

The psychosis epidemiology in Turkey: A systematic review on prevalence estimates and admission rates



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SUMMARY

Objective: To provide prevalence estimate, admission rates and related features of psychotic disorders in Turkey.

Method: Studies with data on prevalence and/or rates in outpatient or inpatient admissions after 1990 were included. Strings of ([schizo*OR psych*] AND Turkey) were used in PubMed and PsychINFO to detect relevant studies. Turkish Medical and Psychiatry indexes were screened with Turkish keywords. Abstract books of national congresses, national index of thesis, and references of the included papers were searched for additional data. Results were presented as prevalence per 1000 and median values of admission rates.

Results: A total of 56 studies were included, including 8 cross-sectional (4 core and 4 special group), 27 outpatient and 21 inpatient admission estimates or rates. The lifetime prevalence of schizophrenia in general population (pooled data, n: 6022) was 8.9 per 1000 (Standard error [SE]: 1.2; 95% confidence interval [CI]: 6.6-11.3). Psychosis prevalence is higher in subgroups including university students, prisoners and homeless people. Patients with a diagnosis of psychotic disorder constituted 7.6% and 26.9% of adult outpatient and inpatient psychiatry admissions. However, median rates vary depending on institutional, regional, temporal and residential features. Male gender was at higher risk in all kinds of estimates and rates for all age groups.

Conclusion: Prevalence of schizophrenia in Turkey is higher than the formerly reported estimates in different countries. Higher prevalence may be a consequence of sample properties, environmental risk exposures, and study design. However more research is needed to further elaborate the relatively higher prevalence. Nevertheless, a major part of the psychiatry services are devoted to psychotic outpatients and inpatients.

Key Words: Schizophrenia, psychosis, prevalence, admission rate, epidemiology

INTRODUCTION

In recent years, considerable improvements have been established in psychosis epidemiology (McGrath 2007). Such an advance has enough impact to transform the commonly accepted knowledge on psychotic disorders, even in textbooks (McGrath 2005). These changes can be summarized under six headings: First, although former reports rounded to a 1% lifetime prevalence of schizophrenia, a recent systematic review of studies conducted between 1960 and 2000 in 46 coun-

tries has reported a wider distribution of prevalence estimates within a heterogeneous range (4.6-9.2 per 1000) (Saha et al. 2005). Furthermore a Finnish study with a full sample data has shown that psychotic disorders (schizophrenia and other psychotic disorders, affective psychoses, substance-induced psychotic disorder, and psychotic disorder due to a general medical condition) interfering with lives of individuals to different degrees, have an impact on 3.5% of the general population (Perala et al. 2007). Second, the incidence of psychosis varies among different populations depending on various

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population characteristics including gender, migrant status (McGrath et al. 2004). Third, the spatial distribution of psychosis within urban and rural areas, also within neighbourhoods of urban areas, is now a well established finding based on high quality data (Krabbendam and van Os 2005, March et al. 2008). There is a medium-sized risk factor for psychosis within the urban areas, but yet not expounded with satisfying hypotheses (McGrath and Scott 2006). However, the ethnic density effect (higher risk of psychoses than native-born individuals, particularly if immigrants live in an area where there are fewer people of the same migrant group) on psychosis distribution among neighbourhoods (Veling et al. 2008) is about to flourish new social environment hypotheses for further research such as social defeat (Selten and Cantor-Graae 2007). Fourth, clinically irrelevant psychotic-like experiences are more prevalent in the general population than psychotic disorders, pointing at a psychosis continuum (van Os et al. 2009). Fifth, immigration-associated factors have specific effects on psychotic disorders, particularly on schizophrenic disorders, which put especially the second generations and highly discriminated immigrants under high risk (Cantor-Graae and Selten 2005). Sixth, males clearly have higher risk of developing psychosis (McGrath et al. 2004).

Although majority of the novel data originate from Western Europe and developed countries, these new findings may facilitate a novel evaluation of current epidemiological knowledge on the psychotic disorders in Turkey. Also there are several important findings for Turkey on the published reports despite limited in nature. In a two-decade-review, an increase from 20% to 60% was reported for rates of psychotic disorders among inpatient admissions for a period between 1950 and 1980, with a prominence of male admissions (Küey et al. 1987). The mean prevalence of psychotic disorders was 4.4 ± 2.8 (2.3-7.0) per 1000 in studies conducted around 1980s mainly in the rural and semi-urban population samples (Küey et al. 1987). Moreover, there are repeated reports of relatively low risk for psychoses in Turkish immigrants compared to other socially disadvantaged ethnic groups (Selten and Sijben 1994, Selten et al. 2001, Veling et al. 2006). However, there are few published data with a special focus on psychosis epidemiology in Turkey, which will enable comparison of findings on both national and international studies (Alptekin et al. 2009, Binbay et al. 2010). Although frequency data (e.g. prevalence or incidence) of an illness provide important insights to general characteristics, outpatient or inpatient admission rates do not necessarily relate to general sociodemographic features of an illness (Saha et al. 2005). Generalizability of any general population rate obtained from a hospital admission is low and inconvenient to substitute for prevalence or incidence studies. However admitted population may have implications for overall prevalence, sociodemographic and clinical features of the relevant disorder (Jarman et al. 1992). Also time-trends in the admission features

of an illness may enable comparisons. So admission rate of a mental disorder may provide surrogate data on epidemiology of particular disorder, where representative data from general population is not adequate.

Our aims for this review based on prevalence estimates, and outpatient or inpatient admission rates were:

1. To overview the cross-sectional population surveys conducted in Turkey to screen for prevalence estimates of psychotic disorders (and symptoms);
2. To overview the proportion of psychotic patients among psychiatric patients taking care in outpatient or inpatient units of various institutions;
3. To investigate reported probable risk factors of psychotic disorders in Turkey.

METHODS

Since there is continuous rise in the number of published data on any scientific issue, and each study may report a new controversial result, novel study designs and statistical techniques have been developed to combine data from different studies and to derive an overall trend of various estimates (Egger et al. 1997). Application of so-called meta-analytical techniques to epidemiological data including prevalence or incidence estimates enabled a wider view in the distribution of disorders (Moncrieff 2003). Systematic reviews using meta-analytical techniques have been applied to combine data on the epidemiology of schizophrenia including incidence estimates (McGrath et al. 2004), prevalence estimates (Saha et al. 2005), migration (Selten and Cantor-Graae 2003), and sub-clinical experiences (van Os et al. 2009). Those reviews provided important outcomes on psychoses. Although systematic reviews have several favourable features, they may lead to uncertainty about the results of individual studies (Egger and Smith 1997).

We aimed to apply several meta-analytical techniques to gather current data on psychoses and to get an overall result. We predicted to investigate whole details of the limited data and to get a single rate from various studies via a systematic review.

Identification of studies

We performed a relevant literature search using different databases. Since there was a review on cross-sectional surveys and hospital-based admission studies conducted before 1988 (Küey et al. 1988), we included the studies published after 1990 through October 2009. At first, a broad search combination ([schizo*OR psych*] AND Turkey) was used in PubMed and PsychINFO for identifying relevant papers published in any language. Additional searches were per-

formed with an additional combination of the Turkish keywords ([schizophrenia OR psychosis] AND [epidemiology OR prevalence]) to search the Turkish Medical Index and Turkish Psychiatry Index. Relevant presentations in three different annual national congresses (National Psychiatry, Social Psychiatry and Anatolian Psychiatry) were searched via abstract books. We also searched for relevant dissertation theses on the national database, supplied by The Turkish Council of Higher Education. The references cited by each potentially relevant paper, review and/or book chapter were scrutinized in order to locate additional potential papers. Electronic messages were sent to the senior authors of papers that have relevant but lacking information on the topic. These authors were further requested to nominate possible missing or unpublished studies.

Inclusion and exclusion of studies

We included studies that reported data on (i) the prevalence of psychotic disorders in general population; (ii) the prevalence of psychotic disorders in special populations; (iii) the rate of psychotic disorders in outpatient and/or inpatient admissions at the mental health facilities of various institutions. Where multiple publications (or presentations) were detected on identical data, the paper with extended knowledge on possible risk factors was included. Studies having insufficient data, overlapping samples, no prevalence rates or studies with an outsider epoch were excluded after a contact with the first author, when needed. Some of the studies were lacking some detailed information but were still presenting some basic rates (e.g., admission rate). Since the number of papers was few, instead of excluding these studies, we included included their data for relevant parts of analysis.

There was heterogeneity among the studies reporting admission rates in terms of study design (e.g. included age group) and outcome features (e.g. an outcome category covering all psychoses without identifying sub-diagnoses). Since such heterogeneity may be associated with the quality of the included studies, it may have impact on the outcome of the analyses. In order to evaluate probable reasons and impact of heterogeneity, each study is categorized in terms of publication method (article, presentation and other), data details (full and detailed data, lacking and cursory data), and publication year (before and after 2000). Each paper was compared on relevant categorization. Since total number of reports was relatively low, all studies were included at the end to achieve the broadest data set.

Data extraction

For every eligible study, data were extracted and entered into a database. STATA 10.1 (Stata Corporation, Collage Station, TX 2008) was used for analysis. The extracted data included study-level variables (authors, year of publication,

year(s) of the study, and site or city of the study), variables on study features (urbanicity, geographic region, age group, recruitment duration, case finding method, and diagnostic criteria), and variables on sample features (mean age, male-female ratio, marital status, educational level).

Geographical region of the cities determined via administrative regions. Reports from the cities located in the eastern two most disadvantaged regions (eastern Anatolia and south-east anatolia) categorized under “east” and the rest of the Turkey categorized under “west”. Cities with a population over 400.000 in 1990 were classified as “highly urbanized area”. All other reports were classified as coming from “low urbanized area” which implies a mixture of urban and rural status of the population served. In order to evaluate the temporal changes in rates, studies were grouped into two (before and after 2000), year 2000 being the cut-off point.

Data analysis

We performed different data analyses for different rates and risk factors. For prevalence estimates, we combined the similar studies and pooled their relevant data. Saha et al. (2008) delineated the difficulties for combining data for prevalence studies, since estimates based on very large populations should not necessarily carry more weight, than estimates based on small populations. They also suggested including each estimate instead of pooling each study. Thus each study will have the same weight in the analysis since prevalence estimate may not be associated with sample size (Saha et al. 2008).

However where the number of studies is limited, small sample-sized studies may affect the overall results much more than large sample-sized ones. Calculating the pooled mean estimate by just adding up the mean values of the studies will lower the power of the wider sample sized studies (Saha et al. 2008). Selected technique of analysis (pooling or calculating the mean) will the result of the outcome particularly in case of low-prevalence disorders.

In order to prevent data loss (Fazel and Danesh 2002), prevalence estimates were combined from general population studies (providing weighted estimates) by direct summation of numerators (number of patients within the sample) and denominators (sample size). A<similar procedure (summation of numerators and denominators) was applied for gender, urbanicity and other particular features or risk factors.

Analysis procedure of Fazel and Danesh (2002) was preferred to achieve an overall single estimate. Before combining data, we performed formal tests of heterogeneity, by deriving standard errors (SE) and 95% confidence intervals (CI). We drove standard errors with the corresponding numerator and denominator of each prevalence estimate of included studies. To make some allowance for multiple comparisons, 95% CI were used for individual studies.

Rate of psychotic disorders in admitted patients may vary depending on the non-disorder related features, including the place of the service, the interval of registered data, the number of care providers and the number of beds (Yıldız et al. 2010). Relevant heterogeneity may lead to a skewed distribution of rates. The median value is more informative than the arithmetic or weighted mean (by sample size) to assess the central tendency in a skewed distribution (Saha et al. 2005). Thus instead of pooling, we calculated the median values of rates of psychotic disorders in admitted patients.

The most common reported variable was rates of psychotic disorders calculated for each gender. A male-female ratio was calculated for each study by dividing the rate of psychotic disorders in admitted males by that in females. An overall ratio was then obtained by calculating the average of the ratios. No further weighting based on sample size was preferred, since male-female ratio was calculated for each study. Some of the papers presented some other risk factors, including family history of psychiatric or psychotic disorder, current socioeconomic status or substance abuse. Since there was limited number of studies reporting particular risk factors, each result was discussed separately and no combined calculation was performed.

RESULTS

Our search strategy, steps of the search and the results are shown in figure 1. Electronic searches of international databases identified 29 potentially eligible papers. Electronic- and

other resources-based research of Turkish databases identified 141 papers. The total of the two searches ended with 139 potential papers, with exclusion of the overlapping papers. After addition of studies detected on the references of the papers, our final evaluation included 56 studies: of these, 4 were cross-sectional general population surveys, 4 were cross-sectional studies on special group populations, 27 were outpatient admission studies and 21 were inpatient admission studies. Two papers provided four different rates in outpatient admissions.

The general population prevalence estimate of schizophrenia was based on a total of 6022 probable non-overlapping individuals. Rates of psychotic disorders in outpatient admissions were based on a total of 52969 probable overlapping cases, over a total recruitment period of 382 months. The median values of captured admission interval and admission size among outpatient studies were 12.0 (range: 1-72) months and 891 (range: 44-21465) persons, respectively. The inpatient admission rates were based on a total of 11738 potentially overlapping cases, over a total recruitment period of 995 months. The median values of captured admission interval and admission size among inpatient studies were 24.0 (range: 4-162) months and 389 (range: 48-2828) persons, respectively. 40 of the admission rate papers reported diagnoses based on DSM III or IV categorization.

Prevalence estimates and admission rates

The pooled lifetime prevalence of schizophrenia was 8.9 per 1000 (SE: 1.2; 95% CI: 6.6-11.3). Only one former study

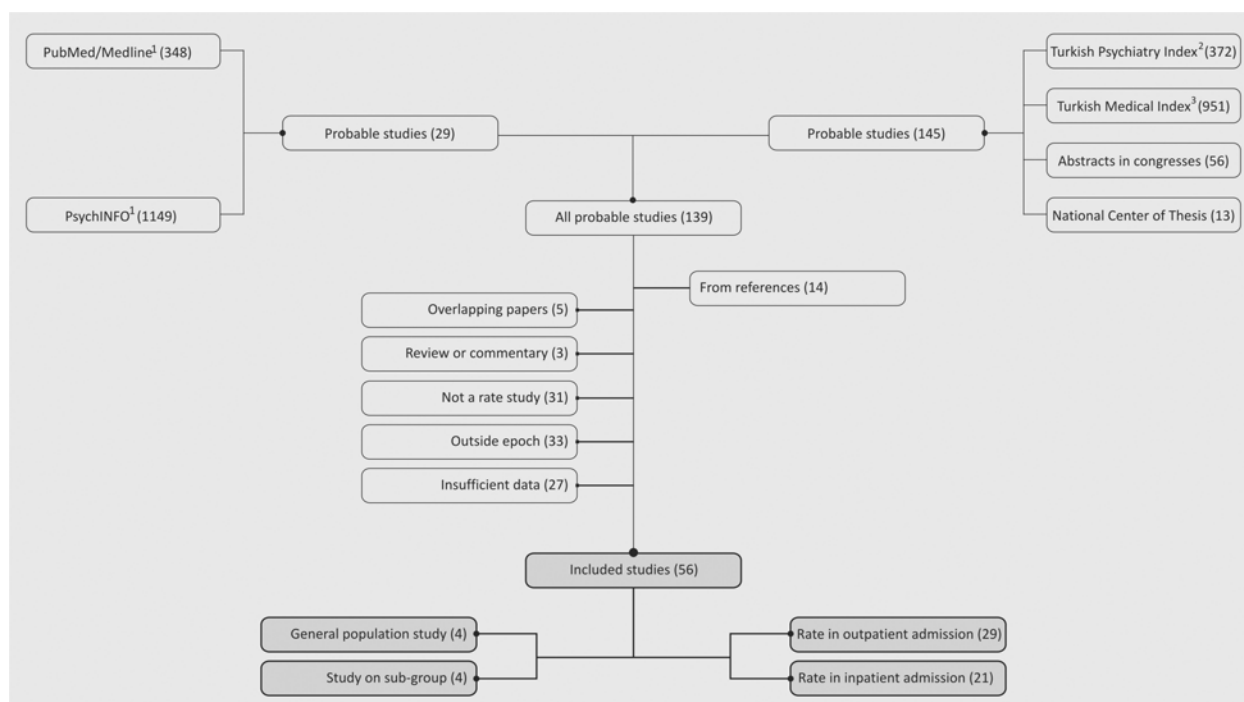


FIGURE 1. Selection strategy of included studies (Total number of studies detected and included or excluded in each step is shown). Strings used in searches: ¹{Schizo* or Psycho*} and {Turkey}; ²{Şizofreni, Psikoz, Yaygınlık}; ³{Şizofreni or Psikoz or Epidemiyoloji}.

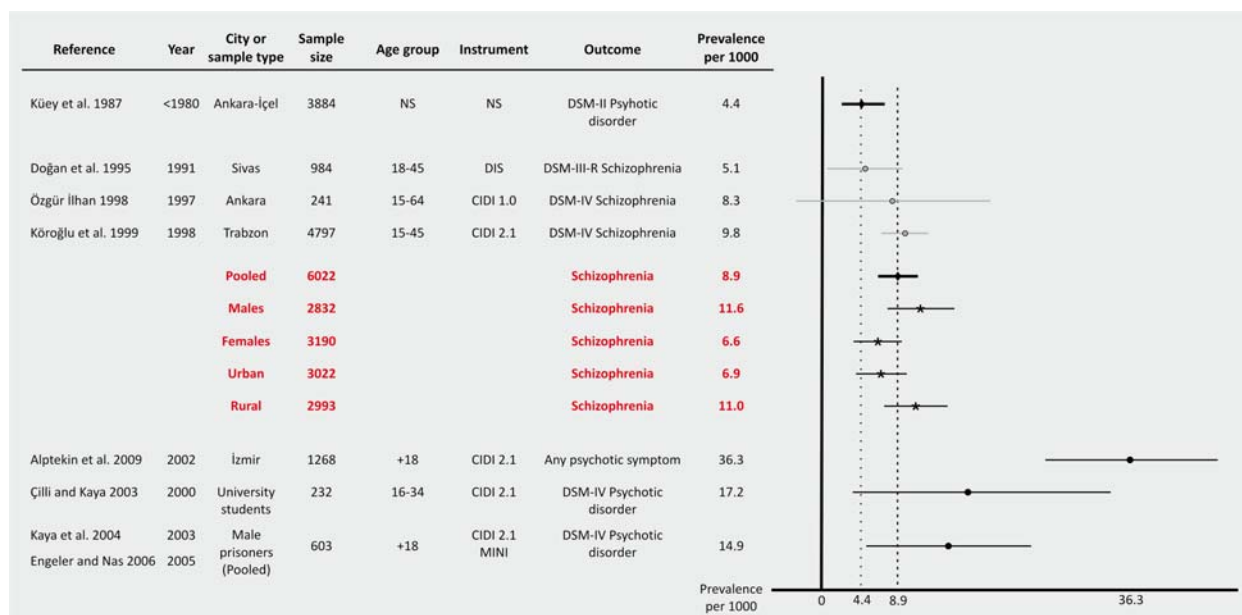


FIGURE 2. Prevalence estimates in samples derived from general population, prisoners and university students, within 95% confidence intervals (CI). A single estimate in pooled sample was calculated for general population studies, which was also further compared with the estimates around 1980s (CIDI: Composite International Diagnostic Interview; DIS: Diagnostic-Interview Schedule; MINI: MINI International Neuropsychiatric Interview; NS: Not specified).

reported lifetime prevalence of clinically relevant psychotic symptoms as 36.3 per 1000 (SE: 0.5; 95%CI: 24.7-44.9) (Alptekin et al. 2009). One-year prevalence of psychotic disorders among a university student sample was 17.2 per 1000 (SE: 8.5; 95% CI: 0.3-34.1) (Çilli and Kaya 2003). The pooled prevalence of psychotic disorders among male prisoners sample was 14.9 per 1000 (SE: 4.9; %95 CI: 5.2-24.6) (Engeler and Nas 2006, Kaya et al. 2004). The point prevalence of psychotic disorders among homeless people in Istanbul was quite high as 39.5 per 100, and may be related with non-systematic sampling methodology (Karamustafalıoğlu et al. 2007). The details of the cross-sectional studies, including sample size, year and city of the study, instrument type, diagnostic classification and age group are presented on figure 2. Confidence intervals derived for individual prevalence rates are also presented with the pooled data to enable comparisons with each other, as well with the pooled prevalence estimate of the studies conducted before 1980.

There were six subtypes on rates of psychotic disorders in *out-patient admissions* as presented on table 1. Overall median rate of psychotic disorders among outpatient admissions (n: 18) was 7.6 (standard deviation [SD]: 4.6; 95% CI: 5.5-10.8) per 100 patients, in mainly adults age group. The median rates of psychotic disorders in subtypes of outpatient admissions were 5.6 (SD: 2.0; 95% CI: 4.5-7.7), 10.6 (SD: 6.6; 95% CI: 9.8-23.5) and 11.0 (SD: 2.4; 95% CI: 7.5-13.5) per 100 patients in university hospitals (n: 10), public hospitals (n: 4) and private practice offices (n: 4), respectively. For the adolescents (n: 6) and geriatric outpatient population (n: 2), the median values of psychotic disorders among psychiatry out-

patient admissions were 3.7 (SD: 6.2; 95% CI: 1.1-16.7) and 4.0 (SD: 3.3; 95%CI: 3.8-4.3) per 100 patients, respectively. There was only one report on the rate of schizophrenia patients admitted to primary health care facilities, which was 4.4% (Ayrancı and Yenilmez 2001)

There were four subtypes on rates of psychotic disorders in *inpatient admissions* as presented on table 2: Adolescents, geriatric patients, and patients from all age groups in university or public hospitals. Median rate of psychotic disorders among inpatient admissions (n: 17) was 26.9 (SD: 8.1; 95% CI: 23.1-32.5) per 100 patients in mainly adults age group. The median rates of psychotic disorders in inpatient admissions of university hospitals (n: 12) and public hospitals (n: 5) were 26.1 (SD: 7.7; 95% CI: 18.0-30.8) and 33.3 (SD: 5.1; 95%CI: 26.7-40.3) per 100 patients, respectively. The median values for psychotic disorders among adolescent (n: 2) and elderly (n: 2) psychiatry inpatient admissions were 20.7 (SD: 0.2; 95% CI: 20.6-20.8) and 11.4 (SD: 7.1; 95% CI: 6.4-16.4) per 100 patients, respectively.

Sociodemographic correlates of psychotic disorders

The pooled lifetime prevalence estimate of schizophrenia was 6.9 per 1000 (SE: 1.5; 95% CI: 4.0-9.9) in urban areas. Only one prevalence estimate for rural residency was 11.0 per 1000 (SE: 1.9; 95% CI: 7.3-14.8) (Köroğlu et al. 1999). Although schizophrenia was higher in rural area than in urban settings, the difference was not statistically significant (χ^2 : 2.83, df(1); $p=0.092$) in the pooled data.

The pooled lifetime prevalence estimates of schizophrenia in

TABLE 1. Studies with a rate on psychotic disorders among outpatient admissions

Sub-type of admission	Number of rates	References
Adults* ¹	10	(Atik et al. 2008), (Gültekin and Söylemez 2007), (Karadağ et al. 2000), (Kıncır et al. 1997), (Kılıç et al. 1994), (Oğuzhanoglu et al. 1993), (Özçetin et al. 2002), (Özdem et al. 1990), (Tümkeya et al. 2005), (Zeytinci et al. 2008)
Adults* ²	4	(Güleç Öyekçin 2008), (Kırpınar et al. 1994), (Özmen et al. 1994), (Hocaoğlu et al. 2009)
Adults* ³	4	(Böke and Aker 2004), (Cimilli 1995), (Yıldız and Özcan 2000)
All ages ⁴	1	(Ayrancı and Yenilmez 2001)
Adolescents	6	(Akdemir and Çetin 2008), (Aras et al. 2007), (Berkem and Bildik 2001), (Çalışkan et al. 1994), (Görker et al. 2004), (Kıncır et al. 1997)
Elderly	2	(Dönmez et al. 2000), (Yazgan and Biçer 2000)

*Mainly adults with few adolescents and elderly. ¹University hospitals, ²public hospitals, ³private practice offices, ⁴primary health care facilities.

TABLE 2. Studies with a rate on psychotic disorders among inpatient admissions

Sub-type of admission	Number of rates	References
All ages* ¹	12	(Böke et al. 2004), (Çilli et al. 1994), (Deveci et al. 2005), (Görgülü et al. 2007), (Gül et al. 1999), (Hocaoğlu et al. 2006), (Karataş 2005), (Özpoyraz et al. 1996), (Öztürk et al. 2007), (Tural et al. 1994), (Vardar et al. 2000), (Yıldız et al. 2003)
All ages* ²	5	(Böke et al. 2006), (Güleç Öyekçin and Mızrak 2007), (Hızlı et al. 2005), (Kısa et al. 2008), (Soygür et al. 2005)
Adolescents	2	(Taş et al. 2007), (Türkcan et al. 2008)
Elderly	2	(Alici-Evcimen et al. 2003), (Hocaoğlu and Sarp 2006)

*Mainly adults with few adolescents and elderly. ¹University hospitals, ²public hospitals.

males and females were 11.6 (SE: 2.0; 95% CI: 7.7-15.6) and 6.5 (SE: 1.4; 95% CI: 3.7-9.3) per 1000, respectively indicating that schizophrenia was significantly more prevalent in males than females (χ^2 : 4.33, df (1); p =0.037). However, clinically relevant psychotic symptoms were more prevalent in females than males (OR: 2.45, 95% CI: 1.18–5.06) (Alptekin et al. 2009).

There was no association between the pooled prevalence estimate of schizophrenia and marital status (being married or not; χ^2 : 0.89, df (1); p =0.344) and educational level (low educational level versus high educational level; χ^2 : 0.01, df (1); p =0.907).

The median rate of psychotic disorders among adult outpatient admissions (n: 18) in low urbanized (n: 14) and highly urbanized areas (n: 4) were 7.6 (95% CI: 4.5-10.7) and 7.8 (95% CI: 5.3- 11.1) per 100 admissions, respectively. While median rate of psychotic disorders in outpatient admissions was 11.0 (95% CI: 4.9-22.3) per 100 admissions in the eastern cities, it was 7.5% (95% CI: 4.9-10.0) in the western cities. Median rate in adult outpatient admissions decreased from 8.7 (95% CI: 4.9-11.1) in studies before 2000 (n: 12) to 6.7 (95% CI: 4.8-11.0) per 100 admissions in studies after year 2000 (n: 6).

Median rate of psychoses in adult males (n: 11) and females (n: 11) were 10.7 (95% CI: 6.7-18.5) and 5.7 (95%CI: 4.3-6.7) per 100 admissions, respectively. In adolescent males (n: 4) and females (n: 4), median rates were 2.9 (95% CI: 1.7-20.2) and 1.6 (95%CI: 0.4-15.5) per 100 admissions, respectively.

The median male:female admission ratio for the psychotic disorders in adult (based on 11 ratios) and adolescent (based on 4 ratios) outpatient admissions were 1.86 (95% CI: 1.62-2.80) and 2.75 (95% CI: 0.69-5.18), respectively. Although the reliability of records in the primary health care data was low, the male:female admission ratio was 4.36 (Ayrancı and Yenilmez 2001, Ayrancı and Yenilmez 2002). There was no effect of the recruitment period of individual studies on the median values in terms of urbanicity, year interval, region and gender. Median rates of psychotic disorders in each outpatient admission subtypes are presented on figure 3A and 3B.

Median rates of psychotic disorders in adult inpatient admissions (n: 17) were 26.1 (95% 18.0-32.3) per 100 admissions in low urbanized areas (n: 12) and 31.1 (95% CI: 26.7-40.3) per 100 admissions in highly urbanized areas (n: 5). The median value of psychotic inpatient admissions for the eastern (n: 5) and western cities (n: 11) were 25.7 (95% CI: 11.9-35.7) and 27.6 (95% CI: 22.1-32.3) per 100 patients, respectively. Regarding temporal changes in inpatient admissions, median rate of psychotic disorders increased from 22.3 (95% CI: 12.4-30.7) per 100 admissions in studies before year 2000 (n: 6) to 30.6 (95% CI: 25.7 - 35.7) per 100 admissions in studies after 2000 (n: 11). Median rate of psychoses in males (n: 10) and females (n: 10) were 31.2 (95% CI: 19.0-37.6) and 22.8 (95%CI: 18.2-27.9) per 100 admissions, respectively. Median of male:female admission ratios among inpatients (n: 10) was 1.25 (95% CI: 1.09-1.46). Median rates of inpatient admission study subtypes are presented on figure 3A and 3B.

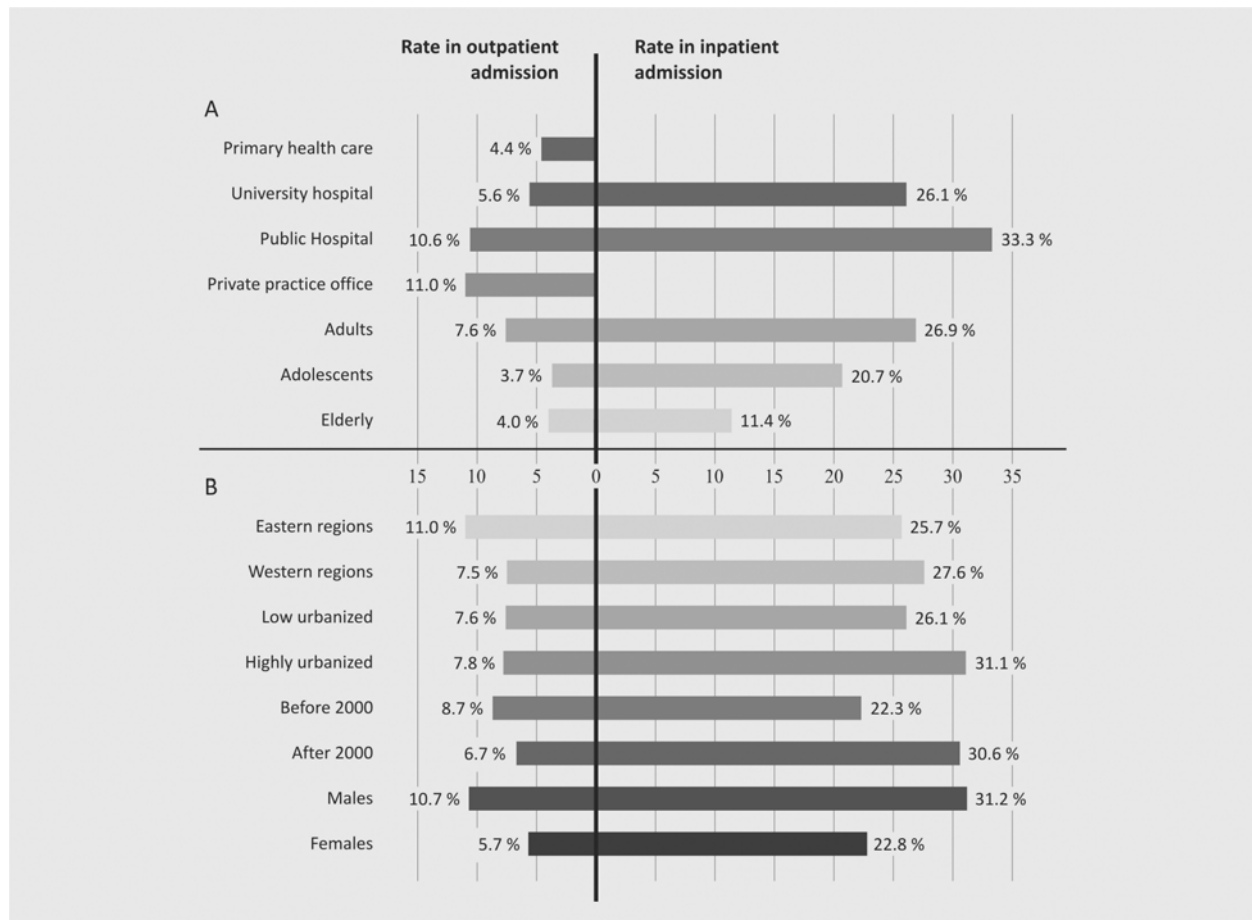


FIGURE 3. Median rates of psychotic disorders in outpatient and inpatient admissions (per 100) at different institutions and age groups (A). Median rates of psychotic disorders in adult outpatient and inpatient admissions (per 100) according to gender, urbanicity, geographical region and temporal features (B).

Other risk factors

One study reported a significant association between schizophrenia and childhood adverse life events (OR: 4.29; 95% CI: 1.53-12.02; $p < 0.01$) (Köroğlu et al. 1999). The same study reported no association between schizophrenia and month of birth however association between schizophrenia and birth trauma was nearly significant (χ^2 : 1.97, $p = 0.051$) (Köroğlu et al. 1999).

Family history of any psychiatric disorder was the major risk factor for psychotic symptoms (OR: 13.9, 95% CI: 5.7–34.3) (Alptekin et al. 2009) and also for schizophrenia (OR: 7.00; 95% CI: 2.37-20.72) (Köroğlu et al. 1999). Ratio of psychotic patients with a family history of any psychiatric disorder was 27.5% in outpatient admissions (Güleç Öyekçin 2008).

The median value of being married, being employed, having low education, urban residency and being younger than 30 years were 44.4 ± 8.2 (35.9 – 54.2), 37.1 ± 5.3 (30.4 – 41.9), 54.9 ± 10.8 (41.0 – 62.3), 63.8 ± 16.3 (43.0 – 75.1) and 44.3 ± 4.8 (39.2 – 49.0) per 100 patients, respectively in psychotic patients admitted to outpatient units.

Only two studies provided demographic features and relevant risk factors of inpatients admitted for psychotic disorder (Deveci et al. 2005, Vardar et al. 2000). The ratios psychotic patients with a family history of any psychiatric disorder were 9.5 and 28.8 per 100 patients respectively. At the time of admission 22.7% and 44.3 % of psychotic patients were employed. Deveci et al. (2005) reported following ratios in the patients admitted to inpatient unit: having lower educational status 28.8 %; upbringing in urban areas 40.4%; resident in urban area 48.1 %; onset of disorder after 30 years 23.1 %; having higher and lower socioeconomic status 1.9 % and 15.4 %; having obstetric complications 5.8%.

The patients with a diagnosis of brief psychotic disorder had sudden onset with a stressor and had less family history with almost full recovery in 1 month, with prominent female dominance (Özpoyraz et al. 1996).

There was no data on association between substance abuse and psychoses in the general population however any alcohol use was related to psychotic symptoms (OR: 4.9; 95% CI: 2.3–10.6) (Alptekin et al. 2009). Only one study reported that 18.2% of psychotic inpatients had at least one sub-

stance abuse (cannabis, opiates, cocaine) other than alcohol or nicotine; but neither addiction nor psychotic disorder due to substance abuse was diagnosed (Karataş 2005). Cannabis abuse was prevalent only in 3.6% of cases (Karataş 2005). In another report, although inpatient admission rates due to substance addiction were 5.4% and 5.7%, respectively among male and female adolescents, all of the psychotic patients due to substance abuse were males (Türkcan et al. 2008).

DISCUSSION

There were six main results of our systematic review. We will discuss the results and compare our results with other published data according to prevalence estimates, rates in admissions, sociodemographic correlates and probable risk factors.

Prevalence estimates

Our first result was that lifetime prevalence of schizophrenia in Turkey (8.9 per 1000) is above the median value (4.0 per 1000) of estimates reported in an earlier systematic review (Saha et al. 2005). Our estimate is also higher than the rates reported in various countries with similar or diverse social circumstances compared to Turkey. Prevalence of schizophrenia were 4.9 per 1000 in an urban and rural setting of Beijing-China (Xiang et al 2008), 4.7 per 1000 in a semi-rural setting in Ethiopia (Kebede et al. 2003), 3.0 per 1000 in Spain (Ayuso-Mateos et al 2006). In a study with full-sample result, the lifetime prevalence of schizophrenia was 8.7 per 1000 in whole Finland (Perela et al. 2007), which is similar to our result. The second result was that prevalence estimates in included studies were almost twice higher than estimates reported before and around 1980s (Küey et al. 1987).

Relative high prevalence of schizophrenia compared to both reports from various countries and former national reports may be associated with the methodology of included studies in this review. Research strategy, sample size, screening tool and diagnostic classification affect reported prevalence of schizophrenia in any survey (Saha et al. 2008). There was some similarity between included studies and studies from various countries and former local studies, regarding sample selection (random, systematic and general population based), screening tool (CIDI: Composite International Diagnostic Instrument, DIS: Diagnostic Interview Schedule), and diagnostic classification (DSM). However sample sizes of included studies have important diversity. Prevalence of schizophrenia is based largely on one of the included studies (Köroğlu et al. 1999) in the pooled sample. Sample sizes of other two studies may be regarded as small to estimate prevalence of schizophrenia.

Also rates of psychotic disorders other than schizophrenia (schizophreniform disorder, schizoaffective disorder, brief psychotic disorder, delusional disorder) were not reported in

the included studies. A probable report of those particular disorders under the heading of schizophrenia may also contribute to relative high prevalence.

Schizophrenia and other psychotic disorders have important associations with environmental factors (Binbay et al. 2007). Prevalence estimates vary depending on the level of environmental exposures on the population under survey (McGrath 2007). Relative high impact of environmental exposures may lead to higher prevalence estimate in our review. Former local studies around 1980s were conducted mainly in rural and semi-rural populations in Turkey (Küey et al. 1987). However samples of included studies were mainly selected from urban populations in our review. Prevalence of schizophrenia is higher in urban areas than rural areas (Krabbendam and van Os 2005, Saha et al. 2005). Residential factors may contribute to relative high prevalence in our review however only one study reported prevalence estimate for rural residency (Köroğlu et al. 1999) which is higher than prevalence estimate in urban population in the same survey. Although prevalence estimates of urban samples tend to be higher in western European countries, social circumstances in rural residencies of countries similar to Turkey (e.g. higher intrauterine infection, higher nutritional deficiency) may contribute to increased level of subthreshold and clinical outcomes including schizophrenia. So that impact of residency may be different in rural populations (McGrath and Scott 2006).

The third finding of our review was that prevalence of psychotic symptoms with different levels of impairment was four fold higher than prevalence of schizophrenia. A systematic review reported 8% prevalence of sub-clinical psychosis-like experiences, 4% prevalence of psychotic symptoms and 3% prevalence of all psychoses in general population /van os et al. 2009). Estimate of psychotic symptoms reported by Alptekin et al. (2009) was similar to the estimate reported by particular review.

Rates in admissions

The fourth finding of our review was that patients with any psychotic disorder constitute 1 admission in 10 outpatient unit admissions and 1 admission in 4 inpatient admissions, which vary by time, age group and geographical region. Patterns of admissions for psychotic disorders point at higher admission rates in public hospitals than admission rates in university hospitals in terms of both outpatient and inpatient admissions. In addition our review does not include reports on rates in the admissions to regional asylums. Whereas psychoses patients, especially chronically ill patients may tend to admit to regional asylums. Reports on rates in the regional asylums may provide further knowledge on the differences of rates in admissions among various institutions. On the other hand our results on rates in inpatient admissions are lower than 1990 and 2003 register data of the Ministry of

Health, which revealed discharge rates of 46.5% and 49.5% with a diagnosis of any psychotic disorder, respectively (Sağlık Bakanlığı 2004, Sağlık Bakanlığı 2001). Higher admission rates in the eastern Turkey can be a result of lacking institutional facilities, regional social deprivation and regional inequalities in health services (Sağlık Bakanlığı 2007). Increase of psychoses rates in inpatient admissions while psychoses rates in outpatient admissions were decreasing from 1990s to 2000s can be associated with growing number of outpatient units for mental health where number of beds for mentally ill patients is still lacking. It is worthwhile to note that Turkey has the lowest number of psychiatric care beds among whole European countries (Ulaş 2008).

However underlying reasons of rates in outpatient and inpatient units of various institutions are multidimensional (Lay et al 2007) and studies included in this review are far from supplying sufficient insight to this multidimensional complexity. Nonetheless, psychotic patients tend to have direct referral to mental health professionals in western and eastern Turkey (Kılıç et al. 1994, Kırpınar et al. 1994). This can be a result of severe impairment associated with psychotic symptoms and severity of whole clinical syndrome (Morgan et al. 2006, van Os and Kapur 2009).

Sociodemographic correlates and risk factors

The fifth finding of our review was that prevalence of psychotic disorders tends to be higher among subgroups including adolescents, prisoners and homeless individuals than adults in the general population.

Acute onset of psychotic disorders is higher in adolescents and young adults than other age groups (van Os and Kapur 2009). Nonetheless, studies in which last one year prevalence is screened, can yield higher estimates among younger age groups than other age groups, since these studies would screen only the cases with symptoms in the last one year (Saha et al. 2005). The prevalence differences among age groups decrease in studies where lifetime prevalence estimate is screened. Relative high prevalence estimate among young age groups in our review is a result of the included study which screened prevalence of psychotic disorders in the last one year (Çilli and Kaya 2003). Also it is noteworthy that our relative high estimate should remind onset of psychoses mainly in the young age groups.

Prevalence of psychotic disorders tends to be higher in studies on prisoners than studies on general population (Fazel and Danesh 2001). Prevalence estimate among prisoners in Turkey is lower than the median rate of a systematic review (37 per 1000) mainly including studies from Western Europe (Fazel and Danesh 2001). Homeless people constitute another subgroup with a relative high prevalence of psychoses (Folsom and Jeste 2002). Although sampling was not systematic and random in the included study (Karamustafalıoğlu et

al. 2007), it is remarkable to note that rate of psychotic disorders among homeless people in Turkey can be as high as rates in various countries.

The sixth finding of our review was that main risk factors of psychotic disorders were psychiatric disorders among parents and/or siblings, childhood adverse life events and male gender. Although no gender differences were obtained in the review of studies from various countries (Saha et al. 2005), incidence studies point out 1.4 fold higher risk of psychosis among males than females (McGrath et al. 2004). Our gender findings on each type of the studies included in review also point out a higher risk. However, females were under higher risk of being diagnosed as brief psychotic disorder than males (Özpoyraz et al. 1996). Nonetheless our analysis covers whole diagnosis of psychotic disorders. A gender analysis solely based on schizophrenia patients can reveal much higher risk among males than females.

Since there was few studies with an epidemiological scope and focus, reports on environmental and genetic risk factors were based on limited number of included studies. Notably childhood adverse life events and genetic load of disorder are two prominent factors that should be handled in details in further studies. A Turkish study on the first onset psychosis reported higher rates of suicide and more severe symptom profile in patients with a history of childhood trauma (Ucak and Bikmaz 2007). However ambiguous research criteria or broad definition of genetic load or adverse life events decrease importance of current findings.

Although cannabis abuse is relatively low in general population and psychoses patients in Turkey (Akvardar et al. 2004a, Akvardar et al. 2004b, Uzun et al 2003), relative high use of cannabis in urban areas among males and adolescents (Ögel et al. 2004, Türkcan et al. 2008) can be contributing to higher psychosis rates in males and adolescents.

Nonetheless recurrent episodes of psychosis and impairment associated with the disorder lead to higher rates of unemployment, being single (either divorced or never get married), and low level education among patients (Marwaha and Johnson 2004). Also our results point out a similar trend in psychosis patients in Turkey.

Limitations

Our review included almost all studies with a report on prevalence estimates and admission rates of psychotic disorders in Turkey in the last two decades due to broad search conducted in national and international databases. However our review has two major limitations. The first limitation is that only two of the studies on prevalence estimate of psychoses were published as a scientific article. There can be various reasons for a study of being unpublished. However it is a major limitation that studies with a report on prevalence didn't have further meth-

odological evaluation by anyone outside the research team. We preferred to overcome this limitation by calculating the confidence intervals and contacting the author(s) for each study. However it is noteworthy that prevalence of schizophrenia in pooled sample of our review is largely based on a single study that has considerably higher sample size than others.

The second limitation is that studies with a rate on psychotic disorders in any type of admission were based on distinct institutional resources and research targets. It can be more probable that studies with a rate on psychotic disorders had results not representing disorder associated outcomes but quality of register system or major aim of research.

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CONCLUSION

More research is needed on prevalence, correlates, associated factors, causes and burden of psychotic disorders in Turkey. Novel research should focus on factors associated with urbanicity and adversities in childhood, and on outcomes including homelessness and imprisonment. Although data on the epidemiology of psychoses is limited in Turkey ground is not empty. Furthermore it is valuable just to recall that although prevalence of psychotic disorders is relatively low, schizophrenia constitutes 2.3% of years lived with disability in Turkey and it is the 9th and the 11th leading cause of disability in males and females respectively (Sağlık Bakanlığı 2006).

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