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Research Article

Public Stigma on Depression Comorbid with Diabetes: A Vignette-Method Study in China

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ABSTRACT

Depression and diabetes are common illnesses affecting individuals with health challenges and family stress. This study examined factors predicting public stigma on depression alone or comorbid with diabetes. In Shanghai, 125 respondents read one of four randomly selected vignettes varied by Vignette Subject (VS)'s illness and gender before answering the Individualized Public Stigma (IPS) scale. This vignette method measured each respondent's Individualized Public Stigma score, attitude toward the subject's family with the Devaluation of Consumer's Families score, and problem seriousness leading to stress. A regression analysis found an overall significance ($p<.001$) between IPS and five independent variables: problem seriousness, knowing someone with a mental health problem, subject's gender, attitude toward the affected family, and depression comorbid with diabetes. A person's Individualized Public Stigma is significantly associated with the perceived problem seriousness and sympathy toward the affected family. Yet, comorbidity with diabetes as a factor does not independently predict public stigma against mental illness. This study concludes that the cultural value toward community support can be an educational means to help the public realize the negative impact of public stigma toward mental illness on the patients and their families.

Keywords: Public stigma; Diabetes-associated depression; Family stress; Anti-stigma; Vignette studies

Abbreviations: DCF: Devaluation of Consumer Families; IPS: Individualized Public Stigma; IRB: Institutional Review Board; KMO: Kaiser-Meyer-Olkin; MDD: Major Depressive Disorder; MHP: Mental Health Problem; MR: Multiple Regression; RA: Research Assistant; RMB: Renminbi, official currency of mainland China; SD: Standard Deviation; T2DM: Type 2 Diabetes; VS: Vignette Subject.

INTRODUCTION

Both depression and diabetes are major global public health concerns. In China, the reported prevalence rates of these two illnesses have been drastically increasing. In terms of depression, a cross-sectional epidemiological survey of the prevalence of mental disorders among 32,552 respondents revealed that depressive disorders were the second most common class of disorders in China both in the 12 months before the interview (weighted prevalence 3.6%, 3.0%-4.2%) and in a lifetime (6.8%, 5.8%-7.8%) [1]. Females (4.2%, 3.4%-4.9%) had a higher prevalence than males (3.0%, 2.3%-3.7%) in the 12 months before the interview; however, there was no significant difference between rural (3.7%, 3.0%-4.5%) and urban (3.4%, 2.7%-4.2%) areas [1]. In terms of diabetes, a nationally representative sample of 75,880 participants found that the weighted prevalences of total diabetes, self-reported diabetes, newly diagnosed diabetes and prediabetes were 12.8%, 6.0%, 6.8%, and 35.2%, respectively [2]. A growing body of research indicates that the relationship between depression and diabetes is bidirectional, wherein individuals with diabetes are twice as likely to develop depression. Conversely, those experiencing depression are at a heightened risk for diabetes [3,4]. However, few studies reported how a better understanding of the connection of depression on physical health might lessen the public stigma toward health-associated depression. This study explores Chinese people's perceptions toward families affected by depression and diabetes-associated depression.

METHODOLOGY

Comorbidities of diabetes and depression

Depression and diabetes frequently occur together, and diabetes-associated depression can increase the risk of severe complications

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and mortality [5]. A recent meta-analysis found comorbid depression occurring in approximately one out of four adults with Type 2 diabetes [6]. These increased rates of depressive disorders in adults with Type 1 and Type 2 diabetes range from 8%-15% worldwide [7]. In China, a meta-analysis found 27% of individuals with Type 2 diabetes also had depression, 20% had mild depression, and 10% had moderate to severe depression [8]. A prospective longitudinal study conducted with 17,708 participants across 28 provinces of China found that participants with depressive symptoms at the baseline were 33% more likely to develop Type 2 diabetes, and those with baseline diabetes were at a 35% increased risk of developing persistent depressive symptoms [4].

Studies also address these illnesses among Chinese in different regions. Results from a Shanghai study of 865 Chinese adults found that individuals with employment, higher salary, and at least a college education exhibited more depressive symptoms than their less financially stable and lower educated counterparts [9]. A Hong Kong, study examined psychological comorbidities among Chinese adults with Type 1 diabetes [10]. The higher rate of depression could be due to lifestyle adaptations to diabetes, lack of social interactions, and feelings of losing control of life events due to medical necessities. In Taiwan, compared treatment utilization between 1,209 patients with Type 2 Diabetes (T2DM) and Major Depressive Disorder (MDD) and 12,090 patients with T2DM but no MDD [1]. They found that the MDD group had 23.43% more non-psychiatric outpatient visits than the non-MDD group.

Gender differences were also found in studies of depression comorbid with diabetes. Studied rates of depression in 229,047 adults with diabetes in China found a 4.8% prevalence of subthreshold depression (male, 3.6%; female, 5.5%) and 1.1% prevalence of probable depression (male, 0.8%; female, 1.3%) [11,12]. Another study indicated high depression rates occurred among females (32%) and males (26%) with Type 2 diabetes [8]. Those with both illnesses represent a population in need of mental and physical health care.

Study framework

The Chinese Lay Theory explains the association between fundamental Chinese values and stigmatization [13]. Lay people perceive mental illnesses as dangerous and unpredictable. An uncontrollable disease can cause shame and guilt, regardless of education, IQ, or income [14,15]. Although the patient's physical symptoms are not as stigmatized as psychiatric symptoms, shame is a psychological barrier against help-seeking [16]. In a 2013 study when depression and diabetes were co-present, 89% of the subjects in China had a negative stigma of depression. Only 32% had a negative stigma of diabetes [17].

To avoid being labeled, families prefer physical healthcare to other treatments. Wang et al. found that Chinese individuals who had a higher perception of stigmatization had a higher likelihood of manifesting depression as a somatic complaint [18]. Other Chinese studies focused on stigma toward depression as the illness is related to dysfunctional attitudes, maladaptive cognitive coping [19], and stigma-reduction interventions [20]. Study results need to contribute to anti-stigma programs incorporated with cultural perspectives.

Methods

In 2018, this research team administrated an anonymous survey to a convenience sample drawn from the general public in Shanghai, China. This study used a community survey designed with four experimental vignettes to examine whether depression alone or comorbid with diabetes could lead to a higher level of public stigma toward the Vignette Subject (VS). The Institutional Review Board (IRB) approved the human subject protection procedures at the first author's affiliated university. Specifically, this study addressed three research questions:

a) Does gender affect public stigma against a patient's depression?

b) Does depression comorbid with diabetes influence public stigma toward depression?

c) Among Chinese individuals, what characteristics could predict a high public stigma toward a patient with depression?

Sampling and data collection

After a series of research training, 24 Mandarin-speaking Research Assistants (RAs) from the last author's affiliated university collected data for three months in 2018. Using a convenience sampling method, they recruited subjects from various public places in Shanghai, including office buildings, cinemas, restaurants, public squares, parks, metro stations, shopping malls, markets, bookstores, universities, beauty salons, and hospitals. Inclusion criteria included adults (18 years or older) currently residing in Shanghai who could speak Mandarin. The survey was self-administered or read to the respondent by the RA. Before asking further questions related to depression, the RA assigned a random vignette to each consented participant (detailed under Measures). This vignette method has proven efficacy in studying attitudes, perceptions, and opinions related to mental health and childhood issues [21,22]. Respondents received 50 Renminbi (RMB, Official currency in mainland China) (equivalent to US$7) as an incentive for filling out this 40-minute survey.

Measures

The first section of the survey contained questions on the respondent's age, gender, marital status, education level, employment and financial situation, number of children, monthly income, and ability to speak the local dialect. It also asked about their residence status with three questions: residence location (urban or rural), hukou (official residence registration) at birth, and current hukou. The respondents also answered whether they knew someone with a mental health problem (0=No; 1=Yes).

The variable 'Attitude toward the Patient's Family' estimated family stress with the 7-item Devaluation of Consumer Families (DCF) scale, ranging from 0 (no stigma) to 3 (highest stigma) (Cronbach's α=.77) [23]. A 4-point Likert-type scale rated the DCF score for calculating the mean of the items: (a) be friends with the patient's relatives; (b) believe in the care provided by the patient's parents; (c) treat the patient's family with no biases; (d) visit the family with a member hospitalized due to a severe mental illness; (e) treat families with or without mental illness problems equally; (f) not blame the patient's parents; (g) be a visitor to the patient's family. The higher this devaluation score, the higher the family stigma.

In the second section of the survey, each respondent read one of four vignettes varied by the VS's gender (male or female) and the illness type (depression only or comorbid with diabetes): (1) a male with depression; (2) a female with depression; (3) a male with diabetes-associated depression; and (4) a female with diabetes-associated depression. Respondents assessed the presenting problem in the vignette based on a 'problem seriousness' rating scale from 1 to 10 (10 being the most serious). Those who answered

questions based on the assigned vignette of the VS with depression and diabetes received a score of 1 in the variable 'Comorbid with Diabetes.'

There was also a 14-item Stigma Scale concerning the VS, from 1 to 7, with 1=low stigma and 7=high stigma (Table 1). The higher the score, the higher the stigma toward depression or depression-associated health problems. The reliability of the Stigma Scale was acceptable (Cronbach α=.79).

Factor analysis

Recent literature on social stigma also recommends using factor analysis to identify appropriate measures to explore depression-related stress factors for examining the impact of health stigma on work productivity [24]. In this study, an eigenvalue of 1 or higher and the Scree plot determined factor extractions. The factor loading of .50 or higher was the criterion for item inclusion under each extracted factor [25]. Table 1 shows that, among 14 items on the Stigma Scale, the final three factors were: Factor 1 (Individualized Public Stigma or IPS) with items (1) to (6); Factor 2 (Probable Change) with items (7) to (11); and Factor 3 (Community Stigma) with items (12) to (14). A Kaiser-Meyer-Olkin (KMO) score of .80 verified that the sampling adequacy with these 14 items was acceptable for analyses.

RESULTS

Respondent characteristics

Table 2 summarizes the characteristics of 125 respondents who completed the survey. Among them, 51% were female, and 49% were male. Over 60% were married, and 36% were single. On average, these respondents were about 38 years old (Standard Deviation (SD)=14.78), ranging from 18 to 78 years of age. Most of them had one child (mean=1.38, SD=.59). More than half of them (58.4%) had a college education or higher. Among these respondents, 56% had employment, but 44% were not employed. About 35% had a monthly income of RMB 3,000-5,999, comparable to a typical Shanghainese's monthly earning earned about RMB 5,348 monthly in 2018 [26]. About 42% indicated that they had a break-even financial situation. The majority (83%) lived in the urban area, but only 58% possessed an urban Hukou as many were still processing their urban residence. More than half (55%) could speak Shanghainese (the local dialect in this city). About 49% would seek help when facing a mental health problem, while 11.2% had personally experienced a mental health problem. The analysis compared respondents by the VS's gender (0=male vignette; 1=female vignette) and the presenting problem (0=depression only; 1=depression comorbid with diabetes).

Predicting public stigma

Three standard Multiple Regression (MR) models analyzed predictive variables on the three "Public Stigma" factors: (1) Individualized Public Stigma (IPS), (2) Probable change, and (3) Community stigma. We checked all assumptions for multiple regression analyses. Only the IPS factor achieved statistical significance, but not probable change or community stigma. As a result, the IPS factor score was used as the dependent variable in the final MR model, with positive scores meaning a low stigma level and negative scores indicating a high stigma level. The operationalized definition of IPS was the attitude towards someone with mental illness as less likely to be accepted in friendship, employment, marriage, or school affiliation and more likely to be found in violence and law troubles.

The final MR model (Table 3) produced results significantly associated IPS with five variables: problem seriousness, knowing someone with a Mental Health Problem (MHP), VS's gender, attitude toward the VS's family, and comorbid with diabetes [$F(5,89)=11.652$, $p<.001$]. These factors account for about 40% of the variance to explain IPS. Specifically, when the respondents perceived the presenting problem as more serious ($t=6.172$, $p<.001$) and had a positive attitude toward the VS's family ($t=2.529$, $p=.013$), they tend to have a higher level of public stigma. However, three other variables (VS's gender, knowing someone with an MHP, and comorbid with diabetes) were not significant in the overall model.

The results did not support research question 1 or 2. The interpretations were 1) IPS toward a patient with depression did not significantly differ whether the patient is male or female, and 2) the VS's diabetes-associated symptoms do not change the respondent's IPS toward depression. For question 3, none of the respondent characteristics were significant IPS predictors. In this multivariate analysis, the public tends to show a higher public stigma toward the VS when assessing depression (with or without diabetes) as a more severe problem and having a more positive attitude toward the VS's family. The Chinese Lay Theory supports this finding that the family's face concern ("mianzi" 面子) is a self-stigma source interacting with a family member's mental health illness [27,28].

Table 1: Factor analysis of stigma components.

How likely would the patient:	Individualized Public Stigma	Probable Change	Community Stigma	h^2
1. Be allowed to be your friend?	0.79	0.36	-0.08	0.76
2. Be hired to work with you?	0.77	0.38	0.03	0.73
3. Be allowed to marry your child?	0.76	0.18	-0.04	0.61
4. Be accepted to attend the same school as your child?	0.72	0.26	-0.12	0.6
5. Be violent toward other people?	-0.63	0.01	0.11	0.41
6. End up in trouble with the law?	-0.53	0.06	0.22	0.33
7. Be able to change?	0.05	0.85	-0.06	0.73
8. Be able to change if receiving help?	-0.06	0.78	0.13	0.62

9. Be respected in the community?	0.43	0.71	0.001	0.69
10. Develop into a successful person?	0.42	0.68	-0.18	0.67
11. Be happy?	0.25	0.53	0.06	0.35
12. Have difficulty finding a job?	-0.1	0.02	0.9	0.82
13. Have difficulty making friends?	-0.03	0.02	0.87	0.58
14. Have difficulty finding someone to marry?	0.03	-0.07	0.76	0.58
Variance	24.5	21.1	16.31	61.82

Notes: The patient has depression or diabetes-associated depression); Extraction Method: Principal Component Analysis; Rotation Method: Varimax with Kaiser Normalization; Varimax Rotation with KMO=.769 (Rotation converged in 5 iterations).

Table 2: Demographics of respondents.

Variable	Frequency (n=125)	%
Vignette Condition		
Male Vignette	62	49.6
Female Vignette	63	50.4
Vignette Presenting Problem		
Depression only	61	48.8
Depression with Diabetes	64	51.2
Respondent's Gender		
Male Respondent	61	48.8
Female Respondent	64	51.2
Marital status		
Single	45	36
Married	76	60.8
Cohabitation	1	0.8
Widowed	1	0.8
No response	2	1.6
Education		
Did not complete High School	3	2.4
High School graduate	36	28.8
Some college/trade	37	29.6
BA or higher	48	38.4
No response	1	0.8
Employed		
Not employed	55	44
Part-time	4	3.2
Full-time	66	52.8
Monthly Income		
≤ 2999 RMB	30	24
3,000 – 5,999 RMB	44	35.2
6,000 – 8,999 RMB	28	22.4

> 9,000 RMB	14	11.2
No response	9	7.2
Financial Circumstances		
Can't Make Ends Meet	9	7.2
I am barely Making it	22	17.6
Breaking even	53	42.4
I have extra money after bills	22	17.6
I don't have to worry about money	15	12.4
No response	4	3.2
Current Residing Area		
Urban	104	83.2
Rural	8	6.4
Suburban	13	10.4
Hukou At Birth		
Urban	42	33.6
Rural	82	65.6
No response	1	0.8
Hukou Current		
Urban	72	57.6
Rural	48	38.4
Transitioning Rural to Urban	5	4
Local Dialect: Do you Speak Shanghainese?		
Yes	69	55.2
No	54	43.2
No response	2	1.6
Know someone with mental health problems		
No	58	46.4
Yes	61	48.8
No response	6	4.8
Ever had a mental health problem		
No	108	86.4
Yes	14	11.2
No response	3	2.4
	Mean	**SD**
Participant's Age (Range: 18-78)	37.95	14.78
Participant's children (Range: 1-3)	1.38	0.59
Problem Seriousness (1-10)	6.37	2.353

Table 3: Multiple regression on public stigma.

N=125	Unstandardized Coefficients	Standard Error	Standardized Coefficients	t	p
	B		Beta		
(Constant)	-2.379	0.454		-5.237	<.001
Problem Seriousness (1-10; 10=most serious)	0.25	0.041	0.523	6.172	<.001
Attitude toward mental illness (0-3; 0=no stigma)	0.656	0.26	0.213	2.529	0.013
Patient's Gender (0=male)	0.332	0.176	0.156	-1.88	0.063
Knowing someone with mental health problems (0=no)	0.1	0.176	0.047	0.569	0.571
Comorbid with Diabetes (0=no)	0.056	0.178	0.026	0.316	0.753

Note: F (5,89)=11.652, p<.001; R^2=.40.

DISCUSSION

In a systematic review of 41 studies in the Pacific Rim region, He found cultural factors leading to mental illness stigma. Specifically, Chinese people with a collectivist orientation prefer keeping mental illness secretive, internalizing it with self-stigma but accepting "one's role as handed down by destiny" [12,29]. Based on literature and current data from this study, the following discussion addresses two significant public stigma predictors and three non-significant results.

First, increased problem seriousness is associated with increased public stigma. This finding aligns with existing research showing individuals report higher mental health stigmatization toward conditions typically viewed as severe (e.g., schizophrenia, psychosis) [30,31]. This study found that the respondents assessed the presenting problem with a moderately severe score (Mean=6.37 on a 10-point scale). This average score implies if the public underestimates the severity of a mental health problem, they would desire anti-stigma interventions to reduce the negative effect of the illness [32]. Based on the Chinese Lay Theory, after seeking treatment, a patient's family felt it essential to deliver community education to correct public misconceptions [12].

Second, having a sympathetic attitude toward the family with a patient with depression tends to hold a higher public stigma. Yang et al. found a similar link between general stigma and individualized stigma [33]. This person-community relationship provides two implications from both individual and cultural perspectives. Individually, there is a sympathy connection. People who have a biased attitude toward a mental illness expect the patient's family not to feel comfortable in social events. However, the Chinese lay value suggests sympathy with the family a social-desirability connection, which captures the communal aspect of Chinese culture that emphasizes the family unit over the individual [12]. With this social-desirability consideration, people might not admit having a negative attitude toward the family with a member suffering from a mental health problem, regardless of its connection to diabetes (as the comorbidity variable is not significant). This reverse stigma phenomenon is associated with the community's desire to balance individual stigma and family concern perceptions. In this study, the respondents maintained a personal value that mental illness is not desirable but also showed a cultural value that the family should not be labeled.

Previous studies identified an association between gender and stigma toward treating mental disorders. Based on the Chinese Lay Theory, depression as misfortune could overshadow one's perception of stigmatization. In a large city project, He found that Chinese men as respondents had a higher personal stigma than Chinese women toward depression as a disorder [31]. In another study involving Asian college students, men had a more increased public stigma than women toward accessing mental health treatment [34]. However, in this study, the gender of the VS, but not of the respondents themselves, did not predict the respondents' public stigma level toward depression. In terms of non-significant factors, this study did not find the VS's gender a significant predictor of public stigma toward individuals with depression.

Another explanation of the non-significant findings was related to educational information about diabetes-associated depression. Most respondents were middle-aged, and over half (52.8%) were employed full-time. Even though the sample came from a large metropolitan city, one-third (33.6%) had a rural hukou at birth. These demographics suggest the findings might come from a cohort with little formal education about mental health or caregiver stress stemming from an individual's illness.

Third, almost half (48.8%) of the respondents personally knew someone with mental health problems, but fewer (11.2%) reported experiencing a mental health issue. Beyond using the Chinese Lay Theory to explain stigma against mental illness [12], previous research found that knowing someone with a mental health disorder could influence one's perception [27,35]. In a random sample of the public in Shanghai, He also found people with frequent close contact with someone with mental illness had less stigma [34]. Similarly, lower stigma toward depression occurred among people with greater exposure to individuals experiencing mental illness [27]. On the contrary, in an online survey conducted in China, He found no relationship between contact levels and

the mental illness stigma toward people with mental disorders [36]. These mixed reviews support early learning through case studies to reduce stigma toward mental illness [37].

This study has limitations. One limitation was its convenience sampling method, although reaching potential subjects in diverse locations was a recruitment strategy. A second limitation was that those with a higher-than-average education level proportionally over-represented the respondents. A third limitation was related to the fact that most respondents had only one child, the country's unique demography due to the country's one-child policy for 34 years between 1980 and 2014. At the time of this study, data were representative of the opinions from both one-child parents (representing respondents mainly from urban areas) and parents with two or more children (representing migrant parents from rural areas).

Implications

He attests to the disclosure challenges Chinese people face, especially the migrant populations, who do not admit their mental health diagnoses to avoid costly hospitalization [38]. Most health insurance schemes in China do not cover mental health services [39,40]. This current study identifies the need to encourage primary-care providers to refer clients to mental health services and normalize psychiatric and psychological medical treatment through educating patients and their families. This support is in line with a folk value of Chinese traditional medicine, bìng xiàng qiǎn zhōng yī (病向浅中医), meaning 'best to seek medical attention before it takes a hold' (our translation). It implies that early mental health treatment could reduce family stress and expenses.

Using healthcare as a bridge, most people can appreciate early prevention efforts for their families. Early education means delivering health-associated education of depression to effectively reduce stigmatization of one self (the patient) and others (the family). As explained in the "Chinese Self" Theory, this self-and-others concept stresses the importance of balancing the social-oriented self and the family-oriented self when people establish regulations for healthy connections between themselves and others [41]. This study further supports using this self-and-others concept to overcome the lay thinking about stigma against depression.

CONCLUSION

Significant results supported the third research question of this study investigating what characteristics among Chinese individuals could help understand the public stigma toward depression. This support implies that effective public education could help patients with internal and external stressors due to mental health issues. Results show that IPS was associated with five variables: problem seriousness, knowing someone with a mental health problem, the affected individual's gender, attitude toward the patient's family, and diabetes-connected depression. In this model, problem seriousness and attitude toward the patient's family were significant predictors of IPS. Future research can examine the interaction between health and mental health on a community's view of mental health diagnoses. Specifically, assessment data from a community-based project that identifies knowledge and attitude toward patients with depression will further support intensive counseling services for the affected family, not only the patient. A potential research question may help identify essential components in early anti-stigma interventions, "What interaction effect may occur between a patient's self-stigmatization toward mental health symptoms of depression and the community's willingness to help the patient's family?" Answers will help practitioners support families with psychological distress and thus prevent health problems, both physical and psychological, from getting more severe.

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