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ORIGINAL RESEARCH

Gender Differences for the Associations among Housework, Self-Stigma, and Psychiatric Symptoms among Community Severe Mental Disorder Patients

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Purpose: Previous studies have suggested housework might reduce self-stigma and psychiatric symptoms, but it had not been validated in severe mental illness (SMI) patients. Considering gender differences, we examined the relationship between housework, self-stigma, and psychiatric symptoms to link family, social, and disease factors, aiding rehabilitation from a "life-oriented" perspective, promoting patients from "passive treatment" to "active life reconstruction".

Patients and Methods: We collected 486 questionnaires from SMI patients in Shandong, China (210 men, 276 women, 124 in 0–40 age group, 244 in 41–64 age group, and 118 in 65 or older age group). Brief Psychiatric Rating Scale, Self-Stigma Scale for Chronic Illness 8-item version were used to measure psychiatric symptoms and self-stigma. Housework and demographic-variables were collected through a questionnaire complied by our research group. Linear regression explicit the relationship between the study variables, based on which a mediation analysis is established to verify the internal mechanism which controls confounding variables (age, religion, marriage, education, occupation, labor capacity, living alone, liability, chronic disease, disease status).

Results: Most participants did housework for less than 1 hour, with men more likely than women (76.2% vs 56.2%). Housework reduced psychiatric symptoms in both genders (men: β = −5.563 (95% CI = −9.513, −1.613), *P* <0.01, and women: β = −4.088 (95% CI = −7.706, −0.469), *P* <0.01). However, housework only lowered self-stigma in women (β = −2.322 (95% CI = −3.922, −0.723), *P* <0.01). Self-stigma fully mediated the housework and psychiatric symptoms (indirect effect = −2.228, 95% CI = −4.046, −0.716).

Conclusion: Housework alleviated psychiatric symptoms in both genders, but only reduced the self-stigma of disease in women, suggesting its potential as a modifiable rehabilitation intervention.

Limitation: The cross-sectional design precludes causal inferences, self-reported data may introduce recall bias, the Shandong-based sample limits generalizability, unmeasured confounders (eg, medications, comorbidities) warrant further study, and the small sample size may reduce statistical power.

Keywords: severe mental illness, housework, self-stigma, psychiatric symptoms, social participation

Introduction

Mental disorder is a kind of chronic disease characterized by distortions of thinking, perception, emotion, language, self-awareness, and behavior.[1] The World Health Organization (WHO) has reported that approximately 16% of the world´s population are affected by a mental disorder.[2] In China, the weighted prevalence of any mental disorder was 9.3%.[3] Severe mental illness (SMI) is a chronic disabling disease with severe symptoms, impaired social function, and serious threat to human health.[4] Researchers had demonstrated that people with SMI had higher mortality rates, resulting in about 20 years of lost life compared with that of the general population.[5] In China, there were about 16 million patients with SMI.[6] In conclusion, SMI has been an important public health problem in China and other countries in the world.

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How to control psychiatric symptom is an important goal for community mental disorder management. In recent years, a lot of research works explored the factors associated with psychiatric symptoms, and many factors were identified to be associated with psychiatric symptoms, such as individual factors, economic factors, treatment-related factors, mediation compliance, family factors, social function, disease self-stigma, and so on.[7–9] Rehabilitation in SMI changes from a clinical perspective that emphasizes symptom relief to a holistic perspective that emphasizes the social functioning of life.[10] Housework is an essential activity for the existence and maintenance of a family, meanwhile, stigma stems from social discrimination. Therefore, it is significant to improve the symptoms of patients with severe mental disorders in the community from the perspective of society and family.

There is no explanation for the association between housework and psychiatric symptoms, but we found that previous literature may support a link. Housework was activities individuals usually did without interaction with others apart from their family members.[11,12] Housework allowed people to organize their day according to their own wishes or get satisfaction from the results they had achieved.[13] Patients with SMI usually have moderate-to-severe impairment in work or non-work activities, as well as social functioning and basic daily activities.[14] A lack of social participation is associated with diminished recovery and higher negative symptoms.[15,16] Housework allows people with severe mental disorders to participate in relevant activities at home, increasing social homeostasis. These activities are personally meaningful and inspire goal-directed behavior to help them in their recovery. Besides, there might also be gender differences in housework. Gender differences in housework exist in all countries, but, in China, influenced by Confucianism, the idea that men take charge of the outside and women take charge of the home leads to the expected norms for women in society. Female patients are often expected to continue to take care of the family, so it is easier for women to assume family responsibilities through housework, thereby enhancing role identity and reducing the stigma of incompetence, while men's participation in housework is useless for their reconstruction of social identity. Therefore, it may be important to study gender differences in housework for people with severe mental disorders.

Self-stigma is another significant social factor, which is associated with psychiatric symptoms. It has negative consequences and can cause a diagnosis of SMI.[17–19] Self-stigma has been testified to worsen psychiatric symptoms, increase suicidal ideation, and change behaviors.[20–22] In addition, over time, an individual´s disease self-stigma would gradually accumulate, making it difficult for an individual to overcome negative social beliefs about SMI, thus aggravating psychotic symptoms and making it difficult to recover.[7,23,24] People with SMI in China may face more severe discrimination because of many negative stereotypes attached to mental illness in Chinese.[25] Family members account for a high proportion of SMI patients' family participation,[26] so housework may reduce feelings of shame and guilt through enhancing resilience.[27] This suggests that disease self-stigma may act as a mediator in the relationship between housework and psychiatric symptoms. Consider the joint efforts from patients, families, hospitals, communities, and other aspects to reduce stigma, promote symptom relief, and social function recovery.

Due to previous research focusing primarily on the relationship between self-stigma and psychiatric symptoms, with little attention given to the important and modifiable behavior of housework, our study raises a novel relationship between housework, self-stigma, and psychiatric symptoms. Furthermore, our study investigates gender differences between them, aiming to aid individuals with severe mental illness in improving their daily functioning and increasing their confidence to reintegrate into normal life. It helps to clarify the significance of family factors and social factors in symptom relief of patients with severe mental disorders in the community.

Materials and Methods

Study Sample and Design

Shandong province is a pilot province for comprehensive mental health management. It has established a city–county–township three-level prevention and control network covering the whole province, with relatively perfect data collection. As the birthplace of Confucian culture, families have a high participation in patient care, and stigma is more significant, and the reporting rate of serious mental disorders is close to that of the whole country. So a cross-sectional study was conducted in Shandong province, China. Shandong province was the second most populous province in China, with 16 prefecture-level cities. In order for the data to fully reflect the differences in health care resources, stigma, economic

burden and social inclusion of people with severe mental disorders, multi-stage cluster random sampling was adopted in our study. First, the 16 prefecture-level cities were divided into two groups based on their economic development: developed and underdeveloped. One city was randomly selected from each group (Jinan, Zaozhuang) and one district was randomly selected from each city (Zhangqiu, Taierzhuang). Then six communities were randomly selected for each area. In the end, a total of 12 communities were chosen randomly. Patients with six types of severe mental disorders registered in the community were randomly selected including schizophrenia, schizoaffective disorder, paranoid psychosis, bipolar disorder, epilepsy-associated mental disorder, and intellectual disability with accompanying mental disorder. "The 686 Program" in China aimed increase the rate of patients´ recovery and return to society. It had developed a new model out of the specialty mental hospital to township or neighborhood level health clinics which provide outreach services into the community.[28] It had registered and assessed patients with severe mental illness, and followed up patients with risk behavior tendencies. When the SMI patients were diagnosed by psychiatric hospitals, their information was recorded in the Shandong Province Management Information System for patients with Severe Mental Disorder in order to provide assistance. Totally, there were 486 valid questionnaires collected in the study.

G*Power is a stand-alone power analysis program for many statistical tests commonly used in the social, behavioral, and bio-medical sciences. We use multiple linear regression based on the random predictor model to calculate sample sizes.[29] This study was a regression analysis, so F distribution was selected, which could verify the effectiveness of the overall regression.[30] For statistical test, multiple linear regression was selected, with effect size 0.15, significance level 0.05, and efficacy 0.95. There were 12 independent variables in the regression of this study, so 184 sample sizes were calculated. When the effective recovery rate of the questionnaire is above 70%, the results can be used as the basis for the conclusion. Therefore, a minimum of 263 sample sizes were required. This study included 486 patients with severe mental disorders, which met the sample needs.

Interview Procedures

The interview of our study was conducted from August to September 2022. Each researcher received professional training prior to the investigation. Investigators were trained on the application of the scale and data collection. Before the investigation began, investigators introduced the purpose, significance, methods, and contents of the research to the interviewees in detail, and promised the principle of privacy protection, so that the interviewees had a full understanding of the research process. The study met ethical standards and handwritten consent was obtained from the subjects. For those with mental disorders who were able to answer, we had obtained their informed consent, and for those with mental disorders who were unable to answer or are under the age of 18, we had obtained the informed consent from their legal guardians. Then, with the informed consent of each subject, according to the questionnaires we prepared in advance, interviewers arranged one-on-one and face-to-face interviews. Because of the specificity of the subjects, the patients' caregivers were invited to accompany them. For patients with impaired cognitive and communication functions or patients younger than 18 years of age, their caregivers answered instead as they were the main caregivers of the patients with a better understanding of patients´ condition, giving a more accurate evaluation.[31]

In order to ensure the completeness and accuracy of the data, the interviewers recruited this time all had a professional background in public health, and the training was organized to help the investigators understand the background and purpose of the investigation, get familiar with the investigation process and questionnaire content, and master the questionnaire filling requirements and questioning skills. After the training, a simulation survey was conducted, and problems were discussed and standardized in time. Every investigator must pass the examination before they can participate in the field investigation. According to the research needs, the investigators were divided into different groups, and there were four rounds of questionnaire quality inspection: questionnaire self-inspection, intra-group mutual inspection, group mutual inspection, and general captain spot inspection. Epidata 3.1 is used to establish the database, and data input is carried out in the way of double input. SPSS 25.0 is used for data cleaning, which mainly includes correcting logic errors, eliminating outliers and missing values. Data missing more than 10% of this research object is directly deleted. Normally distributed numerical variables are filled with the mean, skewed or outlier data are filled with the median, and categorical variables are filled with the mode.

This study was approved by Shandong University with the approval number LL20210803. Other than that, international ethical standards were adhered to. This project was a study on the treatment and management status of patients with severe mental disorders in Shandong Province.

Measures

Psychiatric Symptoms

The Brief Psychiatric Rating Scale (BPRS) was used to testify the psychiatric symptoms of the subjects who were interviewed. It was developed by Overall in 1988, and was one of the most widely used professional rating scales in psychiatry, with a total of 18 items.[31] Scored by five types of factors (anxiety and depression factor, lack of vitality factor, thinking disorder factor, activation factor, hostile suspicion factor), BPRS was a scale to access the severity of psychiatric symptoms. The total score was 18–126 and reflects the severity of the disease: the higher the total score, the more serious the disease. BPRS had also been shown to have good reliability and validity in a Chinese population.[32,33]

Housework

Housework was estimated by the question: "The average time you spend doing housework every day", and participants could choose answers from "<1 hour", "1–2 hours", ">2 hours".

Self-Stigma

Self-stigma was one of a range of personal responses to mental illness; it was measured using the Stigma Scale for Chronic Illness 8-item version (SSCI-8), which was a newly developed short-form instrument[34] appropriate for patients with chronic illness. The item was scored based on a five-point Likert scale from "Never" to "Always". Patients responded to items based on their personal experiences. The higher the score, the higher the level of self-stigma. The SSCI-8 has been proved to have good reliability and variability in China.[35] The Cronbach alpha was 0.917.

Social-Demographic Variables

Based on previous research, data on participants demographic information, clinic and social contact variables were collected, including gender, age, religion, marriage, education, occupation, labor capacity, living alone, liability, chronic disease, and disease status.[14,36]

Statistical Analysis

IBM SPSS Statistics 21 was used for data analysis. Continuous variables with non-normal distribution (self-stigma, psychiatric symptoms) were described by median (interquartile distance) [Median(P_{25}–P_{75})], and categorical variables were described by frequency and component ratio. Since the score of psychiatric symptoms in this study did not conform to the normal distribution, a non-parametric test should be adopted (Mann–Whitney *U*-test was used for two independent samples; Kruskal–Wallis test was used in multiple independent samples to compare the differences of mental symptoms in different sociodemographic characteristics and health status of patients with severe mental disorders. Spearman correlation analysis was used to determine the correlation between mental symptoms and stigma. Linear regression was conducted to verify if mediation was present in the study. The mediation model was analyzed by PROCESS macro for SPSS. The bias-corrected 95% confidence interval (CI) was calculated with 5000 bootstrapping re-samples. In statistics, Confidence Interval (CI) is the core tool for judging the statistical significance of results and the actual significance of effects, which is far more significant than mere *P*-values. If the 95% CI does not contain invalid values (such as 0), the results are statistically significant at the $\alpha = 0.05$ level. CI provides more information (such as effect range) than *P*-values. Model 4 was used to verify the mediation, including testing the direct effect (X→Y) and indirect effect (X→M→Y) of the independent variable on the dependent variable. Statistical significance was defined as a two-tailed *P*-value <0.05. In addition, all models were controlled for covariates[37,38] (age, religion, marriage, education, occupation, labor capacity, living alone, liability, chronic disease, disease status) and the study variables were standardized. Data sets and results generated in this study are available on request from the corresponding authors.

Results

Sample Description and Single Analyses for Gender Difference

There were 486 participants with severe mental illness who were successfully interviewed from rural communities in Shandong Province, China. Sample descriptions and single analyses for gender difference are revealed in Table 1. There were significant differences in the gender difference of different ages (P= 0.001), religions (P = 0.023), marriage (P <0.001), education (P <0.001), housework (P <0.001), and self-stigma (P = 0.023).

Table 1 Sample Description and Single Analyses for Gender Difference [n (%)]

Variables	All	Male	Female	Z/X^2	P
Age				15.171	0.001
0–40	124 (25.5%)	72 (34.3%)	52 (18.8%)		
41–64	244 (50.2%)	95 (45.2%)	149 (54.0%)		
≥65	118 (24.3%)	43 (20.5%)	75 (27.2%)		
Religion				5.185	0.023
Yes	66 (13.6%)	20 (9.5%)	46 (16.7%)		
No	420 (86.4%)	190 (90.5%)	230 (93.3%)		
Marriage				69.772	<0.001
Married	328 (67.5%)	99 (47.1%)	229 (83.0%)		
Others	158 (32.5%)	111 (52.9%)	47 (17.0%)		
Education				24.157	<0.001
Primary school or below	301 (61.9%)	104 (49.5%)	197 (71.4%)		
Middle school or above	185 (38.1%)	106 (50.5%)	79 (28.6%)		
Occupation				0.478	0.489
Yes	210 (43.2%)	87 (41.4%)	123 (44.6%)		
No	276 (56.8%)	123 (58.6%)	153 (55.4%)		
Labor capacity				0.908	0.635
Have ability to work	129 (26.5%)	52 (24.8%)	77 (27.9%)		
Have some ability to work	164 (33.7%)	70 (33.3%)	94 (34.1%)		
Incapacity to work	193 (39.7%)	88 (41.9%)	105 (38.0%)		
Living alone				3.651	0.056
Yes	44 (9.1%)	25 (11.9%)	19 (6.9%)		
No	442 (90.9%)	185 (88.1%)	257 (93.1%)		
Liability				0.116	0.733
Yes	135 (27.8%)	60 (28.6%)	75 (27.2%)		
No	351 (72.2%)	150 (71.4%)	201 (72.8%)		
Chronic disease				1.553	0.213
Yes	217 (44.7%)	87 (41.4%)	130 (47.1%)		
No	269 (55.3%)	123 (58.6%)	146 (52.9%)		
Disease status				5.141	0.077
Acute	34 (7.0%)	19 (9.0%)	15 (5.4%)		
Stable	32 (6.6%)	18 (8.6%)	14 (5.1%)		
Maintenance	420 (86.4%)	173 (82.4%)	247 (89.5%)		
Housework				22.82	<0.001
<1 hour	315 (64.8%)	160 (76.2%)	155 (56.2%)		
2–3 hours	97 (20.0%)	24 (11.4%)	73 (26.4%)		
>3 hours	74 (15.2%)	26 (12.4%)	48 (17.4%)		
Self-stigma	19.50(10.00–27.00)	22.00(12.00~28.00)	17.00(10.00~26.00)	−2.267	0.023
Psychiatric symptom	54.00(39.00–70.00)	55.00(39.00~68.00)	52.00(38.25~87.30)	−0.199	0.842

Socio-Demographic Characteristics and the Distribution of Psychiatric Symptoms among People with Severe Mental Disorders

The differences in psychiatric symptoms in socio-demographic characteristics among the total population and males and females are shown in Table 2. In the general population, occupation (P =0 .001), labor capacity (P <0.015), liability (P <0.001), chronic disease (P = 0.0015), disease status (P = 0.014), housework (P <0.001), and self-stigma (P <0.001) were associated with psychiatric symptoms among people with severe mental disorder. Among the males with severe mental disorder, labor capability (P = 0.004), liability (P = 0.001), housework (P = 0.005), and self-stigma (P <0.001) were associated with psychiatric symptoms. Whereas, among females with severe mental disorder, occupation (P = 0.001), labor capability (P <0.001), liability (P = 0.001), housework (P <0.001), and self-stigma (P <0.001) were associated with psychiatric symptoms.

Linear Regression Analysis of Self-Stigma between Housework and Psychosis Symptoms among Males and Females

Regression analysis was performed on the relationship between housework, self-stigma, and psychiatric symptoms, with age, religion, marriage, education, occupation, labor capacity, living alone, liability, chronic disease, and disease status as control variables. Regression results among males and females are shown in Table 3. In both genders, we conducted three models (Male: A1, A2, A3, Female: B1, B2, B3) to examine whether self-stigma mediated the relationship between housework and psychiatric symptoms. Housework is the independent variable and psychiatric symptoms the dependent variable in Models A1 and B1. Self-stigma is the independent variable and psychiatric symptoms the dependent variable in Models B1 and B2. Housework and self-stigma are independent variables and psychiatric symptoms the dependent variable in Models C1 and C2. In males, the results showed that housework was negatively associated with psychiatric symptoms (β = −5.44, P <0.01), whereas self-stigma was positively associated with psychiatric symptoms (β = 0.73, P <0.001). But, in females, the regression coefficient of housework was not significant (β = −1.86, P >0.05), and the regression coefficient of self-stigma was significant (β = 0.96, P <0.001), indicating that self-stigma was a complete mediator between female housework and psychiatric symptoms.

Mediation Analysis

Based on previous literature and statistical studies, age, religion, marriage, education, occupation, labor capacity, living alone, liability, chronic disease, and disease status were used as control variables. With housework as the independent variable, self-stigma as the mediating variable, and psychiatric symptoms as the dependent variable, the mediating effect models of males and females were constructed, respectively. As shown in Figure 1, there were no mediating effects on male housework, self-stigma, or psychiatric symptoms, since the coefficient of housework on self-stigma was not significant (β = −0.166 (95% CI = −1.984, 1.652), P >0.05). Whereas in females (shown in Figure 2), the results of mediation analysis showed that the total effect (path c) of housework on psychiatric symptoms was significant (β = −4.088 (95% CI = −7.706, −0.469), P <0.05). The significant coefficient of path a (β = −2.322 (95% CI = −3.922, −0.723), P <0.01) and path b (β = 0.959 (95% CI = 0.711, 1.208), P <0.001) indicated the negative association of housework on self-stigma, and a positive association of self-stigma on psychiatric symptoms. Besides, the point estimates of an indirect effect (path a*b) between housework and psychosis symptoms was −2.228 (SE = 0.857), and the 95% bias-corrected bootstrap confidence interval was (−4.046, −0.716), which indicated that the indirect effect of housework on psychiatric symptoms was statically significantly. In addition, the direct effect of housework on psychiatric symptoms (path c′ = −1.860 (95% CI = −5.193, 1.473), P >0.05) was not significant, indicating that self-stigma fully mediated the relationship between housework and psychiatric symptoms.

Discussion

Gender Difference

The present study examined the relationship between housework, self-stigma, and psychiatric symptoms among people with severe mental illness living in the community, and found that there were differences in housework participation between men and

Table 2 Socio-Demographic Characteristics and the Distribution of Psychosis Symptoms among People with Severe Mental Disorders

Variables	Psychosis Symptoms (Total)			Psychosis Symptoms (Male)			Psychosis Symptoms (Female)		
	M (P_{25}~P_{75})	Z/H/r	P	M (P_{25}~P_{75})	Z/H/r	P	M(P_{25}~P_{75})	Z/H/r	P
Age		1.883	0.390		1.536	0.464		0.808	0.668
0–40	52.00 (38.25~66.75)			54.00 (37.50~67.75)			50.50 (38.50~64.75)		
41–64	55.50 (38.00~70.00)			57.00 (38.00~67.00)			55.00 (38.00~71.00)		
≥65	53.00 (39.00~73.25)			55.00 (42.00~76.00)			52.00 (39.00~72.00)		
Religion		−0.10	0.992		−0331	0.741		−0.185	0.853
Yes	69.00 (39.00~54.00)			55.00 (39.75~68.00)			52.50 (39.00~71.00)		
No	55.00 (37.00~71.00)			61.50 (37.25~75.00)			51.00 (36.75~71.00)		
Marriage		−1.035	0.301		−1.288	0.198		–0.438	0.661
Married	53.50 (39.00~71.00)			55.00 (40.00~76.00)			53.00 (39.00~71.00)		
Others	54.00 (38.00~68.00)			55.00 (38.00~67.00)			51.00 (38.00~70.00)		
Education		−0.161	0.872		−0.199	0.842		−0.541	0.558
Primary school or below	53.00 (40.00~69.00)			55.00 (39.25~67.75)			51.00 (40.00~70.00)		
Middle school or above	55.00 (37.00~71.00)			54.00 (38.00~69.25)			71.00 (56.00~83.00)		
Occupation		−3.329	0.001		−1.453	0.146		−3.222	0.001
Yes	56.50 (41.00~75.00)			57.00 (40.00~73.00)			55.00 (41.50~76.50)		
No	50.00 (37.00~65.00)			52.00 (38.00~66.00)			46.00 (36.00~64.00)		
Labor capacity		5.875	0.015		10.973	0.004		26.875	<0.001
Have the ability to work	44.00 (35.00~61.00)			51.00 (35.00~67.00)			56.50 (41.00~56.50)		
Have some ability to work	51.50 (36.00~68.75)			49.50 (36.75~63.00)			55.50 (36.00~71.25)		
Incapacity to work	60.00 (46.00~78.00)			61.50 (46.00~74.75)			55.00 (46.00~82.50)		
Living alone		−1.217	0.224		−0.833	0.405		−1.047	0.295
Yes	51.00 (36.50~65.75)			52.00 (41.00~66.00)			48.00 (33.00~60.00)		
No	54.00 (39.00~71.00)			55.00 (39.00~70.00)			53.00 (39.00~71.00)		
Liability		−4.523	<0.001		−3.401	0.001		−3.234	0.001
Yes	63.00 (46.00~79.00)			65.50 (44.50~79.75)			57.00 (46.00~75.00)		
No	51.00 (37.00~66.00)			52.00 (37.00~66.00)			49.00 (36.00~68.50)		
Chronic disease		−2.424	0.015		−1.658	0.097		−1.856	0.064
Yes	55.00 (40.00~74.00)			55.00 (40.00~76.00)			55.00 (41.00~73.00)		
No	51.00 (37.00~66.00)			54.00 (38.00~66.00)			49.50 (37.00~67.50)		
Disease status		8.497	0.014		5.560	0.062		3.448	0.178
Acute	65.50 (45.67~82.25)			68.00 (45.00~82.00)			64.00 (50.00~83.00)		
Stable	51.00 (32.00~71.75)			48.50 (30.00~73.00)			51.50 (35.75~51.50)		
Maintenance	53.00 (38.25~68.00)			55.00 (39.00~66.50)			51.00 (38.00~70.00)		
Housework		35.874	<0.001		10.645	0.005		26.364	<0.001
<1 hour	57.00 (44.00~75.00)			57.00 (42.25~72.75)			57.00 (45.00~77.00)		
2–3 hours	44.00 (34.50~59.50)			48.00 (33.00~60.75)			42.00 (35.00~59.50)		
>3 hours	43.50 (33.00~66.00)			42.00 (30.00~66.25)			43.50 (33.50~65.50)		
Self-stigma	19.50 (10.00–27.00)	0.431	<0.001	22.00 (12.00~28.00)	0.388	<0.001	17.00 (10.00~26.00)	0.463	<0.001

Abbreviation: SD, standard deviation.

Table 3 Linear Regression Analysis for the Factors Associated with Self-Stigma and Symptoms [β (95% CI)]

Variables	Males		
	Model A1 DV = PS	**Model A2 DV = Self-Stigma**	**Mode A3 DV = PS**
Age	4.92 (0.27, 9.56) *	0.64 (−1.50, 2.78)	4.45 (0.06, 8.85) *
Religion	1.20 (−7.89, 10.29)	−3.32 (−7.50, 0.87)	3.61 (−5.03, 12.25)
Marriage	0.17 (−6.63, 6.97)	0.08 (−3.05, 3.21)	0.11 (−6.31, 6.54)
Education	1.85 (−3.61, 7.31)	1.50 (−1.01, 4.02)	0.76 (−4.42, 5.94)
Occupation	−2.27 (−8.45, 3.92)	−0.22 (−3.06, 2.63)	−2.11 (−7.95, 3.73)
Labor capacity	2.54 (−1/32, 6.41)	1.90 (0.12, 3.68) *	1.16 (−2.53, 4.86)
Living alone	4.35 (−4.89, 13.59)	−1.26 (−5.52, 2.99)	5.27 (−3.47, 4.01)
Liability	−9.10 (−15.65, −2.56) **	−4.38 (−7.39, −1.36) **	−5.92 (−12.24, 0.39)
Chronic disease	−1.40 (−7.47, 4.67)	0.59 (−2.21, 3.38)	−1.83 (−7.56, 3.91)
Disease status	−2.04 (−6.61, 2.53)	−1.86 (−3.96, 0.25)	−0.69 (−5.04, 3.66)
Housework	−5.56 (−9.51, −1.61) **	−0.17 (−1.98, 1.65)	−5.44 (−9.18, −1.71) **
Self-stigma	-	-	0.73 (0.44, 1.01) ***
Constant	61.95 (23.77, 100.14) **	31.29 (12.72, 48.87) **	39.21 (2.03, 76.40) *
R^2	0.099	0.081	0.196
	Females		
	Model B1 DV = PS	**Model B2 DV = Stigma**	**Model B3 DV = PS**
Age	0.87 (−3.16, 5.89)	0.04 (−1.74, 1.82)	0.83 (−2.82,4.48)
Religion	0.24 (−6.38, 6.85)	0.11 (−2.82, 3.04)	0.13 (−5.88,6.14)
Marriage	−0.78 (−8.24, 6.68)	−2.94 (−6.24, 0.36)	2.04 (−4.77,8.84)
Education	−0.26 (−5.94, 5.43)	−0.95 (−3.46, 1.57)	0.65 (−4.51,5.81)
Occupation	−3.13 (−8.64, 2.38)	−0.51 (−2.95, 1.92)	−2.64 (−7.64,2.36)
Labor capacity	5.92 (2.28, 9.56) **	0.82 (−0.79, 2.43)	5.14 (1.83,8.44) **
Living alone	0.45 (−10.99, 11.88)	−0.91 (−5.97, 4.15)	1.32 (−9.06,11.70)
Liability	−7.47 (−13.16, −1.78) *	−3.76 (−6.27, −1.24) **	−3.87 (−9.11,1.38)
Chronic disease	−3.16 (−8.36, 2.05)	0.45 (−1.85, 2.75)	−3.58 (−8.30,1.14)
Disease status	−2.59 (−7.69, 2.52)	−0.58 (−2.83, 1.68)	−2.04 (−6.67,2.60)
Housework	−4.09 (−7.71, −0.47) *	−2.32 (−3.92, −0.72) **	−1.86 (−5.19, 1.47)
Self-stigma	-	-	0.96 (0.71, 1.21) ***
Constant	77.82 (38.18, 117.47) ***	35.26 (17.73, 52.79) ***	44.00 (6.98, 81.03) *
R^2	0.131	0.074	0.285

Note: * *P* <0.05; ** *P* <0.01; *** *P* <0.001.
Abbreviations: PS, psychosis symptoms; DV, dependent variable; CI, confident interval.

women, and most patients with SMI spend less than 1 hour on housework. Housework was negatively associated with psychiatric symptoms in both men and women. In all genders, self-stigma was positively associated with symptoms. For women, housework can reduce self-stigma, but men's participation in housework does not reduce self-stigma.

Cultural and Societal Influence

The study found that most SMI did housework less than 1 hour, even less time than older adults in the West spend on housework.[39] Consistent with previous research, most people with SMI had more severe family and social dysfunction, and might lack stamina and enthusiasm for life, leading to an unwillingness to participate in housework.[14] In addition, among people with SMI in China, men had more severe self-stigma than women. This was contrary to a previous study which demonstrated that women predicted greater self-stigma of the disease.[40] This might be due to the fact that the men in the study population were more likely to make social comparisons, might lose the ability to achieve their goals due to illness, and were often perceived as violent.[41,42]

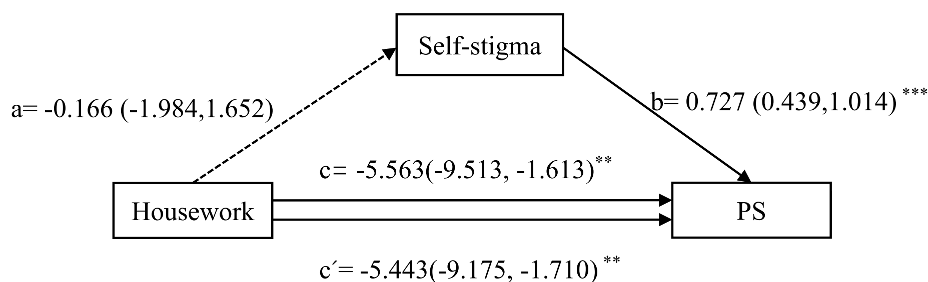

Figure 1 An output model of self-stigma mediating in males.
Note: ** *P* <0.01, *** *P* <0.001.
Abbreviation: PS, psychiatric symptom.

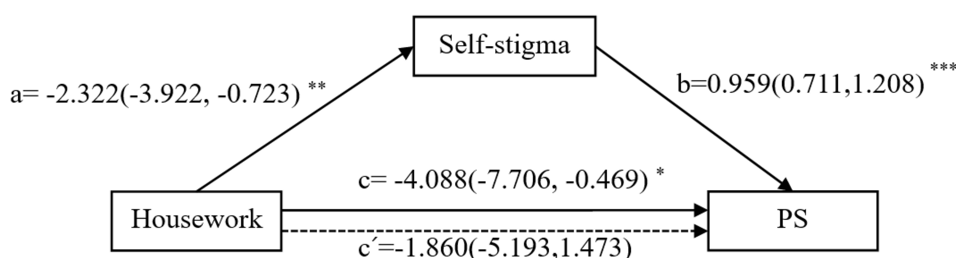

Figure 2 An output model of self-stigma mediating in females.
Note: * *P* <0.05, ** *P* <0.01, *** *P* <0.001.
Abbreviation: PS, psychiatric symptoms.

Research has testified that housework could alleviate psychiatric symptoms in both men and women with SMI. Self-determination theory (SDT) is a social theory of personality, involving the choice motivation of health behavior, which includes three basic psychological needs in human development, namely, the need for autonomy, the need for ability, and the need for belonging. Satisfying these three psychological needs can promote the internalization of individual external motivation and better motivate people's will and behavior.[43] With deinstitutionalization, patients gradually return to society, but the social participation of people with SMI was still less, as most of them slept or sat and watched TV.[14,44,45] Reducing symptom-related problem was the main goal of the treatment of mental disorders.[46] Housework could provide a realistic platform maintaining good social functioning and family interactions. It could enhance the confidence of people with SMI and give them a sense of accomplishment.[8,47–49] Housework could enable people with SMI to undergo a transition from passive dependence to self-action, from isolation to connection, and developnew meaning and purpose in life.[50,51]

Self-stigma is positively correlated with psychiatric symptoms in both genders. Previous studies have shown that self-stigma is not independent of the socio-cultural environment, and the self-stigma of mental disorders in China is higher than that in Western countries,[52] and at the level of psychopathology, self-stigma was associated with an increase in depression and anxiety.[53] In addition, internalizing stereotypes could aggravate psychiatric symptoms.[7] Possible reasons were that self-stigma called into question the social worth of people with SMI, thereby reducing the patients´ hope and self-esteem,[22] reducing service utilization and treatment adherence,[54] increasing the risk of suicide, leading to a vicious cycle of disability, and thus exacerbating psychiatric symptoms.

One interesting finding was that women's participation in housework reduced self-stigma, but men's participation in housework did not. Social exchange theory also emphasized that people who got a lot from others needed to give just as much in return under stress. Traditional Chinese Confucian culture emphasizes that the family is the basic unit of society, and women are the main force in the family, responsible for running the house and raising children. Roles such as daughter, wife, and mother are embedded in the family environment and linked to specific family responsibilities. Housework is consistent with the role of good wife and good mother in traditional culture, and fulfilling this role can

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strengthen social identity and reduce self-shame, while male housework conflicts with the expectation of the role of breadwinner, resulting in a decline in self-evaluation.[55] Men are more likely to compare themselves to society, to find their own incompetence, thus aggravating self-stigma,[56] whereas women are more likely to feel neglected,[42] the self-stigma reduced the interaction of patients, resulting in self-isolation, negative emotions and stress accumulation,[57,58] while housework provided women with the opportunity to interact, had a valuable social role, increasing self-esteem and reducing the self-stigma of illness.[51]

In addition, we found that, in women, disease stigma completely mediated the effect of housework on psychiatric symptoms in patients with mental disorder, while, in men, there was no mediating effect. As a meaningful family participation activity,[59] housework brought purpose and positive emotions to women´s lives,[60] provided them with opportunities to connect with their families, and obtained more support and respect from their families,[61] thus alleviating the self-stigma of disease and promoting the relief of symptoms. Women were the main providers of housework, and too much housework associated with lower health, while too much housework is associated with a lower incidence of death and disease for men.[14,62] Male household involvement may alleviate negative symptoms (such as lack of will) directly through regular activities.

Limitations

There are several limitations in this study. First, the cross-sectional nature of the study limits the causality of the findings, and future longitudinal studies are needed to verify the temporal effects. Second, the collected data was self-reported by the subjects, and there might be recall bias, to some extent, exaggerating or underestimating the relationship between the study variables. It is recommended that they be supplemented by objective behavioral monitoring. Third, the sample was selected from Shandong province of China, thus, generalizability must be treated with caution. Fourth, there were some variables that might play an important role between variables such as medications and co-occurring disorders that were not included in our research. These variables need to be examined further. Finally, the number of participants was relatively small, which may lead to anincrease in probability of errors in statistical significance.

Implications for Intervention

These findings have implications for future interventions. The link of family factors, social factors, and disease are set. People with SMI often encounter stigmatization due to their identity and behaviors, and thus experience higher levels of psychiatric symptoms. It was valuable to encourage people with SMI to participate in housework, it could help to improve the relevant abilities of daily living, improve family relations, and strengthen family interaction and practice, which could lead to improvements in other functions. Valuable roles could help build confidence and return to normal life.

Communities can hold skills workshops, train patients to complete stepped family tasks, invite family members to participate in the display of results, and collaborate with social groups such as women's federations to carry out anti-stigma awareness activities; instruct families to adjust language to describe housework as "healing progress" rather than "responsibility", while affirming and actively encouraging the patient's household contributions. Redefining housework as "shared family responsibility" rather than "exclusively for women, emphasizes male participation as an important contribution to the family.

Conclusion

Our study focused on self-stigma, psychiatric symptoms, and behavior of housework of people with SMI in rural China. Our research had confirmed that housework could alleviate psychiatric symptoms in both men and women, and reduce illness self-stigma in women. Self-stigma significantly affects the relationship between housework and psychiatric symptoms in women. Our study established the relationship between family factors, social factors, and psychiatric symptoms. Therefore, encouraging people with SMI to participate more in housework and helping to reduce self-stigma of illness might be useful targets to alleviate psychiatric symptoms of illness in Chinese patients.

Abbreviations

DALYs, Disability adjusted life years; SMI, Severe Mental Illness; BPRS, Brief Psychiatric Rating Scale; SSCI-8, Self-stigma Scale for Chronic Illness 8-Item version; ANOVA, Analysis of Variance; CI, Confidence Interval; SD, Standard Deviation; SE, Standard Error; DV, Dependence Variable; PS, Psychiatric Symptoms.

Availability of Data and Materials

The datasets generated for this study are available on request to the corresponding author.

Ethics Approval and Consent to Participate

The studies involving human participants were reviewed and approved by the Ethics Committee of School of Public Health, Shandong University (LL20210803). The patients/participants provided their written informed consent to participate in this study. The principles set forth in the Helsinki Declaration were also observed.

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Author´s Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising, or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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