27/08/2014 Tables: 3 Word Count: 3741

Gender differences in outcomes in people with schizophrenia in rural China: 14-year follow-up study

Mao-Sheng Ran[1] MMed., PhD., Wen-Jun Mao[2] MD., Cecilia Lai-Wan Chan[1] PhD., Eric Yu-Hai Chen[3] MD., Yeates Conwell[4] MD

[1]Department of Social Work and Social Administration, University of Hong Kong, Hong Kong
[2]Chengdu Mental Health Center, Chengdu, China
[3]Department of Psychiatry, University of Hong Kong, Hong Kong
[4]Department of Psychiatry, University of Rochester Medical Center, Rochester, NY, USA

Correspondence: Mao-Sheng Ran, B.Med., M.Med., Ph.D., Department of Social Work and Social Administration, Faculty of Social Sciences, University of Hong Kong, Hong Kong. E-mail: msran@hku.hk.

Background

Little is known about gender differences in the long-term outcome of patients with schizophrenia living in the community.

Aims

To explore gender differences in the 14-year outcome of patients with schizophrenia in rural China.

Method

A 14-year follow-up study among a 1994 cohort (*n*=510) of patients with schizophrenia was conducted in Xinjin County, Chengdu, China. All patients and their informants were followed up in 2004 and 2008 using Patients Follow-up Scale.

Results

Compared with females, male patients were significantly younger, had significantly higher rates of mortality, suicide and homelessness, and poorer family and social support. There were no significant gender differences in PANSS scores, previous suicide attempts, never-treated, previous hospitalization, and inability to work. Longer duration of illness might result in patients' functional decline and comparatively poorer family economic status.

Conclusions

The long-term outcome of males with schizophrenia is worse than females in rural China. Higher mortality, suicide and homelessness in male than female patients may contribute partly to the higher prevalence of schizophrenia in women than in men in China. Policy on social and family support, and gender-specific intervention strategies for improving the long-term outcome of the illness should be developed for patients with schizophrenia.

Key Words

Schizophrenia, Gender, China, Community, Follow-up

Declaration of interest

None declared.

Gender differences have been widely observed in the clinical presentation, psychosocial functioning and course of illness in first-episode and chronic patients suffering from schizophrenia.[1,2] Gender-related features of schizophrenia may be important for understanding the biological, psychological and sociological processes.[3] However, it is not clear about the long-term differences of outcome between male and female patients with schizophrenia, especially those living in the community.

Evidence indicates that females have a more favourable prognosis (e.g., better psychosocial functioning, fewer re-hospitalizations, reduced negative symptoms, and less disability) than males.[4,5] Male patients with schizophrenia are found to have significantly higher levels of negative symptoms and marginally lower levels of functioning when baseline and follow-up time points are considered collectively.[2] Differences in negative symptoms are found to mediate differences in functioning between male and female patients. However, the relationship between negative and positive symptoms and gender in long-term outcome of schizophrenia should be explored further.

Beyond psychopathology, improved personal and social functioning are nowadays considered as important outcome measures.[5,6] Evidence from a 2-year follow-up study indicates that male patients with schizophrenia display poorer working capacity and functional ability than female patients.[7] Male patients suffer more from negative symptoms than female patients, which also are particularly harmful for the social role of men in the society. However it is not clear how these differences evolve in the long-term, such as over 10 years, including social functioning between male and female patients.

Is the long-term outcome of male patients with schizophrenia poorer than female patients who are living in the community? Most previous studies on gender and schizophrenia are cross-sectional studies or involve short-term follow-up.[4,5] There are few studies focusing on gender differences of outcome in long-term follow up studies of patients with schizophrenia living in the community. Therefore, a long-term follow-up study should be conducted with large numbers of patients living in the community, to examine the relationship between gender and symptoms, functioning and social support of patients with schizophrenia.[2]

Our research hypothesis was that male patients with schizophrenia would have a poorer long-term outcome than female patients in community settings. The objectives of this study were 1) to explore the gender differences of outcome in patients with schizophrenia in a 14-year follow-up study in Chengdu, China, and 2) to test the research hypothesis.

Methods

Study population

All subjects with schizophrenia (*n*=510) were identified from an epidemiological investigation of 123,572 people aged 15 years and older in six townships of Xinjin County in March 1994. Subjects were identified through screening procedures for psychosis (face-to-face interviews with the head of each household together with the key informant method) and general psychiatric interview. The details of this investigation have been described in previous publications.[8-10] All subjects lived in rural communities and met ICD-10 criteria[11] for a diagnosis of schizophrenia based on standardized administration of the Present State Examination (PSE-9)[12] by trained research interviewers. According to the baseline data in 1994, we followed up and interviewed 98.0% (total 500 cases) and 95.9% of the subjects (total 489 cases) with schizophrenia and/or all their key informants ten years later (May 2004) and again 14 years later (June 2008). The study was approved by the University of Guam's Committee on Human Research Subjects (CHRS, 12/2006) and all respondents gave informed consent at each stage of the study.

Measurement

The principal assessment tools included the PSE and Social Disability Screening Schedule (SDSS) in the baseline investigation in 1994.[8,9] The Positive and Negative Syndrome Scale (PANSS) and Global Assessment of Functioning (GAF) were also used in 2008. For living subjects at the visits in 2004 and 2008, at least one person familiar with each subject's life and circumstances and the subjects themselves were interviewed. For deceased subjects, the next-of-kin or at least one person familiar with the subject was interviewed. All the interviews were conducted by trained psychiatrists using the Patients Follow-up Schedule (PFS) in 2004 and 2008. The PFS was used to collect information concerning demographic characteristics, causes and time of death, clinical symptoms, treatment information, criminal behaviour, social functioning, and social support. For all subjects, medical and psychiatric treatment records were also obtained from hospital, village doctors' clinics, and traditional healers. For deceased subjects, information from the death certification and suicide note, where applicable, was also obtained.

The classification of each death as due to suicide, accident, or natural causes represented the consensus opinion of interviewers and independent researchers after reviewing all information obtained during the interviews. Subjects were defined as homeless and lost to follow-up if informants reported that they had wandered and slept in public places and that their whereabouts, at the time, were unknown. Subjects were defined as without caregiver if they had no person (e.g., family member, and others) to provide care (e.g., food, housing, financial support, treatment, etc). Family economic status was defined according to the average family income. Criminal behaviour (e.g., theft, physical and sexual assault behaviours, and murder) was defined according to the reports of the subjects and informants (e.g., relatives).

Statistical analysis

We explored the link between baseline assessment (1994) and later evaluations (2004 and 2008) for gender and other variables. The gender differences during the follow-up period (1994-2008) were assessed through comparing the demographic, psychological, and social environment characteristics of male and female patients. A χ^2 test or Fisher's exact test was used to assess the significance of the differences in categorical data, and t-tests (two-tailed) were used to compare between-group continuous factors. Statistical analyses were performed using SPSS Windows software (version 20.0).

Results

Characteristics of the cohort participants

There were 510 subjects with schizophrenia in 1994 who were included in this follow-up study.[9,10] Of the 510 person identified as having schizophrenia, 10 were excluded in 2004 and 21 were excluded in 2008 because they were lost to follow up; therefore 500 subjects (98.0%) and 489 subjects (95.9%) were followed up in 2004 and 2008, respectively. Informants were available for all these subjects (100%). Information on 300 subjects was provided by both the subjects and their informants, and information on 189 subjects was provided by informants alone in 2008.

Current status of males and females

Table 1 shows the status of patients in 2008. The rate of survivals was significantly higher in females (74.3%) than males (58.5%) ($P<0.001$). The rate of suicide was significantly higher in males (7.1%) than females (3.0%) ($P<0.05$). There was no significant difference in deaths due to other causes between males and females. The rate of homelessness and lost to follow-up was significantly higher in males (11.2%) than females (5.7%) ($P<0.05$).

Differences between males and females

Table 2 shows the different characteristics of male and female patients alive in 2008. Compared with male subjects, females were significantly older and had more family members. There were no significant differences between males and females in previous physical illness, total positive score of PANSS, total negative score of PANSS, total score of PANSS, and mean score of GAF.

Table 3 shows the gender differences of patients alive in 1994, 2004, and 2008. There were no significant differences between males and females in violent or criminal behavior, previous suicide attempts, never treated, previous hospitalization, and inability to work. Compared with males,

female patients were significantly more likely to be married at all times or bereaved in 1994 and 2008. Compared with females, male patients were significantly more likely to be divorced, living alone, have a lower level of family economic status, and have no caregiver in 1994, 2004 and 2008.

Table 3 also shows the changes in outcome of patients alive during the follow-up. Compared with patients in 1994, there was a significant increase in the rates of patients alive in 2008, regardless of gender, who had poor family economic status ($P<0.01$), violent or criminal behavior ($P<0.001$), previous suicide attempts ($P<0.001$), and previous hospitalization ($P<0.001$). The rate of inability to work had significantly increased only in female patients ($P<0.001$), but not in male patients ($P>0.1$) in 2008 compared with 1994. Patients had a significant decrease in the rate of being without a caregiver ($P<0.001$), and never having been treated ($P<0.05$) in 2008 than in 1994.

Discussion

To our knowledge, this is the first 14-year prospective cohort study exploring gender differences in the outcome of persons with schizophrenia in a rural community. It includes longitudinal follow-up and analyses based on time-dependent factors. The strengths of this study include the use of a large representative community sample in rural China, its longitudinal 14-year follow-up design and high rates of participant retention.

Gender and outcome

The results of this study showed that male patients with schizophrenia had a poorer long-term prognosis than their female counterparts, which is consistent with previous studies in other countries.[5,13] The International Pilot Study in a few countries also found female sex to be the best predictor of a remittent (versus chronic) and course of schizophrenia.[14] The poor long-term prognosis in males in this study may be due to: 1) higher rates of suicide, homelessness, being single or divorced, and without a caregiver; and 2) lower rates of survivals and marriage. Given the high rate of violent and criminal behavior in male patients,[15] they may more likely to be abandoned or rejected by their families and local community. The reasons of better outcome in female patients may include: 1) even though significant discrimination against women still exists,[16] women with schizophrenia may have better support and care from their family or community. This may be related to: a) the results of this study showed that female patients had significantly more family members than male patients. This indicates that female patients' deviant behaviour may be more readily tolerated than male patients in rural China;[4,9,17] Female patients' behavior doesn't alienate their families in the same way as that of the behavior of male patients. Many female patients may continue to be able to perform some family functions (e.g., cooking, cleaning, washing, child-care, et al), but male patients contribute little to smooth family functioning. Moreover, male patients'

level of violence will also be harder for family members to manage.[15] b) schizophrenia develops later in women, so their symptoms may not become apparent until after they are married;[16] c) given the lower social expectations for women than men, women's domestic survival skills in the community are likely to be higher than those of men;[16] and d) given the high ratio of unmarried males to females in rural China (e.g., over 1.9),[18] unmarried man would more likely to marry a woman, even if she may suffer from a mental disorder; 2) evidence indicates that estrogen may facilitate the effects of antipsychotic medications, causing women to have a better treatment response than men and thus a better course of illness;[19] and 3) women have better premorbid functioning.[4,5,16] However, more research is necessary in order to fully understand the relative contribution of gonadal hormones and other sex-specific developmental influences towards symptoms and functioning in psychosis.[2]

The rate of mortality (e.g., death, suicide) among male patients with schizophrenia, shown in Table 1, is alarming. The high rate of suicide in male patients with schizophrenia in this study is consistent with previous studies in developed countries.[20] Homelessness is a serious problem among patients with schizophrenia, especially male patients, which is also consistent with previous studies.[10,17,21] Schizophrenia, which is diagnosed at roughly equal rates for men and women in Western countries,[14,16] is diagnosed more frequently in women in China.[9,22] The authors of this study suggest that higher rates of mortality, suicide and homelessness in male than female patients may contribute partly to the higher prevalence of schizophrenia in women than in men in China.[9,22]

Compared with patients in 1994, even though more patients were treated in 2008, the patients' status in this study became more severe in 2008. For example, patients in 2008 had significantly higher rates of violent or criminal behavior and previous suicide attempts than in 1994. Female patients had a significantly higher rate of inability to work in 2008 than in 1994. Although the average net income of each farmer in Xinjin County had increased from 1994 to 2008, all patients' family economic status had relatively worsened in 2008 compared to that in 1994. Evidence in developed countries indicates that patients with schizophrenia may move downward to less favorable socio-economic status over the course of the illness.[23] The results of this study also indicate that the patients with schizophrenia will move downward to a poor socio-economic status over the course of schizophrenia. The authors of this study suggest that socio-economic factors may play an important role influencing the long-term outcome of persons with schizophrenia. Further studies should be conducted to explore the impact of socio-economic development on the outcome of patients with schizophrenia.

Gender and other characteristics

What factors are important to influence the long-term outcomes of patients with schizophrenia? Evidence indicates that the never-treated individuals with schizophrenia might have a poorer outcome (e.g., higher mortality) than those accepting treatment with antipsychotic drugs.[17,24] In a 15- and 25-year international follow-up study, a significant proportion of treated incident cases of schizophrenia achieved favourable long-term outcome.[25] The results of this study showed that there were no significant differences between men and women in the proportion who never received treatment for their illness in 1994, 2004 and 2008 (Table 3). There was also no significant difference between male and female patients in the proportion who had one or more previous hospitalizations (Table 3), consistent with previous studies in developed countries.[26]

Evidence indicates that later age of onset may be also associated with better outcome in schizophrenia and other psychoses.[27] Consistent with the published literature,[5,28] we found female patients who survived through 14 years of follow up to have a later age of onset (females: 32.4 years, males: 29.8 years) (Table 2) and better outcome than male patients at that point in follow-up. An early onset of schizophrenia may arrest social development, resulting in greater social impairment in boys than girls.[4,16] However, even though female patients had a more favourable outcome profile in young or middle age onset, they tended to have a poorer outcome in the very late onset cases, particularly in terms of course type, longest episode and remission type.[28] The 'estrogen-hypothesis' suggests that the disorder only becomes apparent after menopause, for a proportion of women who have a psychosis liability.[29] Consequently, men with lower levels of vulnerability develop psychotic disorders in old age and may display better outcome than their female counterparts.[28] Further studies will be needed to examine the effect of gender-age interactions.

The link between negative symptoms and functioning has been well established in research studies examining outcomes in chronic schizophrenic patients.[30,31] Differences in negative symptoms were found to mediate differences in functioning between male and female patients.[2] Although females with schizophrenia might have fewer negative symptoms than males,[5] the results of this study indicated that there were no significant differences in positive and negative symptom between men and women who had survived through 14 years follow-up (Table 2), which is consistent with a previous study.[4] It may be that male patients with severe positive and negative symptoms are more likely to die earlier or be lost to follow up. Further studies need to be conducted on gender and long-term symptoms.

The previous studies in developed countries indicate that females with schizophrenia may have better psychosocial functioning or be more skilled and less disabled than males.[4,5,32] However, the results of the present study indicated that there were no differences in long-term social functioning (e.g., score of GAF, inability to work) between male and female patients (Tables 2 and 3). The

results of this study also showed that significantly more female patients were unable to work after 14 years (2008 compared to 1994) (Table 3), which indicates higher rates of disability and poor long-term social functioning. The results of this study indicate that the trend of social functioning in patients with schizophrenia, especially female patients, may on a downhill path.[33] Given the higher rates of suicide and mortality in male patients with schizophrenia in this study, female patients with more severe illness might survive longer into the follow-up period which might also result in different mixes of illness severity over time. Further investigations should explore the factors that influence the course of social disability, which is meaningful for planning rehabilitation interventions.

Although our previous study showed that Chinese male patients had significantly higher rates of all forms of criminal behaviour (13.8%) than female patients (6.8%) ($P<0.05$),[15] the results of this study indicated that there were no significant gender differences in rates of violent and criminal behavior, which is consistent with some previous international studies.[34,35] The results of this study showed that violent behaviour was also common among female patients in rural China. Previous violent behavior was found to be a predictor of criminal behaviour in patients with schizophrenia.[15]

Sociocultural conditions appear to modify the long-term course of schizophrenia.[25] The results of this study indicated that male patients had higher rates of divorce and living alone, lower family economic level, and fewer caregivers in rural China. Compared with male patients, the results of this study showed that female patients might be more likely to be accepted by families and communities in rural China, which are vital to patients' survival and integration in the community. Stronger social and familial acceptance for female patients may serve to reduce female's stress more effectively. Poor family and social support for male patients may be risk factors for males' poor long-term prognosis. This is consistent with a previous study in which males reported less positive social support than their female counterparts and felt they received marginally more criticism than females.[2] Although persons with mental illness are not confined in developed countries, it does not guarantee they will be fully integrated into their communities as the disabilities produced by their illness and partly by stigmatizing and discriminator attitudes of the public.[36] The quality of social networks around an individual patient has been shown to correlate with that person's level of functioning.[37] Family involvement, support, and warmth may predict improvement in negative symptoms and social functioning.[38]

In general, China had been developing rapidly from 1994 to 2008. However, the results of this study did not show the improvement in family or social support for, and family economic status of patients with schizophrenia in rural Xinjin County. Further studies should be conducted to explore the relationship between social development and mental health care (e.g., family, community, and social care) for patients with schizophrenia in the community.

Limitations of the study

The limitations of this study include the possible recall bias for interviews with subjects and informants at long-term follow-up intervals, but such bias may be minimized by the use of multiple follow-up data sources. The death and suicide rates may be underestimated because most homeless individuals were lost to follow-up. Over the 14 years much has changed in China, including access to and the nature of the treatments received, access to other services, and quality of life more generally. Findings here may not apply to other settings in which such changes have not been observed. Given the diversity of sociocultural, economic and care provision characteristics, the results of this rural China study may not generalize to high-income countries.

Implications for services

The major findings of the study indicate that even though significant discrimination against women still exists, women with schizophrenia have better support and care from family or community which contributes to their better long-term outcome in rural China. Male patients have higher rates of mortality, suicide and homelessness than female patients which contribute partly to the higher prevalence of schizophrenia in women than in men in China. The results of the present study have implications for improving long-term prognosis of patients with schizophrenia in China and elsewhere. The long-term characteristics of male and female patients with schizophrenia should be taken into account when developing interventions to enhance the long-term prognosis. Compared with females, male patients in rural China comprise a highly vulnerable subgroup of individuals who, in addition to psychiatric care, need more support from family, community and society on a long-term basis. The authors suggest that early treatment (e.g., antipsychotic medication and other interventions) and community-based care and support (e.g., family, community, and social level) are crucial for improving the long-term outcome of male and female patients with schizophrenia.[25,39] Given few programs that address psychosis in rural China from the standpoint of gender, gender specific interventions should be provided for patients with schizophrenia.[40] For example, for male patients, care should focus on medication, preventing suicide and violent behavior, and providing family and social support. For female patients, how to improve the medication and social functioning should be more emphasized. In Chinese context, support for patients' family should also be strengthened.

Given the representative sample used in this study, we are confident that our findings are generalizable to the population of patients with schizophrenia in rural areas, and even other low- and middle-income countries that have a similar social environment. Overall long-term outcome of schizophrenia is a major concern in psychiatry. It is crucial to supply comprehensive community

mental health services and medication for these people in rural China. The impact of socio-economic development on outcomes of male and female persons with schizophrenia should be investigated further in communities.

Funding

The 1994 Chengdu study was supported by a grant from the China Medical Board in New York (CMB, 92-557; M.Z. Xiang, PI). This study was supported in part by NIH GRIP 1 R01 TW007260-01 (M.S. Ran, PI) from the Fogarty International Center of NIH and American Foundation for Suicide Prevention (AFSP) (M.S. Ran, PI).

Acknowledgments

The authors thank Chengdu Mental Health Center and Xinjin Mental Hospital for collaboration and data collection.

References

1 Usall J, Ochoa S, Araya S, Márquez M. Gender differences and outcome in schizophrenia: a 2-year follow-up study in a large community sample. *Eur Psychiatry* 2003; **18**: 282-4.

2 Willhite RK, Niendam TA, Bearden CE, Zinberg J, O'Brien MP, Cannon TD. Gender differences in symptoms, functioning and social support in patients at ultra-high risk for developing a psychotic disorder. *Schizophr Res* 2008; **104**: 237-45.

3 Castle DJ, Abel K, Takei N, Murray RM. Gender differences in schizophrenia: hormonal effect or subtypes? *Schizophr Bull* 1995; **21**: 1-12.

4 Mueser KT, Bellack AS, Morrison RL, Wade JH. Gender, social competence, and symptomatology in schizophrenia: a longitudinal analysis. *J Abnorm Psychol* 1990; **99**: 138-47.

5 Leung A, Chue P. Sex differences in schizophrenia, a review of the literature. *Acta Psychiatr Scand Suppl* 2000; 401: 3-38.

6 Burns T, Patrick D. Social functioning as an outcome measure in schizophrenia studies. *Acta Psychiatr Scand* 2007; **116**: 403-18.

7 Salokangas RKR, Stengard E. Gender and short-term outcome in schizophrenia. *Schizophr Res* 1990; **3**: 333-45.

8 Ran MS, Xiang MZ, Huang MS, Shan YH: Natural course of schizophrenia: two-year follow-up study in a rural Chinese community. *Br J Psychiatry* 2001; **178**: 154-8.

9 Ran MS, Xiang MZ, Li SX, Shan YH, Huang MS, Li SG, et al. Prevalence and outcome of schizophrenia in a Chinese rural area: an epidemiological study. *Aust NZ J Psychiatry* 2003; **37**: 452-7.

10 Ran MS, Chen EYH, Conwell Y, Chan CLW, Yip PSF, Xiang MZ, et al. Mortality in people with schizophrenia in rural China. *Br J Psychiatry* 2007; **190**: 237-42.

11 World Health Organization. The ICD-10 classification of mental and behavioural disorders: clinical descriptions and diagnostic guidelines. WHO, Geneva, 1992.

12 Wing JK, Cooper JE, Sartorius N. *The measurement and classification of psychiatric symptoms.* Cambridge University Press, 1974.

13 Tamminga CA. Gender and schizophrenia. *J Clin Psychiatry* 1997; **58**: 33-7.

14 Sartorius N, Jablensky A, Korten G, Ernberg G, Anker M, Cooper JE, et al. Early manifestations and first contact incidence of schizophrenia in different cultures. *Psychol Med* 1986; **16**: 909-928.

15 Ran MS, Chen PY, Liao ZG, Chan CLW, Chen EYH, Tang CP, et al. Criminal behavior among persons with schizophrenia in rural China. *Schizophr Res* 2010; **122**: 213-218.

16 Pearson V. Goods on which one loses: women and mental health in China. *Soc Sci Med* 1995; **41**: 1159-1173.

17 Ran MS, Chan CLW, Chen EYH, Mao WJ, Hu SH, Tang CP, et al. Differences in mortality and suicidal behavior between treated and never-treated people with schizophrenia in rural China. *Br J Psychiatry* 2009; **195**: 126-31.

18 Zhou XD, Wang XL, Li L, Hesketh T. The very high sex ratio in rural China: Impact on the psychosocial wellbeing of unmarried men. *Social Science & Medicine* 2011; **73**: 1422-1427.

19 Goldstein JM, Cohen LS, Horton NJ, Lee H, Andersen S, Tohen M, et al. Sex differences in clinical response to olanzapine compared with haloperidol. *Psychiatry Res* 2002; **110**: 27–37.

20 Lester D. Sex differences in completed suicide by schizophrenic patients: a meta-analysis. *Sui Life-Threat Beh* 2006; **36**: 50-56.

21 Folsom DP, Hawthorne W, Lindamer L, Gilmer T, Bailey A, Golshan S, et al. Prevalence and risk factors for homelessness and utilization of mental health services among 10,340 patients with serious mental illness in a large public mental health system. *Am J Psychiatry* 2005; **162**: 370-376.

22 Phillips MR, Yang GH, Li SR, Li Y. Suicide and the unique prevalence pattern of schizophrenia in mainland China: a retrospective observational study. *Lancet* 2004; **364**: 1062-1068.

23 Hudson CG. Socioeconomic status and mental illnesss: test of the social causation and selection hypotheses. *Am J Orthopsychiatry* 2005; **75**: 3-18.

401 **24** Tiihonen J, Lönnqvist J, Wahlbeck K, Klaukka T, Niskanen L, Tanskanen A, et al. 11-year
402 follow-up of mortality in patients with schizophrenia: a population-based cohort study (FIN11
403 study). *Lancet* 2009; **374**: 620-7.
404 **25** Harrison G, Hopper K, Craig T, Laska E, Siegel C, Wanderling J, et al. Recovery from
405 psychotic illness: a 15- and 25-year international follow-up study. *Br J Psychiatry* 2001; **178**:
406 506-17.
407 **26** McAlpine D, Mechanic D. Utilization of specialty mental health care among persons with
408 severe mental illness: the roles of demographics, need, insurance, and risk. *Health Serv Res*
409 2000; **35**: 277-92.
410 **27** Rabinowitz J, Levine SZ, Hafner H. A population based elaboration of the role of age of onset
411 on the course of schizophrenia. *Schizophr Res* 2006; **88**: 96-101.
412 **28** Köhler S, van der Werf M, Hart B, Morrison G, McCreadie R, Kirkpatrick B, et al. Evidence
413 that better outcome of psychosis in women is reversed with increasing age of onset: A
414 population-based 5-year follow-up study. *Schizophr Res* 2009; **113**: 226-32.
415 **29** Seeman MV, Lang M. The role of estrogens in schizophrenia gender differences. *Schizophr*
416 *Bull* 1990; **16**: 185-94.
417 **30** Breier A., Schreiber JL, Dyer J, Pickar D. National Institute of Mental Health longitudinal
418 study of chronic schizophrenia: prognosis and predictors of outcome. *Arch Gen Psychiatry*
419 1991; **48**: 239-46.
420 **31** Bottlender R, Strauß A, Möller HJ. Social disability in schizophrenic, schizoaffective and
421 affective disorders 15 years after first admission. Schizophrenia Research 2010; **116**: 9-15.
422 **32** Grossman LS, Harrow M, Rosen C, Faull R. Sex difference in outcome and recovery for
423 schizophrenia and other psychotic and nonpsychotic disorders. *Psychiatric Ser* 2006; **57**: 844-
424 850.
425 **33** Ganev K. Long-term trends of symptoms and disability in schizophrenia and related disorders.
426 *Soc Psychiatry Psychiatr Epidemiol* 2000; **35**: 389-95.
427 **34** Swanson JW, Swartz MS, Van Dorn RA, Elbogen EB, Wagner HR, Rosenheck RA, et al. A
428 national study of violent behavior in persons with schizophrenia. *Arch Gen Psychiatry* 2006;
429 **63**: 490-9.
430 **35** Walsh E, Gilvarry C, Samele C, Harvey K, Manley C, Tattan T, et al. Predicting violence in
431 schizophrenia: a prospective study. *Schizophr Res* 2004; **67**: 247-52.
432 **36** Leff J, Warner R. *Social inclusion of people with mental illness*. Cambridge University Press,
433 2006.
434 **37** Erickson DH, Beiser M, Iacono WG. Social support predicts 5-year outcome in first-episode
435 schizophrenia. *J Abnorm Psychol* 1998; **107**: 681-5.

38 O'Brien MP, Gordan JL, Bearden CE, Lopez SR, Kopelowicz A, Cannon TD. Positive family environment predicts improvement in symptoms and social functioning among adolescents at imminent risk for onset of psychosis. *Schizophr Res* 2006; **81**: 269-75.

39 Ran MS, Xiang MZ, Chan CLW, Leff J, Simpson P, Huang MS, et al. Effectiveness of psychoeducational intervention for rural Chinese families experiencing schizophrenia: A randomised controlled trial. *Soc Psychiatry Psychiatr Epidemiol* 2003; **38**: 69-75.

40 Køster A, Lajer M, Lindhardt A, Rosenbaum B. Gender differences in first episode psychosis. *Soc Psychiatry Psychiatr Epidemiol* 2008; **43**: 940-6.

Table 1 Current status of male and female patients with schizophrenia in 2008

Current status	Male Patients	Female Patients	Total
	n (%)	*n* (%)	
Survivals	131 (58.5)	197 (74.3)***	328 (67.1)
Deaths			
Suicide	16 (7.1)	8 (3.0)*	24 (4.9)
Deaths due to other causes	52 (23.2)	45 (17.0)	97 (19.8)
Homeless and lost to follow-up	25 (11.2)	15 (5.7)*	40 (8.2)
Total	224 (45.8)	265 (54.2)	489 (100)

* $P<0.05$; *** $P<0.001$

455

456

457 **Table 2** Characteristics of patients with schizophrenia survived in 2008

	n=328		Analysis		
Variable	Male (*n* =131) *n* (%)	Female (*n*=197) *n* (%)	χ^2	df	*P*
Living with offspring	17 (13.0)	42 (21.3)	3.7	1	0.05
Previous physical illness	52 (39.7)	61 (31.0)	2.6	1	0.10
	Mean (s.d.)	Mean (s.d.)	T	df	*P*
Age (years)	53.4 (12.6)	57.8 (12.7)	3.11	326	0.00
Education (years)	5.1 (3.2)	4.3 (3.2)	2.28	308	0.02
Age of onset (years)	27.2 (11.1)	30.7 (10.6)	2.93	326	0.00
Number of family members	2.8 (1.7)	3.5 (1.5)	3.89	320	0.00
Duration of illness (years)	24.7 (11.0)	25.9 (10.9)	0.98	314	0.33
Total positive score of PANSS	11.8 (5.6)	12.4 (6.2)	0.85	288	0.40
Total negative score of PANSS	15.8 (9.3)	15.2 (9.0)	0.44	222	0.66
Total score of PANSS	54.8 (20.0)	56.9 (22.8)	0.65	199	0.52
Global Assessment of Functioning (GAF)	61.5 (24.5)	61.5 (24.9)	0.01	307	0.99

458

459

Table 3 Comparison of the outcomes of male and female patients with schizophrenia survived in 1994, 2004, and 2008

	1994 (*n*=510)		2004 (*n*=367)		2008 (*n*=328)	
Variable	Male (*n* =237) *n* (%)	Female (*n* =273) *n* (%)	Male (*n* =156) *n* (%)	Female (*n* =211) *n* (%)	Male (*n* =131) *n* (%)	Female (*n*=197) *n* (%)
Marital status						
Married	105 (44.3)	222 (81.3)**	71 (45.5)	167 (79.1)***	59 (45.0)	150 (76.1)***
Single	93 (39.2)	16 (5.9)**	51 (32.7)	6 (2.8)***	42 (32.1)	4 (2.0)***
Divorced	29 (12.2)	5 (1.8)**	19 (12.2)	7 (3.3)**	19 (14.5)	8 (4.1)**
Bereavement	10 (4.2)	30 (11.0)*	15 (9.6)	31 (14.7)	11 (8.4)	35 (17.8)*
Family economic status (<mean)	143 (60.3)	135 (49.5)*	97 (61.0)	108(50.7)*	96 (73.3)	137 (69.5)
Live alone	51 (21.5)	13 (4.8)**	44 (28.2)	21(10.0)***	35 (26.7)	14 (7.1)***
Without caregiver	65 (27.4)	25 (9.2)**	25 (15.7)	11 (5.2)**	15 (11.5)	5 (2.5)**
With violent or criminal behavior	7 (3.0)	11 (4.0)			26 (19.8)	30 (15.2)
Previous suicide attempts	14 (5.9)	23 (8.4)	26 (16.4)	35 (16.4)	28 (21.4)	41 (20.8)
Never treated	81 (34.2)	75 (27.5)	37 (23.3)	52 (24.4)	29 (22.1)	38 (19.3)
Previous hospitalization	56 (23.6)	54 (19.8)	59 (37.8)	61 (28.9)	50 (38.2)	70 (35.5)
Inability to work	51 (21.5)	46 (16.8)	34 (21.8)	50 (23.7)	37 (28.2)	57 (28.9)

* p<0.05; **p<0.01; ***p<0.001 (differences between gender within each year)