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### Highlights

- Among all caregivers, parents of patients with mental illness felt more stigmatized than the others.
- Muslim caregivers endorsed less affiliate stigma compared to caregivers Christian caregivers
- Difficulties of coping with affiliate stigma could significantly influence primary caregivers to report poor quality of life.

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## Abstract

Affiliate stigma often refers to internalized stigma among family members of stigmatized individuals. This study aimed to investigate the relationship between affiliate stigma and quality of life (QOL) among primary caregivers of individuals with mental illness undergoing treatment at the Institute of Mental Health, Singapore. Three hundred and fifty caregivers were recruited for the study. The World Health Organization Quality of Life questionnaire (WHOQOL-BREF) and Family Stigma Scale (FSS) were administered to the primary caregivers of patients with mental illness. Multiple linear regression analyses were conducted to investigate the association of affiliate stigma with QOL. A high proportion of caregivers of individuals with mental illness experience affiliate stigma in Singapore. All four QOL domains were significantly associated with affiliate stigma. These findings entail that it is imperative to improve public's perception of those with mental illness to reduce stigmatization and thus improve caregiver's QOL.

Psychology; mental health; internalized stigma; primary caregivers; Asia; WHOQOL; multi-ethnic

## 1. Introduction

Erving Goffman (1963, p 3) defined stigma as *'The phenomenon whereby an individual with an attribute which is deeply discredited by his/her society is rejected as a result of the attribute. Stigma is a process by which the reaction of others spoils normal identity.'* It involves the processes of labeling, stereotyping, separation, emotional reaction, status loss and discrimination (Corrigan, 2000; Link and Phelan, 2001). The awareness of stigma has increased considerably in the field of mental health services. Substantial research in the area of mental illness has been carried out to understand the complexity and a multidimensional effect of stigma on an individual's well-being (Major and O'Brien, 2005; Perlick et al., 2007).

However, stigma not only affects the individual suffering from the illness but also affects individuals they closely associate with (e.g. family members, primary caregivers). Previous studies have referred to these public perceptions of the family members as 'courtesy stigma' (Seeman & Goffman, 1964) or 'associated stigma' (Mehta and Farina, 1988). Instead of focusing on the public view of stigma, this present study chooses to focus attention on the internalization of stigma among primary caregivers, mostly family members of individuals with mental illness. Referred to as affiliate stigma (Mak and Cheung, 2008), it represents the affected individuals' internalization process of public's negative view towards themselves (Corrigan and Watson, 2002). Affected individuals are more likely to experience negative emotions, such as shame, low self-esteem, anger and conceal their stigmatized status from others (Corrigan and Miller, 2009).

Existing literature on affiliate stigma suggests an association between caregivers' perception of stigma, psychological distress and subjective burden among caregivers (Mak and Cheung, 2012; Werner et al, 2012). Some of the factors studied in association with stigma and burden include socio-demographic factors (e.g., gender, ethnic minority status etc.), cultural factors such as 'face' concern in the Chinese which refers to one's desire to maintain his/her social image that is based on one's specific role within the interpersonal context (Mak and Chen, 2012), and interpersonal factors (e.g., family members who live with the ill relative versus those who do not, social support etc.) (Perlick et al, 2007; Phelan et al, 1998). Mak and Cheung (2012) for instance, found strong 'face' concern among Chinese caregivers of individuals with mental illness to be associated with a greater tendency to internalize stigma which was then related to more psychological distress and subjective burden among caregivers. Similarly, Magana et al (2007) found caregivers' affiliate stigma to be significantly related to caregivers' depressive symptoms, even after adjusting for care recipients' psychiatric symptoms and caregivers' socio-demographic variables; a finding replicated by Perlick et al. (2007).

The World Health Organisation Quality of Life (WHOQOL) group defines QOL as *"individuals' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns."* (The WHOQOL Group, 1994a). QOL is a multi-dimensional concept that includes physical functioning, role limitations due to physical health, bodily pain, general health, vitality, social

functioning, role limitations due to emotional problems, and mental health (Grover and Dutt, 2011).

In Hong Kong and Taiwan, several studies have found that caregivers of people with mental illness or intellectual disability experience more affiliate stigma and burden which could possibly lead to poor family functioning and disturbed social life (Mak and Cheung, 2008; Mak and Cheung, 2010; Chang et al, 2017). In Singapore, a qualitative study concluded that affiliate stigma may have potential deleterious effects on caregivers of people with mental illness in the Chinese community (Ow and Katz, 1999). A recent study from Singapore reported a negative relationship between internalized stigma and QOL in a psychiatric patient sample, where those who had higher internalized stigma score were more likely to be associated with poorer QOL in three of the four domains (psychological, social relationships and environment) of the WHOQOL-BREF. (Picco et al., 2016) Another study similarly found a negative effect of self-stigma on QOL among patients with schizophrenia. (Chang et al., 2016). Unfortunately, little quantitative research has been done to measure such associations between affiliate stigma and primary caregivers' QOL in Singapore. Therefore it is essential and useful to explore this relationship.

The current study thus aimed to i) identify possible socio-demographic factors that are associated with affiliate stigma; ii) explore the relationship between affiliate stigma and QOL among caregivers with relatives suffering from mental illness (including Early Psychosis, Chronic Schizophrenia, Depressive disorders, Anxiety disorders and Dementia).

## 2. Methodology

### 2.1 Study Design

The present study used a cross sectional design comprising a single visit. 350 primary caregivers of people with mental illnesses (early psychosis, chronic schizophrenia, depressive disorders, anxiety disorders and dementia) seeking treatment at the Institute of Mental Health (IMH), and its affiliated clinics participated in the study from July 2014 to March 2015. IMH is Singapore's only tertiary psychiatric hospital that offers psychiatric, rehabilitative and counseling services to children, youth, adults and the elderly. To be considered a primary caregiver, the family member/relative had to be over 21 years old and living with their care recipients for at least six months and taking care of them on a daily basis. This was to ensure that all the questions in the interview would be relevant to the participants.

All the research officers and assistants involved in the study were bilingual, in English/Mandarin, English/Bahasa Malayu or English/Tamil. We ensured that each participant was paired with a respective language speaking interviewer. Researchers assessed participants' language ability both during the process of recruitment and during consent taking. During consent taking trained researchers ensured that the language of the consent was understood by the participants and if the

researchers felt that the participant was unable to understand the language they were excluded from the study.

All instruments were self-administered by participants who could read and write the language (English, Mandarin, Bahasa Malayu or Tamil). Researchers administered the instrument when participants were not able to read and write but understand the language well; third party witnesses were present in such cases during consent taking.

This study was approved by the local ethics committee (i.e. National Healthcare Group Domain Specific Review Board). Interviews were conducted in English, Mandarin, Bahasa Malayu and Tamil, the four official languages in Singapore, based on participants' language preference. Interviewers were professional researchers who spoke at least two of the official languages.

## 2.2 Instruments

The Family stigma scale, a 14-item instrument from the Family Interview Schedule (WHO developed psychiatric assessment), was used in the study to assess the affiliate stigma among caregivers. A score ranging from 0 to 3 for each item indicates how frequently caregivers experience stigma, higher scores indicate that one experienced stigma more frequently. This instrument has been validated in China along with other instruments for a major international longitudinal study on schizophrenia and the investigators found that both intra-class correlation and pairwise agreement rates were higher than 0.7 (Chen et al, 2007; Lee et al, 2007).

The WHO Quality of Life-BREF (WHOQOL-BREF) is a 26-item self-administered questionnaire that assesses participants' QOL across four domains (Physical health, Psychological, Social relationships and Environment). Each item is scored on a scale of 1 to 5. A higher score in WHOQOL-BREF indicates higher level of QOL. Test-retest reliability for the domains when tested 2-4 weeks apart were 0.66 for physical health, 0.72 for psychological, 0.76 for social relationships and 0.87 for environment in a Taiwanese population (Yao et al, 2002) which is similar to the findings of Xia et al, (2012), who examined the psychometric property of WHOQOL-BREF in a large sample of citizens in mainland China (Physical: 0.67, Psychological: 0.76, Social relationships: 0.72, and Environment: 0.78). The instrument has been well validated in Asian samples (Saxena et al, 2001; Su et al, 2014).

## 2.3 Statistical analysis

All statistical analyses were performed using SPSS version 23. Socio-demographic distribution of participants was obtained by descriptive statistics. Frequencies of endorsements of each stigma item were calculated, and then transformed into percentage to explore the distribution of the scale items (Shibre et al., 2001). WHOQOL-BREF scores for the four domains (Physical, Psychological, Social relationship and Environment) were calculated according to the syntax provided in the WHOQOL-BREF Manual. (Skevington et al, 2004) Multiple Linear Regression analyses were performed to explore the socio-demographic correlates of affiliate stigma.

Relationships between affiliate stigma and QOL among caregivers were examined by multiple linear regression analyses. We treated each domain of QOL as dependent variable predicted by affiliate stigma after controlling for all socio-demographic factors. Statistical significance was set at  $p$  value  $<0.05$ .

After eliminating 6 incomplete cases, data of 344 cases were included in the final data analysis.

### 3. Results

#### 3.1 Socio-demographic characteristics and Mean stigma score

As shown in Table 1, majority of the participants were female (68%), Chinese (58.1%), had received at least secondary education level (43.0%), were parents of patients (35.3%), caregivers of relatives diagnosed with schizophrenia (45.6%), married (64.8%), full time employed (5.5%), with an average monthly personal income of SGD 2000 and below (63.0%) and were Muslims (26.5%). Table 2 summarizes socio-demographic correlates of stigma scores.

Compared to primary caregivers aged 50-64 years, primary caregivers who were 35 years or younger ( $p = 0.01$ ) scored significantly higher on the stigma scale. Compared to parents as primary caregivers, spouse ( $p = <0.001$ ), son/daughter ( $p = <0.001$ ), sibling ( $p = 0.02$ ) and other relatives ( $p = 0.01$ ) who were primary caregivers scored significantly lower on the stigma scale.

#### 3.2 Stigma Endorsement and prevalence

94.5% of the total sample population endorsed at least one positive answer on the stigma scale. Figure 1 shows the distribution of positive responses for each stigma item. The most frequently endorsed item was 'You have helped other people to understand what it is like to have family member with psychiatric problems' (62.6%), followed by 'You felt grief or depression because of it' (60.2%)(Table 4). The least endorsed item was 'You felt ashamed or embarrassed about it' (18.9%).

#### 3.3 Association between Stigma and QOL

Table 3 shows stigma scores are significantly related to QOL across all four domains. After adjusting for socio-demographic variables (i.e. age, gender, ethnicity, education and employment), higher scores on the stigma scale were significantly associated with poorer QOL among caregivers in three out of four domains; psychological ( $\beta = -0.09$ ,  $p < 0.001$ ), social relationship ( $\beta = -0.17$ ,  $p < 0.001$ ) and environment ( $\beta = -0.12$ ,  $p < 0.001$ )

### 4. Discussion

The current study found that among all caregivers, parents of patients with mental illness felt more stigmatized than the others. Studies suggest that among Asians, with the strong cultural influence exerted by Taoism, Buddhism and Confucianism, close family members, especially parents seem to feel more stigmatized compared to siblings and spouses (Corrigan and Miller, 2004). Parents are viewed to be more responsible for the mental health development of their children (Corrigan and Miller, 2009; Struening et al., 2001) and thus having a mental illness could reflect negatively on the person's family and can bring the family shame (Lauber and Rössler, 2007). Some possible explanations include the duration and nature of the mental disorder, which may have played an important role in the association. However, an analysis to confirm the association, interestingly, showed no significant correlation between stigma and duration of mental illness.

A considerably high proportion (94.5%) of primary caregivers reported experiencing affiliate stigma since their care recipient developed psychiatric problems. The estimated percentage is higher than another study conducted in Ethiopia that used the same stigma scale (75%) (Shibre et al., 2001). In the present study, majority of the caregivers had shared their experiences and emotions of being primary caregivers of mental illness patients to help others understand their situation; a small number of the caregivers felt ashamed or embarrassed having relatives with mental illness. These responses are quite different compared to other studies conducted in Asia. For example, in Hong Kong (Chung and Wong, 2004) and Singapore (Ow and Katz, 1999), family members' disclosure of potentially distressful information was selective, and they kept secrets from other people to save their face (Mak and Cheung, 2008). The nature of the information that primary caregivers shared with others was not collected in the present study; further studies could include an in-depth interview to examine this phenomenon in greater depth.

A study conducted in Taiwan found that caregivers of family members with schizophrenia had a higher level of affiliate stigma than those of bipolar disorder and major depressive disorder. (Chang et al, 2017) Contrary to Chang's study, the current study did not find such a relationship. One possible explanation could be that the caregivers recruited in this study did not perceive differences between the various diagnostic groups and instead perceive 'mental illness' as a single entity, thus the extent of stigma associated with any mental illness was similar.

Several limitations should be considered when reviewing the findings; all primary caregivers were recruited from the outpatient clinic in a tertiary hospital, thus limiting our ability to generalize the findings to caregivers in other settings. In addition, this study relied on interviewer administered and self-administered mode to conduct the survey and the responses may be affected by social desirability bias in the interviewer administered group.

A negative relationship was observed between affiliate stigma and three out of four domains of WHOQOL-BREF (Psychological, Social relationships and Environment). Higher affiliate stigma was associated with poor quality of life. Both Chou and Palley, (1998) and Chou and Hunter,

(2009) suggested that the difficulties of coping with affiliate stigma could significantly influence primary caregivers to report poor QOL.

## 5. Conclusion

The present study is one of the first to measure affiliate stigma among a multi-ethnic caregiver sample quantitatively. Findings indicate affiliate stigma has an important impact on the QOL of primary caregivers of relatives with mental illness, especially parents of those with mental illness.

The association between affiliate stigma and caregivers' QOL provides an overall idea of how affiliate stigma could adversely affect caregivers' life. In addition to studying the phenomenon of affiliate stigma, care providers and researchers should also develop and evaluate interventions to reduce affiliate stigma.

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**Table 1. Socio demographic characteristics of the sample**

<b>Socio Demographic Characteristics</b>	<b>N</b>	<b>%</b>
<b>Gender</b>		
Female	234	68.0
Male	110	32.0
<b>Age</b>		
<35	65	18.9
35-49	82	23.8
50-64	157	45.6
>64	40	11.6
<b>Ethnicity</b>		
Chinese	198	58.0
Indian	76	22.3
Malay	67	19.7
<b>Relationship to the care recipient</b>		
Spouse	80	23.3
Parent	121	35.3
Son/Daughter	92	26.8
Sibling	37	1.8
Other relatives	13	3.8
<b>Religion</b>		
Islam	91	26.5
Buddhism	87	25.3
Taoism	18	5.2
Christian	78	17.7
Catholic	17	4.9
Hinduism	36	1.5
Free-Thinker	34	9.9
<b>Marital Status</b>		
Married	223	64.8
Single	89	25.8
Divorced	15	4.4
Separated	2	0.6
Widowed	15	4.4
<b>Education</b>		
Primary education and below	52	15.1
Secondary	148	43.0
Vocational institute/ITE nitec cert	20	5.8
'A' level/completed pre-u or junior college	18	5.2
Diploma	50	14.5
University Degree and Above	56	16.3
<b>Employment</b>		

Full Time	174	5.6
Part Time	47	13.6
Homemaker/housewife	65	19.0
Retired	25	7.3
Unemployed	33	9.6
<b>Relatives' Diagnosis</b>		
Schizophrenia	157	45.6
Depressive Disorders	104	3.2
Anxiety Disorders (OCD* and GAD*)	27	7.9
Dementia	16	4.7
Other Disorders	11	3.2
Don't know	29	8.4
<b>Personal Income</b>		
Below SGD* 2000 per month	213	63.0
SGD 2000-3999 per month	78	23.1
SGD 4000-5999 per month	30	8.9
SGD 6000-9999 per month	17	5.0

\* GAD = Generalised anxiety disorder; OCD = Obsessive compulsive disorder; SGD = Singapore Dollar

**Table 2 : Socio-demographic correlates of stigma scores**

<b>Socio Demographic Characteristics</b>	<b>Beta coefficient</b>	<b>95% CI</b>		<b>P</b>
<b>Gender</b>				
Female	Ref.	Ref.	Ref.	Ref.
Male	0.04	-0.09	0.16	0.56
<b>Age</b>				
50-64	Ref.	Ref.	Ref.	Ref.
<35	0.22	0.06	0.39	0.01
35-49	0.11	-0.02	0.25	0.24
>64	-0.10	-0.26	0.06	0.23
<b>Ethnicity</b>				
Chinese	Ref.	Ref.	Ref.	Ref.
Indian	0.10	-0.13	0.33	0.38
Malay	0.11	-0.18	0.41	0.45
<b>Relationship to the care recipient</b>				
Parent	Ref.	Ref.	Ref.	Ref.
Spouse	-0.32	-0.46	-0.17	<0.001
Son/Daughter	-0.32	-0.49	-0.16	<0.001
Sibling	-0.22	-0.42	-0.03	0.02
Other relative	-0.35	-0.61	-0.08	0.01
<b>Religion</b>				
Islam	Ref.	Ref.	Ref.	Ref.
Buddhism	0.06	-0.23	0.35	0.73
Taoism	0.06	-0.28	0.40	0.71
Christian	0.20	-0.07	0.47	0.14
Catholic	-0.06	-0.38	0.25	0.70
Hinduism	-0.04	-0.27	0.19	0.75
Free-Thinker	0.09	-0.21	0.39	0.55
<b>Marital Status</b>				
Married	Ref.	Ref.	Ref.	Ref.
Single	-0.06	-0.21	0.09	0.45
Divorced	-0.05	-0.28	0.18	0.68
Separated	-0.48	-1.07	0.12	0.11
Widowed	-0.04	-0.27	0.20	0.76
<b>Education</b>				
Primary education and below	Ref.	Ref.	Ref.	Ref.
Secondary	0.02	-0.13	0.16	0.81
Vocational institute/ITE nitec cert	0.02	-0.22	0.25	0.90

'A' level/completed pre- u or junior college	0.05	-0.20	0.29	0.70
Diploma	0.03	-0.17	0.23	0.77
University and above	-0.01	-0.22	0.21	0.95
<b>Employment</b>				
Full Time	Ref.	Ref.	Ref.	Ref.
Part Time	-0.03	-0.18	0.12	0.70
Homemaker/housewife	-0.07	-0.22	0.09	0.39
Retired	-0.02	-0.26	0.22	0.87
Unemployed	-0.02	-0.20	0.17	0.85
<b>Relatives' Diagnosis</b>				
Schizophrenia	Ref.	Ref.	Ref.	Ref.
Depressive Disorders	-0.01	-0.12	0.11	0.95
Anxiety Disorders (OCD* and GAD*)	0.01	-0.17	0.18	0.95
Dementia	0.003	-0.23	0.24	0.98
Other Disorders	-0.10	-0.37	0.18	0.48
Don't know	-0.04	-0.21	0.14	0.68
<b>Personal Income</b>				
Below SGD* 2000 per month	Ref.	Ref.	Ref.	Ref.
SGD 2000-3999 per month	-0.01	-0.15	0.13	0.87
SGD 4000-5999 per month	-0.002	-0.20	0.20	0.98
SGD 6000 per month and above	-0.12	-0.39	0.15	0.37
<b>Duration of Illness</b>	<0.001	-0.004	0.005	0.85

**R-squared = 0.15**

**Adj R-squared = 0.05**

GAD = Generalised anxiety disorder; OCD = Obsessive compulsive disorder; SGD = Singapore Dollar

Table 3. Association between stigma and quality of life

	Physical Domain				Psychological Domain				Social Domain			Environment Domain				
	Coeff.	P	95%CI		Coeff	P	95%CI		Coeff	P	95%CI	Coeff	P	95%CI		
Stigma	-0.05	0.52	-0.21	0.11	-0.30	0.02	-0.55	-0.05	-0.46	3	-0.83	-0.08	-0.34	2	-0.62	-0.07
50-64	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
<35	-3.67	0.07	-7.76	0.41	-4.02	0.17	-1.30	2.26	-1.71	0.58	-9.52	6.10	-2.00	0.52	-9.05	5.05
35-59	-3.42	0.03	-6.31	-0.53	-1.85	0.36	-6.29	2.59	2.04	0.42	-4.22	8.30	-2.20	0.33	-7.18	2.78
>64	-2.42	0.07	-5.07	0.23	-1.74	0.35	-5.82	2.34	-5.12	0.09	-11.41	1.17	-3.11	0.15	-7.69	1.46
Female	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Male	-3.23	0.03	-5.93	-0.53	-2.50	0.20	-6.65	1.64	-2.70	0.20	-7.58	2.17	-2.57	0.23	-7.23	2.08
Chinese	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Malay	-1.10	0.65	-6.61	4.40	-4.06	0.29	-	4.41	-6.89	0.14	-	3.49	-7.69	0.10	-	17.19
Indian	-1.14	0.57	-5.73	3.44	-5.59	0.10	-	1.46	-4.17	0.27	-	4.95	-5.14	0.17	-	13.04
Married	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Single	2.13	0.26	-2.01	6.27	2.43	0.40	-3.95	8.80	2.72	0.45	-6.25	11.69	3.59	0.27	-3.56	1.74
Divorced	-1.59	0.30	-4.94	1.75	-1.44	0.53	-6.58	3.71	-2.54	0.53	-12.86	7.78	-1.52	0.55	-7.29	4.25
Widowed	-4.43	0.12	-1.41	1.55	-7.13	0.11	-	2.07	-7.43	0.15	-	4.16	-2.99	0.52	-	7.33
Islam	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Taoism	-0.68	0.78	-6.21	4.86	-4.94	0.21	-	3.57	-7.97	0.10	-	2.21	-4.07	0.35	-	5.48

Buddhism	-0.72	0.78	-6.55	5.11	-3.96	0.33	-	12.94	5.01	-6.08	0.21	-	17.52	5.35	-6.79	0.15	-	16.86	3.27	
Hinduism	0.40	0.85	-4.24	5.03	0.30	0.92	-6.83	7.44	-2.88	0.40	-	11.47	5.71	-1.18	0.74	-	-9.18	6.82		
Free-thinker	1.11	0.67	-4.85	7.07	-3.12	0.45	-	12.29	6.06	-2.05	0.65	-	13.55	9.46	-2.56	0.58	-	12.84	7.73	
Christian	-0.24	0.92	-5.45	4.97	-5.59	0.14	-	13.61	2.43	-7.53	0.12	-	18.30	3.23	-6.15	0.15	-	15.14	2.84	
Catholic	-4.80	0.17	-	12.28	2.68	-	11.92	4	23.43	-41	-	19.65	3	35.33	-3.98	-	12.19	0.06	25.10	0.72
Primary education and below	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	
Secondary	-3.27	0.05	-6.58	0.04	-0.68	0.76	-5.77	4.42	-3.16	0.30	-	1.57	4.24	-0.88	0.73	-	-6.59	4.83		
Vocational	-0.78	0.86	-	11.04	9.48	-6.27	0.38	-	22.05	9.52	14.45	0.13	-6.91	35.81	7.17	0.37	-	-1.53	24.88	
'A' Level/completed pre U or JC	-3.66	0.13	-8.68	1.35	-2.11	0.54	-9.82	5.60	-	11.03	3	-2.59	-1.48	-4.56	0.25	-	13.21	4.09		
Diploma	-5.86	0.09	-	13.03	1.31	-9.51	0.08	-2.54	1.53	-4.60	0.42	-	18.93	9.73	-5.13	0.36	-	17.50	7.24	
University and Above	-1.71	0.55	-8.15	4.74	-3.98	0.37	-	13.89	5.94	-	14.25	4	27.60	-0.90	-7.19	0.17	-	18.31	3.93	
Full time	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	
Part time	-0.07	0.97	-4.39	4.26	-4.00	0.20	-1.66	2.65	-2.82	0.44	-	11.92	6.28	-2.78	0.41	-	-1.24	4.69		
Homemaker/housewife	-1.05	0.62	-5.89	3.78	-6.98	0.06	-	14.42	0.45	-7.02	0.15	-	17.90	3.85	-3.56	0.35	-	11.90	4.77	
Retired	4.34	0.13	-1.70	1.39	-1.99	0.63	-	11.29	7.31	2.53	0.57	-8.69	13.75	-0.20	0.97	-	-1.63	1.23		
Unemployed	-0.83	0.75	-6.73	5.07	-5.50	0.20	-	14.57	3.58	-9.32	0.12	-	22.19	3.55	-6.86	0.16	-	17.04	3.31	
Below SGD* 2000 per month	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	
SGD 2000-3999 per month	0.48	0.77	-3.34	4.31	-2.98	0.27	-8.87	2.91	1.29	0.63	-	5.67	8.25	-0.71	0.81	-	-7.32	5.89		
SGD 4000-5999 per month	-2.13	0.50	-9.10	4.85	-4.34	0.37	-	15.08	6.40	4.31	0.42	-9.12	17.74	1.08	0.84	-	-1.96	13.13		
SGD 6000 per month and above	0.94	0.7	-4.65	6.53	-1.76	0.6	-1.36	6.85	4.17	0.3	-6.23	14.5	4.12	0.3	-5.53	13.7				

	0				4				3	7		5		7		
Parents	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	
Spouse	-0.52	0.70	-3.59	2.54	0.46	0.82	-4.26	5.18	-5.61	0.07	-12.03	0.82	-2.40	0.32	-7.69	2.89
Son/daughter	-0.81	0.52	-3.65	2.02	0.42	0.83	-3.94	4.78	-1.89	0.37	-7.06	3.27	-1.01	0.64	-5.90	3.88
Sibling	-1.49	0.38	-5.22	2.24	2.48	0.34	-3.25	8.22	1.44	0.60	-5.49	8.37	0.37	0.90	-6.06	6.80
Other Relatives	3.68	0.42	-6.46	13.82	3.79	0.58	-11.81	19.40	-23.62	0.06	-49.49	2.25	-7.76	0.33	-25.26	9.74
Schizophrenia	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Depressive Disorder	-1.10	0.24	-3.13	0.93	-1.15	0.41	-4.28	1.98	-2.83	0.12	-6.83	1.17	-0.78	0.62	-4.29	2.73
Anxiety Disorder (OCD* and GAD*)	-2.33	0.50	-9.98	5.32	-7.06	0.20	-18.84	4.71	-5.49	0.34	-19.68	8.71	-0.74	0.90	-13.94	12.47
Dementia	2.11	0.51	-5.03	9.25	3.89	0.43	-7.09	14.88	15.91	0.06	-1.04	32.85	6.12	0.28	-6.20	18.44
Others	1.50	0.76	-9.53	12.53	8.00	0.30	-8.97	24.98	-14.85	0.16	-38.87	9.18	-5.80	0.50	-24.84	13.24
Duration of illness	<0.001	0.96	-0.09	0.09	0.02	0.78	-0.12	0.15	0.07	0.31	-0.10	0.24	0.08	0.26	-0.07	0.23

**R-square:** Physical Domain: 0.89 Psychological Domain: 0.86 Social Domain: 0.95 Environmental Domain: 0.87

**Adj R-square:** Physical Domain: 0.30 Psychological Domain: 0.12 Social Domain: 0.46 Environmental Domain: 0.17

GAD = Generalised anxiety disorder; OCD = Obsessive compulsive disorder; SGD = Singapore Dollar

**Table 4.** Endorsement of each stigma item

Stigma Item	0 - Not at all		1 - Sometimes		2 - Often		3 - A lot		Any positive endorsement	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
1. You worried that your neighbours would treat you differently	264	76.7	61	17.7	12	3.5	7	2.0	80	23.3
2. You spent time worrying whether people would find out about it	239	69.5	77	22.4	21	6.1	7	2.0	105	30.5
3. You sometimes felt the need to hide this fact	188	54.8	114	33.1	20	5.8	21	6.1	155	45.1
4. You have helped other people to understand what it is like to have a family member with psychiatric problems	128	37.2	138	40.4	51	14.9	25	7.3	214	62.6
5. When you met people for the first time, you made a special effort to keep this fact a secret	174	50.6	74	21.5	55	16.0	41	11.9	170	49.4
6. You worried that friends and neighbours would avoid you after they found out about it	268	77.9	53	15.4	10	2.9	13	3.8	76	22.1
7. You have found yourself explaining to others that <i>_(name)_</i> isn't like their picture of "Crazy" people	194	56.4	89	25.9	49	14.2	12	3.5	150	43.6
8. You worried that people would blame you for his or her problems	273	79.4	47	13.7	13	3.8	11	3.2	71	20.6
9. You worried that a person looking to marry would be reluctant to marry into your family	219	64.6	80	23.6	16	4.7	24	7.1	120	35.4
10. You worried about taking him or her out	261	75.9	60	17.4	13	3.8	10	2.9	83	24.1
11. You felt ashamed or embarrassed about it	279	81.1	51	14.8	9	2.6	5	1.5	65	18.9
12. You sought out people who also have a family member who has had psychiatric problems	223	64.8	89	25.9	22	6.4	10	2.9	121	35.2

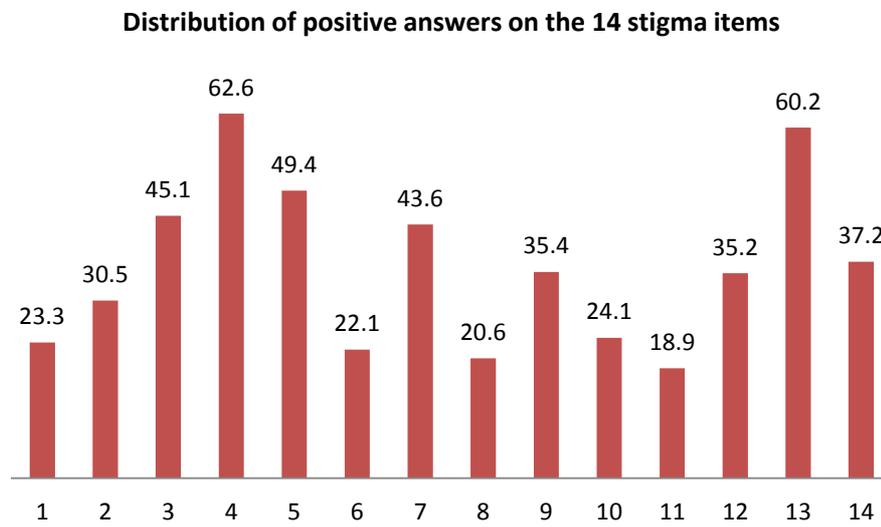
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13. You felt grief or depression because of it	137	39.8	145	42.2	35	10.2	27	7.8	207	60.2
14. You felt somehow it might be your fault	216	62.8	107	31.1	12	3.5	9	2.6	128	37.2

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ACCEPTED MANUSCRIPT

Fig.1



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