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ORIGINAL RESEARCH

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Impact of social participation on rural male population's mental health: evidence from the 2020 China family panel studies

Deqiang Yang[1,*]

[1]School of Public Administration and Law, Hunan Agricultural University, 410128 Changsha, Hunan, China

***Correspondence**
sx20210653@stu.hunau.edu.cn
(Deqiang Yang)

Abstract

Social participation in recent years has been an important mean of enhancing mental health. It is thus increasingly been focused in countries around the world. However, existing research lacks on the analysis of their relationship. Pertaining to the increasing men's mental health issues, this study is aimed to explore the impact of social participation on mental health of China's rural male population. This can practically improve the health of rural population and promote the Healthy China Strategy and the Rural Revitalization Strategy. Data from the 2020 China Family Panel Studies were used to analyze the impact of social participation on rural male population's mental health via the ordinary least squares model. Social participation reduced the depression levels of rural male population. Social participation exhibited lower depression levels for those with high compared to those with low. Both labor practice and virtual network participations improved the mental health of rural male population with the former having more impact. Social participation improves the mental health of rural male population. The government should thus create environment for the social participation of population, continuously improve these levels, expand diversified social participation channels, and adopt modern digital technology to improve health and promote implementation of the Healthy China strategy and high-quality development of rural medical and health services.

Keywords

Social participation; Rural male population; Mental health

1. Introduction

An important indicator of country or society healthcare development is the health level of its population [1]. The demand for mental health among rural male residents has increased with the improvements of material standard of living in rural China [2]. According to the China National Mental Health Development Report (2019–2020), in 2021, the detection rate of depression in China's rural population is 16.6%, which is higher than that of urban residents (14%). The rural mental health situation is thus not as optimistic as of urban. The studies have also shown that men mental health problems are more prominent than of women [3–5]. The mental health problems of rural male residents thus need more attention. Social participation is an important mean of enhancing individual mental health and has increasingly been considered by countries worldwide [6, 7]. The academic community has not yet reached unified consensus on the definition of social participation. Some scholars hold that it focuses community-level activities and define it as the community-based social interaction, leisure, recreation, volunteerism and civic participation that promotes the interests of individuals and society [8]. Others define it from the perspective of motivation for participation and hold that it includes the participation that satisfies individual needs, serves the interests of others, and contributes to society [9]. The core elements of social participation are inseparable from the behavior of individuals participating in social activities. With the continuous development of Internet technology, an increasing number of individuals are involved in "online" activities. This paper defines social participation based on two dimensions, *i.e.*, labor practice participation which includes social work, physical exercise and social security, and virtual network participation which encompasses the usage of Internet, online speech and online shopping.

The existing studies have consensus that social participation positively affects mental health and well-being [10, 11]. Chen *et al.* [12] found that the incidence ratio of better mental health among older adults with social participation and family support was 5.72% to 17.50%. The leisure and recreational social participation and living with family had promotional effects on mental health of older adults. Xiao's study showed that the elderly's participation in paid labor, caring for grandchildren, voluntary activities, and community voting had positive impact on mental health. Greater number of activities had greater

positive effect [13]. Existing research has provided some results, however, certain shortcomings still exist. First, regarding the conceptual definition, current research focuses on labor practice participation in real society and neglect network participation pertaining to the technological advances. Regarding the research object, most studies focus on older adults or the entire population. Research on mental health in rural areas, especially for the male population is insufficient. Owing to the characteristics of urban-rural duality in China, a large gap exists between rural and urban areas regarding infrastructure and social participation channels [14]. Therefore, assessing the relationship between social participation and the mental health of rural male population has practical significance to improve the overall health in rural areas and promote the rural revitalization strategy. The purpose of this study is to use the latest 2020 China Household Tracking Survey data to empirically analyze social participation's impact on mental health of rural male population and conduct robust tests and heterogeneity analyses. They would provide empirical evidence on the relationship between social participation and mental health of rural male population regarding the new era. It has practical value for the smooth promotion of Healthy China Strategy and Rural Revitalization Strategy.

2. Study design

2.1 Data sources

Data of this study were derived from the 2020 China Family Panel Studies (CFPS). Database from the Centre for Social Research and Studies of Peking University was a survey on entire country with authority and typicality. Being a public database, the users could apply and obtain access on the Centre for Social Research and Studies of Peking University's official website (http://www.isss.pku.edu.cn/cfps/index.htm). The target population of this study was rural male residents. The sample pool had rural residents as the respondents for statistical analysis. This study focused on the social participation and mental health of rural residents. Adult self-response questionnaires were selected as the primary sample. Missing values (N = 1216), outliers (N = 37) and invalid variables (N = 3) were eliminated by screening the samples. Finally, 13,199 valid samples were obtained.

2.2 Variable selection

2.2.1 Dependent variable

The explanatory variable in this study was mental health of rural male population. Following the previous research, depression level was used to indicate this variable [15, 16]. CFPS database being a large-scale survey in China was typical and authoritative and could reflect the current developments of Chinese society. The 2020 CFPS used a version of CES-D8 question, "Indicate the frequency of various feelings or behaviors in the past week" including "I feel like life cannot go on", "I feel sad and upset", "I live a happy life", "I feel lonely", "I feel happy", "I do not sleep well", "I find it hard to do anything" and "I feel depressed". Values of 0 to 3 were assigned to each of the four response alternatives, namely, "Hardly ever (less than a day)", "Occasionally (1–2 days)", "Frequently (3–4 days)" and "Most of the time (5–7 days)". The reverse question was transposed. The eight scores were summed up to get final value of 0 to 24. Higher scores indicated that the respondent had more severe tendency for depression in the past week, *i.e.*, poorer mental health.

2.2.2 Independent variables

The core explanatory variable was social participation. The specific activity content of social participation was accessed in the modules of work status, social interactions and activities, religion and politics, Internet usage and health level, as available in the 2020 CFPS database. The labor practice and virtual network participations were selected as the two dimensions of social participation based on related studies and combining the questionnaire content [17–19]. These two dimensions were selected because of the continuous development of Internet technology, and participation of more and more residents in "online" activities via Internet platforms. The number of Internet users had reached 1.092 billion (the largest number of Internet users in world) in Chinese society, and the Internet had penetrated in all the aspects of society [20, 21]. This paper thus defined the social participation in two dimensions considering this reality and referring to previous studies: labor practice participation and virtual network participation. The labor practice participation included five subdimensions namely, social labor, physical exercise, social security, association membership and political election. Virtual network participation had seven subdimensions namely, Internet use, online speech, online shopping, using WeChat, online learning, watching short videos and playing online games. The respondent answering yes to any of 12 dimensions was assigned a value of 1 to indicate participation in that social activity, otherwise, it was assigned a value of 0. Various types of social participation were summed up to obtain core explanatory variable of social participation.

2.2.3 Control variables

Population health as per the theory of health economics had been affected by number of factors including medical care, health services, education, income, lifestyle and the environment [22–24]. Based on previous studies [25, 26] and integrating them herein, the control variables included individual characteristic variables like age and marital status. Furthermore, the mental health of rural male population might be affected by bad habits such as smoking, alcohol abuse and staying up late, and series of social subjective judgments like respondents' income level, social class and life quality. In conclusion, this study integrated respondents' behaviors and miscellaneous factors like smoking, drinking frequently, staying up late, income status, social status, life satisfaction and subjective well-being into the model and taken as control variables.

2.3 Method

Since the dependent variable of this paper, mental health of the male population, is a continuous numerical variable, this paper analyses the impact of social participation on the mental health of the rural male population using the OLS (Ordinary

Least Squares) regression model, which is constructed with the following econometric model:

$$Health_i = \beta_0 + \beta_1 Participation_i + \sum_{1}^{n} \beta_j x_{ij} + \epsilon_i$$

Where $Health_i$ denotes the mental health level of individual i, $Participation_1$ denotes whether or not the male residents engage in social participation, x_{ij} represents the control variable; β_1 and β_j represent the regression coefficients of the social participation and the control variables, respectively; and ϵ_i is a constant term, which denotes the random interference term.

3. Results

3.1 Descriptive statistical analyses

According to the descriptive statistics provided in Table 1, mean psychological depression self-assessment score in the selected sample is 7.193, social participation overall mean is 4.419 of which the mean values of participations in labor practices and in virtual network are 2.517 and 1.902, respectively. The mean age of sample is 46.427 years with the range of 18–92 years. Regarding the respondents' marital status, 83.45% (N = 11,015) are partnered (married, cohabiting) and 16.55% (N = 2184) unpartnered (unmarried, divorced, widowed). Pertaining to respondents' living habits, 29.4% (N = 3881) smoke and 70.6% (N = 9318) do not, 13.1% (N = 1729) frequently drink alcohol and 76.9% (N = 10,150) do not and 66.7% (N = 8804) stay up late and 33.3% (N = 4395) do not. In terms of income status, 70.84% (N = 9350) consider their income status as high and 29.16% (N = 3849) as low. Regarding social status, 75.3% (N = 9939) consider their social status as high and 24.7% (N = 3260) as low. Further, 94.8% (N = 12,513) and 66.3% (N = 8751) rate their life satisfaction and subjective well-being as high, respectively, while 5.2% (N = 686) and 33.7% (N = 4448) as low.

3.2 Baseline regression results

Table 2 provides the regression results of impact of social participation on mental health of rural male population. Model (1) presents the analysis results when no control variables are included. It reveals that social participation estimated coefficient is negative 0.146 and significant at 1% level, which indicates that it reduces depression level and improves mental health of rural male population. The rural male population with high social participation exhibits lower depression levels. Model (2) adds control variables such as gender, age, marital status, individual habits, self-rated income, and social status to Model (1). Results indicate that the estimated coefficient is negative 0.147 and significant at 1% level, which again verifies that social participation alleviates depression and improves mental health in rural male population.

This study conducts in-depth analysis pertaining to the labor practice and virtual network participations for differentiating the impact of various forms of social participation on mental health in rural male population. Model (3) presents the analysis results of the impact of labor practice and virtual network participations when control variables are not included. Correlation coefficients of the impact of labor practice and virtual network participations are minus 0.284 and minus 0.096, respectively at 1% significance level. Both labor practice and virtual network participations thus improve the mental health of rural male population with the former having more impact. Model (4) also indicates that labor practice and virtual network participations improve the mental health in rural male

TABLE 1. Variable assignment and descriptive statistics analysis.

Variable	Definition	Mean	SE	Min	Max
Mental health	Numeric variable	7.193	4.359	0	24
Social participation	Numeric variable	4.419	2.096	0	11
Labor practice participation	Numeric variable	2.517	0.976	0	5
Virtual network participation	Numeric variable	1.902	1.730	0	7
Age	Numeric variable	46.427	15.040	18	92
Marital status	Unmarried = 1, Married = 2, Cohabiting = 3, Divorced = 4, Widowed = 5	2.088	0.767	1	5
Smoking	No = 0, Yes = 1	0.294	0.456	0	1
Drinking	No = 0, Yes = 1	0.131	0.338	0	1
Staying up late	No = 0, Yes = 1	0.667	0.471	0	1
Income status	1–5 in ascending order	2.942	1.080	1	5
Social status	1–5 in ascending order	3.108	1.092	1	5
Life satisfaction	1–5 in ascending order	4.002	0.964	1	5
Subjective well-being	1–5 in ascending order	7.368	2.199	0	10

Note: The abbreviations: SE: standard deviation; Min: minimum value; Max: maximum value.

TABLE 2. Baseline regression results.

Variable	Model (1) Mental health	Model (2) Mental health	Model (3) Mental health	Model (4) Mental health
Social participation	−0.146*** (0.018)	−0.147*** (0.021)		
Labor practice participation			−0.284*** (0.039)	−0.133*** (0.037)
Virtual network participation			−0.096*** (0.022)	−0.155*** (0.028)
Age		−0.005*** (0.003)		−0.006*** (0.003)
Marital status		0.275*** (0.050)		0.276*** (0.050)
Smoking		0.319*** (0.098)		0.320*** (0.098)
Drinking		−0.166 (0.112)		−0.168 (0.112)
Staying up late		−0.043*** (0.011)		−0.043*** (0.011)
Income status		−0.100*** (0.040)		−0.101*** (0.040)
Social status		0.175*** (0.041)		0.174*** (0.041)
Life satisfaction		−0.809*** (0.045)		−0.809*** (0.045)
Subjective well-being		−0.417*** (0.019)		−0.418*** (0.019)
Cons	7.840*** (0.088)	14.816*** (0.348)	8.090*** (0.109)	14.831*** (0.349)
N	13,199	13,199	13,199	13,199
Adj-R^2	0.0049	0.1257	0.0060	0.1257

*Note: *** indicate significance at the 1% levels, respectively.*

population. It presents the analysis results after adding all control variables. The results are significant at 1% level to indicate that both these dimensions are important in improving the mental health of rural male population.

The estimates of control variables come out as expected. Regarding individual characteristics, age has positive affects and the increasing age has negligible impact on sample's mental health status. Pertaining to marital status, divorced or widowed respondents exhibit higher depression levels than married or cohabiting ones. Concerning individual behavioral habits, those who smoked depict poorer mental health compared to who do not. Those staying up late show better mental health compared to who do not, which can be because they prefer being alone at night to relieve anxiety. Regarding self-assessed income and social status, income positively affects mental health. Those believing higher income depict better mental health compared to who do not. The social status negatively affects mental health. Those believing higher social status show poorer mental health compared to who do not. This can be attributed to the fact that those with higher social status assume more social responsibilities which add psychological pressure and burden. Regarding individual perceptions of living standards, the respondents' mental health improves with the increase in life satisfaction and subjective well-being. Frequent alcohol consumption has no significant effect on respondents' mental health. This can be linked to the China's drinking culture where cultural belief exists that "a little drinking is bad for you, but a lot of drinking is bad for you". So, drinking alcohol may even promote mental health in rural elderly population [27].

3.3 Robustness tests

This study uses replacement variable to conduct robustness test of the model to further assess the impact of social participation. An individual's mental health status is related to the future life expectations. Respondents' confidence in future life is thus selected as the replacement explanatory variable. According to the results in Table 3, Models (5) and (6) are the estimation results of the impact of social participation on rural male population confidence in future life after replacing the explanatory variables. The positive impact of social participation on rural male population confidence in future life is significant at 1% level. It suggests that the social participation increases confidence in future life, which is consistent with the above analysis results. Models (7) and (8) are the estimation results of the impact of labor practice and virtual network participations on the rural male population confidence in future life after replacing the explanatory variables. Both labor practice and virtual network participations positively impact confidence in future life which is consistent with the regression results. Estimation results of the model used in this study exhibit satisfactory robustness. In the 2020 CFPS questionnaire, there is a question "How confident do you feel about your future?". There are 5 options of 1 as very unconfident and 5 as very confident, with the confidence level increasing from 1–5.

4. Discussion

Results of this study indicate that social participation lowers depression levels and improves mental health in rural male population. Generally, the participation of rural male population in social activities like clubs, village events, and door-to-

TABLE 3. Robustness test results.

Variable	Model (5) life confidence	Model (6) life confidence	Model (7) life confidence	Model (8) life confidence
Social participation	0.031*** (0.004)	0.035*** (0.005)		
Labor practice participation			0.065*** (0.009)	0.032*** (0.009)
Virtual network participation			0.019*** (0.005)	0.037*** (0.007)
Age		−0.002*** (0.001)		−0.002** (0.001)
Marital status		0.065*** (0.012)		0.065*** (0.012)
Smoking		−0.081*** (0.024)		−0.081*** (0.024)
Drinking		−0.039 (0.028)		−0.040 (0.028)
Stay up late		−0.010*** (0.003)		−0.010*** (0.003)
Income status		0.022*** (0.010)		0.023** (0.010)
Social status		0.040*** (0.010)		0.039*** (0.010)
Life satisfaction		0.199*** (0.011)		0.199*** (0.011)
Subjective well-being		0.102*** (0.005)		0.102*** (0.005)
N	13,199	13,199	13,199	13,199
Adj-R^2	0.0008	0.0233	0.0003	0.0235

*Note: *** indicate significance at the 1% levels, respectively.*

door visits can help them in venturing outside homes for outdoor activities to activate mind, and decelerate the decline in cognitive functions [28]. This practice can promote emotional communication, stimulate cognition, maintain certain degree of social integration, and prevent depression, loneliness, and other psychological problems. They in turn mitigate the negative emotions. Efforts should thus be made to create favorable environment for social participation [29, 30]. The social participation in rural areas differs from that in urban areas owing to the characteristics of China's urban-rural duality. It is imperative to inculcate positive role of social norms like township rules, industry regulations, and group charters in residents' social participation; create favorable social participation environment of living and working in peace and happiness within stable and orderly society; motivate rural male population to participate in society life; and enhance social development. The interactions among rural male population and in turn social behaviours are improved. Their experience and happiness in social participation become conducive [31, 32].

Different forms of social participations, *i.e.*, labor practice and virtual network have impact on the psychological health of rural men. Men have better physical qualities and strength. Consequently, it is easier to regulate their physiology, balance mentality, and relieve stress in the labor practice process [33, 34]. Studies have shown that participation in physical activity improves the mental health of male population compared to who do not [35, 36]. The number of Internet names in China has reached the highest in world because of the continuous development of Internet technology. Internet penetration rate has reached 76.5%. Internet communication infrastructure has become abundant in rural areas and the era of universal Internet access has arrived. Numerous studies also show that the Internet usage enhances physical and mental health [37, 38]. The participation of rural male population in virtual networks expands the channels and ways of entertainment, and increases opportunities for social participation, social trust, and sense of well-being. Virtual network participation can thus enhance mental health of rural male population.

This study utilizes the latest 2020 CFPS data to empirically analyze the impact of social participation on mental health of rural male population. The conclusions drawn herein are relevant for improving the male population health in China and promoting the development of Healthy China Strategy. The innovations of this study are as follows: first, analysis is performed using the latest database which provides novel empirical evidence of the relationship between social participation of rural male population and health in the new era; second, unlike previous studies, this study selects two dimensions to measure social participation namely, labor practice and virtual network participations which expand the social participation's connotation and scope. This study has some limitations. For instance, certain control variables are selected with multiple perspectives for inclusion in the model, however, the factors affecting the health of male population are complex, thus making omissions inevitable. Hence, the control variables will further be refined and included comprehensively in future studies. The endogenous problem of model can further be eliminated by using propensity score matching and other methods. Additionally, China is a vast country and differences exist among the health levels of rural male populations in the eastern, central and western regions. In future studies, the regional factors will further be controlled and in-depth analysis be conducted through regional heterogeneity test for analyzing the relationship between social participation and male population's health.

Finally, the possibility of bidirectional causality is a limitation of this study. It is not effectively dealt because of the limited data availability on human and complexity of instrumental methods of research. However, it will be expanded further in future studies. The multi-year panel data for analysis will be

used and suitable instrumental variables will be sought to solve the bidirectional causality problem.

5. Conclusions

This study utilizes data derived from the 2020 CFPS to analyze the impact of social participation on mental health of male rural population via the ordinary least squares model and explores the heterogeneity of this impact regarding gender and age. This has practical significance for improving the health of rural residents and promoting the Healthy China Strategy and Rural Revitalization Strategy. Social participation positively affects the mental health of rural male population. It reduces depression levels. Those with high social participation exhibit lower depression levels compared to with low. Both labor practice and virtual network participations improve mental health of respondents with the former having more impact. In future, the Chinese government should create environment for social participation, extend them to rural residents, expand relevant diversified channels, and adopt modern digital technology. These measures would improve health, promote implementation of the Healthy China strategy and develop high-quality rural medical and healthcare services.

AVAILABILITY OF DATA AND MATERIALS

The data of 2020 China Family Panel Studies (CFPS) is publicly available at http://www.isss.pku.edu.cn/cfps/sjzx/gksj/index.htm accessed on 30 December 2021.

AUTHOR CONTRIBUTIONS

DQY—designed the research study; performed the research; analyzed the data; wrote the manuscript. The author contributed to editorial changes in the manuscript. The author read and approved the final manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study was approved by the Ethics Committee of Peking University (IRB approval number IRB00001052-14010). Written informed consent to participate in this study was provided by the participants or the participant's legal guardian/next of kin.

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CONFLICT OF INTEREST

The author declares no conflict of interest.

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