health services are relatively high among patients despite long-term and repeated use of services (Kohn et al. 2004, Lieberman et al. 2005). The prevalence estimates of our study may indicate that more than half of the psychotic disorder cases had no referral to any primary and/or secondary health services during the three-year period in the area. Furthermore, a portion of the cases may be partially remitted, which decreases any need for the use of health services in the study period. Also, some cases in the defined area may be using health services in other provinces, which may result in exclusion from the registry systems.

The prevalence estimates of our study may also indicate correlations of the sociodemographic features of population at-risk. Sinop lies in the Black Sea region where almost half of the population migrated to metropolitan areas (including Istanbul) within the last 20 years (Başel 2007, Murat 2007). An important portion of the cases might have migrated outside of the defined area, which may lead to low prevalence estimates. However, there is no population and case data that will help to test the so called "selective migration" (Cantor-Graae and Selten 2005). When compared to estimates of the general population cross-sectional studies, prevalence estimates of the study may indicate that almost half of the cases of DSM-IV schizophrenia and other psychotic disorders have no admission to primary or secondary health services during three-year period.

Prevalence of BPI disorder is generally lower than prevalence of schizophrenia in cross-sectional general population studies

(Perala et al. 2007, Binbay et al. 2012). It is notable that the difference between registry based prevalence estimates of BPI and schizophrenia in our study was not as high as the difference in cross-sectional studies. Registry based prevalence estimate of BPI disorder was almost similar to lifetime prevalence estimates of cross-sectional studies (approximately 4 per 1,000 individuals) (Binbay et al. 2012, Özdemir and Doğan 2015). However, the prevalence estimate of BPI disorders in Turkey is lower than estimates of other countries (Merikangas et al. 2007, Merikangas et al. 2011, Dell’Aglia et al. 2013). The main reason of variation in prevalence estimates of BPI disorder is case ascertainment in the cross-sectional studies (Wittchen et al. 2003). Due to low sensitivity of case ascertainment in the cross-sectional studies, there may be variation in prevalence of BPI disorder (Dell’Aglia et al. 2013).

On the other hand, BPI disorder is in some aspect similar to schizophrenia and can be chronic with fluctuating affective symptoms from relapses to remissions, which may lead to long-term and repetitive use of health services (Wittchen et al. 2003). Therefore, prevalence estimate of BPI disorder in our study may be almost similar to estimates of general population studies. The proximity of the estimates may also reflect demographic and geographical (Black Sea) features of common hyperthymic temperament of the region. It is publicly well-known; however, it lacks any scientific data that is suitable for any analysis.

Prevalence of depression with psychotic features was lower than prevalence of general populations studies (approximately 4 per 1,000) (Ohayon and Schatzberg 2002, Perala et al. 2007, Binbay et al. 2012). The main reason of lower estimate may be related to the period of the study; meaning that only a portion of the actual patients might have been admitted to health services. Furthermore, psychotic depression has some screening limitations even in clinical settings (Maj et al. 2007). Therefore, some of the cases of psychotic depression might have been diagnosed with another psychiatric disorder.

Both prevalence and admission rate of schizophrenia is higher in males than females (Binbay et al. 2011, Binbay et al. 2012). However, there was no sex difference in registry based prevalence estimates of schizophrenia and schizoaffective disorder. In Turkey, the prevalence of BPI disorder tends to be higher in females than males in cross-sectional studies (Binbay et al. 2012, Özdemir and Doğan 2015). There is no reported sex difference in estimates of BPI disorder in other countries (Merikangas et al. 2011). The relative high prevalence of BPI disorder in females is only in line with estimates of cross-sectional studies in Turkey.

Age specific prevalence estimates of psychotic disorders reflect the cohort effect related with onset and severity of the disorder, which lead to admission. Furthermore, onset of the disorders with psychotic symptoms are prominently

around a period that needs educational, occupational, and social achievement; and any hitch eventually leads to long-term consequences (Wittchen et al. 2003, van Os and Kapur 2009). Associations between prevalence estimates and marital status in our study are important as indicators of broad social dysfunctioning. This points to difficulties in getting married or establishing a long-term relationship particularly in DSM category of schizophrenia and other psychotic disorders.

Prevalence of schizophrenia tends to be higher in urban areas than rural areas (March et al. 2008), which is both associated with pathophysiology and sociodemographic correlates of the disorder (Allardyce and Boydell 2006). Prevalence and risk of schizophrenia were higher in rural than urban areas in our study. Considering the massive migration within the defined area in the last two decades (Başel 2007, Murat 2007), relative high risk in rural areas may be associated with selective migration (where relatively healthy individuals migrate) or social residue (where subsyndromal or syndromal individuals are left or tend to stay) phenomena. On the other hand, socioeconomic disadvantage is higher in rural areas of Turkey (Aran et al. 2010) and may lead to increased cumulative risk and prevalence of psychotic disorders in rural areas (Drukker et al. 2007, March et al. 2008). Although not statistically significant, higher estimates of BPI and schizoaffective disorders in urban areas are notable.

The results of the study must be considered with some limitations. First of all, registry-based prevalence of any disorder is biased. Probable cases in registry systems of a proportion of the family medicine units, tertiary health services in other provinces, and private sector were not included; although most comprehensive registry systems of the health services in the defined area were included. In addition, probable cases that were coded in the registries with another ICD code and needed neither admission due to symptomatic remission or medical treatment during the study period couldn’t be reached. The defined area of the study may have some demographic differences compared to districts excluded. However, our study didn’t investigate variations in population, demography, and use of health services. The aforementioned limitations may end up with an underrepresentation of cases in the area. If missed cases do form a substantial proportion of patients, prevalence estimates of our study may partially represent the need and/or use of services. Furthermore, registry-based limitations of the results also hinder the effect of detected and undetected associations between prevalence estimates of disorders and related sociodemographic factors.

Another source of bias is related to case ascertainment, which means systematic failure to represent all cases in a population. Miscoding of ICD diagnoses, inadequate self-reports about current or past symptoms of the disorder, hiding the diagnosis of psychotic disorder due to stigmatization, and limitations of phone interview may have led to bias in case identification

and diagnostic clarification. Also, half of the probable cases had no psychotic disorder. However, they had a diagnosis of psychotic disorder at least once in one of the registries. Of which, a substantial proportion had no clinical interview or phone interview, and the final diagnostic clarification only based on registry information. Diagnostic reliability of the registries can be very low and some of the cases may be missed with aforementioned procedure.

Despite the limitations, the SinoPsy is the first registry-based study to provide the three-year prevalence estimates of any DSM-IV disorder with psychotic symptoms in a defined area of Turkey. Any requirement of registry-based epidemiological studies was full-filled and supported with clinical reappraisal for final diagnosis with an aim of high-quality information.

CONCLUSION

The prevalence estimates of the SinoPsy study indicate that at least 10 per 1,000 individuals admit to primary and secondary health services for disorders with psychotic symptoms in a three-year period. Registry-based prevalence of psychotic disorders is lower than cross-sectional general population studies. Almost half of the psychotic disorder cases may have been excluded from the health services in three-year period with unknown reasons. These need to be evaluated in future studies. Even so, a comprehensive registry system may provide prevalence estimates of low-prevalence disorders and improvements to the health services with provided rates. On the other hand, almost half of the cases with any registry diagnosis of psychotic disorder in Turkey seem to have no psychotic disorder. Therefore, the registry system and administrations regarding particularly antipsychotic prescription must be reviewed and changed.

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