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Employment outcome for people with schizophrenia in rural *v.* urban China: population-based study

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Abstract

Background—Although outcomes among people with schizophrenia differ by social context, this has rarely been examined across rural *v.* urban settings. For individuals with schizophrenia, employment is widely recognised as a critical ingredient of social integration.

Aims—To compare employment for people with schizophrenia in rural *v.* urban settings in China.

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Declaration of interest
None.

Method—In a large community-based study in four provinces representing 12% of China's population, we identified 393 people with schizophrenia (112 never treated). We used adjusted Poisson regression models to compare employment for those living in rural (n = 297) *v.* urban (n = 96) settings.

Results—Although rural and urban residents had similar impairments due to symptoms, rural residents were three times more likely to be employed (adjusted relative risk 3.27, 95% CI 2.11–5.07, P<0.001).

Conclusions—People with schizophrenia have greater opportunities to use their capacities for productive work in rural than urban settings in China. Contextual mechanisms that may explain this result offer a useful focus for future research.

Many studies have suggested that for people with schizophrenia and related psychoses, the course and outcome of illness may be shaped in part by social context.[1–4] A classic exemplar is a multinational World Health Organization (WHO) study, begun more than 30 years ago, that followed people with schizophrenia in low- and middle-income (LAMI) countries and also in high-income countries from the time of onset. Although study participants in LAMI countries had less access to health services and formal education, and fewer material resources than their counterparts in high-income countries, both short-term and long-term course and outcome were on average better in the LAMI countries compared with the high-income countries.[1,5] Recent papers question whether such a comparison of LAMI *v.* high-income countries is relevant to the variations in sociocultural environment across contemporary societies[6,7] and caution against 'idealising' conditions of people with schizophrenia in low-income settings.[6] Notwithstanding these caveats, the results of the WHO study strongly support the inference that social context can make a difference in the course of illness.

Rural and urban settings represent different social contexts within the same country.[8] This has been well recognised in the numerous studies that have compared the incidence of schizophrenia[9,10] in rural *v.* urban settings, most of which have found a higher incidence in urban settings. Yet few prior studies have examined whether rural *v.* urban context is linked with social integration or other outcomes for people with schizophrenia, such as employment. These prior studies comparing outcomes between rural and urban settings were innovative and provide an important initial foundation, but with some notable exceptions,[11–13] they had inherent methodological limitations.[14,15] To advance understanding of how outcomes may differ across rural *v.* urban locales, we made use of a large, representative, community-ascertained and reliably diagnosed sample of people with schizophrenia in China. This unique sample includes individuals from both rural and urban settings. A substantial number had never received any treatment. In China, the social context is strikingly different for rural and urban residents, generally to the disadvantage of rural residents.[16] For example, rural residents have less access to health services and education,[17] are poorer, and have less opportunity for upward social mobility than their urban counterparts.[16] Despite the overall disadvantage associated with living in a rural area in China, in keeping with evidence from the pivotal WHO study described earlier and prior studies comparing outcomes in rural *v.* urban areas, we investigated whether the rural social environment might also be beneficial in some crucial ways to people with schizophrenia. In particular, we hypothesised that the rural context might offer more opportunity for people with schizophrenia to use their capacities for productive work. For example, the kind of employment available in rural environments (such as farming) might be more accessible to people with schizophrenia than the employment available in urban environments (such as work in manufacturing). Employment is a critical ingredient of participation in civil society and generally beneficial to the course and outcome of schizophrenia.[3] In this paper, therefore, we undertake a comparison of employment for people with schizophrenia in rural

and urban settings in China that capitalises on a unique data-set to examine this issue and that significantly extends prior work.

Method

Ascertainment of individuals with psychotic disorders

Individuals with psychotic disorders were ascertained in a large population-based study of mental disorders that used a two-stage design for diagnosis and has been described in detail elsewhere.[18] Briefly, the sampling frame included 113 million individuals (≥18 years), representing 12% of China's adult population. Multistage stratified random sampling methods identified 363 sampling (267 rural and 96 urban) sites in four provinces (Shandong, Gansu (Tianshui prefecture), Qinghai, and Zhejiang; see online Table DS1). Random selection (1 adult per household) in the sampling sites was used to identify 66 554 adults.

The first-stage assessment was conducted in person by trained psychiatric nurses and included the 12-item General Health Questionnaire (GHQ) supplemented by 8 items (only 4 in Zhejiang) assessing mental health risk factors;[19] the GHQ has shown good reliability and validity in China.[20] In total 63 004 (94.7%) completed the first-stage assessment. Respondents were then classified into three risk strata: (a) high risk (n = 10 815; 17%): GHQ score ≥4 (on a 12-point scale) or at least one of the eight mental health risk factors; (b) moderate risk (n = 10 599; 17%): GHQ score 1–3; and (c) low risk (n = 41 590; 66%): GHQ score 0. The assessment was repeated for a random sample of respondents (n = 6717; 10.7%) by interviewers masked to the results of the prior assessment. For the classification into one of the three risk strata, there was high reliability between the repeat and prior assessments (kappa (κ) = 0.84).

A total of 17 598 individuals were selected for the second-stage assessment: all 10 815 high-risk individuals and a random sample of 6783 moderate- or low-risk participants. Senior-level psychiatrists masked to the result of the first-stage assessment administered face-to-face SCID (Chinese version) interviews for DSM-IV-TR psychiatric diagnoses; the Chinese version of the SCID has shown good reliability.[21] They also rated Global Assessment of Functioning (GAF).[22] Of the 17 598 individuals selected for the second-stage assessment, 16 577 (94.2%) completed the SCID. The second-stage assessment was also repeated for a random sample of respondents (n = 2579, 15.6%) by interviewers masked to the results of the prior assessment.

We defined people with schizophrenia as all individuals given a current (past month) SCID DSM-IV-TR diagnosis of schizophrenia, schizoaffective disorder, schizophreniform disorder, delusional disorder, brief psychotic disorder or psychotic disorder not otherwise specified. Among those who completed the SCID, 393 (2.3%) met this criterion. Analysis of the repeat assessments for a random sample (masked to initial assessment) showed that the reliability of the classification was very high (κ= 0.94). At each stage, after complete description of the study to the participants, oral (in Zhejiang) or written (in other sites) informed consent was obtained. Each site's local institutional review board granted study approval.

Key sociodemographic variables

Urban *v.* rural residence—Urban areas in China are officially designated as 'cities' or 'towns' by the Chinese government.[23] 'Cities' must meet specific criteria, including total population (minimum of 80 000 residents, with >60 000 non-agricultural), economic development (for example ratio of gross domestic product attributable to agriculture *v.* industry) and infrastructure (for example extensiveness of paved road and running water).

'Towns' are generally seats of county-level state governments or centres of mining/industry. The *hukou*, or household registration system, enforces this differentiation between urban/rural areas. More than 95% of the people with schizophrenia who comprised our study sample were living in their assigned *hukou* district.

Employment status—Participants were asked whether they were currently employed and, if applicable, their job title. Responses were classified into one of eight categories: (a) farmer/fisherman; (b) worker/service staff; (c) professional/technician/manager; (d) self-employed/contractor; (e) student/homemaker; (f) retired due to sickness; (g) unemployed/laid off; and (h) 'other'. Very few (5.8%) reported being 'other' ($n = 3$) or 'student/homemaker' ($n = 20$). Therefore, it was possible to exclude these categories and create a dichotomised variable – 'employed' *v.* 'unemployed' – that applied to almost 95% of participants. 'Employed' were individuals holding any occupation, whether full or part time (i.e. farmer/fisherman, worker, professional or self-employed). 'Unemployed' were people retired because of sickness or who were unemployed/laid off.

We anticipated that some readers might question the accuracy of self-reported employment by individuals with psychoses. Therefore, we compared self-reports with reports from the relative most knowledgeable about the participant's condition. Relative reports were available in three of the four provinces ($n = 304$ people with schizophrenia) but not for Zhejiang ($n = 89$ people with schizophrenia). Agreement between self-report and relative report of employment was excellent, both for the original eight-category variable ($\kappa = 0.98$) and for the dichotomous employed *v.* unemployed variable derived from six of the eight categories as described above ($\kappa = 0.93$).

Medical insurance—Participants reported their insurance status, which was classified as: (a) self-pay – whereby individuals pay all medical expenses out-of-pocket; (b) cooperative medical services – primarily rural health insurance organised through subsidies from multiple levels of government administration and supplemented by individual premiums; (c) free medicare – insurance paid by government re-employment centres for laid-off or retired workers; and (d) medical insurance – public and private company insurance for employees via cost-sharing between government, employers and employees.

Key illness and treatment variables (other than diagnosis)

Global Assessment of Functioning—Participants were asked about their symptomatic and functional impairment within the past month. 'Score for impairment related to symptoms in the worst week in the recent month' was assessed via psychiatrists' GAF rating (0–100; intraclass correlation coefficient 0.88).

Duration of illness—Duration of illness was defined as the number of years between current age and age at onset of psychotic symptoms reported by the participant.

Treatment status—Participants were asked whether they were currently in treatment and about any treatment history. To assess 'lifetime treatment status', respondents were asked: 'In any time in the past, who have you sought help from due to mental problems?' Responses were classified into one of eight categories: (a) psychiatric in-patient admission; (b) out-patient psychiatrist; (c) out-patient general Western medical doctor; (d) out-patient traditional Chinese medicine doctor; (e) shaman; (f) friends or colleagues; (g) relatives; and (h) never sought help. Although respondents could endorse multiple categories, lifetime treatment status was classified according to a hierarchy based on exposure to regular antipsychotic medication. For example, if a patient endorsed both 'shaman' and 'out-patient psychiatrist', the patient was coded 'out-patient psychiatrist' because of more likely

exposure to antipsychotic medication. The highest ranking was given for ever being a psychiatric in-patient because admissions in China typically last ≥3 months, which include antipsychotics and continued antipsychotic medication after leaving the hospital.[7] For the present analyses, we created three mutually exclusive categories for lifetime treatment: (a) untreated (never sought help; sought help from relatives, friends, or colleagues only); (b) out-patient treatment only (sought help from shaman, traditional Chinese medicine doctor, general Western medical doctor, or psychiatrist); and (c) ever psychiatric in-patient.

Statistical methods

We first compared the raw frequencies for rural *v.* urban residents on sociodemographic and illness/treatment variables. We used chi-squared (for categorical variables) or *t*-tests (for continuous variables). Alpha was set at $P<0.05$ and all tests were two-tailed. For employment categories, in order to gain some indication as to whether the results varied by gender, we also compared frequencies for men and women stratified by urban/rural setting.

We used Poisson regression models with a log-link function and a robust variance estimator to compare employment in rural *v.* urban settings.[24,25] This approach was more appropriate than methods such as logistic regression that yield odds ratios, because an odds ratio strongly overestimates the prevalence ratio when the outcome of interest is very common, as was the case in this study for the outcome of employment. We report relative risks (with 95% confidence intervals) derived from both unadjusted and adjusted Poisson regression models. In a cross-sectional study such as this one, relative risks derived from regression models may be most accurately interpreted as prevalence ratios. To construct the adjusted model, we initially included a set of 'basic' potential confounders[26,27] consisting of gender, age (in years), GAF score (0–100), province (Shandong, Gansu, Qinghai and Zhejiang), medical insurance status (four categories: self-pay, cooperative medical services, free medicare, medical insurance) and lifetime treatment status (three categories: no treatment, out-patient or ever an in-patient). Next, we examined whether the following five variables, entered singly into the Poisson regression model with the 'basic' covariates already entered, influenced the results: years of schooling, family income, religion, marital status and duration of illness. Only duration of illness and marital status had an appreciable impact. Thus, the adjusted model included the basic covariates plus duration of illness and marital status. Analyses were conducted using SAS Version 9.2 on Windows.

Results

Sociodemographic measures other than employment

The mean age of participants was 44.0 years (s.d. = 13.5) and 47.6% ($n = 187$) of the sample was male. They averaged 6.1 years of schooling (s.d. = 4.2), and had a mean monthly family income of 3028 Chinese RMB (s.d. = 3612). More lived in rural than urban areas (rural 75.6%, $n = 297$; urban 24.4%, $n = 96$). In terms of insurance status, 64.8% (247/381) were self-pay, 20.5% (78/381) had cooperative medical services, 3.9% (15/381) had free medicare, and 10.8% (41/381) had medical insurance. Regarding religious endorsement, 91.7% (318/347) were non-religious, 2.0% (7/347) were Christian/Catholic, and 6.3% (22/347) were Buddhist/Taoist.

Table 1 compares the sociodemographic variables for rural *v.* urban residents. Rural *v.* urban residence was not significantly associated with age, gender or religion. Compared with their urban counterparts, rural residents had fewer years of schooling, lower mean family income and less medical insurance overall (i.e. had a higher proportion of individuals who self-pay). Rural residents were more likely to be married than urban residents.

Employment

For the dichotomised employment variable, 77.6% (287/370) were employed *v.* 22.4% (83/370) unemployed. Participants endorsed the following detailed categories of employment: farmer/fisherman (68.1% or 252/370), worker/service staff (5.4% or 20/370), professional/technician/manager (1.4% or 5/370), self-employed/contractor (2.7% or 10/370), retired due to sickness (10.8% or 40/370), and unemployed/laid off (11.6% or 43/370).

Table 2 compares both dichotomous and detailed employment categories for rural *v.* urban residents. Rural participants were employed more often than urban participants. Distribution of employment by detailed categories also differed by location. As expected, rural participants were more likely to work as a farmer/fisherman. Urban participants were more likely to be employed as workers/service staff, and were also more frequently retired because of sickness or to be unemployed/laid off.

We explored gender differences in employment separately for rural and for urban areas. Within rural areas, women were somewhat more likely to be employed than men (99.3% (146/147) *v.* 88.0% (117/133); $\chi^2(1) = 15.77$, $P<0.0001$). On further examination, it appeared that women had more employment than men in farming/fishing (96.6%, $n =$ 142/147; for women; 81.9%, $n = 109/133$ for men; $\chi^2(5) = 19.40$, $P = 0.0016$). In urban areas, there were no appreciable differences in employment between women and men ($\chi^2(5) = 4.44$, $P = 0.49$).

Measures of illness and treatment

The 393 people with schizophrenia had the following SCID diagnoses: schizophrenia, $n =$ 326 (83%); schizoaffective disorder, $n = 13$ (3.3%); schizophreniform disorder, $n = 12$ (3.1%); delusional disorder, $n = 15$ (3.8%); brief psychotic disorder, $n = 3$ (0.8%); and psychotic disorder not otherwise specified, $n = 24$ (6.1%). The average GAF score was 45.7 (s.d. = 15.30). A GAF score in this range indicates that, on average, participants exhibited serious symptoms or serious impairment in functioning.[22] The average duration of illness was 11.9 years (s.d. = 11.0), and average age at onset was 31.5 years (s.d. = 11.5).

With respect to lifetime treatment broadly classified, 28.5% ($n = 112$) were never formally treated, 22.6% ($n = 89$) had sought out-patient treatment only and 48.9% ($n = 192$) were ever psychiatric in-patients. Participants had sought the following detailed categories of treatment: psychiatric in-patient (48.9% or 192/393), out-patient psychiatrist (14.8% or 58/393), general Western medicine doctor (5.9% or 23/393), traditional Chinese medicine doctor (1.3% or 5/393), shaman (0.8% or 3/393), friends or colleagues (1.0% or 4/393), relatives (0.5% or 2/393) and never treated (27.0% or 106/393).

Table 3 compares illness and treatment for rural and urban residents. Rural *v.* urban residence was not significantly associated with differences in duration of illness, GAF, age at onset or type of psychotic diagnosis. Lifetime treatment broadly defined (three categories) differed for rural *v.* urban residents ($\chi^2(2) = 13.60$, $P = 0.0011$). For example, urban residents were more likely to have had in-patient hospital treatment, whereas rural residents were more likely to have had out-patient treatment or to have never received formal treatment. Distribution of treatment by detailed categories also differed for rural *v.* urban residents (Fisher's exact test, $P = 0.03$).

Poisson regression models

Table 4 shows the results for the unadjusted and adjusted Poisson regression models. In the unadjusted model, residence in a rural area was associated with over three times the

likelihood of employment when compared with residence in an urban area. In the adjusted model (including gender, age, GAF, province, medical insurance, treatment status, duration of illness and marital status), residence in a rural area remained associated with over three times the likelihood of employment when compared with residence in an urban area. Among the covariates, only shorter duration of illness (in years) was associated with (increased) likelihood of employment.

Discussion

The central finding of this study was that people with schizophrenia living in a rural area were over three times more likely to be employed than those living in an urban area. Yet impairment due to symptoms was similar across rural and urban settings. We infer that people with schizophrenia have greater opportunities to use their capacities for productive work in rural than urban settings in China.

Comparison with previous studies

Despite numerous population-based surveys of mental disorders having been conducted across the globe,[28,29] comparisons of people with schizophrenia in rural *v.* urban areas have been relatively rare. One reason is that other large epidemiological surveys ascertained too few individuals with psychotic disorders, used diagnostic methods more suitable for common mental disorders, or did not sample both rural and urban areas.[30] The few existing studies have generally been hindered by a variety of methodological limitations, such as lacking formal reliability testing for diagnoses[12,13] or ascertaining only from treatment settings.[14,15] Arguably the two most rigorous previous studies were done in Chandigarh, India, and in Butajira, Ethiopia. The Chandigarh study compared outcomes for 'incident cases' of non-affective psychoses ascertained via treatment settings in rural *v.* urban Chandigarh; results suggested that symptomatic outcomes were better in rural than urban areas.[11] The Chandigarh study was limited, however, by small sample size, was restricted to people who received treatment and was done in the 1980s before the recent massive urban migration in many LAMI countries. The more recent study in Butajira ascertained a population-based prevalence sample of individuals with schizophrenia, and also found better symptomatic and functional outcomes among rural than urban residents.[12,13] This exceptional study was, however, geographically restricted to one district within Ethiopia, and it is unclear whether its results are generalisable to other districts of Ethiopia or other African populations.

The current study adds substantially to this previous work. We used a large and representative sample of people with schizophrenia, drawn from a two-stage community study of 12% of the Chinese population. Due to the two-stage design, diagnoses for psychotic disorders could be established via a standardised, clinician-administered diagnostic interview, and masked reassessments of a random sample could be used to assess measurement error. Due to the community-based sampling, we could ascertain a significant number of reliably diagnosed people with schizophrenia who had never been treated. Given the strengths of the design, the threefold difference in employment for rural *v.* urban areas is unlikely to be a chance or an artifactual finding.

Employment favoured rural areas despite less access to treatment

The rural advantage in employment held even though people with schizophrenia residing in rural settings were disadvantaged relative to their urban counterparts in having less medical insurance and less access to psychiatric treatment. Of note, only 43.8% of people with schizophrenia in rural settings *v.* 64.6% in urban settings had received psychiatric in-patient treatment (the most prominent form of psychiatric treatment in China) and 30.3% of people

with schizophrenia in rural settings *v.* 22.9% in urban settings had never received formal treatment. Our findings corroborate earlier writings that rural residents face more difficulties in accessing formal psychiatric treatment due to less extensive medical insurance coverage and because such treatment is restricted to psychiatric hospitals that are primarily situated within large urban centres.[17] Although the association between symptomatology and employment remains debated,[26] prior studies specifically within rural China suggest that marked symptoms as a result of not being treated[31] are linked to worse employment outcome at 10-year follow-up.[27] The results indicate greater employment for people with schizophrenia within rural settings despite disadvantages in treatment and suggest that rural contexts may provide considerable accommodating effects.

Sociocultural factors that have an impact on employment in rural and urban settings

Our findings indicate that increased employment opportunities for people with schizophrenia within rural settings were predominantly located within the agrarian sector: 89.6% of rural people with schizophrenia who worked did so either in farming or fishing. Our results corroborate another study of people with schizophrenia within rural China that reported that these individuals were primarily working in less organised, low-skill sectors such as farming or domestic help.[27] Prior sociological findings suggest the social and contextual conditions that may promote such employment accommodation.[32–34] Opportunities for agricultural work are made plentiful because government regulations mandate that farmland be primarily used for individual agriculture and survival often requires maximising its usage.[32] Such work has also been described as being flexible seasonally, and even daily,[33] allowing for periodic disability. Involvement of extended kin, including parents, siblings and other relatives, may further aid ill individuals in fulfilling farming or household responsibilities.[34] These conditions may have provided the supportive context for rural people with schizophrenia in our study to remain employed, who as indicated by average GAF scores, were still experiencing serious symptoms. Our results also indicated that this rural advantage in agrarian forms of employment slightly favoured women relative to men. This may be attributable to rural women predominantly being limited to agricultural labour due to needing to be close to home because of a traditional focus on housekeeping, whereas rural men may pursue off-farm labour, where an increasing emphasis on education and training may disadvantage people with schizophrenia.[35]

These generally accommodating features of rural settings are contrasted by the competitive labour market in urban China, whereby modern market dynamics predominate and employment opportunities heavily favour young, educated and skilled workers.[36] The constraints that productivity and technology place on employment prospects generally for people with schizophrenia[26] are reflected by the small proportion in our sample working in professional/managerial positions (5/370, 1.4%). This emphasis on modern wage-earners in urban China thus particularly disadvantages employment opportunities for those with any health conditions, especially those experiencing symptoms of schizophrenia. In addition, financial disincentives provided via benefit systems that are more likely to be accessible in urban areas might contribute to the lower urban employment rate. Yet another factor may be more exposure to employer-based discrimination in urban settings.[26] In agrarian jobs, discrimination may be mitigated by more informal hiring practices based on kinship-networks and fewer formal requirements for employment.[37]

Although we have put forth some potential explanations along the lines of supportive accommodation in rural areas, we caution that much more work is required to fully understand these socio-cultural factors. It may turn out that supportive accommodation does not properly characterise the factors that contribute to employment in rural areas. For example, the increased employment in rural areas may also be driven by dire necessity. For women, in particular, it is possible that these individuals with schizophrenia were required to

work in order to avoid becoming destitute or ostracised. In that scenario, employment may still have beneficial effects for social integration, but this might also be associated with potentially adverse effects of coercion. The data available in this study do not indicate whether women in rural areas could choose whether or not to work, or how they felt about their work.

Study limitations and strengths

Study limitations include the cross-sectional design, which precluded causal inference or controlling for important baseline variables (such as pre-morbid employment).[27] Also, although broad definitions of employment are frequently utilised,[26] more refined measures of employment (for example hours worked, income) would have yielded more detailed information. However, our study is one of the few to corroborate patient report of employment with relative data. Another limitation is that although the GAF accounted for effects of symptoms on impairment, it did not assess specific symptom domains (i.e. positive or negative symptoms), which have sometimes been associated with functional outcomes.[26] Study strengths included the unprecedented use of clinician-administered semi-structured interview to reliably diagnose psychotic disorders within a large, representative psychiatric epidemiology study. Other study strengths include its stratified random sampling, high response rate and that it encompassed both urban and rural areas in a single middle-income country.

Another potential study limitation is that the sampling strategy did not enable ascertainment of rural migrants who have illegally relocated to urban areas for work opportunities. Phillips *et al*'s study[18] selected respondents by household or computerised registry, ascertainment methods that would heavily bias towards respondents who held 'official' urban *hukou* status via official recognition of their residence. This resulted in the vast majority of study respondents residing in their assigned *hukou* area. Nevertheless, this sampling strategy points towards the study sample remaining valid for identified rural respondents, and being representative of urban respondents who did not illegally migrate from rural settings.

Future directions

We intend these findings to spur investigators to study the pathways by which contextual factors have an impact on people with schizophrenia. With this in mind, we pose four broad questions that follow naturally from the data presented here and could be a useful focus for future research.

First, what features of the rural context in China (and perhaps elsewhere) explain the higher employment in rural areas? Future research might focus on the specific contextual mechanisms – including neighbourhood, household and daily social interactions – that could lead to more supportive accommodation of employment for people with schizophrenia in rural areas. As we have noted above, such research might also reveal that 'supportive accommodation' does not properly characterise the contextual effects. Future research should also focus on the local interpretation of being employed in rural *v.* urban contexts, as holding a job in a rural *v.* an urban setting may confer significantly different meanings (and better educated, urban patients may very well not be satisfied with the type of employment that might be available in rural contexts).

Second, are rural settings generally more conducive than urban settings to social integration for people with schizophrenia in China? Across the many approaches to conceptualising and measuring social integration, or closely related outcomes such as social inclusion and participation in civil society, employment looms large in every approach. The rural advantage might pertain not only to the key domain of employment, but also to other

domains of social integration. Furthermore, this question might pertain not only to China, but also to many other countries.

Third, are there striking rural *v.* urban differences in employment in countries other than China? Some previous findings tend to support this view, but as noted earlier, data are scant. As a corollary, are there also rural *v.* urban differences for other domains of social integration in other countries?

Fourth, what proportion of individuals with schizophrenia in LAMI countries do not receive any treatment, and what are the implications of receiving no treatment for the outcome of their illness? Although not a focus of this study, our finding that 28.5% of people with schizophrenia in the overall sample never received formal treatment provides one of the few available estimates of the proportion of people with schizophrenia who remain untreated in LAMI countries, thus significantly contributing to the literature on global mental health and underscoring the scarcity of psychiatric resources in LAMI countries.[38] But due to the cross-sectional nature of our study, and the lack of in-depth information about the duration and quality of treatments received, it remains difficult to make any strong inferences about causal relationships between treatment and outcome. We hope that future studies will shed more light on this question.

As a final note, our findings may also have relevance to the earlier debates about differential outcome of psychoses in LAMI *v.* high-income countries.[1,5] Work in rural settings was found to be mainly agrarian and low-skilled, whereas in urban settings it was mainly skilled and service-related. There might be similarities here to the different types of work available in previously defined 'developing' *v.* 'developed' contexts, for example, more formal employment in 'developed' contexts. Thus, while classifying socio-cultural environments in such a fashion is no longer as salient within contemporary societies,[6] our findings might still aid understanding of the prior reported advantages in employment that residence within LAMI countries conferred when compared with high-income countries.

In conclusion, this study suggests that for people with schizophrenia in China, those in rural settings generally retain opportunities to participate in employment, whereas those in urban settings do not. This result poses important questions about how a rural social context might increase the opportunities for these individuals to use their capacities for productive work, and perhaps also limit their opportunities not to work. Systematically examining these questions could provide key insights into the conditions that enable people with schizophrenia to take up essential roles in different contexts.

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Table 1

Sociodemographic variables by urban, rural and urban *v.* rural comparison

			Statistic		
	Urban	**Rural**	***t* (d.f.)**	**χ^2 (d.f.)**	***P***
Age, years: mean (s.d.)	44.9 (14.1)	43.7 (13.4)	0.71 (391)		0.48
Years of schooling, mean (s.d.)	9.1 (3.6)	5.1 (3.9)	8.77 (390)		<0.0001
Family income, Chinese RMB: mean (s.d.)	5335.5 (3833.0)	2275.1 (3202.0)	7.06 (141)		<0.0001
Gender, *n*/*N* (%)				1.03 (1)	0.31
Male	50/96 (52.1)	137/297 (46.1)			
Female	46/96 (47.9)	160/297 (53.9)			
Marital status, *n*/*N* (%)				6.00 (1)	0.01
Unmarried	46/96 (47.9)	101/297 (34.0)			
Married	50/96 (52.1)	196/297 (66.0)			
Insurance status, *n*/*N* (%)					<0.0001[a]
Self-pay	46/96 (47.9)	201/285 (70.5)			
Cooperative medical services	1/96 (1.0)	77/285 (27.0)			
Free medicare	10/96 (10.4)	5/285 (1.8)			
Medical insurance	39/96 (40.6)	2/285 (0.7)			
Religion, *n*/*N* (%)					0.09[a]
Non-religious	83/88 (94.3)	235/259 (90.7)			
Catholic/Christian	3/88 (3.4)	4/259 (1.5)			
Buddhist/Taoist	2/88 (2.3)	20/259 (7.7)			

[a]Fisher's exact test.

Table 2

Employment categories by urban, rural and urban *v.* rural comparison

	***n* (%)**		**Statistic**	
	Urban (*n* = 90)	**Rural (*n* = 280)**	**χ^2 (d.f.)**	***P***
Occupation (2 categories)			177.08	<0.0001
Employed	24 (26.7)	263 (93.9)		
Unemployed	66 (73.3)	17 (6.1)		
Occupation (detailed categories)				<0.0001[a]
Employed				
Farmer/fisherman	1 (1.1)	251 (89.6)		
Worker/service staff	15 (16.7)	5 (1.8)		
Professional/technician/manager	3 (3.3)	2 (0.7)		
Self-employed/contractor	5 (5.6)	5 (1.8)		
Unemployed				
Retired due to sickness	35 (38.9)	5 (1.8)		
Unemployed/laid off	31 (34.4)	12 (4.3)		

[a]Fisher's exact test.

Table 3

Illness/function and lifetime treatment variables by urban, rural and urban *v.* rural comparison

			Statistic		
	Urban (*n* = 96)	**Rural (*n* = 297)**	***t* (d.f.)**	**χ^2 (d.f.)**	***P***
Duration of illness, years: mean (s.d.)	13.5 (11.7)	11.4 (10.7)	1.58 (355)		0.11
Global Assessment of Functioning score, mean (s.d.)	47.0 (16.2)	45.3 (15.0)	0.93 (390)		0.35
Age at onset, years: mean (s.d.)	31.2 (11.2)	31.6 (11.7)	−0.30 (355)		0.76
Diagnosis, *n* (%)					0.10[a]
Schizophrenia	86 (89.6)	240 (80.8)			
Psychotic disorder not otherwise specified	1 (1.0)	23 (7.7)			
Delusional disorder	5 (5.2)	10 (3.4)			
Schizoaffective disorder	2 (2.1)	11 (3.7)			
Schizophreniform disorder	2 (2.1)	10 (3.4)			
Brief psychotic disorder	0 (0.0)	3 (1.0)			
Prior treatment-seeking for psychological problems (3 categories), *n* (%)				13.60 (2)	0.0011
In-patient admission	62 (64.6)	130 (43.8)			
Only out-patient treatment	12 (12.5)	77 (25.9)			
Never treated	22 (22.9)	90 (30.3)			
Prior treatment-seeking for psychological problems (detailed categories), n (%)					
In-patient admission	62 (64.6)	130 (43.8)			0.03[a]
Only out-patient treatment					
Out-patient psychiatrist	8 (8.3)	50 (16.8)			
Out-patient general Western medicine doctor	3 (3.1)	20 (6.7)			
Out-patient traditional Chinese medicine doctor	0 (0.0)	5 (1.7)			
Shaman	1 (1.0)	2 (0.7)			
Never treated					
Only sought help from friends or colleagues	0 (0.0)	4 (1.4)			
Only sought help from relatives	0 (0.0)	2 (0.7)			
Never sought help	22 (22.9)	84 (28.3)			

[a] Fisher's exact test.

Table 4

Unadjusted and adjusted Poisson regression of factors associated with employment in individuals with schizophrenia

	Unadjusted		Adjusted	
	Relative risk (95% CI)	***P***	**Relative risk (95% CI)**	***P***
Rural *v.* urban residence	3.52 (2.50–4.97)	<0.001	3.27 (2.11–5.07)	<0.001
Female *v.* male gender			0.94 (0.86–1.03)	0.1637
Age			0.99 (0.99–1.00)	0.0953
Global Assessment of Functioning			1.00 (0.99–1.00)	0.8289
Province				
Shandong			–	–
Gansu			1.01 (0.90–1.13)	0.8992
Qinghai			1.12 (0.97–1.30)	0.1305
Zhejiang			0.95 (0.74–1.21)	0.6779
Insurance status				
Self-pay			–	–
Cooperative medical service			0.95 (0.83–1.08)	0.4341
Free medicare			0.79 (0.47–1.34)	0.3891
Medical insurance			0.99 (0.51–1.92)	0.9742
Treatment status				
No treatment			–	–
Out-patient treatment			0.92 (0.84–1.01)	0.0843
In-patient admission			0.94 (0.84–1.06)	0.3219
Duration of illness			0.99 (0.99–0.99)	0.0243
Marital status				
Unmarried			–	–
Married			1.11 (0.99–1.23)	0.0669