Original Article

Hoarding in an Asian Population: Prevalence, Correlates, Disability and Quality of Life

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Abstract

Introduction: Hoarding is defined as the acquisition of, and inability to discard items even though they appear to others to have no value. The objectives of the study were to establish the prevalence of hoarding behaviour among the general population and among individuals with obsessive-compulsive disorder (OCD) in a cross-sectional study conducted in Singapore. Materials and Methods: The Singapore Mental Health Study was a cross-sectional epidemiological survey of a nationally representative sample of residents aged 18 years or older, living in households. The diagnoses of mental disorders were established using Version 3.0 of Composite International Diagnostic Interview (CIDI 3.0). Differences between 3 groups i.e. those diagnosed with lifetime/12-month Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) OCD with hoarding, those diagnosed with lifetime/12-month DSM-IV OCD without hoarding and those with lifetime hoarding behaviour without diagnosis of DSM-IV OCD were determined. Results: The weighted prevalence of lifetime hoarding behaviour was 2% and that of hoarding among those with OCD was 22.6%. Those who met the criteria for hoarding behaviour alone were associated with lower odds of having obsessions of contamination, harming, ordering as well as compulsions of ordering and other compulsions than those who met criteria for both OCD and hoarding. Conclusion: Hoarders without OCD were less impaired, in terms of comorbid psychopathology, than those with OCD with and without hoarding, and had a higher quality of life versus those with both OCD and hoarding, though still lower than that of the general population.

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Introduction

Hoarding is defined as the acquisition of, and inability to discard items even though they appear to others to have no value, leading to clutter, distress, and disability.[1] The clutter in severe hoarding precludes the use of space to accomplish the activities for which they were designed, such as cooking, cleaning, moving through the house, and even sleeping. Interference with these functions makes hoarding a dangerous problem, putting people at risk for fire, falling (especially elderly people) and other health risks.[2] According to the cognitive behavioural model of hoarding, the behaviour is driven by information processing deficits, fear of losing important items that the person believes will be needed later, distorted beliefs about the nature of possessions, exaggerated emotional attachment to possessions and avoidance of the anxiety associated with discarding and decision-making.[3]

The prevalence of clinically significant hoarding behaviour in the general population has been reported to be as high as 4% to 5%.[4,5] Hoarding has been observed in non-clinical populations as well as among those with neuropsychiatric disorders such as dementia,[6] schizophrenia,[7] depression,[8] compulsive buying[9] and more frequently and notably with obsessive-compulsive disorder (OCD).[10] Hoarding is not listed in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition: Text Revision (DSM-IV-TR) as one of the possible symptoms of OCD; it is however included in most clinical scales that assess OCD. Research has suggested that hoarding behaviour is a distinct condition

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from OCD, both clinically as well as genetically. Severity of OCD symptoms among those with hoarding tends to be greater than for OCD patients who do not hoard.[10] Hoarders report significantly more impairment in academic, work life, family life and social relationships than non-hoarders;[10,11] hoarders (vs non-hoarders) also report greater lifetime comorbidity with major depressive disorder (MDD), dysthymia, specific phobia and generalised anxiety disorder (GAD).[10] Patients with hoarding have less insight[12] and have been reported less likely to respond to treatment[13-15] than those with non-hoarding OCD symptoms. Tolin et al[16] found that hoarders have a greater number of chronic medical condition and higher healthcare utilisation than non-hoarding family members. Saxena et al[17] found that hoarders had lower global functioning and lower scores in the domains of safety and living situations as compared to non-hoarding OCD patients. Family studies have found greater prevalence of hoarding behaviour among first-degree relatives of hoarding pro-bands than the relatives of non-hoarding pro-bands[18,19] as well as strong correlations among siblings on hoarding factor scores.[20] Samuels et al[19] also found a suggestive linkage of hoarding behaviour to a marker on chromosome 14 in families with OCD.

The objectives of this study were to establish the prevalence of hoarding behaviour among the general population and among individuals with OCD in a cross-sectional epidemiological study conducted in Singapore. We also investigated sociodemographic and clinical differences between individuals with hoarding behaviour who met DSM-IV criteria for OCD (OCD plus hoarding group), individuals with hoarding (compulsions) who did not meet criteria for OCD (hoarding minus OCD group) and individuals with OCD without hoarding symptoms (OCD minus hoarding group).

Materials and Methods

Sample

The Singapore Mental Health Study (SMHS) was a cross-sectional epidemiological survey of a nationally representative sample of residents aged 18 years or older, living in households and able to speak English, Malay or Mandarin. Face-to-face interviews were completed with 6616 respondents between December 2009 and December 2010. The study was approved by the institutional review board (Institute of Mental Health, Clinical Research Committee) and the ethics Committee (National Healthcare Group, Domain Specific Review Board, Singapore). Written informed consent was obtained from all respondents and parents/guardians of respondents who were between 18 and 21 years of age, as the age of majority is 21 years in Singapore. The survey response rate was 75.9%. The study methodology is described in detail in an earlier article.[21]

Measures

The diagnoses of mental disorders were established using Version 3.0 of Composite International Diagnostic Interview (CIDI 3.0).[22] Diagnostic modules for lifetime and 12-month prevalence of affective disorders, including MDD, dysthymia and bipolar disorder; anxiety disorders including GAD and OCD and alcohol use disorders i.e. alcohol abuse and alcohol dependence were included in the survey. The OCD section assessed lifetime experience of commonly reported obsessive-compulsive (OC) symptoms that were present most days for at least 2 weeks in the respondent's lifetime. The obsessions and compulsions elicited in CIDI included those related to 'saving things'. For the purposes of our study, the key question to establish a diagnosis of hoarding behaviour was, "Did you ever have a time in your life when you repeatedly carried out any of the following behaviours — Always having to save things, to the point where you could not throw away things that you no longer needed or cared about?".

Respondents who met the criteria for the symptoms of OCD were questioned further to establish onset, course and recency of the illness. Clinical severity in the past 12 months was assessed using a fully structured version of the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS)[23,24] which is incorporated in the CIDI.

Functional impairment was assessed using the disease specific Sheehan Disability Scale (SDS)[25] among respondents with OCD in the past 12 months. The SDS is a self-reported scale which consists of 4 questions that measure 4 domains of role impairment including home management, ability to work, ability to form and maintain close relationships and social life. A visual analogue scale of 0 to 10 is used to measure the impairment caused by the symptoms with the response options of "none" (0), "mild" (1 to 3), "moderate" (4 to 6), "severe" (7 to 9), and "very severe" (10) interference. For the purpose of this study we categorised those who endorsed any of the response options for impairment i.e. mild, moderate, severe or very severe impairment as 'any impairment'.

Disability was also assessed using a measure of 'days out of role', where respondents were asked "how many days out of 365 in the past 12 months they were totally unable to work or carry out their normal activities because of these (unpleasant thoughts/repeated behaviours)". Chronic medical conditions were assessed by using a modified version of the CIDI check list of chronic medical disorders and the respondents were asked to report any of the disorders in the checklist. Health-related quality of life was measured using the EuroQol 5 dimension scale (EQ-5D).[26] We used the EQ-5D index scores for the study.

Statistical Analysis

Statistical analyses were carried out using the Statistical Analysis Software (SAS) System version 9.2. To ensure that the survey findings were representative of the Singapore population, the data were weighted to adjust for over-sampling and post-stratified by age and ethnicity distributions between the survey sample and the Singapore resident population in 2007. Mean and standard deviations were calculated for continuous variables, and frequencies and percentages for categorical variables. Differences between the 3 groups i.e. those diagnosed with lifetime/12-month DSM-IV OCD with hoarding, those diagnosed with lifetime/12-month DSM-IV OCD without hoarding and those with lifetime hoarding behaviour without diagnosis of DSM-IV OCD were determined by chi-square and analysis of variance (ANOVA) tests. Multiple logistic regression models were used to explore the association between the 3 groups and sociodemographic variables, OC symptoms, comorbid DSM-IV mental disorders and chronic physical conditions. Standard errors (SE) were estimated using the Taylor series linearisation method. Multivariate significance tests were evaluated using χ^2 tests based on design-corrected coefficient variance-covariance matrices. Statistical significance level was evaluated at the *P* value <0.05 using 2-sided tests.

Results

The weighted prevalence of lifetime and 12-month hoarding behaviour was 2% and 0.8%, respectively. The weighted prevalence of lifetime and 12-month hoarding among those with OCD was 22.6% and 17.1% respectively. The lifetime prevalence of OCD without hoarding, hoarding behaviour but no OCD and OCD with hoarding was 2.3% (n = 175), 1.4% (n = 122) and 0.7% (n = 55) respectively. The 12-month prevalence of OCD without hoarding, and OCD with hoarding was 0.9% (n = 68), and 0.2% (n = 14) respectively. We were unable to establish the 12-month prevalence of hoarding without OCD as the questions in CIDI do not address hoarding alone in the past 12 months. Table 1 shows the demographic characteristics of the study sample among the 3 groups based on lifetime prevalence. There were significantly higher odds of being 'unemployed' in those diagnosed with lifetime OCD with hoarding than those with lifetime hoarding behaviour alone.

Table 2 shows the prevalence and odds ratio of DSM-IV OC symptoms between 3 groups based on lifetime prevalence. After adjusting for age, gender and ethnicity in multiple logistic regressions, those who meet criteria for hoarding behaviour alone were associated with lower odds of having obsessions of contamination, harming, ordering as well as compulsions of ordering and other compulsions than those who met criteria for both OCD and hoarding. In addition, those diagnosed with OCD without hoarding were also associated with lower odds of obsessions of ordering and compulsions of washing/cleaning, ordering and other compulsions than those who met both criteria.

Table 3 shows the prevalence and odds ratio of lifetime DSM-IV mental disorders in the 3 groups. As compared to those who met both, OCD and hoarding criteria, those with hoarding behaviour alone were associated with lower odds of having MDD, bipolar disorder and any psychiatric comorbidity.

Table 4 shows the prevalence and odds ratio of lifetime chronic physical conditions among the 3 groups. As compared to those who had OCD with hoarding, we found the odds of having chronic pain and peptic ulcer were lower in those diagnosed with OCD without hoarding and those with hoarding behaviour without OCD diagnosis, respectively.

There were no significant differences in the age of onset, age at interview, Y-BOCS score, work days lost, and days out of role between the 3 groups. The mean EQ-5D index was significantly higher in those diagnosed with lifetime OCD without hoarding (0.911 vs 0.831, $P = 0.003$) and in those with hoarding behaviour without OCD diagnosis (0.907 vs 0.831, $P = 0.0009$) versus those with both OCD and hoarding. Those diagnosed with both OCD and hoarding were significantly more likely to report any problems in the EQ-5D domains of mobility and pain compared to the other 2 groups.

Table 5 shows the role impairment by SDS among those with OCD with and without hoarding by 12-month prevalence. The rate of any impairment in the home management and social life domains were significantly higher in those who met criteria for OCD with hoarding than the other group.

Discussion

The lifetime prevalence of hoarding behaviour of 2% is slightly lower than that reported in other non-clinical samples of about 4%.[4,5] These differences could be due to differences in the methodology, differences in the population or they could reflect true differences between the different populations. Unlike other studies,[27-29] we did not find an association between age and hoarding. We also found no difference in the age of onset of symptoms/disorder between the 3 groups. Some previous research studies[10,19] similarly found no difference in the age of onset of illness between hoarders and non-hoarders. However, Fontenelle et al[30] reported that hoarders in their clinical sample had an earlier age of onset. The 3 groups did not differ significantly in any other sociodemographic features, with the exception of those with OCD and hoarding, among whom the odds of unemployment were higher. Tolin et al[16]

Table 1. Demographic Characteristics of Sample in the 3 Groups (n = 352)

		Univariate Analysis*					Multivariate Analysis†				
		LT OCD – Hoarding‡ (n = 175)	LT Hoarding§ (n = 122)	LT OCD + Hoarding‖ (n = 55)			LT OCD – Hoarding vs LT OCD + Hoarding			LT Hoarding vs LT OCD + Hoarding	
		%	%	%	*P* Value	OR	95% CI	*P* Value	OR	95% CI	*P* Value
Age (years)	18 – 34	40.49	37.88	46.70		ref			ref		
	35 – 49	40.30	21.37	38.75		0.89	(0.22, 3.53)	0.86	0.44	(0.09, 2.05)	0.29
	50 – 64	18.73	18.46	14.54		2.2	(0.36, 13.47)	0.39	3.54	(0.56, 22.45)	0.18
	≥65	0.48	22.29	.							
Ethnicity	Chinese	71.68	61.93	68.95	0.45	ref			ref		
	Malay	13.06	19.57	17.33		0.7	(0.25, 1.97)	0.49	1.4	(0.43, 4.54)	0.58
	Indian	10.43	13.90	10.37		1.45	(0.47, 4.43)	0.52	2.68	(0.77, 9.4)	0.12
	Others	4.83	4.60	3.35		2.13	(0.19, 24.18)	0.54	2.81	(0.21, 38.2)	0.44
Gender	Male	45.82	48.05	46.56	0.97	ref			ref		
	Female	54.18	51.95	53.44		1.55	(0.53, 4.55)	0.42	1.75	(0.54, 5.61)	0.35
Marital status	Single	36.24	27.38	45.01		ref			ref		
	Married	50.80	54.88	42.96		0.89	(0.23, 3.51)	0.87	1.42	(0.34, 5.96)	0.63
	Divorced/ separated	12.82	4.04	12.03		1.2	(0.12, 11.81)	0.88	1.69	(0.15, 19.47)	0.67
	Widowed	0.14	13.70	.							
Education	Primary and below	8.32	15.37	13.27	0.65	ref			ref		
	Secondary	33.12	34.98	25.10		0.98	(0.15, 6.52)	0.98	1.36	(0.16, 11.82)	0.78
	Post secondary	58.57	49.65	61.63		1.26	(0.4, 3.97)	0.69	0.96	(0.28, 3.27)	0.94
Employment status	Employed	79.55	68.37	59.23	0.06	ref			ref		
	Economically inactive	15.52	29.78	28.80		0.82	(0.18, 3.83)	0.80	1.29	(0.28, 6.09)	0.74
	Unemployed	4.93	1.85	11.97		0.28	(0.04, 1.88)	0.19	0.11	(0.02, 0.78)	0.03
Income	Low	44.40	61.76	57.89	0.45	0.62	(0.11, 3.55)	0.59	0.77	(0.1, 5.81)	0.80
	Middle	37.30	24.23	26.87		1.05	(0.24, 4.61)	0.95	0.83	(0.13, 5.49)	0.85
	High	18.30	14.01	15.24		ref			ref		

*chi-square test.
†Multinomial regression analysis.
‡Those diagnosed with lifetime OCD without hoarding.
§Those with lifetime hoarding behaviour but no OCD.
‖Those diagnosed with lifetime OCD with hoarding.
LT: Lifetime; OCD: Obsessive-compulsive disorder; OR: Odds ratio

Table 2. Prevalence and Odds Ratio of Obsessive and Compulsive Symptoms in the 3 Groups

Variable		LT OCD without Hoarding (n = 175)			LT Hoarding Behaviour without OCD (n = 122)			LT OCD with Hoarding (n = 55)	
Obsession				***P* Value**			***P* Value**		
Contamination	% (SE)	26.29	(3.33)		15.57	3.29		32.73	6.34
	OR (95% CI)	0.76	(0.38, 1.49)	0.42	0.39	(0.18, 0.85)	<0.05	1.00	(reference)
Harming	% (SE)	24.57	(3.26)		18.85	3.55		36.36	6.5
	OR (95% CI)	0.55	(0.28, 1.07)	0.08	0.43	(0.21, 0.92)	<0.05	1.00	(reference)
Ordering	% (SE)	29.71	(3.46)		24.59	3.9		49.09	6.75
	OR (95% CI)	0.42	(0.22, 0.81)	<0.01	0.35	(0.17, 0.7)	0.01	1.00	(reference)
Other obsessions	% (SE)	36.57	(3.65)		14.75	3.22		25.45	5.88
	OR (95% CI)	1.64	(0.81, 3.34)	0.17	0.51	(0.22, 1.17)	0.11	1.00	(reference)
Compulsion				***P* Value**			***P* Value**		
Washing/cleaning	% (SE)	12	(2.46)		17.21	3.42		25.45	5.88
	OR (95% CI)	0.41	(0.19, 0.9)	<0.05	0.6	(0.27, 1.32)	0.20	1.00	(reference)
Checking	% (SE)	27.43	(3.38)		34.43	4.31		32.73	6.34
	OR (95% CI)	0.77	(0.4, 1.49)	0.43	1.05	(0.52, 2.1)	0.90	1.00	(reference)
Ordering	% (SE)	20	(3.03)		18.03	3.49		43.64	6.7
	OR (95% CI)	0.31	(0.16, 0.63)	<0.01	0.27	(0.13, 0.57)	<0.01	1.00	(reference)
Other compulsions	% (SE)	20	(3.03)		19.67	3.6		34.55	6.42
	OR (95% CI)	0.48	(0.24, 0.96)	<0.05	0.43	(0.2, 0.9)	<0.05	1.00	(reference)

Odds ratio (OR) was based on multiple logistic regression analysis adjusted for age, gender and ethnicity.
LT: Lifetime; OCD: Obsessive-compulsive disorder

Table 3. Prevalence and Odds Ratio of Lifetime DSM-IV Mental Disorders in the 3 Groups

Variable		LT OCD without Hoarding (n = 175)			LT Hoarding Behaviour without OCD (n = 122)			LT OCD with Hoarding (n = 55)	
				***P* Value**			***P* Value**		
MDD	% (SE)	18.73	4.26		7.92	3.05		25.18	8.67
	OR (95% CI)	0.72	(0.35, 1.51)	0.39	0.37	(0.16, 0.87)	<0.05	1.00	(reference)
Dysthymia	% (SE)	1.85	1.47		0.33	0.33		1.10	0.80
	OR (95% CI)	0.44	(0.05, 3.68)	0.45	0.24	(0.02, 3.04)	0.27	1.00	(reference)
Bipolar disorder	% (SE)	7.72	2.94		1.14	0.66		19.84	8.48
	OR (95% CI)	0.54	(0.18, 1.66)	0.28	0.2	(0.05, 0.86)	<0.05	1.00	(reference)

Odds ratio (OR) was based on multiple logistic regression analysis adjusted for age, gender and ethnicity.
LT: Lifetime; MDD: Major depressive disorder; OCD: Obsessive-compulsive disorder

Table 3. Prevalence and Odds Ratio of Lifetime DSM-IV Mental Disorders in the 3 Groups (Con't)

Variable		LT OCD without Hoarding (n = 175)			LT Hoarding Behaviour without OCD (n = 122)			LT OCD with Hoarding (n = 55)	
				P Value			*P* Value		
GAD	% (SE)	6.39	2.66		1.28	0.66		13.30	7.33
	OR (95% CI)	0.64	(0.2, 2.04)	0.45	0.34	(0.09, 1.32)	0.12	1.00	(reference)
Alcohol abuse	% (SE)	5.00	1.91		3.34	2.50		0.76	0.77
	OR (95% CI)	4.41	(0.53, 36.6)	0.17	1.89	(0.2, 18.18)	0.58	1.00	(reference)
Alcohol dependence	% (SE)	2.34	1.55		2.98	1.35		1.42	1.03
	OR (95% CI)	0.56	(0.1, 3.33)	0.52	1.26	(0.23, 6.88)	0.79	1.00	(reference)
Any comorbidity	% (SE)	36.7	5.3		5.36	1.65		52.83	9.47
	OR (95% CI)	0.72	(0.38, 1.35)	0.30	0.14	(0.06, 0.31)	<0.01	1.00	(reference)

Odds ratio (OR) was based on multiple logistic regression analysis adjusted for age, gender and ethnicity.
GAD: Generalised anxiety disorder; LT: Lifetime; MDD: Major depressive disorder; OCD: Obsessive-compulsive disorder

Table 4. Prevalence and Odds Ratio of Lifetime Chronic Physical Conditions in the 3 Groups

Variable		LT OCD without Hoarding (n = 175)			LT Hoarding Behaviour without OCD (n = 122)			LT OCD with Hoarding (n = 55)	
				P Value			*P* Value		
Respiratory conditions	% (SE)	20.08	4.14		17.87	6.19		8.36	5.06
	OR (95% CI)	3.48	(0.84, 14.51)	0.09	3.30	(0.7, 15.72)	0.13	1.00	(reference)
Diabetes	% (SE)	3.35	1.67		19.76	6.82		6.44	4.94
	OR (95% CI)	0.38	(0.04, 3.79)	0.40	2.03	(0.22, 18.55)	0.53	1.00	(reference)
Hypertension	% (SE)	9.97	3.22		24.64	6.06		13.82	7.16
	OR (95% CI)	0.59	(0.12, 2.76)	0.50	1.30	(0.29, 5.87)	0.73	1.00	(reference)
Chronic pain	% (SE)	17.21	3.87		27.34	6.47		37.67	9.78
	OR (95% CI)	0.28	(0.1, 0.79)	<0.05	0.46	(0.16, 1.35)	0.16	1.00	(reference)
Cancer	% (SE)	0.19	0.01		.	.		.	.
	OR (95% CI)	.	.	.	.	.	.	.	(reference)
Neurological conditions	% (SE)	7.77	3.08		7.27	3.81		.	.
	OR (95% CI)	1.14	(0.2, 6.35)	0.88	1.00	(reference)			
Cardiovascular disease	% (SE)	1.63	1.46		6.59	5.01		.	.
	OR (95% CI)	0.35	(0.04, 2.81)	0.32	1.00	(reference)			
Ulcer	% (SE)	4.30	2.24		1.01	0.59		6.40	5.50
	OR (95% CI)	0.57	(0.07, 4.73)	0.60	0.09	(0.01, 0.77)	<0.05	1.00	(reference)
Any chronic physical condition	% (SE)	47.73	5.50		56.13	5.85		64.66	9.17
	OR (95% CI)	0.46	(0.18, 1.13)	0.09	0.50	(0.19, 1.29)	0.15	1.00	(reference)

Odds ratio (OR) was based on multiple logistic regression analysis adjusted for age, gender and ethnicity.
LT: Lifetime; OCD: Obsessive-compulsive disorder

Table 5. Role Impairment by Severity of Disability Assessed by Sheehan Disability Scale

	12-month OCD without Hoarding (n = 68)			12-month OCD with Hoarding (n = 14)			
	n	%	SE	n	%	SE	*P* Value
Home management							
No impairment	27	42.64	8.26	2	4.91	3.78	
Any impairment	41	57.36	8.34	12	95.09	3.78	<0.05
Work							
No impairment	31	44.80	8.84	6	33.14	17.08	
Any impairment*	37	55.20	8.74	8	66.86	16.94	0.41
Relationship							
No impairment	30	34.15	7.72	3	22.10	15.93	
Any impairment*	38	65.85	7.81	11	77.90	15.81	0.12
Social life							
No impairment	32	35.47	7.72	3	22.10	15.93	
Any impairment*	36	64.53	7.83	11	77.90	15.81	<0.05
Any domain							
No impairment	18	28.54	7.69	2	4.91	3.78	
Any impairment*	50	71.46	7.76	12	95.09	3.78	0.10

*Includes those with 'mild', 'moderate', 'severe' and 'very severe' impairment.
OCD: Obsessive-compulsive disorder; SE: Standard error

similarly found that hoarding was associated with marked occupational impairment; among people who meet relatively strict diagnostic criteria for hoarding, 7% of them were on disability and 6% reported having been fired from jobs due to hoarding.

Those who meet the criteria for hoarding behaviour alone were associated with lower odds of having obsessions of contamination, harming, ordering as well as compulsions of ordering and other compulsions than those who met criteria for both OCD and hoarding. Those diagnosed with OCD with hoarding were associated with higher odds of obsessions of ordering and compulsions of washing/cleaning, ordering and other compulsions compared to those with OCD without hoarding. Our findings are similar to those reported by others who found that obsessions of symmetry and ordering compulsions were higher among those with OCD and hoarding.[19,30] These findings have led to suggestions that hoarding may belong to a separate dimension of OC symptoms.[31] It is possible that these findings reflect the existence of a common neuro-anatomical basis of these symptoms, while it has also been suggested that these symptoms could be secondary behavioural manifestations of hoarding.[30]

There were no significant differences in terms of prevalence and risk of association with other comorbid psychiatric illnesses among those with OCD with or without hoarding. Our findings are different from those observed by Lochner et al[10] who found in their clinical sample a higher rate of lifetime MDD, dysthymia and GAD among those with OCD and hoarding. Other studies similarly have suggested that patients with OCD and hoarding are more likely to be associated with disorders characterised by mood swings, anxiety and impulsive behaviours.[19,30] However, all these studies were conducted among treatment-seeking populations i.e. patients with OCD and thus there would be significant differences from the respondents in this population-based study as patient samples are more likely to have other psychopathologies and behavioural disturbances. However, it is also possible that this is indeed a true difference i.e. risk of depression among those with OCD and hoarding is not higher in our population. As suggested by Li et al[32] being thrifty and saving are thought to be virtues in Chinese traditional culture and therefore a person with such characteristics may not be thought of as having a disorder and the individual may not be significantly distressed by the same. Thus, certain Asian societies may have a different view of hoarding and it may not be associated with depression. This would have implications for public health as individuals and even their families may be less likely to perceive this as abnormal and they may delay or resist help-seeking. As compared to those with OCD with and without hoarding, those with hoarding behaviour but no OCD were associated with lower odds of having MDD, bipolar disorder and any comorbidity. Grisham et al[29] similarly reported that those with hoarding alone in terms of psychopathology reported less worry, anxiety, stress and depression compared to those with OCD and hoarding.

Similar to other studies, we found that the rate of any impairment in the home management and social life domains were significantly higher in those who met criteria for OCD with hoarding than those with OCD without hoarding. Saxena et al[15,17] found significantly lower functioning in OCD patients with hoarding as compared to OCD patients without hoarding. However, OCD symptoms were not more severe in hoarders than non-hoarding OCD patients. OCD patients with hoarding symptoms also showed significantly greater levels of disability in multiple domains of functioning, including work, family, romantic relationships, friendships and activities of daily life as compared to non-hoarding OCD patients in a study by Lochner et al.[10] However in their study, hoarding patients had significantly more severe overall OCD symptoms and greater comorbidity with depressive and anxiety disorders than non-hoarding OCD patients. Frost et al[11] similarly found that, OCD patients with hoarding scored higher on anxiety, depression, family and social disability compared to non-hoarding OCD patients. In contrast, 2 studies[29,30] found no difference in functioning scores between hoarding and non-hoarding OCD patients. While the disability and impairment in functioning seen in those with OCD and hoarding may be partly explained by comorbid anxiety and depressive symptoms in these studies, we are unable to establish this in our study as the likelihood of comorbid MDD and GAD were similar in both the groups. The domains that were most significantly affected were those of home management and social life. A possible explanation might be that the marked clutter in a hoarder's home may affect the livability and ability to use the living space, thus interfering with home management. Hoarding may also affect relationships with family members and neighbours and restrict visits from friends and relatives which affect the social life of a hoarder, leading to isolation. This is supported by a study which found that family members who cohabit with hoarders feel embarrassed about the condition of their home, and may harbour feelings of rejection and hostility toward the hoarder.[16]

The mean EQ-5D score in the overall Singapore population was 0.951,[33] while that of 'healthy controls' (i.e. those without a diagnosis of the mental and physical illnesses included in the SMHS) was 0.98.[34] It is interesting to note that in the present study all 3 groups had lower EQ-5D indices than the population as well as that of 'healthy controls'. However, those with OCD and hoarding reported lower subjective quality of life as compared to those with OCD without hoarding as well as those with hoarding behaviour without OCD diagnosis.

The main limitation of our study was that it did not include any specific rating scale for hoarding. The modified Y-BOCS checklist adapted in CIDI was the only instrument used to establish hoarding and its severity. Another potential limitation of the present study is the exclusive reliance on self-report for the hoarding symptoms. A clinical interview as well as some corroboration with interviewer observations might be more reliable and valid than self-report measures of hoarding, particularly given the poor insight among those with hoarding.[35] We did not examine the phenomenology of hoarding such as the items hoarded and the reasons for hoarding. Lastly, we did not conduct a clinical validation in the sample population.

These limitations notwithstanding, the strengths of our study are that it is a nationwide survey of a representative multiethnic population that examined psychiatric morbidity using a structured diagnostic instrument with face-to-face interviews, and psychiatric diagnoses were made according to DSM-IV criteria. Our population-based study on those with hoarding without OCD, OCD with hoarding and OCD without hoarding has some rather unique findings. Our study shows that hoarders without OCD are a somewhat distinct group. They are less impaired than those with OCD with and without hoarding, in terms of comorbid psychopathology, and have a higher quality of life than those with OCD and hoarding, though still lower than that of the general population. Grisham et al[29] have suggested that the ego-syntonic nature of compulsive hoarding may explain the lack of distress in this unique group. They also suggested that pure hoarding may be better conceptualised as an impulse control disorder given that individuals derive pleasure from it. On the other hand, the 2 groups with OCD with and without hoarding differ from each other mainly in terms of the association with other OC symptoms with those with hoarding behaviour more likely to be associated with symptoms of symmetry obsessions and ordering compulsions. Hoarders with OCD also reported a lower quality of life as compared to those with OCD without hoarding. However, the 2 groups did not differ on the level of comorbid psychiatric disorders or severity of symptoms.

Conclusion

Our study is one of the few (and the first Asian) population-based studies that has examined hoarding behaviour. This is in contrast to majority of studies in the extant literature that have been conducted in the clinical population to examine hoarding. Given the large treatment gap reported in studies, clinical studies may represent a population of those with severe symptoms or comorbidities that may not be representative of the community sample of people with OCD and/or hoarding. Future studies using specific scales such as the University of California Los Angeles (UCLA) Hoarding Severity Scale[36] or Savings Inventory Revised[37] should be conducted on community samples to understand the phenomenology and true impact of hoarding in the population.

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