Lifetime Prevalence and Correlates of Schizophrenia and Disorders with Psychotic Symptoms in the General Population of Izmir, Turkey

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Summary

Objective: To estimate the lifetime prevalence of 12 DSM-IV disorders with psychotic symptoms in a general population survey.

Method: Addresses were contacted in a multistage clustered area probability sampling frame of administrative neighbourhoods and households, covering 9 districts and 302 neighbourhoods in the Izmir metropolitan area between November 2007 and October 2008. One household member aged between 15 and 64 years and available to complete the interview was randomly selected using a within-household sampling method. The primary screening instrument was the Composite International Diagnostic Interview 2.1. A systematic screening procedure was implemented to detect probable cases with any psychotic disorder. Those selected by the screens were re-interviewed with the Structured Clinical Interview for DSM-IV. Diagnoses of individuals who were not available for re-interview were made by combining screening information with case register diagnoses and/or the telephone interviews with relatives or spouse.

Results: A total of 4011 individuals were screened for disorders with psychotic symptoms. After screening, 499 respondents were selected as a probable case. 277 of screen positive respondents were available for clinical reappraisal. Initial screening interviews and additional material were used for best estimate diagnoses of the remaining 172 respondents. Total lifetime prevalence of 12 DSM-IV disorders with psychotic symptoms was 2.62%. Lifetime prevalence of each disorder separately were as follows: 0.74% for schizophrenia, 0.20% for schizoaffective disorder, 0.05% for schizophreniform disorder, 0.10% for delusional disorder, 0.12% for brief psychotic disorder, 0.55% for major depressive disorder with psychotic features, 0.37% for bipolar I disorder, 0.20% for substance induced psychotic disorder, and 0.07% for psychotic disorders due to a general medical condition.

Conclusion: Total lifetime prevalence of disorders with psychotic symptoms is higher than any previously reported estimates in Turkey; with a prevalence of approximately 2.5%, these disorders can be considered a major public health concern.

Key words: Schizophrenia, psychosis, bipolar disorder, prevalence, epidemiology

INTRODUCTION

The prevalence of a disease not only indicates how commonly a particular condition is expressed within a population, but also can be used as a public health measure of disease burden in the community. Knowledge of prevalence rates of psychiatric disorders in a country are important, because the rates of psychiatric disorders vary widely across groups and settings (Wittchen et al. 2011), and expenditure of scarce resources needs to be tailored according to the specific morbidity burden of a particular condition (Gustavsson et al. 2011).

Burden of disease is high for psychiatric disorders, in particular when psychotic features are prominent (Rossler et al. 2005). The prototype of psychotic disorders is schizophrenia, a psychotic syndrome with longer duration, miscellaneous delusions, more negative symptoms and fewer affective symptoms (van Os and Kapur 2009). Despite the relatively low prevalence, burden of disease of schizophrenia is quite high (Ayuso-Mateos 2001a, Gustavsson et al. 2011). Furthermore, when psychotic symptoms form part of the clinical picture (e.g. in mood disorders, psychotic disorder due to substance abuse, and psychotic disorder due to somatic illness), the

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burden of disease dramatically increases (Ayuso-Mateos 2001b, Rossler et al. 2005).

Various surveys of the World Health Organization (WHO) conducted in various countries led to lifetime prevalence rates of schizophrenia up to 1% in various societies (Jablensky et al. 1992). However, a meta-analysis of eligible prevalence studies indicated a much wider distribution of estimates, possibly associated with different characteristics of the populations under each survey (Saha et al. 2005). These studies, however, are marred by the exclusion of other psychotic disorders that form an integral part of the same syndrome (van Os and Kapur 2009) yet typically are neglected. Only a few surveys included lifetime prevalence estimates of other psychotic disorders. A landmark study showed that the lifetime prevalence of psychotic disorders (all diagnoses combined) is 3.5%, divided over 12 different diagnostic categories including schizophrenia, schizoaffective disorder, schizophreniform disorder, brief psychotic disorder, delusional disorder, depressive disorder with psychotic disorder, bipolar I disorder, psychotic disorder due to substance abuse, and psychotic disorder due to general medical condition (Perala et al. 2007). Recent studies revealed that the total lifetime prevalence of other psychotic disorders (schizoaffective disorder, schizophreniform disorder, brief psychotic disorder) may be higher than the estimates of schizophrenia in isolation (Kessler et al. 2005, Perala et al. 2007, Gureje et al. 2010, Phanthunane et al. 2010).

The median lifetime prevalence of schizophrenia in Turkey is 8.9 per 1000 persons, according to a recent systematic review of general population studies (Binbay et al. 2011a). However, this estimate is not suitable for international comparison due to methodological shortcomings of the surveys considered. *The Izmir Mental Health Survey for Gene-Environment in Psychoses (TürkSch)* was, therefore, conducted to provide new insights and knowledge in psychiatric epidemiology in Turkey. Aims were to provide internationally comparable data and to identify effects of environmental risks in interaction with genetic background risk (Binbay et al. 2011b). Thus, in the same epidemiological sample, the lifetime prevalence of the extended psychosis phenotype (van Os et al. 2009) as well as the lifetime prevalence of DSM-IV mental health disorders with psychotic symptoms were assessed amongst adolescents and adults (aged between 15 - 64 years). In the current paper, we present the prevalence estimates of 12 DSM-IV disorders with psychotic symptoms in the general population sample of *TürkSch.* In addition, the unique design enabled to estimate the proportion of cases with an actual diagnosis of psychotic disorder within an initial group of screen positives.

METHOD

The *TürkSch* study consisted of a 3-stage data collection to assess individual, family, and neighbourhood level variables. The present article uses data collected in stage 1. The *TürkSch* study has been described in more detail in previous articles (Binbay et al. 2011b, Binbay et al. 2011c, Binbay et al. 2012a).

Sampling and survey design

The study was approved by the ethics committee of the Ege University. Subjects provided written informed consent. 6000 households were randomly selected from the Izmir population using a multistage sampling procedure. First, the Turkish Institute of Statistics (TURKSTAT) selected 6000 households stratified by 4 categories of urbanicity (Metropolitan Municipality of Izmir 2007) including highly, moderately and weakly developed urban areas as well as one rural category in the wider Izmir area. Between November 2007 and October 2008, each address was visited by interviewers.

Of the 6000 households, 5242 were eligible for interview. Main reasons for ineligibility were change of address, incorrect address, and addresses with residents not meeting the inclusion criteria (not aged between 15 and 64 years). In the 5242 eligible households, a total of 4011 individuals were successfully interviewed, resulting in a response rate of 76.5%. Main reasons for non-response were refusal to participate (18.2%), failure to contact anyone in the identified household (3.1%), and failure to contact the sampled individual in the identified household (3.0%) (Binbay et al. 2011b). Response was lower in moderately urban and highly urban areas (75%) than in low urban and rural areas (82%; based on all 764 non-respondents and 4011 participants; χ^2=26.8, df=1, p<0.001). In a convenience sample of the non-respondents, (n=177; 23%) mean age was 41.2 (standard deviation [sd]=12.9) and significantly higher than in respondents (mean age=37.4, sd=13.4; t=2.9, p=0.004); 42% of respondents and 51% of non-responders were male (χ^2=5.3, p=0.02) (Binbay et al. 2012a).

After providing informed consent, one household member aged between 15 and 64 years, and available to complete the interview, was randomly selected using the Kish within-household sampling method (Kish 1949). If one of the residents of the household was already diagnosed with a psychotic disorder, he or she was recruited for the study. Persons who were not immediately available (due to hospitalization, military service, travel, imprisonment, or acute exacerbation of a mental disorder) were contacted later in the year. More details have been described elsewhere (Binbay et al. 2011b, Binbay et al. 2011c, Binbay et al. 2012a).

Screening and Diagnostic Instruments

In order to assess psychotic experiences and to diagnose disorders with psychotic symptoms, assessments were based on the relevant sections of the Composite International Diagnostic

Interview (CIDI) 2.1 (Andrews and Peters 1998). The CIDI 2.1 is a fully structured interview developed by the WHO (Robins et al. 1988) and has been used in various surveys around the world including Turkey (Kılıç 1998, Çilli and Kaya 2003, Deveci et al. 2007, Alptekin et al. 2009). Primarily designed for use in epidemiological studies of mental disorders, the CIDI can be used by both clinicians and trained interviewers. CIDI-based screening of symptoms provides diagnoses of various mental disorders in accordance with the definitions and criteria of the International Classification of Diseases, Tenth Revision (ICD-10) (World Health Organization 1992), and the Diagnostic and Statistical Manual of Mental Disorders (Fourth Edition) (DSM-IV) (American Psychiatric Association 1994), along with information about frequency, duration and severity of symptoms, as well as help-seeking and psychosocial impairment due to symptoms.

The *TürkSch* study included CIDI screening sections on tobacco (section B), alcohol (section J) and substance-related disorders (section J), depressive and dysthymic disorders (section E), manic and bipolar affective disorders (section F), schizophrenia and other psychotic disorders (section G), posttraumatic stress disorder (section K), and two final sections containing concluding questions, interviewer observations (section P), and interviewer ratings (section X).

Furthermore, the interview included a sociodemographic questionnaire in order to determine various risk factors and background characteristics including educational achievement, employment, social insurance, socioeconomic status, monthly household income, and locations of current and past residence. Each sociodemographic variable was dichotomised. Marital status was recorded into married (married and widowed) and unmarried (single, divorced). Cut-off point for educational achievement was 5 years of completed education (below or above). Income was based on total monthly income of the household and categorized by tertile group (low, medium, high). Social insurance was dichotomised into insured and non-insured. The cut-off point for urbanicity of birth place was a population of 50.000 (below or above). Current and parental socioeconomic status was based on profession (Erikson and Goldthorpe 1992).

An additional section was devoted to mental health service use including questions on any lifetime psychological complaint, any admission as an outpatient or an inpatient because of a mental health problem, name of the institution of admission, year of admission, diagnosis at the end of admission, and name of the prescribed medications (current and during the previous year).

Defining Probable Cases

Guided by previous literature (Kessler et al. 2005, Perala et al. 2007), the psychosis screening items included several elements. If any of the following screen findings were endorsed, the person was defined as a probable case:

1. any self-reported diagnosis of psychotic or bipolar disorder (n: 49);
2. any self-reported hospitalization due to a mental health problem (n: 65);
3. any self-reported medication of any antipsychotic (typical or atypical) and/or lithium or mood-stabilizing anticonvulsant drugs (n: 76);
4. in the CIDI section F screen for bipolar disorder: a lifetime episode of elevated mood lasting at least 4 days plus at least 3, not necessarily concurrent, CIDI manic symptoms (n=92);
5. in the CIDI section G screen for positive psychotic symptoms: any clinically relevant positive psychotic symptoms (i.e., the symptom interfered with normal life or led to help-seeking), or at least 3 symptoms regardless of clinical relevance that may have occurred during the subject's lifetime (n=343);
6. in the CIDI section P screen for other psychotic symptoms: a rating of positive formal thought disorder, negative symptoms, behaviour that suggests the person is having hallucinations, or catatonic symptoms; or the interviewer comments were indicative of psychotic disorder (n=105).

Clinical reappraisal and diagnoses of probable cases

The TürkSch study team tried to recontact all probable cases (n: 449) for a clinical reappraisal using the research version of the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I) (Spitzer et al. 1992). All clinical reappraisals were performed between January 2008 and January 2009 in the hospital or in the respondents' houses by experienced psychiatrists (HE, KA), and by a trainee in psychiatry (TB) or by a psychologist (NZ).

When clinical reappraisal during an oral interview was not possible, clinical reappraisal based on SCID-I was performed on phone by a trainee psychiatrist (TB). If clinical reappraisal by telephone was insufficient to get a final diagnosis, two further steps were applied. First, a family member was called to ask further questions on the illness and treatment of the probable case. Second, patient register databases of the two university hospitals (Ege and Dokuz Eylül University Hospitals) in Izmir were checked in order to get type of diagnosis. In Turkey, psychiatric diagnoses are coded according to the ICD-10 (World Health Organization 1992) since 2006. The final diagnosis according to DSM-IV-TR criteria (American Psychiatric Association 2000) was based on all available and systematically evaluated data obtained from the

Table 1. Overlap of Screening Items in the TürkSch[a]

Screening Item	Self-reported psychosis	Self-reported hospitalization	Self-reported medication	CIDI section G	CIDI section F	CIDI section P
Total number	**49**	**65**	**76**	**343**	**92**	**105**
Self-reported psychosis		33 (50.8%)	40 (52.6%)	46 (13.4%)	15 (16.3%)	27 (25.7%)
Self-reported hospitalization	33 (67.3%)		36 (47.4%)	47 (13.7%)	14 (15.2%)	23 (21.9%)
Self-reported medication	40 (81.6%)	36 (55.4%)		60 (17.5%)	19 (20.6%)	30 (28.6%)
CIDI section G	46 (93.8%)	47 (72.3%)	60 (78.9%)		49 (53.2%)	63 (60.0%)
CIDI section F	15 (30.6%)	14 (21.5%)	19 (25.0%)	49 (14.3%)		17 (16.2%)
CIDI section P	27 (55.1%)	23 (35.4%)	30 (39.5%)	63 (18.4%)	17 (18.5%)	

[a]The bold values in the first row represent the total number of probable cases selected by the respective screening item. Other values represent the overlap of probable cases selected by both items in the respective row and column, with percentages.

CIDI interview, the SCID-I based phone check, family interview, and/or the patient register records.

In case of unsuccessful attempts to recontact a probable case, the final diagnosis was based on the CIDI interview, with or without additional data on the patient registry. A best-estimate diagnosis according to DSM-IV-TR criteria (American Psychiatric Association 2000) was made for each non-contacted probable case in a collective evaluation (HE, KA, TB, NZ) of each CIDI interview.

Probable Cases and Control Subjects

Eleven percent (n: 449) of the *TürkSch* sample endorsed at least one of the six screening items. 211 were clinically evaluated using SCID-I and 66 were successfully re-interviewed by telephone. We were unable to recontact 172 of the probable cases. Additional data was obtained from registries for 56 of these probable cases. Best-estimate diagnoses of the remaining 116 probable cases were based solely on the CIDI interview.

In order to examine the possibility of false-negative psychotic disorder, 225 controls with screen-negative findings were selected for re-interview from the baseline CIDI interview study. 168 of these controls were successfully re-interviewed using SCID-I and 57 of the controls were re-interviewed using SCID-I by telephone.

Statistical Analysis

All prevalence estimates and test statistics were obtained using the software package STATA, version 11 (STATA 2009). The prevalence estimates and the 95% confidence intervals (CI) were calculated using the number of cases as the nominator and the *TürkSch* cohort as the denominator. Furthermore, the sample was stratified by age groups and sex. Differences between strata were tested using the χ^2 statistic. Associations between the prevalence estimates and the sociodemographic factors were analysed using logistic regression analysis, providing odds ratios (OR) and 95% CI. The ORs were adjusted for age and sex.

RESULTS

Overlap between the screening items was substantial, e.g. 50.8% of the subjects who reported hospitalisation also had evidence of psychosis (Table 1). Disorders with psychotic symptoms were diagnosed in 23.4% of probable cases (Table 2). Diagnosis was deferred in 8 probable cases. Clinical reappraisal using SCID-I was performed in 83.8% of the cases with a psychotic disorder. In 49 cases, additional data ob-

Table 2. The DSM-IV Diagnoses of the Probable Cases*

Diagnostic category	Number of cases (n)	Percentage of cases (%)
Any Psychotic Disorder[a]	105	(23.4)
Nonpsychotic Disorders		
Mood Disorders[b]	244	(54.3)
MDD[c]	201	(44.8)
Bipolar Disorders[d]	5	(1.1)
Anxiety Disorders	53	(11.8)
Substance Induced Disorders[e]	31	(6.9)
Other Diagnoses	15	(3.4)
Diagnosis Deferred	8	(1.8)
No diagnosis	78	(17.4)
Total Probable Cases**	449	(100.00)

[a]Schizophrenia and other psychotic disorders, affective disorder with psychotic features, psychotic disorder due to substance abuse, and psychotic disorder due to general medical condition.
[b]Major depressive disorder (MDD), depressive disorder not otherwise specified (NOS), dysthymia, cyclothymia, bipolar disorders, and affective disorder NOS.
[c]Major depressive disorder (MDD) (single episode or recurrent).
[d]Bipolar II disorder, bipolar disorder NOS, cyclothymia.
[e]Alcohol and other substance abuse or dependence.
*Based on clinical reappraisal, telephone reassessments or best-estimate diagnosis
**Some cases had more than 1 diagnosis.

Table 3. The Lifetime Prevalence Estimates of DSM-IV Disorders with Psychotic Features[a]

Diagnosis	Number of cases	Entire sample		Males		Females	
Non-Affective Psychotic Disorders	**57**	**1.42**	**(1.05 – 1.79)**	**1.72**	**(1.10 – 2.34)**	**1.20**	**(0.76 – 1.65)**
Schizophrenia	30	0.74	(0.48 – 1.01)	0.95	(0.49 – 1.41)	0.60	(0.29 – 0.92)
Schizoaffective Disorder	8	0.20	(0.06 – 0.34)	0.18	(0.00 – 0.38)	0.21	(0.02 – 0.40)
Schizophreniform Disorder	2	0.05	(0.00 – 0.11)	0.12	(0.00 – 0.28)	0	
Delusional Disorder	4	0.10	(0.00 – 0.19)	0.06	(0.00 – 0.18)	0.13	(0.00 – 0.27)
Brief Psychotic Disorder	5	0.12	(0.01 – 0.23)	0.06	(0.00 – 0.18)	0.17	(0.00 – 0.34)
Psychotic Disorder NOS	8	0.20	(0.06 – 0.34)	0.36	(0.07 – 0.64)	0.08	(0.00 – 0.21)
Affective Psychotic Disorders	**37**	**0.92**	**(0.62 – 1.21)**	**0.77**	**(0.35 – 1.19)**	**1.03**	**(0.62 – 1.44)**
Bipolar I Disorder	15	0.37	(0.18 – 0.56)	0.47	(0.14 – 0.80)	0.30	(0.08 – 0.52)
With Psychotic Features	9	0.22	(0.08 – 0.37)	0.35	(0.07 – 0.64)	0.13	(0.00 – 0.27)
Without Psychotic Features	6	0.15	(0.03 – 0.27)	0.12	(0.00 – 0.28)	0.17	(0.00 – 0.34)
MDD With Psychotic Features	22	0.55	(0.32 – 0.77)	0.30	(0.04 – 0.56)	0.73	(0.38 – 1.08)
Psychotic Disorder due to Substance Abuse	**8**	**0.20**	**(0.06 – 0.34)**	**0.35**	**(0.07 – 0.64)**	**0.08**	**(0.00 – 0.20)**
Alcohol-induced	4	0.10	(0.00 – 0.19)	0.12	(0.00 – 0.28)	0.08	(0.00 – 0.20)
Other Substance-induced	4	0.10	(0.00 – 0.19)	0.24	(0.00 – 0.47)	0	
Psychotic disorder due to a GMC	**3**	**0.07**	**(0.00 – 0.16)**	**0.12**	**(0.00 – 0.28)**	**0.04**	**(0.00 – 0.13)**
Any psychotic disorder	**105**	**2.62**	**(2.12 – 3.11)**	**2.97**	**(2.16 – 3.78)**	**2.36**	**(1.74 – 2.98)**

NOS: not otherwise specified; MDD: major depressive disorder; GMC: general medical condition.
[a]Prevalence estimates are given as percentages and are presented as lifetime (95% CI).

tained from hospital registries or family interviews, in order to achieve a final diagnosis.

The total lifetime prevalence estimate of the 12 DSM-IV-TR disorders with psychotic features was 2.62% (Table 3). The lifetime prevalence estimates of non-affective psychotic disorders (DSM-IV-TR schizophrenia and other psychotic disorders) and affective psychotic disorders (DSM-IV-TR mood disorders with psychotic features) were 1.42% and 0.92%, respectively. If bipolar I disorder without psychotic features was excluded, the estimates were 2.47% (95% CI: 1.98-2.95) for any psychotic disorder and 0.77% (95% CI: 0.49-1.04) for affective psychotic disorders, respectively (data not shown).

Although differences were not statistically significant, the prevalence of affective psychotic disorders (particularly depressive disorder with psychotic features) was higher in females, whereas prevalence of alcohol/substance abuse related psychotic disorder was higher in males (Table 4). Since each estimate represented lifetime prevalence, individuals with any psychotic disorder were more prevalent in the older age groups than in the younger age groups. Schizophrenia was more prevalent in young males than in young females.

Of probable cases detected in the first screening step (self-reported psychosis), 69.4% were diagnosed with a psychotic disorder. The positive predictive values were 43.1%, 40.8%, 16.6%, 6.2% and 30.5% in the second (self-reported hospitalisation), third (self-reported medication), fourth (CIDI section G), fifth (CIDI section F) and sixth (CIDI section P) screening items, respectively. The positive predictive value for mood disorders was 28.6%, 20.0%, 25.0%, 10.2%, 16.3%, and 7.6%, respectively.

The number of screen positives at the F section was 5 times as high as the number of respondents with a diagnosis of bipolar disorder while the number of screen positives at the G section was approximately 7 times as high as the number of respondents with a diagnosis of schizophrenia and other psychotic disorders. On the other hand, one in ten cases diagnosed with psychotic disorder was screened negative (data not shown). None of the 225 respondents in the control group that were interviewed with SCID was diagnosed with psychotic disorder.

Schizophrenia and other psychotic disorders were significantly more prevalent in single or divorced individuals than in married or widowed individuals (OR schizophrenia= 10.32; 95% CI 4.43 – 24.06 and OR other psychotic disorder= 2.39; 95% CI 1.00 – 5.69, table 5). Schizophrenia was significantly higher in non-insured individuals than in insured individuals (OR= 2.54; 95% CI 1.13 – 5.72). The diagnosis of mood disorder with psychotic symptoms was significantly lower in individuals with middle (OR= 0.42; 95% CI 0.19 – 0.91) or

Table 4. The Prevalence Estimates of DSM-IV Disorders with Psychotic Features, by Age Groups and Sex[a]

Diagnosis	15-24 years	25-34 years	35-44 years	45-54 years	55-64 years
	All cases				
Non-Affective Psychotic Disorders	**1.01 (0.31 – 1.70)**	**1.47 (0.75 – 2.19)**	**1.29 (0.53 – 2.06)**	**2.22 (1.14 – 3.30)**	**1.07 (0.21 – 1.92)**
Schizophrenia	0.37 (0.01 – 0.81)	0.74 (0.23 – 1.24)	0.82 (0.21 – 1.43)	1.25 (0.44 – 2.06)	0.53 (0.01 – 1.14)
Affective Psychotic Disorders	**1.01 (0.31 – 1.70)**	**1.01 (0.41 – 1.61)**	**0.82 (0.21 – 1.44)**	**0.69 (0.08 – 1.30)**	**1.07 (0.21 – 1.92)**
Bipolar I Disorder	0.51 (0.01 – 1.00)	0.27 (0.01 – 0.58)	0.35 (0.01 – 0.75)	0.42 (0.01 – 0.89)	0.36 (0.01 – 0.85)
Psychotic Disorder due to Substance Abuse	**0.25 (0.01 – 0.60)**	**0.28 (0.01 – 0.59)**	**0.35 (0.01 – 0.75)**	**0**	**0**
Psychotic Disorder due to a GMC	**0**	**0.09 (0.01 – 0.27)**	**0.12 (0.01 – 0.35)**	**0**	**0.18 (0.01 – 0.53)**
Any Psychotic Disorder	**2.27 (1.23 – 3.31)**	**2.85 (1.86 – 3.84)**	**2.59 (1.52 – 3.66)**	**2.92 (1.68 – 4.15)**	**2.31 (1.07 – 3.56)**
	Males				
Non-Affective Psychotic Disorders	**1.54 (0.31 – 2.76)**	**1.14 (0.14 – 2.13)**	**1.50 (0.19 – 2.81)**	**3.53 (1.37 – 5.70)**	**1.27 (0.01 – 2.71)**
Schizophrenia	0.77 (0.01 – 1.64)	0.68 (0.01 – 1.45)	1.20 (0.03 – 2.38)	1.77 (0.22 – 3.31)	0.42 (0.01 -1.26)
Affective Psychotic Disorders	**0.51 (0.01 – 1.22)**	**0.45 (0.01 - 1.08)**	**1.20 (0.03 – 2.38)**	**1.06 (0.01 – 2.26)**	**0.85 (0.01 – 2.02)**
Bipolar I Disorder	0.51 (0.01 – 1.22)	0.23 (0.01 – 0.67)	0.90 (0.01 – 1.92)	0.35 (0.01 – 1.05)	0.42 (0.01 – 1.26)
Psychotic Disorder due to Substance Abuse	**0.51 (0.01 – 1.22)**	**0.68 (0.01 – 1.45)**	**0.30 (0.01 – 0.89)**	**0**	**0**
Psychotic Disorder due to a GMC	**0**	**0.22 (0.01 – 0.67)**	**0.30 (0.01 – 0.89)**	**0**	**0**
Any Psychotic Disorder	**2.56 (0.99 – 4.14)**	**2.49 (1.03 – 3.95)**	**3.30 (1.37 – 5.23)**	**4.59 (2.14 – 7.05)**	**2.12 (0.27 – 3.97)**
	Females				
Non-Affective Psychotic Disorders	**0.50 (0.01 – 1.19)**	**1.70 (0.70 – 2.70)**	**1.16 (0.23 – 2.09)**	**1.37 (0.28 – 2.46)**	**0.92 (0.01 – 1.96)**
Schizophrenia	0	0.77 (0.09 – 1.44)	0.58 (0.01 – 1.24)	0.91 (0.02 – 1.81)	0.61 (0.01 – 1.46)
Affective Psychotic Disorders	**1.49 (0.30 – 2.68)**	**1.39 (0.48 – 2.29)**	**0.58 (0.01 – 1.24)**	**0.46 (0.01 – 1.09)**	**1.23 (0.02 – 2.43)**
Bipolar I Disorder	**0.50 (0.01 – 1.19)**	**0.31 (0.01 – 0.74)**	**0**	**0.46 (0.01 – 1.09)**	**0.31 (0.01 – 0.91)**
Psychotic Disorder due to Substance Abuse	**0**	**0**	**0.38 (0.01 – 0.92)**	**0**	**0**
Psychotic Disorder due to a GMC	**0**	**0**	**0**	**0**	**0.31 (0.01 – 0.91)**
Any Psychotic Disorder	**2.00 (0.62 – 3.36)**	**3.09 (1.74 – 4.43)**	**2.13 (0.88- 3.38)**	**1.83 (0.57 – 3.09)**	**2.45 (0.76 – 4.14)**

GMC: general medical condition.
[a]Prevalence estimates are given as percentages and are presented as lifetime (95% CI).

low (OR= 0.34; 95% CI 0.14 – 0.83) parental socioeconomic status at birth than in individuals with high socioeconomic status at birth.

DISCUSSION

Prevalence estimates of various psychiatric disorders

Schizophrenia and other psychotic disorders

TürkSch is the most comprehensive general population survey of psychotic disorders ever conducted in Turkey. A fully structured interview was used for screening and a systematic definition was used to identify probable cases. Final assessment of the diagnosis of probable cases was based on clinical reappraisal, patient registries, family interviews or baseline screening, all of which were evaluated by clinicians on the study team. The lifetime prevalence estimates of each disorder with psychotic symptoms were reported separately.

Recent studies of general population samples reported higher prevalence estimates of psychotic disorders than earlier studies (Kessler et al. 2005, Perala et al. 2007, Gureje et al. 2010). A total lifetime prevalence estimate of 2.6% in *TürkSch* is higher than previous studies of general population samples in Turkey (Binbay et al. 2011a), except another Izmir study where the lifetime prevalence of clinically releavent psycotic symptoms was estimated at 3.6% (Alptekin et al. 2009).

The lifetime prevalence of schizophrenia reported in the present paper is similar to the median rate of previous Turkish estimates (Binbay et al. 2011a, Binbay et al. 2012b). The total lifetime prevalence of schizophrenia and other psychotic disorders is higher in *TürkSch* than in the US National Comorbidity Survey Replication (Kessler et al. 2005). However, this US study used different methods and other

Table 5. Sociodemographic Correlates and Adjusted Odds Ratios (OR) for Psychotic Disorders

	None		Schizophrenia				Other Psychotic Disorders				Affective Psychotic Disorders				Any Psychotic Disorder			
	n	%	n	%	OR[a]	%95 CI	n	%	OR[a]	%95CI	n	%	OR[a]	%95CI	n	%	OR[a]	%95CI
Sex																		
Male	1633	(41.8)	16	(53.3)	1.00	-	13	(48.2)	1.00	-	13	(35.1)	1.00	-	50	(47.6)	1.00	-
Female	2273	(58.2)	14	(46.7)	0.62	(0.30 – 1.27)	14	(51.8)	0.77	(0.36 – 1.65)	24	(64.9)	1.33	(0.67 – 2.63)	55	(52.4)	0.79	(0.53 – 1.16)
				$\chi2$=1.62				$\chi2$=0.44				$\chi2$=0.67				$\chi2$=1.42		
Marital status																		
Married/widowed	2786	(71.3)	9	(30.0)	1.00	-	15	(55.6)	1.00	-	23	(62.2)	1.00	-	53	(50.5)	1.00	-
Single/Divorced	1120	(28.7)	21	(70.0)	10.32	(4.43 – 24.06)[b]	12	(44.4)	2.39	(1.00 – 5.69)[b]	14	(37.8)	1.68	(0.79 – 3.56)	52	(49.5)	3.08	(1.98 – 4.79)
				$\chi2$=24.69[c]				$\chi2$=3.25				$\chi2$=1.50				$\chi2$=21.49[c]		
Educational level																		
>8 y	1623	(41.6)	11	(36.7)	1.00	-	8	(29.6)	1.00		14	(37.8)	1.00	-	36	(34.3)	1.00	-
≤8 y	2283	(58.4)	19	(63.3)	1.25	(0.58 – 2.67)	19	(70.7)	1.77	(0.76 – 4.11)	23	(62.2)	1.15	(0.58 – 2.26)	69	(65.7)	1.41	(0.93 – 2.14)
				$\chi2$=0.29				$\chi2$=1.57				$\chi2$=0.20				$\chi2$=2.22		
Income[d]																		
High	1258	(32.5)	9	(30.0)	1.00	-	6	(22.2)	1.00	-	10	(27.0)	1.00	-	28	(26.7)	1.00	-
Medium	1309	(33.8)	12	(40.0)	1.31	(0.55 – 3.14)	9	(33.3)	1.47	(0.52 – 4.14)	14	(37.9)	1.32	(0.58 – 2.99)	38	(36.2)	1.32	(0.81 – 2.17)
Low	1306	(33.7)	9	(30.0)	1.00	(0.39 – 2.56)	12	(44.4)	2.01	(0.74 – 5.40)	13	(35.1)	1.21	(0.53 – 2.79)	39	(37.1)	1.38	(0.84 – 2.28)
				$\chi2$=0.51				$\chi2$=1.78				$\chi2$=0.53				$\chi2$=1.59		
Social Insurance																		
Yes	3294	(84.3)	21	(70.0)	1.00	-	23	(85.2)	1.00	-	33	(89.2)	1.00	-	82	(78.1)	1.00	-
No	612	(15.7)	9	(30.0)	2.54	(1.13 – 5.72)[b]	4	(14.8)	0.93	(0.32 – 2.73)	4	(10.8)	0.64	(0.22 – 1.84)	23	(21.9)	1.51	(0.94 – 2.45)
				$\chi2$=4.60[c]				$\chi2$=0.15				$\chi2$=0.65				$\chi2$=2.98		
Parental SES[e]																		
High	546	(14.4)	4	(13.8)	1.00	-	2	(7.4)	1.00	-	11	(29.7)	1.00	-	17	(16.4)	1.00	-
Medium	1984	(52.3)	11	(37.9)	0.73	(0.23 – 2.33)	14	(51.9)	1.95	(0.44 – 8.66)	17	(45.9)	0.42	(0.19 – 0.91)[b]	46	(44.2)	0.75	(0.42 – 1.32)
Low	1266	(33.3)	14	(48.3)	1.55	(0.50 – 4.73)	11	(40.7)	2.43	(0.53 – 11.01)	9	(24.4)	0.34	(0.14 – 0.83)[b]	41	(39.4)	1.06	(0.59 – 1.88)
				$\chi2$=3.06				$\chi2$=3.06				$\chi2$=7.11[c]				$\chi2$=2.64		
Birth place																		
Population<50.000	1982	(50.7)	15	(50.0)	1.00	-	10	(37.0)	1.00	-	21	(56.8)	1.00	-	50	(47.6)	1.00	-
Population>50.000	1924	(49.3)	15	(50.0)	1.12	(0.53 – 2.34)	17	(63.0)	1.82	(0.81 – 4.08)	16	(43.2)	0.76	(0.39 – 1.49)	55	(52.4)	1.14	(0.76 – 1.70)
				$\chi2$=0.01				$\chi2$=2.01				$\chi2$=0.53				$\chi2$=0.40		
Current residence																		
Rural-semi urban	891	(22.8)	5	(16.7)	1.00	-	6	(22.2)	1.00	-	16	(43.2)	1.00	-	28	(26.7)	1.00	-
Urban	3015	(77.2)	25	(83.3)	1.49	(0.57 – 3.92)	21	(77.8)	1.04	(0.42 – 2.60)	21	(56.8)	0.38	(0.20 – 0.74)[b]	77	(73.3)	0.82	(0.53 – 1.27)
				$\chi2$=0.64				$\chi2$=0.01				$\chi2$=8.64[c]				$\chi2$=0.86		

[a] Adjusted for age and sex.
[b] Significant at the level of 0.05, two-sided test.
[c] χ^2 significant at the level of 0.05.
[d] In all, 33 respondents did not provide information.
[e] In all, 111 respondents did not provide information.

studies using similar methods of sampling and screening reported similar prevalence estimates (Perala et al. 2007, Gureje et al. 2010). In addition, our prevalence is between the 75th and the 90th percentile of various studies included in a a meta-analysis of schizophrenia prevalence estimates (Saha et al. 2005).

The incidence (McGrath et al. 2004) and the morbid risk (Aleman et al. 2003) of schizophrenia is higher in men then in women. However, the meta-analysis of Saha and colleagues (2005) did not report sex difference in prevalence estimates, which is replicated in the present study. Van Os and Kapur (2009) showed that male preponderance is most likely when rates are restricted to narrow definitions of illness as in DSM-IV, whereas if syndromes with affective expression are also allowed to appear in the rates, the sex ratio changes to (close to) unity. Therefore, reported sex differences likely are an artefact of the pathoplastic effects of sex on psychopathology (van Os and Kapur 2009).

Although the DSM-IV category "other psychotic disorders" is as prevalent as schizophrenia (Perala et al. 2007), only few previous studies provided separate estimates of prevalence. Previously, the prevalence of schizoaffective disorder was reported to be half the estimate of schizophrenia and higher among women than men (Tsuang et al. 2003, Scully et al. 2004). This was not replicated in the present study. Furthermore, our lifetime prevalence estimate of schizoaffective disorder is lower than other estimates (Scully et al. 2004, Perala et al. 2007), suggesting international variation in rates.

Our lifetime prevalence estimate of delusional disorder (0.10%) is not as low as in a previous study (0.04%) (Copeland et al. 1998) and lower than another general population study (0.18%) (Perala et al. 2007). All cases were aged over 45 years. Patients diagnosed with delusional disorder have non-bizarre delusions that are generally limited to one area and do not display disorganization, negative symptoms, and deterioration in functionality or repeated hospitalization (American Psychiatric Association 2000). Given the difficulty to detect isolated delusions, an underestimation of the real life prevalence of delusional disorder may have occurred.

Both in the present paper (0.05% and 0.12%) and in previous research (between 0.05% and 0.07%), the prevalence estimates of schizophreniform disorder and brief psychotic disorder were relatively low (Singh et al. 2004, Perala et al. 2007, Castagnini and Berrios 2009). Most of the patients who were diagnosed with brief psychotic disorder had a shift in their initial diagnosis after sufficient follow-up (Singh et al. 2004). All the cases of schizophreniform disorder in this study were male, whereas brief psychotic disorder was more prevalent in women. This is in line with previous research in Turkey (Özpoyraz et al. 1996).

Unipolar depression and bipolar disorders with psychotic features

It has been shown that the prevalence of bipolar spectrum disorder increases over time and estimates probably fluctuate with type of screening instrument and methodology (Merikangas et al. 2011). The lifetime prevalence of bipolar disorder ranges between 0.2% and 3.3% (Tohen and Angst 2002). However, more recent reviews reported estimates between 0.6% and 0.84% for bipolar I disorder (Ferrari et al. 2011, Merikangas et al. 2011) except for one general population study that reported a prevalence of 0.24% (Perala et al. 2007). Our lifetime prevalence of bipolar I disorder (0.37%), the first Turkish estimate, is similar to the estimate reported by Perala and colleagues (2007), which had a similar, although possibly more sensitive, methodology.

A difficulty when estimating the prevalence of bipolar disorder is that structured interviews or self-report questionnaires used for screening the bipolar spectrum have high false positive rates and CIDI 2.1 is not an exception (Perala et al. 2007). Further clinical evaluation using sensitive interviews with registry-based information is needed to clarify the diagnosis of any probable case of bipolar disorder (Regeer et al. 2004, Perala et al. 2007).

We tried to use multiple sources to diagnose bipolar I disorder. However, some probable cases with poor insight may have reported that they never experienced any of the screened manic symptoms. Furthermore, some cases may be diagnosed as depressive disorder, as up to 30% of bipolar patients are erroneously diagnosed with recurrent depression for sometimes lengthy periods (Angst et al. 2011). In an effort to overcome recall- and register system based-biases, we attempted to clinically evaluate all probable cases that reported any hospitalization or any use of anticonvulsant medication including main mood stabilizers.

Our lifetime prevalence estimate of depressive disorder with psychotic features (0.55%) was somewhat higher than previous estimates which were 0.35% and 0.40% (Ohayon and Schatzberg 2002, Perala et al. 2007). Previous studies estimated higher rates of unipolar depression among females and middle-aged adults in Turkey (Kılıç 1998, Kaya and Kaya 2007). Similarly, our estimate was higher in females and middle-aged adults.

Other psychiatric disorders with psychotic features

In Finland, lifetime prevalence of psychotic disorder due to alcohol or substance abuse was 0.41%, while the majority of the cases were psychotic due to alcohol abuse (Perala 2007). In Turkey, the overall prevalence of alcohol and substance abuse is lower than in European and Baltic countries (Ögel et al. 1998, Ögel 2005), which may explain why prevalence in our sample was lower (0.20%). In *TürkSch*, cases were more

prevalent among males and in the middle aged respondents, which is in line with the prevalence of alcohol abuse in the general population (Ögel 2005).

The lifetime prevalence of psychotic disorder due to a general medical condition (0.07%) was much far lower than the prevalence (0.21%) reported in Finland by Perala and colleagues (2007). However, the present study excluded individuals aged over 65 years, whereas most cases were among individuals aged over 65 years in Finnish. Future studies with a broader age range may yield higher rates.

Demographic and background characteristics

Schizophrenia patients have fewer opportunities; they are more likely to be single, socially uninsured and have lower income than subjects in the general population (van Os and Kapur 2009). Probably, pre-diagnosis symptoms which emerge in early adulthood led to interrupted attempts in various areas of social functioning including family, education and occupation (van Os and Kapur 2009). Furthermore, there is a multidimensional association between schizophrenia and social disadvantage (Muntaner et al. 2004, Drukker et al. 2007). Accumulating adversities throughout childhood may be associated with later onset of psychosis (Wicks et al. 2005). In the present study, schizophrenia and other psychotic disorders were higher among individuals with lower parental socioeconomic status. However, the association between socioeconomic status and schizophrenia remains unclear, as different studies report different associations, which may be occasioned by an interaction between cognitive ability and social class (Goldberg et al. 2011)

There is a well-established association between the incidence of schizophrenia and urban residence (Marcelis et al. 1999, McGrath et al. 2004, March et al. 2008). However, no such associatoin is apparent between urbancity and the prevalence of schizophrenia (Saha et al. 2005). This is in line with the present study, that also did not show an association between the prevalence of schizophrenia and urbanicity of either birth place or current address. The likely reason for this is that the effect of urban environment is developmental and associated with growing up in urban environments (March et al. 2008) – prevalence studies therefore will not reflect accurately exposure status as people may have moved many times.

Methodological issues

Two-step procedures (screening and clinical reappraisal) are preferred to reliably determine the prevalence estimates of psychotic disorders in general population studies (Kessler et al. 2005, Perala et al. 2007). Such a procedure is efficient to identify cases of psychotic disorders, but they need a high number of probable cases which leads to low positive predictive values (Bebbington and Nayani 1995). In addition to cross-sectional screening, data based on multiple sources by far provide the most comprehensive prevalence rates for psychotic disorders (Perala et al. 2007). A more detailed screening procedure and a wider probable case pool may facilitate detection of cases in countries where patient registries are not available such as in Turkey.

The results should be interpreted in the light of several limitations. First, the prevalence of psychotic disorders is usually higher in the non-response group (Perala et al. 2007) Previous research showed a 10% increase in prevalence estimates when adding the cases from the non-response group (Perala 2007).

Second, although the number of homeless in Turkey is lower than in western countries, the prevalence of psychotic disorders among them may be higher (Binbay et al. 2011a). The *TürkSch* sample did not include homeless as well as institutionalized patients. Perala et al. (2007) reported that 6% of their cases with psychotic disorders were hospitalized for long periods. Thus, the prevalence estimates of *TürkSch* may be lower than the actual rates.

Third, *TürkSch* included psychotic cases at the visited address without application of in-household sampling methods. As the prevalence of psychotic disorders is low, this may have lead to higher prevalence estimates. Thus both underestimation and overestimation may have occurred to a degree, possibly cancelling out each other to a degree.

Furthermore, males were under-represented in our sample compared to both the general population of the Izmir metropolitan area (Binbay et al. 2011b) and to non-respondents (Binbay et al. 2012a). This may be a consequence of the sampling procedure. When visiting the households, lay interviewers more often found women at home. Such a selection may lead to higher lifetime prevalence estimates of disorders for which previous studies reported higher rates among females (e.g. delusional disorder, depression with psychotic features, psychotic disorder not otherwise specified), and lower lifetime prevalence estimates of disorders for which previous studies reported higher rates among men (e.g. schizophrenia, psychotic disorder due to alcohol and substance abuse). However, given the fact that the sex ratio is unity when the whole spectrum of psychotic disorders in included (Van Os and Kapur 2009), our total estimate likely was not affected by this.

Finally, the sample size was sufficient to screen the whole spectrum of the extended psychosis phenotype. However, sample size was relatively low when stratifying by sociodemographic characteristics or risk factors. This led to relatively wide confidence intervals.

Despite these limitations, the response rate was satisfactory and significant efforts were made in order to ensure optimal quality of the data. For example, assessment not only involved

lay interviewers, but also clinician visits to households, telephone follow-up, re-assessments, broad clinical evaluations, register based confirmation of diagnoses and continuous monitoring of the field work with efforts to increase response. All the lifetime prevalence estimates reported in this paper were captured in the third most populated urban area of Turkey, a country with rapid intra-country migration, intra-city residency change and urbanization.

CONCLUSION

The lifetime prevalence of 12 DSM-IV disorders with psychotic symptoms was 2.6% in the Izmir metropolitan area. Multiple screening strategies and clinical reappraisal were applied in order to capture each prevalence estimate. Reported estimates point to the important morbidity burden of psychotic disorders, thus representing a major public health concern in Turkey.

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